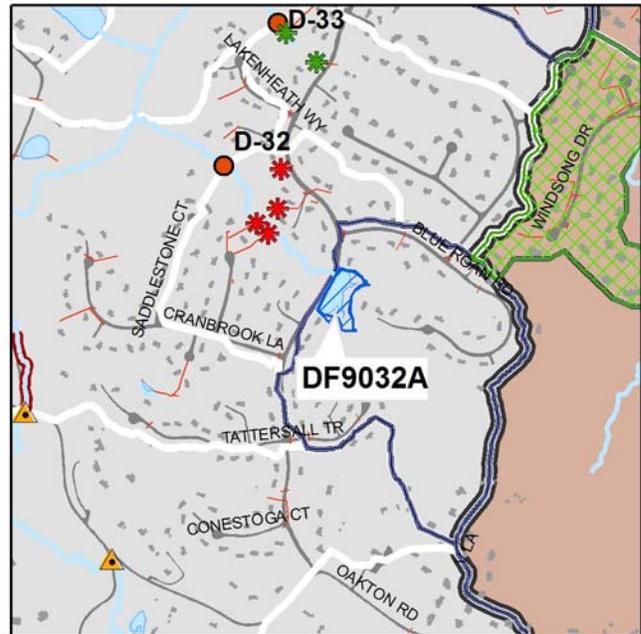


Project Number: DF9032A
Catchment Code: DFDF9101
Candidate Site: D-32

Project Type: Culvert Retrofit
Project Size: 2.3 acres
Treated Area: 66.4 acres

Project Location: This project is at the Miller Heights Road stream crossing.

Project Description: This project consists of a retrofit to the culvert at Miller Heights Road to provide detention. The roadway at this location allows for a maximum depth of storage of five feet. The primary goal for this facility is channel protection, with a secondary goal of improving runoff quality.



Potential Project Benefits:

Streamflow	The project will provide 100% of the channel protection volume.
Water Quality	100% of the water quality volume can be provided as extended detention. Use of wetland vegetation and a micro-pool will improve treatment effectiveness.

Potential Project Constraints:

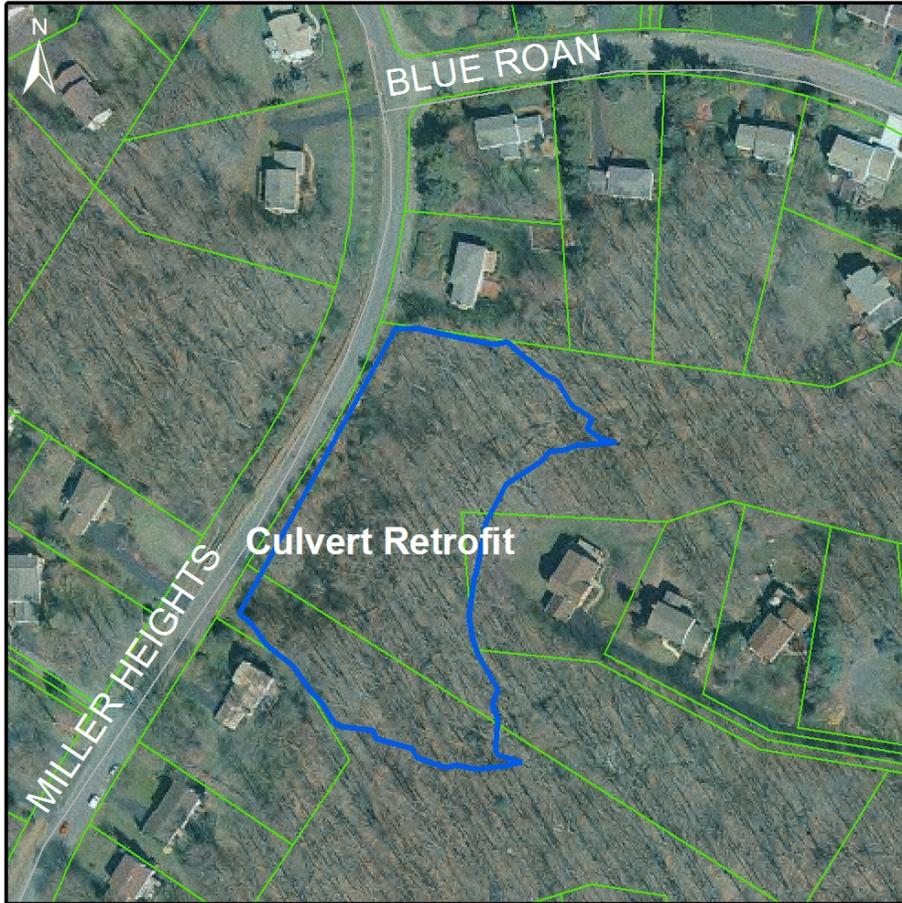
Environmental	Environmental permitting issues would be anticipated for any activity in and around a stream corridor. Forest and wetland impacts are anticipated during construction. Projects in RPAs may require exceptions or waivers.
Facility Access	Access is very good from the roadway
Design / Construction	No significant design or construction issues were noted.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.4	AC	\$5,000.00	\$2,000
Excavation	1,680	CY	\$35.00	\$58,800
Impoundment Structure	1	LS	\$5,000.00	\$5,000
Landscaping	1,820	SY	\$2.50	\$4,550
Wetland Planting	610	SY	\$2.00	\$1,220
Base Construction Cost				\$71,570
Mobilization (5%)				\$3,579
Subtotal 1				\$75,149
Contingency (25%)				\$18,787
Subtotal 2				\$93,936
Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)				\$42,271
Estimated Project Cost				\$136,000

*This project is part of the alternative project group for Regional Pond D-32.
 See Table 5-2 for the recommended disposition.*

Concept Sketch

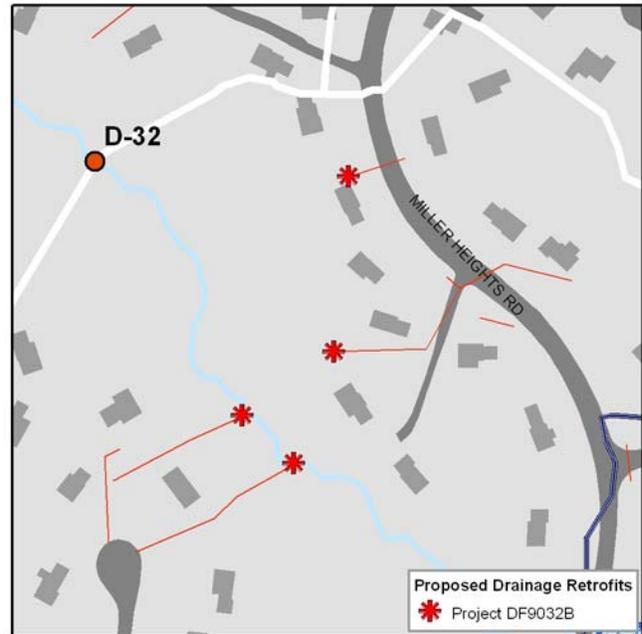


Project Number: DF9032B
Catchment Code: DFDF9101
Candidate Site: D-32

Project Type: Drainage Retrofit
Project Size: 7 Outfalls

Project Location:
 At various locations distributed throughout the catchment.

Project Description:
 This project consists of reconfiguring outfalls or retrofitting energy dissipation structures to reduce scour and erosion where flows from the storm drainage system enter the stream. Reduction of erosive velocities will reduce the amount of sediment transported downstream.



Potential Project Benefits:

Streamflow	The project will reduce velocity from the outfalls 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. Habitat would be improved by reducing sediment loads from erosion.

Potential Project Constraints:

Environmental	Environmental impacts and permit requirements are not anticipated for this project; however, projects in RPAs may require exceptions or waivers
Facility Access	Access to these sites can usually be obtained from the roadway and driveways.
Design / Construction	No unusual design or construction issues were identified.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Outfall Protection	7	EA	\$8,000.00	\$56,000
Base Construction Cost				\$56,000
Mobilization (5%)				\$2,800
Subtotal 1				\$58,800
Contingency (25%)				\$14,700
Subtotal 2				\$73,500
Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)				\$33,075
Estimated Project Cost				\$107,000

This project is part of the alternative project group for Regional Pond D-32. See Table 5-2 for the recommended disposition.

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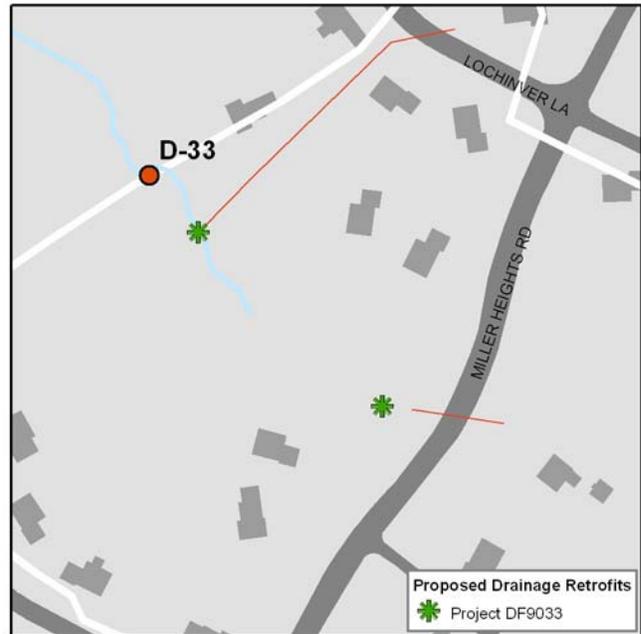
Project Number: DF9033
Catchment Code: DFDF8701
Candidate Site: D-33

Project Type: Drainage Retrofit
Project Size: 2 Outfalls

Project Location:

This project will be distributed throughout the catchment. Particular attention should be paid to the downstream outlet of the culvert under Miller Heights Road.

Project Description: This project consists of reconfiguring outfalls or retrofitting energy dissipation structures to reduce scour and erosion where flows from the storm drainage system enter the stream. Reduction of erosive velocities will reduce the amount of sediment transported downstream.



Potential Project Benefits:

Streamflow	The project will reduce velocity from the outfalls 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. Habitat would be improved by reducing sediment loads from erosion.

Potential Project Constraints:

Environmental	Environmental impacts and permit requirements are not anticipated for this project; however, projects in RPAs may require exceptions or waivers
Facility Access	Access to these sites can usually be obtained from the roadway and driveways.
Design / Construction	No unusual design or construction issues were identified.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Outfall Protection	2	EA	\$8,000.00	\$16,000
Base Construction Cost				\$16,000
			Mobilization (5%)	\$800
Subtotal 1				\$16,800
			Contingency (25%)	\$4,200
Subtotal 2				\$21,000
			Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)	\$9,450
Estimated Project Cost				\$30,000

*This project is part of the alternative project group for Regional Pond D-33.
 See Table 5-2 for the recommended disposition.*

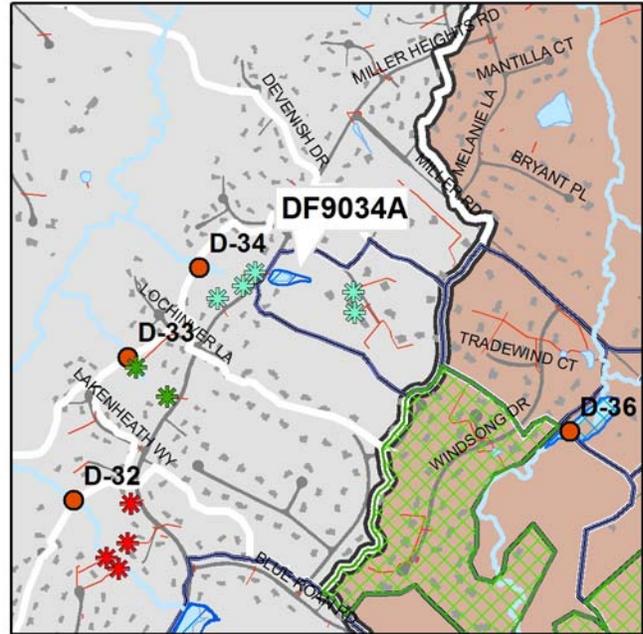
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Project Number: DF9034A
Catchment Code: DFDF8501
Candidate Site: D-34

Project Type: Culvert Retrofit
Project Size: 0.5 acres
Treated Area: 24.4 acres

Project Location: Upstream of the culvert under Miller Heights Road.

Project Description: This project would consist of replacing regional pond D-34 with a culvert retrofit upstream of Miller Heights Road. A redundant embankment would be created for detention storage, with the primary goal of reducing erosive streamflows



Potential Project Benefits:

Streamflow	This retrofit would provide 100% of the channel storage volume and help to reduce erosive flows downstream.
Water Quality	There is sufficient storage to detain 80% of the water quality volume. Improvements to the water quality would be obtained through the reduction in scour forming discharges downstream, and sedimentation and vegetative uptake at the site.

Potential Project Constraints:

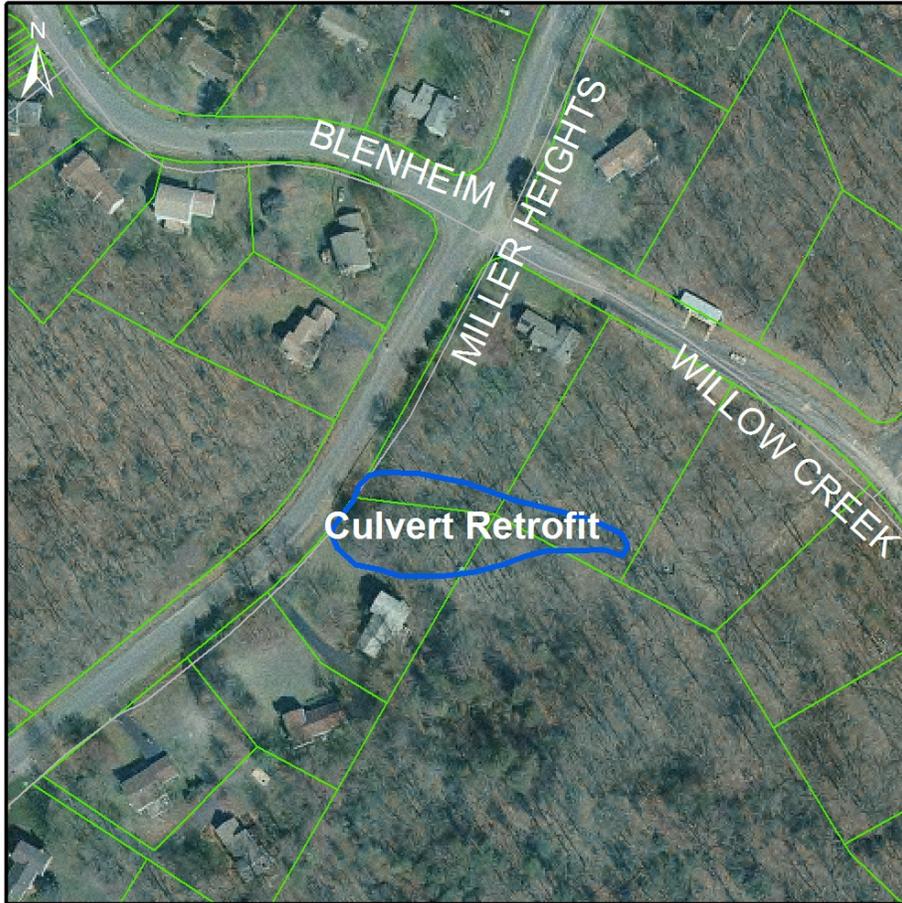
Environmental	There may be some permitting issues associated with the temporary impoundment of runoff in the floodplain above this culvert. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this project is excellent from the roadway.
Design / Construction	No unusual design or construction issues were noted.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.2	AC	\$5,000.00	\$1,000
Excavation	380	CY	\$35.00	\$13,300
Impoundment Structure	1	LS	\$5,000.00	\$5,000
Landscaping	490	SY	\$2.50	\$1,225
Wetland Planting	170	SY	\$2.00	\$340
Base Construction Cost				\$20,865
Mobilization (5%)				\$1,043
Subtotal 1				\$21,908
Contingency (25%)				\$5,477
Subtotal 2				\$27,385
Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)				\$12,323
Estimated Project Cost				\$40,000

This project is part of the alternative project group for Regional Pond D-34. See Table 5-2 for the recommended disposition.

Concept Sketch:

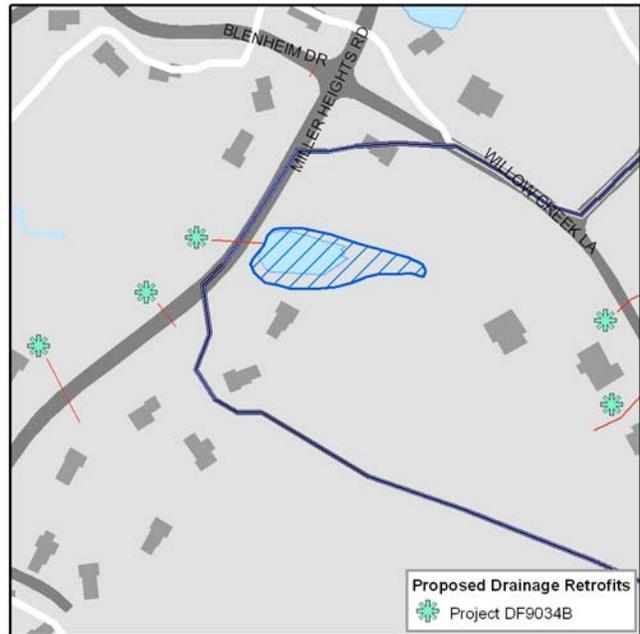


Project Number: DF9034B
Catchment Code: DFDF8501
Candidate Site: D-34

Project Type: Drainage Retrofit
Project Size: 5 Outfalls

Project Location:
 This project will be distributed throughout the catchment.

Project Description:
 This project consists of reconfiguring outfalls or retrofitting energy dissipation structures to reduce scour and erosion where flows from the storm drainage system enter the stream. Reduction of erosive velocities will reduce the amount of sediment transported downstream.



Potential Project Benefits:

Streamflow	The project will reduce velocity from the outfalls 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. Habitat would be improved by reducing sediment loads from erosion.

Potential Project Constraints:

Environmental	Environmental impacts and permit requirements are not anticipated for this project; however, projects in RPAs may require exceptions or waivers
Facility Access	Access to these sites can usually be obtained from the roadway and driveways.
Design / Construction	No unusual design or construction issues were identified.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Outfall Protection	5	EA	\$8,000.00	\$40,000
Base Construction Cost				\$40,000
Mobilization (5%)				\$2,000
Subtotal 1				\$42,000
Contingency (25%)				\$10,500
Subtotal 2				\$52,500
Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)				\$23,625
Estimated Project Cost				\$76,000

*This project is part of the alternative project group for Regional Pond D-34.
 See Table 5-2 for the recommended disposition.*

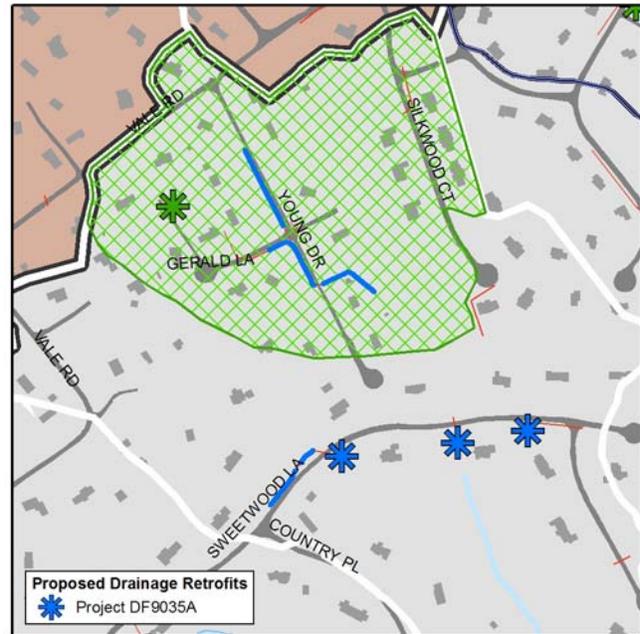
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Project Number: DF9035A
Catchment Code: DFDF8101
Candidate Site: D-35

Project Type: Drainage Retrofit
Project Size: 4 Outfalls and 1101 feet of ditch removal

Project Location: This project is distributed throughout the catchment where piped drainage systems or concrete ditches discharge into natural channels.

Project Description: This project will consist of two major phases of drainage retrofit. The first phase will be the elimination of paved roadside ditches with dry swale systems with an underdrain, which will increase filtration and infiltration. The second phase of this project will be the improvement of outlet protection at outfalls throughout the catchment.



Potential Project Benefits:

Streamflow	The project will reduce velocity from the outfalls and erosive potential immediately downstream. Swales will reduce both volume and velocity.
Water Quality	Replacing ditches with swales will provide treatment before stormwater reaches the stream system. Water quality will also benefit from the reduction of sediment loads associated from scour at the outfall locations.

Potential Project Constraints:

Environmental	Environmental impacts and permit requirements are not anticipated for this project; however, projects in RPAs may require exceptions or waivers
Facility Access	Access to these sites can usually be obtained.
Design / Construction	Design of swales should incorporate check dams or other features to ensure flow velocity is not erosive.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Paved Ditch Demolition (Haul Away)	1101	LF	\$18.00	\$19,818
Dry Swale w/ Underdrain	1101	LF	\$50.00	\$55,050
Outfall Protection	4	EA	\$8,000.00	\$32,000
Base Construction Cost				\$106,868
Mobilization (5%)				\$5,343
Subtotal 1				\$112,211
Contingency (25%)				\$28,052
Subtotal 2				\$140,264
Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)				\$63,119
Estimated Project Cost				\$203,000

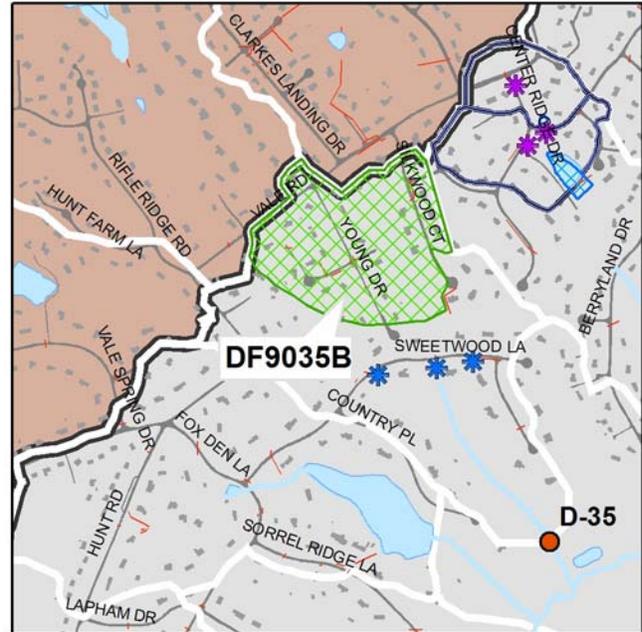
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Project Number: DF9035B
Catchment Code: DFDF8101
Candidate Site: D-35

Project Type: LID Retrofit
Project Size: 0.1 acres
Treated Area: 35 acres

Project Location:
 This project is located behind private residences on east side of Young Drive.

Project Description:
 This project consist of: a) replacing a paved drainage swale from Young Drive to the rear of the properties with a Bioswale; b) partially daylighting an existing piped system conveying runoff from Silkwood Court; and c) creating a bioretention facility or conventional detention facility at the intersection of three properties where an existing drainage easement crosses another property. The drainage to these areas currently creates a muddy bog in the rear yard of a private property before continuing downstream. This project could reduce the flow significantly, returning a portion of the private property that is unusable back to the property owner.



Potential Project Benefits:

Streamflow	This project could result in a reduction to the volume and peak rate of runoff through replacing piped drainage with swales.
Water Quality	This project has been designed to treat 100% of the water quality volume for the site.

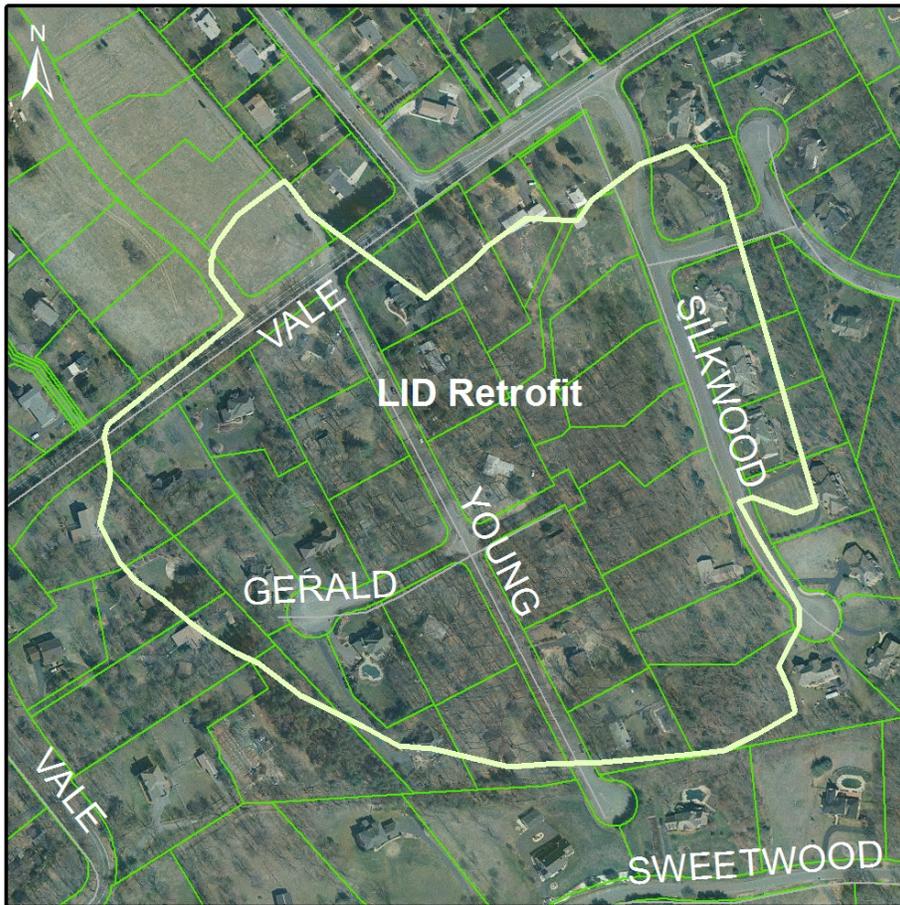
Potential Project Constraints:

Environmental	No significant environmental issues have been identified.
Facility Access	Access to this project is limited and a temporary construction easement would need to be provided.
Design / Construction	Education and community support will be a significant factor in the success of this project.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
LID Structural Control	437.0	SY	\$120.00	\$52,440
Base Construction Cost				\$52,440
Mobilization (5%)				\$2,622
Subtotal 1				\$55,062
Contingency (25%)				\$13,766
Subtotal 2				\$68,828
Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)				\$30,972
Estimated Project Cost				\$100,000

Concept Sketch:

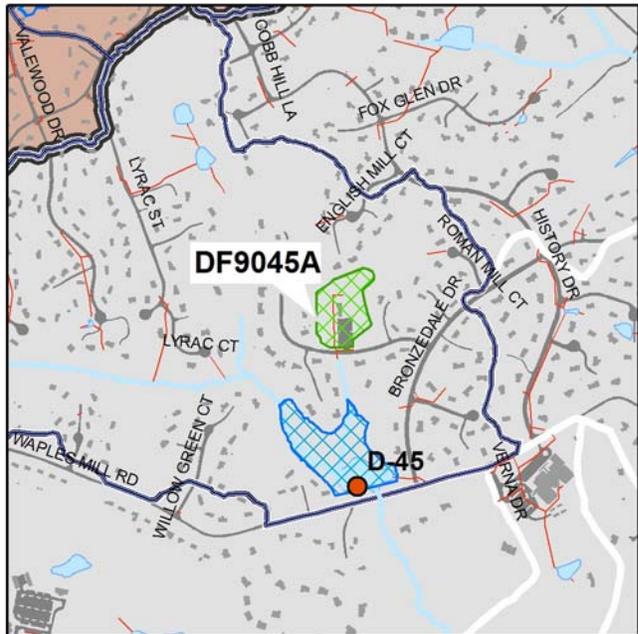


Project Number: DF9045A
Catchment Code: DFDF9203
Candidate Site: D-45

Project Type: LID Retrofit
Project Size: 0.04 acres
Treated Area: 4.6 acres

Project Location:
 This project will be located next to the drive at the Oakton Swim and Racquet Club.

Project Description:
 This project will serve as an educational demonstration site for LID facilities. The topography of this area is ideally suited for a bioretention system or rain garden. The public access at this area makes it an excellent alternative to provide an educational and outreach opportunity for the community.



Potential Project Benefits:

Streamflow	While designed primarily for water quality, this project would reduce the amount of runoff through reduction of impervious area, infiltration and evapotranspiration.
Water Quality	This project has been designed to treat 100% of the water quality volume for the site.

Potential Project Constraints:

Environmental	No environmental constraints are anticipated for this project.
Facility Access	Facility access is excellent.
Design / Construction	The property for this project is privately owned. Coordination and support will have to be a part of this project's success.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
LID Structural Control	194.0	SY	\$120.00	\$23,280
Interpretive Signs	1	LS	\$1000.00	\$1000
Base Construction Cost				\$24,280
Mobilization (5%)				\$1,214
Subtotal 1				\$25,494
Contingency (25%)				\$6,374
Subtotal 2				\$31,868
Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)				\$4,340
Estimated Project Cost				\$46,000

*This project is part of the alternative project group for Regional Pond D-45.
 See Table 5-2 for the recommended disposition.*

Concept Sketch

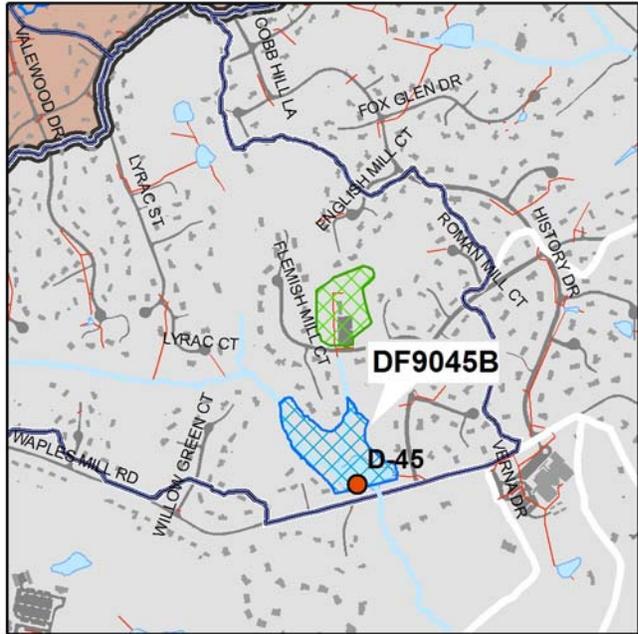


Project Number: DF9045B
Catchment Code: DFDF9203
Candidate Site: D-45

Project Type: Pond Retrofit
Project Size: 7.7 acres
Treated Area: 252.4 acres

Project Location: This project will be located next to Waples Mill Road and Bronzedale Drive.

Project Description: There is enough available volume within the facility to achieve the necessary channel protection volume without excavation. This volume will be created by constructing a weir with an orifice sized for channel protection and to allow uninterrupted passage of baseflow in front of the existing culvert. Since this pond is located in-stream in a well-forested area, it is not recommended to clear established vegetation to the sole purpose of creating water quality volume. Small pockets of marsh areas currently function as water quality components that provide a degree of settling of sediment and removal of nutrients. Finally, erosion was observed on the spillway as well as on the backside of the embankment. Maintenance and stabilization of these areas is recommended.



Potential Project Benefits:

Streamflow	Installing a multi-stage control structure will provide detention of 100% of the channel protection volume.
Water Quality	The pond will remain a dry facility and water quality improvements will be relatively minor; however, improvements to water quality would be obtained through the reduction in scour forming discharges downstream. .

Potential Project Constraints:

Environmental	Since there is an existing impoundment in the stream, environmental permitting would be minimal. Projects in RPAs may require exceptions or waivers.
Facility Access	This facility has an access road to the embankment.
Design / Construction	No design or construction issues have been identified. County staff will coordinate with the facility owner to implement the project.

Costs:

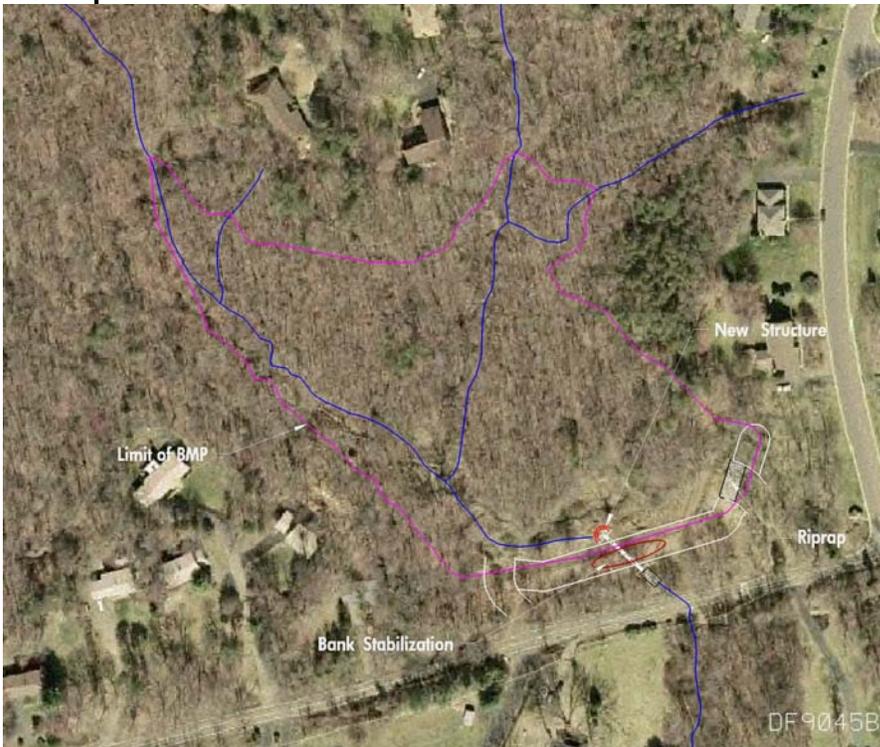
ITEM	QUANTITY	UNIT S	UNIT COST	TOTAL
Clear and Grub	0.1	AC	\$5,000.00	\$500
Riser	1	LS	\$10,000.00	\$10,000
Rip Rap Stabilization	30	LF	\$50.00	\$1,500
Base Construction Cost				\$12,000
Mobilization (5%)				\$600
Subtotal 1				\$12,600
Contingency (25%)				\$3,150
Subtotal 2				\$15,750
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$7,088
Estimated Project Cost				\$23,000

This project is part of the alternative project group for Regional Pond D-45. See Table 5-2 for the recommended disposition.

Site Photo:



Concept Sketch:



Project Number: DF9045D
Catchment Code: DFDF9203
Candidate Site: D-45

Project Type: Stream Restoration
Project Size: 481 Linear Feet

Project Location: This project is located east of the intersection of Valeview Drive and Wayland St.

Project Description: The stream appears to have eroded from incision moving upstream. There are two headcut points where the stream is holding grade. The project will create a step-pool system to lower the effective slope of the stream, and stabilize portions by regrading the banks. Stream buffers will be restored on all project reaches.



Potential Project Benefits:

Stream Stability	The step pool system will restore the stream profile to a more stable condition.
Water Quality	Water quality will be improved by a significant reduction in current and future bank and bed erosion.
Instream Habitat	Erosion reduction, created bed features, and establishing a riparian buffer will improve physical habitat conditions.

Potential Project Constraints:

Environmental	The site will require some tree removal and 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 average compared to other stream restoration projects. General constructability is good.

This project is part of the alternative project group for Regional Pond D-45. See Table 5-2 for the recommended disposition.

Difficult Run Watershed Management Plan
 Concept Plans
 Upper Difficult Run

Costs

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Change channel type -- step pools	337	LF	\$225.00	\$75,825
Stabilize in place -- grading	144	LF	\$175.00	\$25,200
Buffer restoration	included above	LF	\$25.00	\$0
Add'l cost, first 500 LF	481	LF	\$200.00	\$96,200
Base Construction Cost				\$197,225
Mobilization (5%)				\$9,861
Subtotal 1				\$207,086
Contingency (25%)				\$51,772
Subtotal 2				\$258,858
Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)				\$116,486
Estimated Project Cost				\$375,000

Concept Sketch

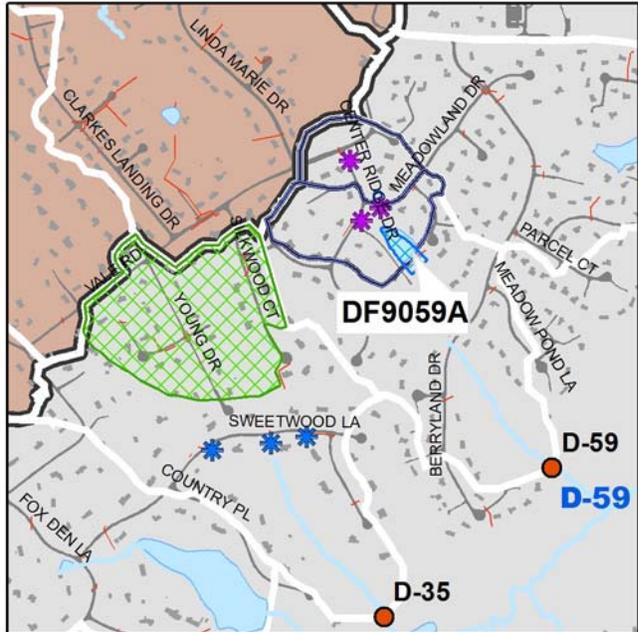


Project Number: DF9059A
Catchment Code: DFDF7901
Candidate Site: D-59

Project Type: Pond Retrofit
Project Size: 1.2 acres
Treated Area: 15.8 acres

Project Location: This project is located at the farm pond along Center Ridge Drive.

Project Description: The existing facility has more than enough volume to meet its calculated water quality volume as well as enough excess wet storage to provide water quality treatment for the dry pond located directly upstream, project DF9059C. To create adequate channel protection volume, a new multistage riser can be placed over the existing iron standpipe, or a weir can be placed across the entrance to the emergency spillway. Finally, there is an abundance of woody vegetation along the embankment and it is recommended that it be removed.



Potential Project Benefits:

Streamflow	100% of the calculated channel protection can be achieved with a multi-stage control structure.
Water Quality	The water quality improvement potential for this project is excellent. There is sufficient storage to meet more than 100% of the water quality volume for this site.

Potential Project Constraints:

Environmental	The use of an existing pond for a stormwater management retrofit would minimize environmental impacts, however, some permit negotiation and mitigation could be expected. Projects in RPAs may require exceptions or waivers.
Property Ownership	The pond is on private property.
Design / Construction	The final design should enhance the facility's use as a neighborhood amenity. County staff will coordinate with the facility owner to implement the project.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.3	AC	\$5,000.00	\$1,500
Outlet Protection	1	EA	\$8,000.00	\$8,000
Riser	1	LS	\$10,000.00	\$10,000
Rip Rap Stabilization	125	LF	\$50.00	\$6,250
Base Construction Cost				\$25,750
Mobilization (5%)				\$1,288
Subtotal 1				\$27,038
Contingency (25%)				\$6,759
Subtotal 2				\$33,797
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$15,209
Estimated Project Cost				\$49,000

This project is part of the alternative project group for Regional Pond D-59. See Table 5-2 for the recommended disposition.

Site Photo:



Concept Sketch:

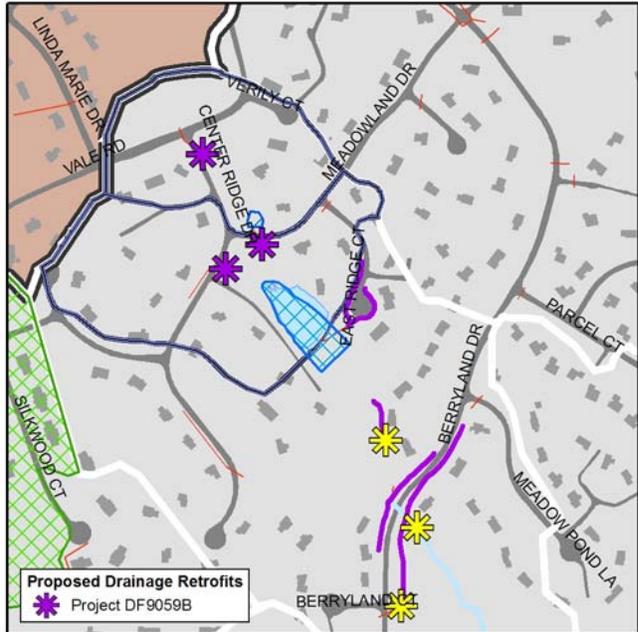


Project Number: DF9059B
Catchment Code: DFDF7901
Candidate Site: D-59

Project Type: Drainage Retrofit
Project Size: 6 Outfalls and 1950 ft of ditch removal

Project Location: This project is distributed throughout the catchment where piped drainage systems discharge into natural channels.

Project Description: This project consists of retrofitting the drainage system to reduce scour and erosion where flows from the storm drainage system enter the stream. In some instances (e.g. below Berryland Drive) structural energy dissipation may be required. Concrete roadside ditches which are prevalent will be removed and replaced with dry swale systems. Where necessary stone may be used to control velocities and stabilize the ditches.



Potential Project Benefits:

Streamflow	The project will reduce velocity from the outfalls and erosive potential immediately downstream. Swales will reduce both volume and velocity.
Water Quality	Replacing ditches with swales will provide treatment before stormwater reaches the stream system. Water quality will also benefit from the reduction of sediment loads associated from scour at the outfall locations.

Potential Project Constraints:

Environmental	Environmental impacts and permit requirements are not anticipated for this project; however, projects in RPAs may require exceptions or waivers
Facility Access	Access to these sites can usually be obtained from the roadway and driveways.
Design / Construction	No unusual design or construction issues were identified. Design should incorporate check dams or other features to ensure flow velocity is not erosive.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Paved Ditch Demolition (Haul Away)	1950	LF	\$18.00	\$35,100
Dry Swale w/ Underdrain	1950	LF	\$50.00	\$97,500
Outfall Protection	6	EA	\$8,000.00	\$48,000
Base Construction Cost				\$180,600
Mobilization (5%)				\$9,030
Subtotal 1				\$189,630
Contingency (25%)				\$47,408
Subtotal 2				\$237,038
Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)				\$106,667
Estimated Project Cost				\$344,000

This project is part of the alternative project group for Regional Pond D-59. See Table 5-2 for the recommended disposition.

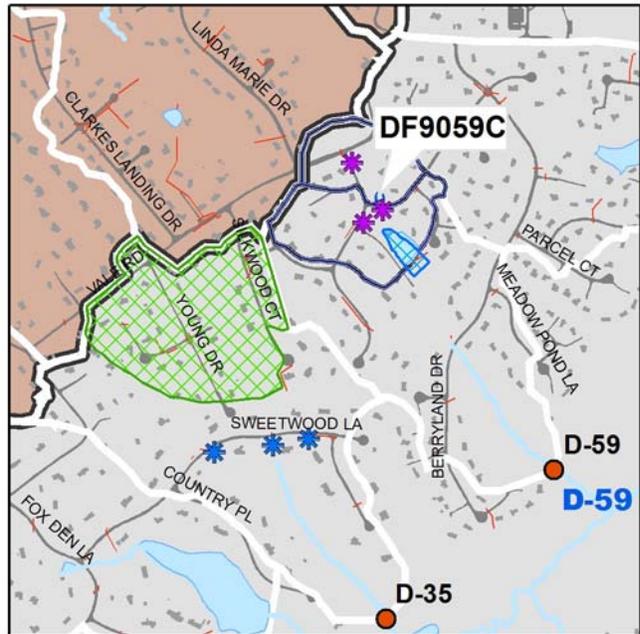
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Project Number: DF9059C
Catchment Code: DFDF7901
Candidate Site: D-59

Project Type: Pond Retrofit
Project Size: 0.1 acres
Treated Area: 10.3 acres

Project Location: Upstream of the culvert at Meadowland Drive

Project Description: Retrofitting this dry pond for channel protection involves installing a new multi-stage riser on the existing 18 inch pipe and excavation to optimize the space available for detention. The project will remain a dry pond and the ground will be re-sodded to restore the current use and aesthetic nature of this area.



Potential Project Benefits:

Streamflow	100% of the calculated channel protection requirement for this facility can be met by installing a multistage control structure and excavation.
Water Quality	100% of the water quality volume requirement can be met in project DF9059A downstream.

Potential Project Constraints:

Environmental	No environmental constraints are anticipated. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to the project is excellent from Meadowland Drive.
Design / Construction	Any changes will likely require approval by the community association. County staff will coordinate with the facility owner to implement the project.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.6	AC	\$5,000.00	\$3,000
Grading and Excavation	2560	CY	\$30.00	\$76,800
Riser	1	LS	\$10,000.00	\$10,000
Dry Landscaping	2570	SY	\$2.50	\$6,425
Base Construction Cost				\$96,225
Mobilization (5%)				\$4,811
Subtotal 1				\$101,036
Contingency (25%)				\$25,259
Subtotal 2				\$126,295
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$56,833
Estimated Project Cost				\$183,000

This project is part of the alternative project group for Regional Pond D-59. See Table 5-2 for the recommended disposition.

Site Photo:



Concept Sketch:

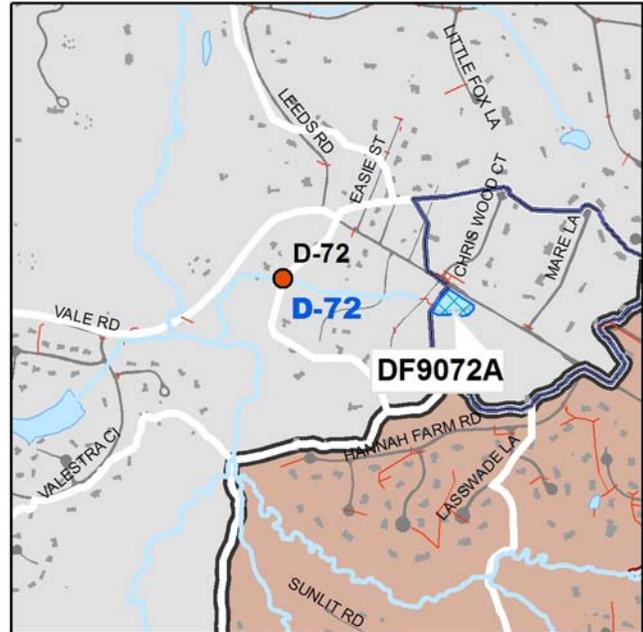


Project Number: DF9072A
Catchment Code: DFDF7701
Candidate Site: D-72

Project Type: Pond Retrofit
Project Size: 0.9 acres
Treated Area: 50.1 acres

Project Location: This project will be on private property across Vale Road from Chris Wood Court.

Project Description: The embankment should be stabilized and the existing outlet pipe repaired or replaced because of corrosion before recommendations for improvements can be made. It is necessary to remove all woody vegetation along the embankment. This pond can be retrofit for peak flow attenuation by installing a multistage riser structure. The existing volume within this pond is adequate to meet the required water quality volume. Treatment will be enhanced by constructing an aquatic bench around part of the perimeter of the pond.



Potential Project Benefits:

Streamflow	About 40% of the required channel protection volume can be met at this site.
Water Quality	100% of the required water quality volume exists as wet storage.

Potential Project Constraints:

Environmental	No significant environmental constraints have been identified. Projects in RPAs may require exceptions or waivers.
Facility Access	Facility access is very good from Vale Road and from the private drive.
Design / Construction	Embankment restoration measures are required for retrofit improvements to function as designed. County staff will coordinate with the facility owner to implement the project.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.1	AC	\$5,000.00	\$500
Remove Barrel Pipe	60	LF	\$77.00	\$4,620
Excavation/Grading (aquatic bench)	95	CY	\$30.00	\$2,850
Outlet Protection	1	EA	\$8,000.00	\$8,000
Reconstruct Embankment	500	CY	\$60.00	\$30,000
Riser	1	LS	\$10,000.00	\$10,000
Outflow Pipe	60	LF	\$35.00	\$2,100
Wetland Planting (aquatic bench)	73	SY	\$2.00	\$146
Base Construction Cost				\$58,216
Mobilization (5%)				\$2,911
Subtotal 1				\$61,127
Contingency (25%)				\$15,282
Subtotal 2				\$76,409
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$34,384
Estimated Project Cost				\$111,000

This project is part of the alternative project group for Regional Pond D-72. See Table 5-2 for the recommended disposition.

Site Photo:



Concept Sketch:

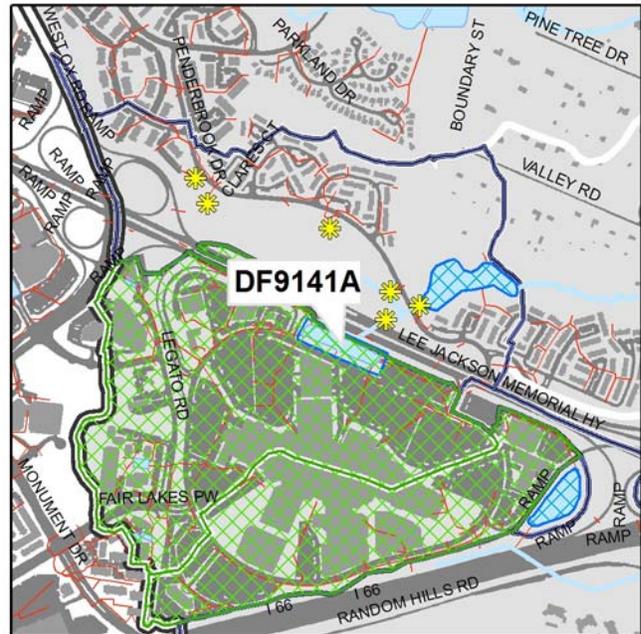


Project Number: DF9141A
Catchment Code: DFDF0009
Candidate Site: C41

Project Type: Pond Retrofit
Project Size: 3.0 acres
Treated Area: 98.4 acres

Project Location: This project is on Fair Oaks Mall property, adjacent to Lee Jackson Memorial Highway.

Project Description: This pond discharges into another wet pond, project DF9141B, located approximately 200 feet downstream. The water quality volume is met within the existing wet storage of this pond. To create channel protection, the control structure would be replaced with a multistage riser. This will provide peak flow attenuation of higher frequency storm events but is not capable of meeting the channel protection volume. Proper anti-clogging measures and routine maintenance are important factors to ensure reliability and function of this stormwater management facility.



Project Benefits:

Streamflow	Approximately 40% of the calculated channel protection volume can be met.
Water Quality	100% of the calculated water quality volume exists within this pond.

Project Constraints:

Environmental	Environmental permitting issues are not anticipated for this project. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this project is excellent.
Design / Construction	No design or construction issues have been identified. County staff will coordinate with the facility owner to implement the project.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.3	AC	\$5,000.00	\$1,500.
Riser	1	LS	\$10,000.00	\$10,000
Fencing	1540	LF	\$20.00	\$30,800
Rip Rap Stabilization	35	LF	\$50.00	\$1,750
Dry Landscaping	1332	SY	\$2.50	\$3,330
Base Construction Cost				\$47,380
Mobilization (5%)				\$2,369
Subtotal 1				\$49,749
Contingency (25%)				\$12,437
Subtotal 2				\$62,186
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$27,984
Estimated Project Cost				\$90,000

Site Photo:



Concept Sketch:

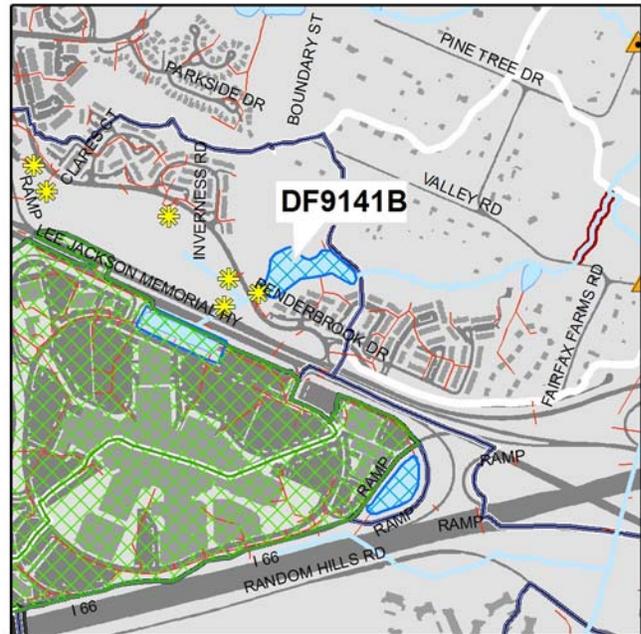


Project Number: DF9141B
Catchment Code: DFDF0009
Candidate Site: C41

Project Type: Pond Retrofit
Project Size: 3.4 acres
Treated Area: 96.2 acres

Project Location: This project is on the golf course off of Penderbrook Drive.

Project Description: Flow exiting from project DF9141A is directed under Lee Jackson Memorial Highway and into this pond. The recommendations to retrofit this facility will not affect the aesthetic appeal of the pond. A simple modification to the riser structure will allow this facility to provide the channel protection volume. The wet storage within this pond meets the water quality volume. An aquatic bench is proposed around the perimeter of the pond to increase the uptake of nutrients and improve overall water quality treatment function at this location.



Project Benefits:

Streamflow	100% of the required channel protection volume can be met at this location.
Water Quality	100% of the required water quality volume exists as wet storage.

Project Constraints:

Environmental	Environmental permitting issues are not anticipated for this project. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this project is very good from Penderbrook Drive.
Design / Construction	As this project is located on a private golf course, care should be taken during the construction phase to not damage the existing greens. 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
Excavation/Grading (aquatic bench)	6100	CY	\$30.00	\$183,000
Riser	1	LS	\$10,000.00	\$10,000
Rip Rap Stabilization	35	LF	\$50.00	\$1,750
Wetland Planting (aquatic bench)	1765	SY	\$2.00	\$3,530
Base Construction Cost				\$200,280
Mobilization (5%)				\$10,014
Subtotal 1				\$210,294
Contingency (25%)				\$52,574
Subtotal 2				\$262,868
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$118,290
Estimated Project Cost				\$381,000

Site Photo:



Concept Sketch:

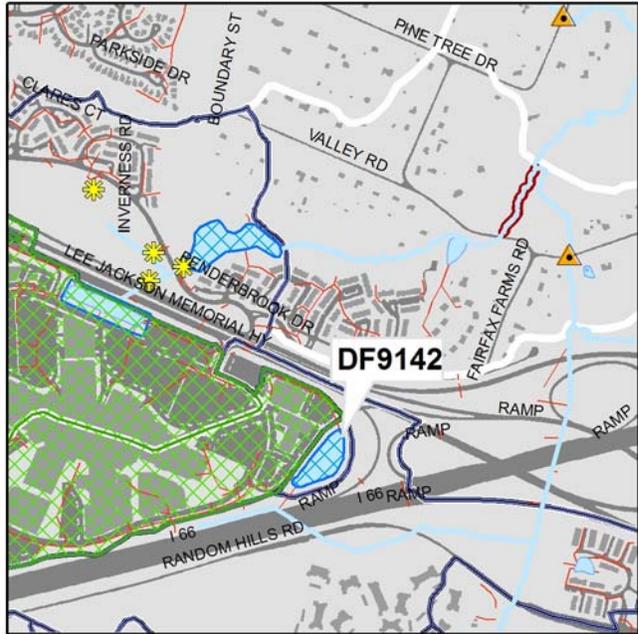


Project Number: DF9142
Catchment Code: DFDF0005
Candidate Site: C42

Project Type: Pond Retrofit
Project Size: 2.0 acres
Treated Area: 60.7 acres

Project Location: This project is on the east end of the Fair Oaks Mall property.

Project Description: This wet pond is located between the mall parking lot and the interchange of I-66 and Lee Jackson Memorial Highway. The control structure should be upgraded to a multi-stage riser. In addition, due to surrounding conditions, anti clogging measures should be incorporated into the multistage riser design. The wet storage within this pond meets the water quality volume. An aquatic bench is proposed around the perimeter of the pond to increase the uptake of nutrients and improve overall water quality treatment function at this location.



Potential Project Benefits:

Streamflow	This project should achieve 100% of the channel protection volume.
Water Quality	100% of the water quality volume can be met at this location.

Potential Project Constraints:

Environmental	Environmental permitting should not be an issue for this project. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this project is very good from the roadway.
Design / Construction	No design or construction issues were identified for this project. County staff will coordinate with the facility owner to implement the project.

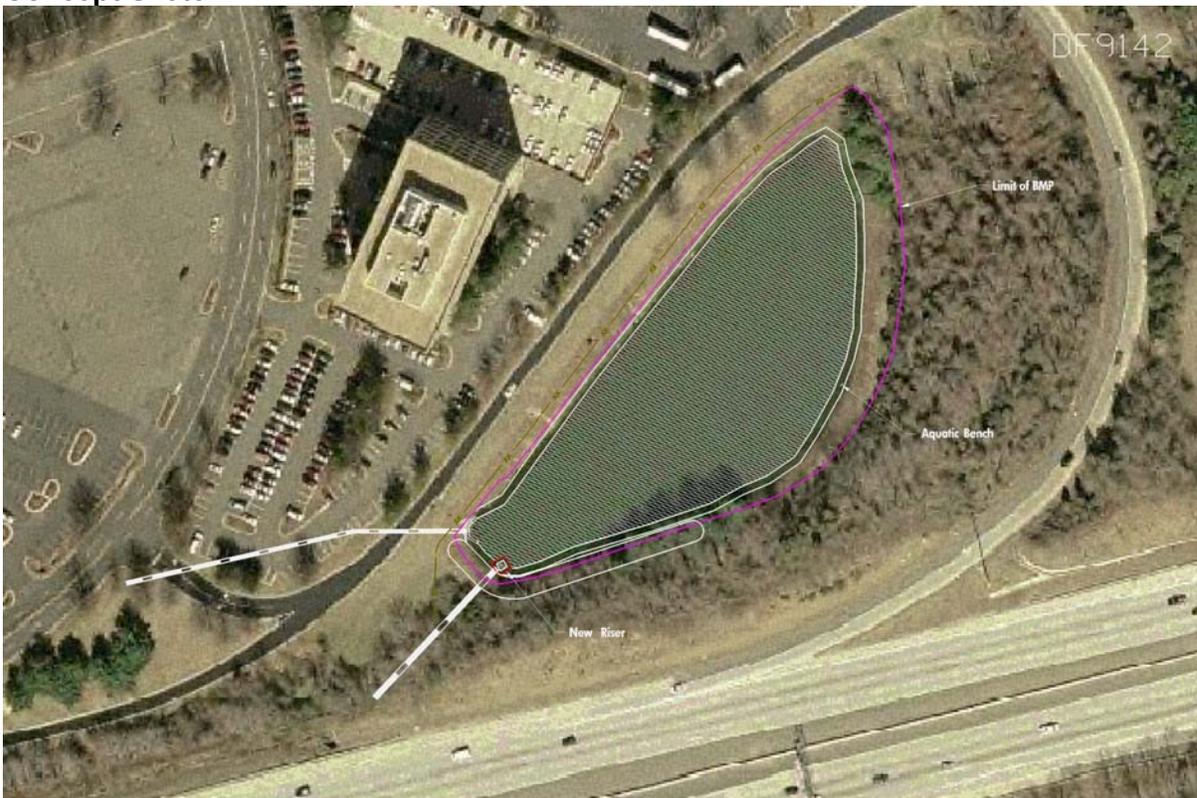
Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.3	AC	\$5,000.00	\$1,500.
Excavation/Grading (aquatic bench)	3467	CY	\$30.00	\$104,010
Riser	1	LS	\$10,000.00	\$10,000
Fencing	684	LF	\$20.00	\$13,680
Wetland Planting (aquatic bench)	1156	SY	\$2.00	\$2,312
Base Construction Cost				\$131,502
Mobilization (5%)				\$6,575
Subtotal 1				\$138,077
Contingency (25%)				\$34,519
Subtotal 2				\$172,596
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$77,668
Estimated Project Cost				\$250,000

Site Photo:



Concept Sketch:

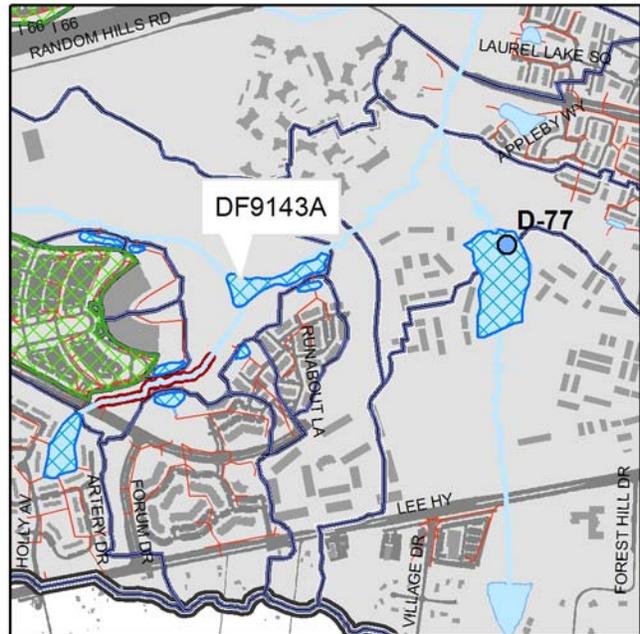


Project Number: DF9143A
Catchment Code: DFDF0001
Candidate Site: C43

Project Type: Pond Retrofit
Project Size: 2.1 acres
Treated Area: 67.8 acres

Project Location: East of the Fairfax County Government Center.

Project Description: This project consists of two amenity ponds in series that were not designed to act as stormwater management facilities. The wet storage within these ponds is enough to meet the calculated water quality volume for not only this location, but also an additional eight dry pond facilities located upstream. The retrofit design for these eight upstream facilities, projects DF9143B1, DF9143B2, DF9143C, DF9143D, DF9143E, DF9143F1, DF9143F2, and DF9143G, utilizes the available storage volume within each to provide channel protection while the water quality treatment is met within DF9143A.



Potential Project Benefits:

Streamflow	Streamflow benefits at this site are provided by projects upstream.
Water Quality	100% of the water quality volume is available for this pond as well as for eight other dry ponds directly upstream.

Potential Project Constraints:

Environmental	Permits are expected to be minimal for this retrofit project. There may be forest impacts during construction. Projects in RPAs may require exceptions or waivers.
Facility Access	Access is available from Government Center, but site is forested.
Design / Construction	No significant design or construction issues were identified 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	0.1	AC	\$5,000.00	\$500
Outlet Protection	1	EA	\$8,000.00	\$8,000
Riser	1	LS	\$10,000.00	\$10,000
Outflow Pipe	75	LF	\$35.00	\$2,625
Outlet Stabilization	100	LF	\$50.00	\$5,000
Base Construction Cost				\$26,125
Mobilization (5%)				\$1,306
Subtotal 1				\$27,431
Contingency (25%)				\$6,858
Subtotal 2				\$34,289
Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)				\$15,430
Estimated Project Cost				\$50,000

Site Photo 1: Amenity pond 1.



Site Photo 2: Amenity pond 2.

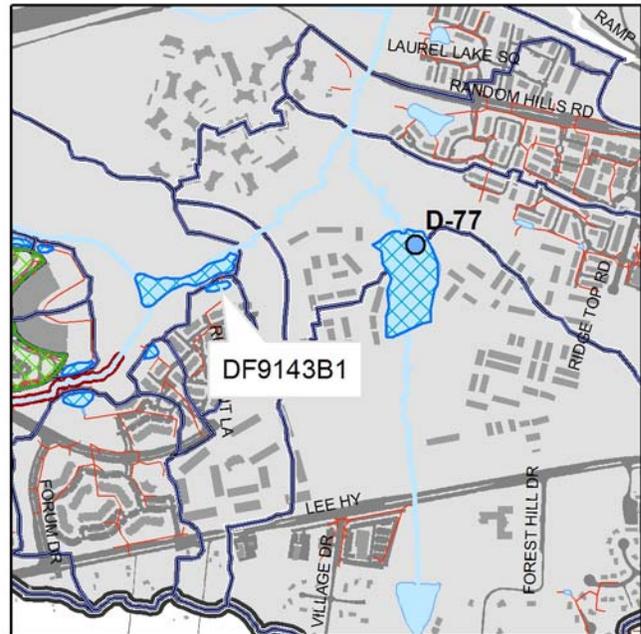


Project Number: DF9143B1
Catchment Code: DFDF0001
Candidate Site: C43

Project Type: Pond Retrofit
Project Size: 0.2 acres
Treatment Area: 9.9 acres

Project Location: Immediately south of project DF9143A

Project Description: This dry pond flows directly into a wet pond, project DF9143A. The storage volume from the design plans for this pond is adequate for extended detention of the 1-year event. However, the pond shows evidence of sedimentation, reducing volume available to manage storm water. This project includes removal of the sediment to return this facility to its original design storage. It will then be possible to modify the riser to meet the channel protection volume requirement. Also, any established vegetation disturbed should be returned/replanted. Finally, the water quality volume requirement for this facility will be met in the excess wet storage available in the wet amenity pond located directly downstream if it is retrofitted.



Potential Project Benefits:

Streamflow	100% of the channel protection volume requirement can be met with sediment removal and by modifying the riser.
Water Quality	Water quality treatment can be met in project DF9143A downstream.

Potential Project Constraints:

Environmental	Environmental permitting should not be an issue for this project. Projects in RPAs may require exceptions or waivers.
Facility Access	Access is adequate from the existing access road.
Design / Construction	No design or construction issues were identified 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	0.1	AC	\$5,000.00	\$500
Riser	1	LS	\$10,000.00	\$10,000
			Base Construction Cost	\$10,500
			Mobilization (5%)	\$525
			Subtotal 1	\$11,025
			Contingency (25%)	\$2,756
			Subtotal 2	\$13,781
			Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)	\$6,202
			Estimated Project Cost	\$20,000

Site Photo:



Concept Sketch:

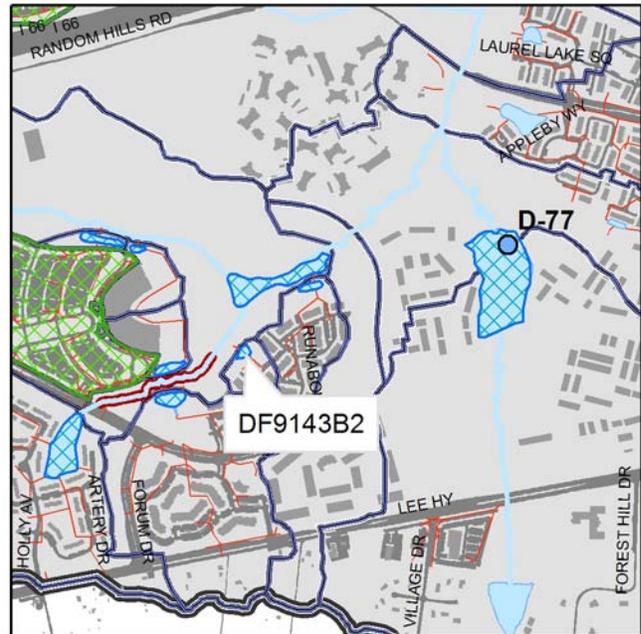


Project Number: DF9143B2
Catchment Code: DFDF0001
Candidate Site: C43

Project Type: Pond Retrofit
Project Size: 0.2 acres
Treated Area: 4.8 acres

Project Location: North of Rockaway Lane.

Project Description: There is a concrete channel leading from the one inflow to the riser structure. To provide the channel protection volume, the concrete pilot channel should be removed, redesigned, and the available area within the existing pond footprint excavated to its optimum storage volume. Due to the proximity to residences, positive grading will maintain this as a dry facility. The excavated areas will be re-sodded for aesthetic purposes and the riprap channel at the single concentrated inflow point should be replaced. In addition, sagging and erosion of the downstream side of the embankment was noticed in some areas and should be stabilized.



Potential Project Benefits:

Streamflow	100% of the channel protection volume can be met with excavation.
Water Quality	Water quality treatment can be met in project DF9143A downstream.

Potential Project Constraints:

Environmental	Environmental permitting should not be an issue for this project. Projects in RPAs may require exceptions or waivers.
Facility Access	Access is adequate from the high-density residential area.
Design / Construction	No design or construction issues were identified 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	0.2	AC	\$5,000.00	\$1,000
Remove Pilot Channels	30	LF	\$6.00	\$180
Grading and Excavation	190	CY	\$30.00	\$5,700
Riser	1	LS	\$10,000.00	\$10,000
Dry Landscaping	775	SY	\$2.505	\$1,937
Base Construction Cost				\$18,818
Mobilization (5%)				\$941
Subtotal 1				\$19,758
Contingency (25%)				\$4,940
Subtotal 2				\$24,698
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$11,114
Estimated Project Cost				\$36,000

Site Photo:



Concept Sketch:

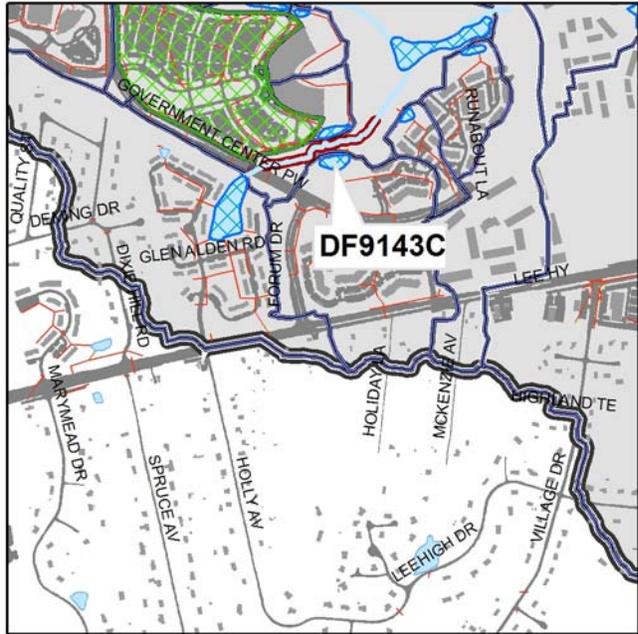


Project Number: DF9143C
Catchment Code: DFDF0001
Candidate Site: C43

Project Type: Pond Retrofit
Project Size: 0.4 acres
Treated Area: 40.9 acres

Project Location: North of Government Center Parkway and Forum Drive.

Project Description: The pond has aggraded approximately 3 feet since it was constructed, which limits its potential for meeting its design requirements, and the upstream channel shows signs of degrading and erosion. Although removing established wetland vegetation is not usually recommended, because sediment removal is necessary and would require excavation to clean out this facility, much of the vegetation throughout would be disturbed, so further excavation to maximize the available storage is proposed. The water quality volume that is not met within this facility will be treated in the project DF 9143A. Finally, the upstream channel located on the backside of this facility should be stabilized.



Potential Project Benefits:

Streamflow	75% of the channel protection volume can be met with excavation and modifications to the riser.
Water Quality	Water quality treatment can be met in project DF9143A downstream.

Potential Project Constraints:

Environmental	Environmental permitting should not be an issue for this project. Projects in RPAs may require exceptions or waivers.
Facility Access	Access is adequate from the existing access road.
Design / Construction	No design or construction issues were identified for this project. County staff will coordinate with the facility owner to implement the project.

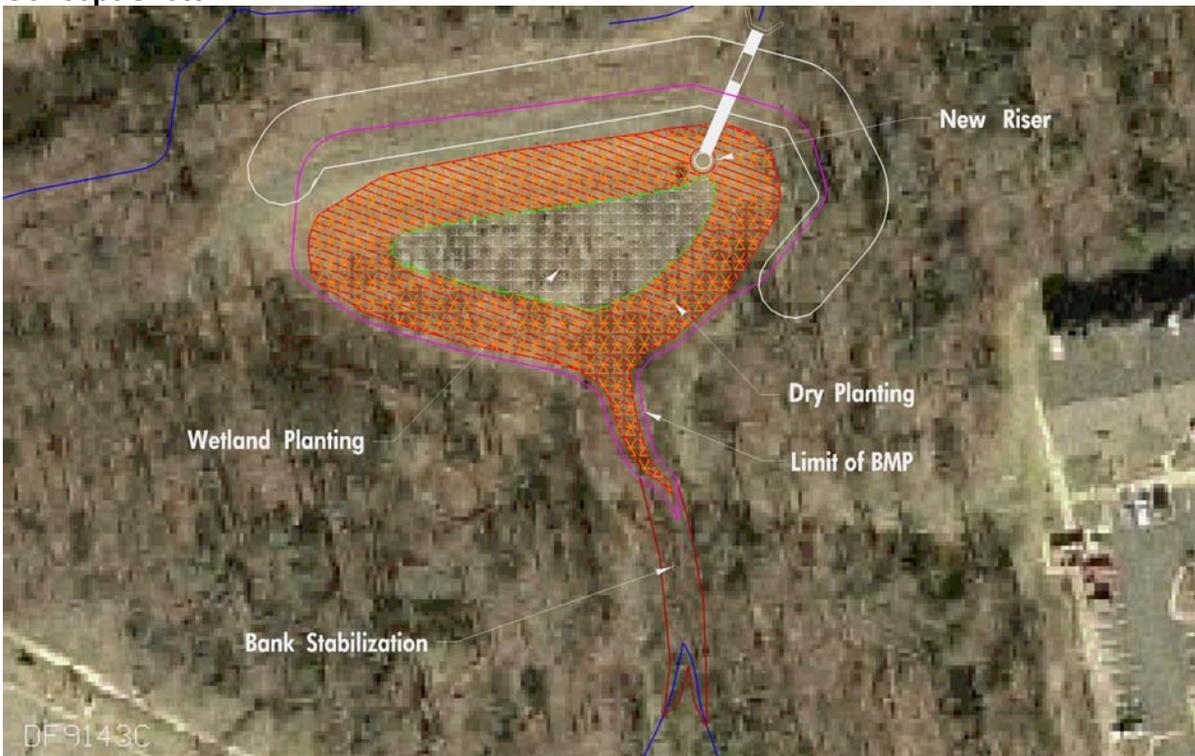
Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.5	AC	\$5,000.00	\$2,500.
Excavation/Grading	2068	CY	\$30.00	\$62,040
Riser	1	LS	\$10,000.00	\$10,000
Rip Rap Stabilization	100	LF	\$50.00	\$5,000
Wetland Planting	672	SY	\$2.00	\$1,344
Dry Landscaping	1690	SY	\$2.50	\$4,225
Base Construction Cost				\$85,109
Mobilization (5%)				\$4,255
Subtotal 1				\$89,364
Contingency (25%)				\$22,341
Subtotal 2				\$111,706
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$50,268
Estimated Project Cost				\$162,000

Site Photo:



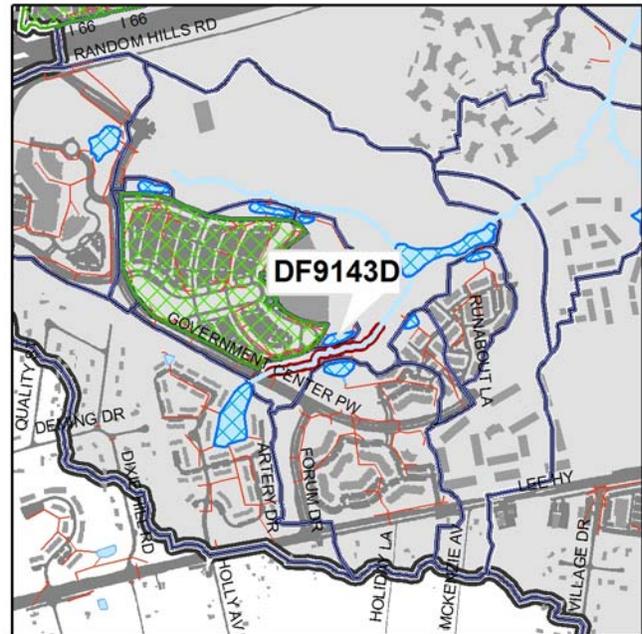
Concept Sketch:



Project Number: DF9143D
Catchment Code: DFDF0001
Candidate Site: C43

Project Type: Pond Retrofit
Project Size: 0.3 acres
Treated Area: 7.5 acres

Project Location: South of the Fairfax Government Center



Project Description: The channel protection volume can be met by modifying the existing control structure to better utilize the available storage volume within this dry pond. Cutting back the dewatering orifice to the base of the riser will maximize the flow length and detention time. It is also recommended to remove the existing concrete channels and create vegetated, natural channels. The water quality volume for this site can be met in the excess wet storage available at project DF9143A) located downstream. Also, sediment forebays are proposed at each of the 3 three inflows. The size and type of each component can be determined with further analysis for each individually.

Potential Project Benefits:

Streamflow	100% of the channel protection volume requirement can be met by modifying the riser.
Water Quality	This facility will remain a dry pond. Water quality treatment can be met in project DF9143A downstream..

Potential Project Constraints:

Environmental	Environmental permitting should not be an issue for this project. Projects in RPAs may require exceptions or waivers.
Facility Access	Access is adequate from the parking area of the Government Center.
Design / Construction	No design or construction issues were identified for this project. County staff will coordinate with the facility owner to implement the project.

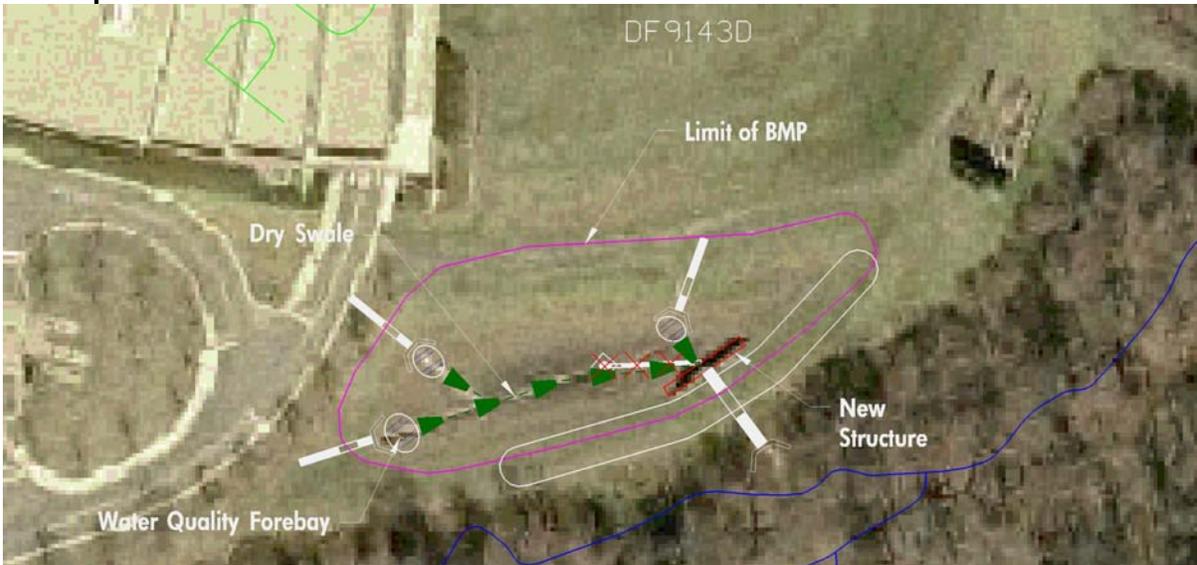
Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.1	AC	\$5,000.00	\$500
Remove Pilot Channels	200	LF	\$6.00	\$1,200
Dry Swale	200	LF	\$35.00	\$7,000
Forebays (3 locations)	131	CY	\$45.00	\$5,895
Riser	1	LS	\$10,000.00	\$10,000
Base Construction Cost				\$24,595
Mobilization (5%)				\$1,230
Subtotal 1				\$25,825
Contingency (25%)				\$6,456
Subtotal 2				\$32,281
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$14,526
Estimated Project Cost				\$47,000

Site Photo:



Concept Sketch:

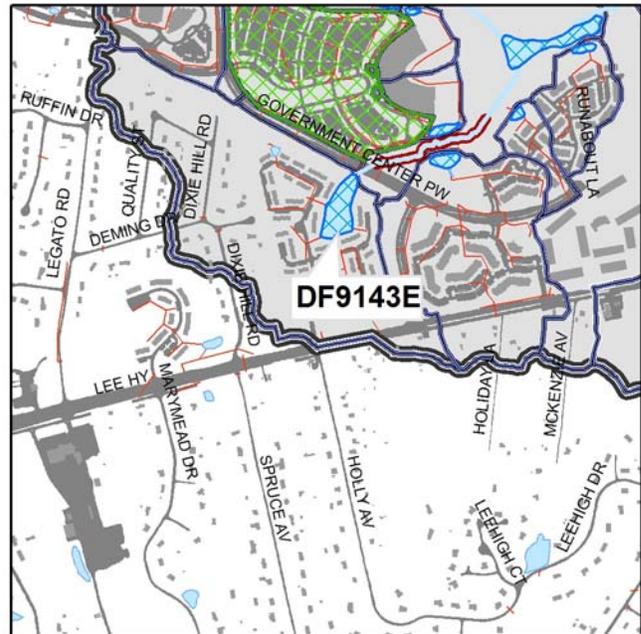


Project Number: DF9143E
Catchment Code: DFDF0001
Candidate Site: C43

Project Type: Pond Retrofit
Project Size: 1.9 acres
Treated Area: 64.6 acres

Project Location: This project is between Glen Alden Road and Government Center Parkway.

Project Description: This dry pond can be retrofitted for improved management of smaller storm events by modifying the control structure. The riser modification should also include a trash rack and an anti-clogging device, as debris appears to collect at this location. Although the existing ground slope is too shallow to create wet storage volume at this site, by removing/replacing the concrete pilot channels with vegetated channels, a water quality component can be created. Currently, grass ditches conveying impervious runoff from the inflows to the outlet perform some degree of water quality treatment.



Potential Project Benefits:

Streamflow	50% of the channel protection volume can be achieved by modifying the control structure and without excavation.
Water Quality	Water quality treatment can be met in project DF9143A downstream.

Potential Project Constraints:

Environmental	Environmental permitting should not be an issue for this project. Projects in RPAs may require exceptions or waivers.
Facility Access	Access is good from the subdivision and public roads.
Design / Construction	Shallow ground slope limits retrofit design options. County staff will coordinate with the facility owner to implement the project.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.1	AC	\$5,000.00	\$500
Remove Pilot Channels	150	LF	\$6.00	\$900
Riser	1	LS	\$10,000.00	\$10,000
Dry Landscaping	506	SY	\$2.50	\$1,265
Base Construction Cost				\$12,665
Mobilization (5%)				\$633
Subtotal 1				\$13,298
Contingency (25%)				\$3,325
Subtotal 2				\$16,623
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$7,480
Estimated Project Cost				\$24,000

Site Photo:



Concept Sketch:

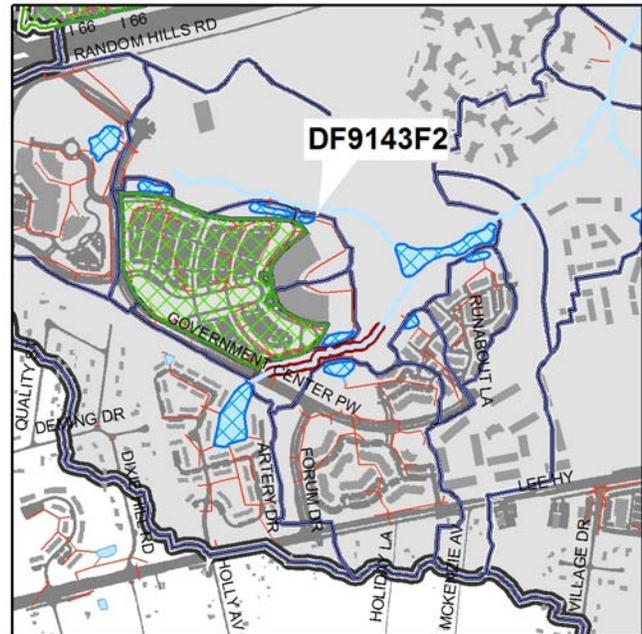


Project Number: DF9143F2
Catchment Code: DFDF0001
Candidate Site: C43

Project Type: Pond Retrofit
Project Size: 0.1 acres
Treated Area: 5.6 acres

Project Location: This project is north of the Government Center building.

Project Description: This dry pond appears to manage the 2, 10, and 100-year events. Three pilot channels direct flow from concentrated inflow points to a dewatering orifice located in the center of the pond. Cutting back the dewatering orifice to the base of the riser will maximize the flow length and detention time. It is also recommended to remove the existing concrete channels and create vegetated, natural channels. Although the water quality volume requirement for this facility can be met in the excess wet storage available at project DF9143A located downstream, sediment forebays are proposed at each of the 3 three inflows to improve pollutant removal and ease of maintenance. The size and type of each component can be determined with further analysis for each individually.



Potential Project Benefits:

Streamflow	90% of the channel protection volume can be achieved by modifying the control structure and without excavation.
Water Quality	Water quality treatment can be met in project DF9143A downstream.

Potential Project Constraints:

Environmental	Environmental permitting should not be an issue for this retrofit project. There are no significant environmental constraints. Projects in RPAs may require exceptions or waivers.
Facility Access	Access is very good from the parking areas.
Design / Construction	No design or construction issues were identified 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	0.1	AC	\$5,000.00	\$500
Forebays (3 locations)	45	CY	\$45.00	\$2,025
Riser	1	LS	\$10,000.00	\$10,000
Base Construction Cost				\$12,525
Mobilization (5%)				\$626
Subtotal 1				\$13,151
Contingency (25%)				\$3,288
Subtotal 2				\$16,439
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$7,398
Estimated Project Cost				\$24,000

Site Photo:



Concept Sketch:

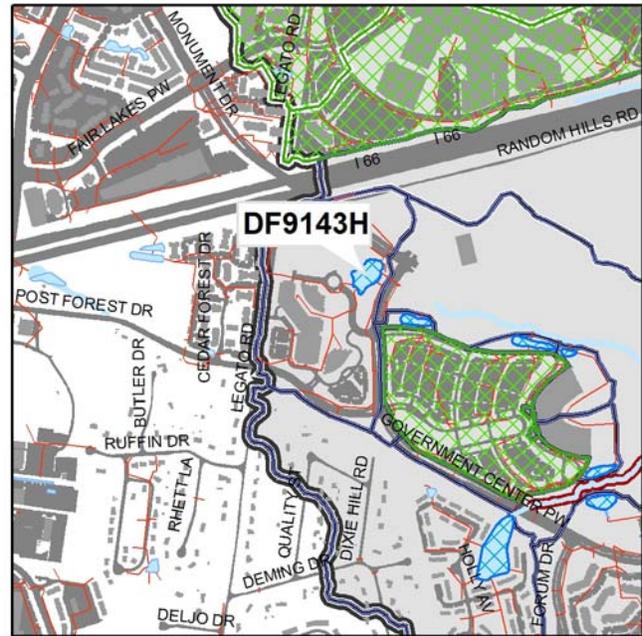


Project Number: DF9143H
Catchment Code: DFDF0001
Candidate Site: C43

Project Type: Pond Retrofit
Project Size: 0.9 acres
Treated Area: 36.5 acres

Project Location: This project is at the corner of Government Center Parkway and Monument Drive.

Project Description: The existing volume within the pond meets the water quality volume. There is enough excess wet storage volume to construct an aquatic bench around the entire perimeter of this facility. At this location, impacts of construction and aesthetic appeal of this component must be carefully considered. This feature is included in the project costs shown below. The channel protection volume can be met above the water surface elevation by modifying the control structure.



Potential Project Benefits:

Streamflow	100% of the calculated channel protection volume can be met by modifying the control structure of this wet pond.
Water Quality	100% of the required water quality volume exists as wet storage within this pond. Additional components such as an aquatic bench can be added to improve treatment function if desired.

Potential Project Constraints:

Environmental	Environmental permitting should not be an issue for this project. Projects in RPAs may require exceptions or waivers.
Facility Access	Access is very good from the public roads.
Design / Construction	No design or construction issues were identified 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	0.2	AC	\$5,000.00	\$1,000
Excavation/Grading (aquatic bench)	2173	CY	\$30.00	\$65,190
Riser	1	LS	\$10,000.00	\$10,000
Wetland Planting (aquatic bench)	650	SY	\$2.00	\$1,300
Base Construction Cost				\$77,490
Mobilization (5%)				\$3,875
Subtotal 1				\$81,365
Contingency (25%)				\$20,341
Subtotal 2				\$101,706
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$45,768
Estimated Project Cost				\$147,000

Site Photo:



Concept Sketch:

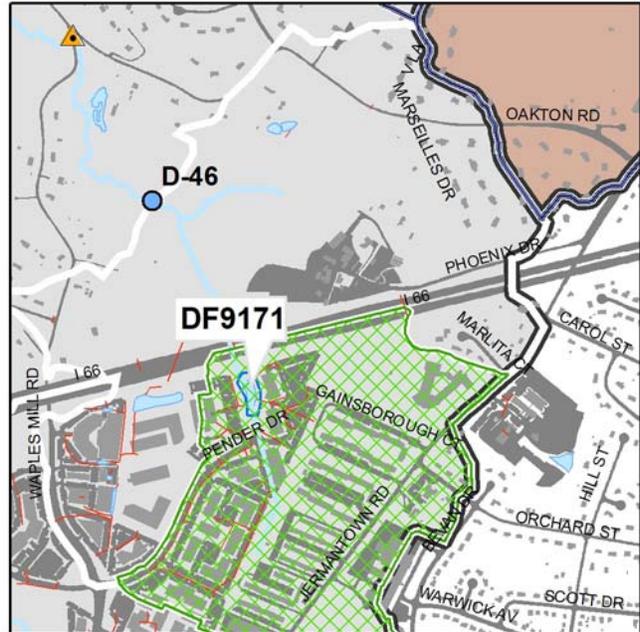


Project Number: DF9171
Catchment Code: DFDF9501
Candidate Site: C71

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

Project Location: At the eastern end of Pender Drive

Project Description: Commercial buildings, parking lots, and trees completely surround this wet pond. Although the drainage area to this location is large, some improvements can be made to optimize the onsite stormwater management. One recommendation is to reduce the size of the orifice at the normal water surface elevation. Also, placement of riprap in the downstream channel at the outfall will provide an additional measure to reduce exiting flow velocities. Although the wet storage within this pond is a fraction of the required water quality volume, installing water quality treatment components (ie. forebays) at each concentrated inflow location can promote nutrient removal and sedimentation. Also, the emergency spillway shows signs of erosion and requires maintenance.



Potential Project Benefits:

Streamflow	Modifying the control structure can create approximately 15% of the calculated channel protection volume.
Water Quality	The existing wet storage in this pond is only 20% of the water quality volume; however, components to improve water quality treatment can be implemented in multiple locations where closed storm drains enter.

Potential Project Constraints:

Environmental	Environmental permitting issues would not be anticipated for this project. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this area is decent by way of public roads and parking areas.
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.

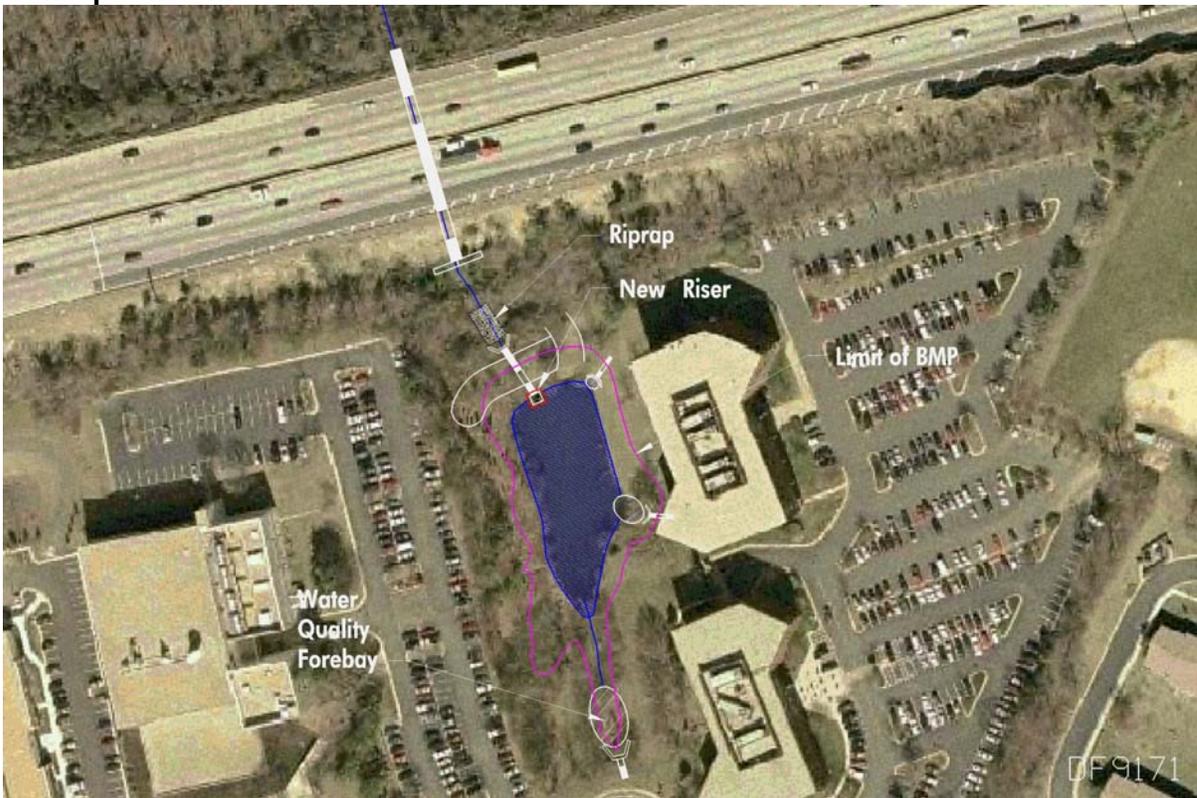
Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Clear and Grub	0.1	AC	\$5,000.00	\$500
Forebays (3 locations)	900	CY	\$45.00	\$40,500
Riser	1	LS	\$10,000.00	\$10,000
Rip Rap Stabilization	30	LF	\$50.00	\$1,500
Base Construction Cost				\$52,500
Mobilization (5%)				\$2,625
Subtotal 1				\$55,125
Contingency (25%)				\$13,781
Subtotal 2				\$68,906
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$31,008
Estimated Project Cost				\$100,000

Site Photo:



Concept Sketch:

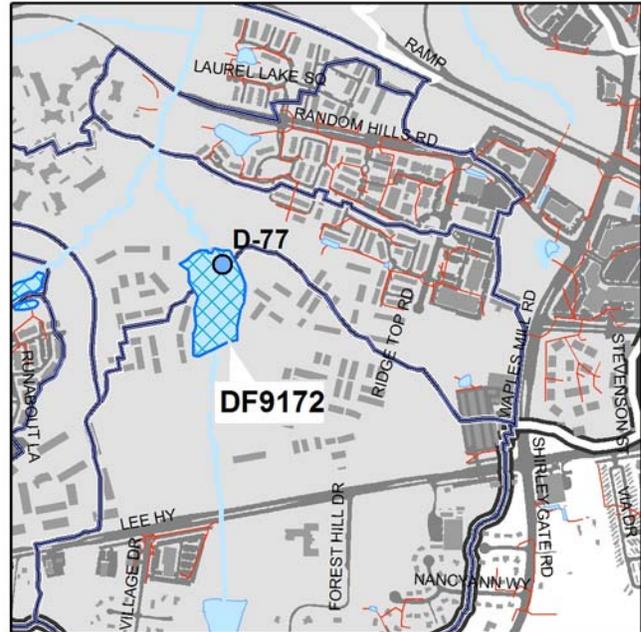


Project Number: DF9172
Catchment Code: DFDF9901
Candidate Site: C72

Project Type: Pond Retrofit
Project Size: 6.4 acres
Treated Area: 241.8 acres

Project Location: This project is located east of Lower Park Drive.

Project Description: This facility can be retrofitted to manage the required channel protection volume by modifying the riser. Potential water quality improvements at this location are limited by the existence of base flow and surrounding woods. It is not recommended to clear established vegetation for the sole purpose of creating water quality volume. Although the calculated water quality volume will not be met at this location, a number of water quality components already exist within this facility which will improve pollutant removal. A forebay constructed at the outflow of the closed storm drain system can treat the impervious runoff prior to it entering the stream.



Potential Project Benefits:

Streamflow	100% of the required channel protection volume can be achieved by modifying the existing control structure.
Water Quality	Interrupting the stream channel to create a permanent wet storage volume is not recommended, however, a variety of components to improve water quality treatment can be implemented at this location.

Potential Project Constraints:

Environmental	No environmental constraints are anticipated. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this area is very good by way of a paved access road.
Design / Construction	No design or construction issues are anticipated 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	0.1	AC	\$5,000.00	\$500
Forebay	484	CY	\$45.00	\$21,780
Riser	1	LS	\$10,000.00	\$10,000
Wetland Planting	445	SY	\$2.00	\$890
Base Construction Cost				\$33,170
Mobilization (5%)				\$1,659
Subtotal 1				\$34,829
Contingency (25%)				\$8,707
Subtotal 2				\$43,536
Engineering Design, Surveys, Land Acquisition, Utility Relocations and Permits (45%)				\$19,591
Estimated Project Cost				\$63,000

Site Photo:



Concept Sketch:



Project Number: DF9238
Catchment Code: DFDF0017
Candidate Site: S38

Project Type: Buffer Restoration
Project Size: 593 Linear Feet

Project Location: This project is located east of Fox Mill Road and north of the intersection with Waples Mill Road.

Project Description: The riparian zone along the right streambank is largely in pasture. There are areas of streambank erosion along the reach. The stream is located on private property. The proposed restoration would involve planting a forested buffer along the right streambank and riparian zone.



Potential Project Benefits:

Stream Stability	The project will not significantly affect stream stability.
Water Quality	Water quality may be improved by the nutrient uptake potential of the forested buffer.
Instream Habitat	The buffer will provide thermal shading and organic inputs.

Potential Project Constraints:

Environmental	The site will not require forest clearing or impacts to jurisdictional wetlands. No permit will be required. Projects in RPAs may require exceptions or waivers.
Property Ownership	This project appears to be located on private property.
Facility Access	Access to this facility will require an easement on private property but is open and unconstrained adjacent to the stream.
Design / Construction	Design efforts are minimal compared to other stream restoration projects. No earthwork or structures are required

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Buffer restoration	593	LF	\$25.00	\$14,825
Base Construction Cost				\$14,825
Mobilization (5%)				\$741
Subtotal 1				\$15,566
Contingency (25%)				\$3,891
Subtotal 2				\$19,457
Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)				\$8,756
Estimated Project Cost				\$28,000

Concept Sketch

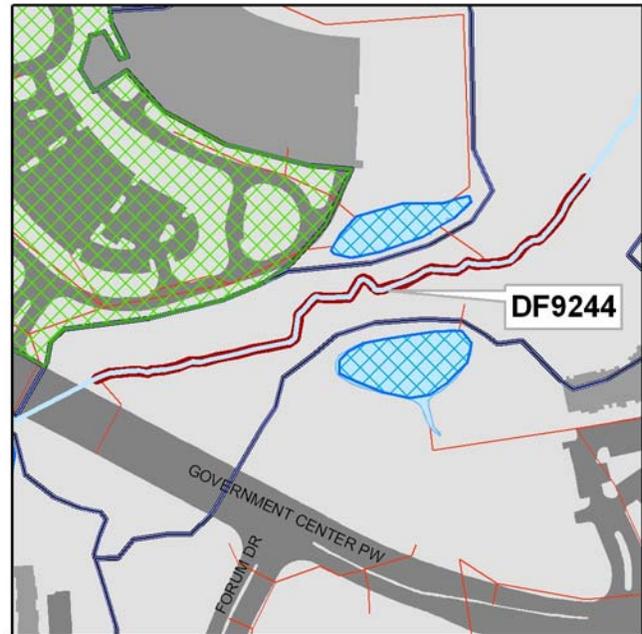


Project Number: DF9244
Catchment Code: DFDF0001
Candidate Site: S44

Project Type: Stream Restoration
Project Size: 1016 Linear Feet

Project Location: This project is located on the Fairfax Government Center property to the north of Government Center Parkway.

Project Description: This stream reach is moderately to severely eroding its banks. The bed has eroded to weathered rock and is severely incised. The stream is located in a lightly wooded area between the government center parking area and a pedestrian trail behind a town home. The proposed restoration would involve excavating a floodplain bench and reshaping the streambanks and creating stable features in the upper and middle portions of the reach.



Potential Project Benefits:

Stream Stability	The stream banks will be graded to a stable angle and a floodplain bench will be created. Stable bed features will be created.
Water Quality	Water quality will be improved by a significant reduction in current and future bank and bed erosion.
Instream Habitat	Erosion reduction and created bed features will improve physical habitat conditions.

Potential Project Constraints:

Environmental	The site will require some forest clearing and limited impacts to jurisdictional wetlands. However, 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 be along the pedestrian trail and from the government center parking lot.
Design / Construction	Design efforts are minimal compared to other stream restoration projects. General constructability is good.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Change channel type -- nested channel	1016	LF	\$200.00	\$203,200
Add'l cost, first 500 LF	500	LF	\$200.00	\$100,000
Base Construction Cost				\$303,200
Mobilization (5%)				\$15,160
Subtotal 1				\$318,360
Contingency (25%)				\$79,590
Subtotal 2				\$397,950
Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)				\$179,078
Estimated Project Cost				\$577,000

This project is part of the alternative project group for Regional Pond D-59. See Table 5-2 for the recommended disposition.

Concept Sketch:



Project Number: DF9245
Catchment Code: DFDF0011
Candidate Site: S45

Project Type: Stream Restoration
Project Size: 587 Linear Feet

Project Location: This project is located to the north of Valley Road just past the intersection of Fairfax Farms Road.



Project Description: This stream reach has moderately incised eroding streambanks. Floodplain redevelopment and point bar formation indicate that the stream is recovering. The project is located on several private properties. The site lacks a forested buffer on both sides of the stream. The proposed restoration would involve excavating a floodplain bench and reshaping the streambanks. The new floodplain would be planted with native woody vegetation and grasses. A forested buffer would be established.

Potential Project Benefits:

Stream Stability	The streambanks will be regarded and a floodplain bench will be excavated. This will reduce and prevent further bank instability
Water Quality	Water quality will be improved by a significant reduction in current and future bank erosion.
Instream Habitat	Erosion reduction and establishing a riparian buffer will improve physical habitat conditions.

Potential Project Constraints:

Environmental	The site will not require forest clearing or impacts to jurisdictional wetlands. However, 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 but is open and unconstrained adjacent to the stream.
Design / Construction	Design efforts are moderate compared to other stream restoration projects. General constructability is good.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Change channel type -- step pools	587	LF	\$225.00	\$132,075
Add'l cost, first 500 LF	500	LF	\$200.00	\$100,000
Base Construction Cost				\$232,075
Mobilization (5%)				\$11,604
Subtotal 1				\$243,679
Contingency (25%)				\$60,920
Subtotal 2				\$304,598
Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)				\$137,069
Estimated Project Cost				\$442,000

Concept Sketch:

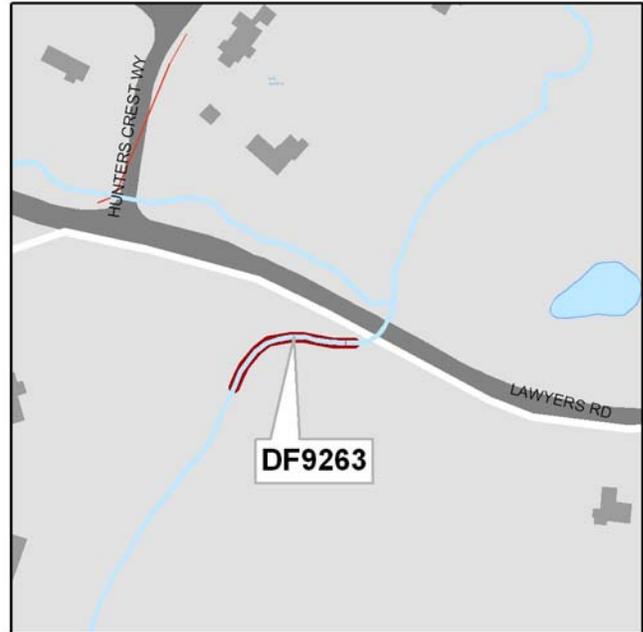


Project Number: DF9263
Catchment Code: DFDF0029
Candidate Site: S63

Project Type: Stream Restoration
Project Size: 255 linear feet

Project Location: This project is located to the southwest of Lawyers Road just before Hunters Crest Way to the northwest.

Project Description: The stream is slightly incised with raw and erosive streambanks. Bed features are inconsistent and poorly developed. The stream is located in an open pasture. The proposed restoration would entail excavating a floodplain bench and reshaping the streambanks. This would prevent further erosion and improve floodplain dynamics. The new floodplain would be planted with native woody vegetation and grasses. A forested buffer will be established on both sides of the stream.



Potential Project Benefits:

Stream Stability	The streambanks will be reshaped and planted to improve stability.
Water Quality	Water quality will be improved by a significant reduction in current and future bank and bed erosion.
Instream Habitat	Erosion reduction, created bed features, and establishing a riparian buffer will improve physical habitat conditions.

Potential Project Constraints:

Environmental	The site will not require forest clearing or impacts to jurisdictional wetlands. It will require a permit from the U.S. Army Corps of Engineers. Projects in RPAs may require exceptions or waivers.
Facility Access	Access to this facility will require an easement on private property but is open and unconstrained adjacent to the stream.
Design / Construction	Design efforts are minor compared to other stream restoration projects. General constructability is good.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Change channel type -- nested channel	255	LF	\$200.00	\$51,000
Add'l cost, first 500 LF	255	LF	\$200.00	\$51,000
Base Construction Cost				\$102,000
Mobilization (5%)				\$5,100
Subtotal 1				\$107,100
Contingency (25%)				\$26,775
Subtotal 2				\$133,875
Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)				\$60,244
Estimated Project Cost				\$194,000

Concept Sketch:

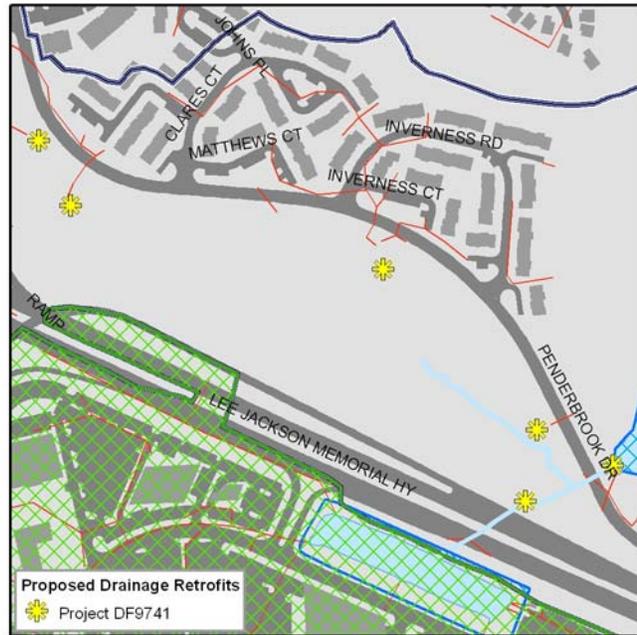


Project Number: DF9741
Catchment Code: DFDF0009
Candidate Site: C41

Project Type: Drainage Retrofit
Project Size: 6 Outfalls

Project Location: This project is distributed throughout the catchment.

Project Description: This project consists of reconfiguring outfalls or retrofitting energy dissipation structures to reduce scour and erosion where flows from the storm drainage system enter the stream. Reduction of erosive velocities will reduce the amount of sediment transported downstream.



Potential Project Benefits:

Streamflow	The project will reduce velocity from the outfalls 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. Habitat would be improved by reducing sediment loads from erosion.

Potential Project Constraints:

Environmental	Environmental impacts and permit requirements are not anticipated for this project; however, projects in RPAs may require exceptions or waivers
Facility Access	Access to these sites can usually be obtained from the roadway and driveways.
Design / Construction	No unusual design or construction issues were identified.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Outfall Protection	6	EA	\$8,000.00	\$48,000
Base Construction Cost				\$48,000
Mobilization (5%)				\$2,400
Subtotal 1				\$50,400
Contingency (25%)				\$12,600
Subtotal 2				\$63,000
Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)				\$28,350
Estimated Project Cost				\$91,000

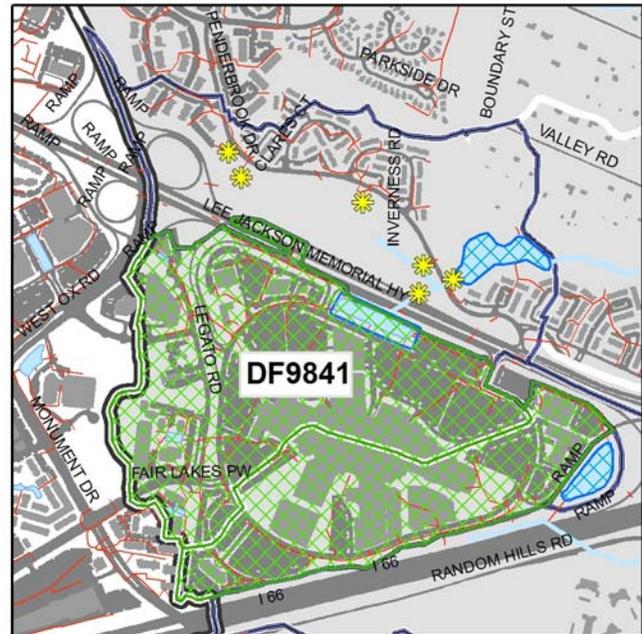
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Project Number: DF9841/DF9842
Catchment Code: DFDF0009
Candidate Site: C41/C42

Project Type: LID Retrofit
Project Size: 2.0 acres
Treated Area: 155 acres

Project Location: This project would be implemented throughout the entire developed portion area on or around Fair Oaks Mall.

Project Description: This project consists of a holistic LID retrofit to the developed area on and around Fair Oaks Mall. This area is almost entirely impervious, with the small areas of pervious surface being hydrologically disconnected and non-functioning. The goal of this project would be to reduce imperviousness, lengthen hydraulic flow times, increase infiltration and improve water quality.



Potential Project Benefits:

Streamflow	Peak flow reduction should be significant due to reduction in impervious area. Volume losses to infiltration are not assumed to be very significant for this project.
Water Quality	This project has been designed to treat 100% of the water quality volume for the site.

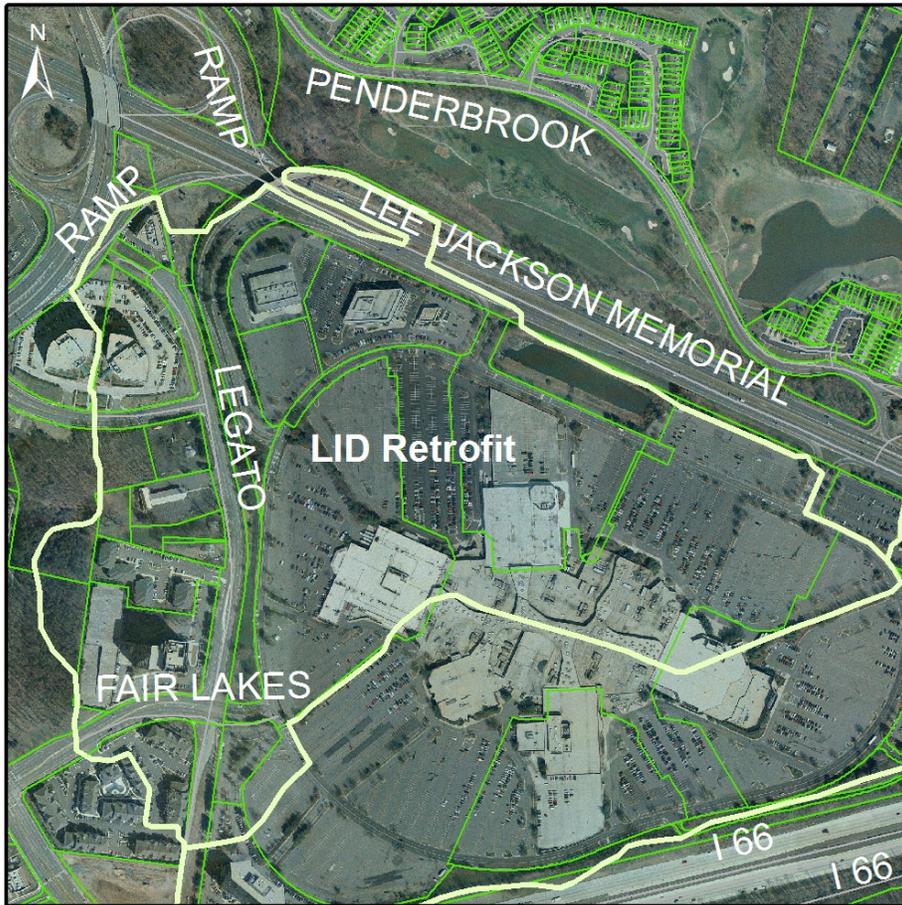
Potential Project Constraints:

Environmental	Environmental permitting issues are not anticipated for this project.
Facility Access	Access to this project is excellent.
Design / Construction	All of this property appears to be privately owned and operated. Projects could be implemented with a public / private partnership.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
LID Structural Control	9,702.0	SY	\$120.00	\$1,164,240
			Base Construction Cost	\$1,164,240
			Mobilization (5%)	\$58,212
			Subtotal 1	\$1,222,452
			Contingency (25%)	\$305,613
			Subtotal 2	\$1,528,065
Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)				\$687,629
			Estimated Project Cost	\$2,216,000

Concept Sketch

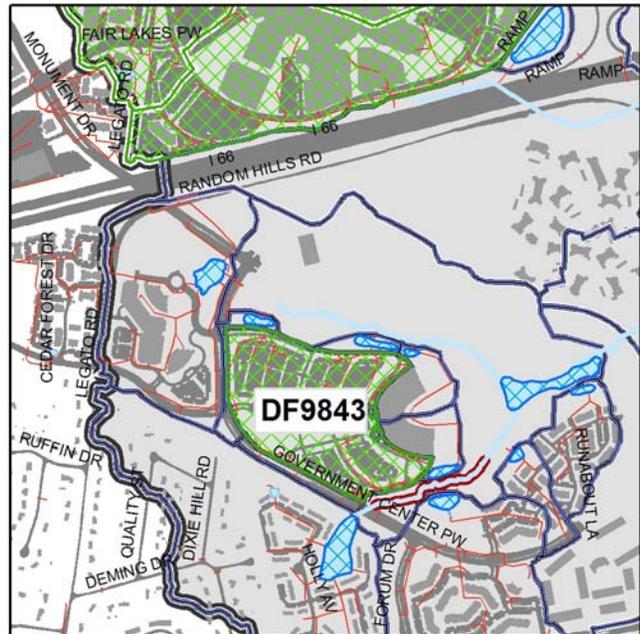


Project Number: DF9843
Catchment Code: DFDF0001
Candidate Site: C43

Project Type: LID Retrofit
Project Size: 0.3 acres
Treated Area: 29.6 acres

Project Location: This project is the entire parking area for the Government Center.

Project Description: This project consists of retrofits to the parking area for the Fairfax County Government Center. Individual LID retrofits could include inlet filtration, removal of pavement or porous pavement, and bioretention in parking islands.



Potential Project Benefits:

Streamflow	This project is expected to reduce runoff volume and flows rate through reduction of effective imperviousness, evapotranspiration, and infiltration..
Water Quality	Significant water quality improvement may be expected through filtration and infiltration with LID systems. The project is designed to treat 100% of the water quality volume for the site.

Potential Project Constraints:

Environmental	Environmental permitting should not be an issue for this project.
Facility Access	Access is excellent.
Design / Construction	No design or construction issues were identified for this project

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
LID Structural Control	1,440.0	SY	\$120.00	\$172,800
Interpretive Signs	1	LS	\$2,000	\$2,000
Base Construction Cost				\$174,800
Mobilization (5%)				\$8,740
Subtotal 1				\$183,540
Contingency (25%)				\$45,885
Subtotal 2				\$229,425
Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)				\$103,241
Estimated Project Cost				\$333,000

Concept Sketch

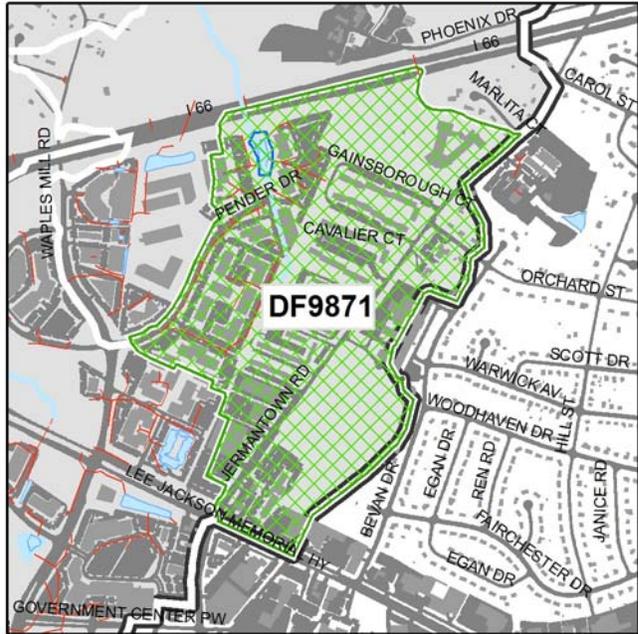


Project Number: DF9871
Catchment Code: DFDF9501
Candidate Site: C71

Project Type: LID Retrofit
Project Size: 1.1 acres
Treated Area: 136.1 acres

Project Location: This project includes part of Pender Bus Park, Sidney Lanier Middle School, and the area in between.

Project Description: The project consists of retrofits to parking areas for all of the sites east of Pender Drive. Individual LID retrofits could include inlet filtration, removal of pavement or porous pavement, and bioretention in parking islands.



Potential Project Benefits:

Streamflow	This project is expected to reduce runoff volume and flows rate through reduction of effective imperviousness, evapotranspiration, and infiltration.
Water Quality	Significant water quality improvement may be expected through filtration and infiltration with LID systems. The project is designed to treat 100% of the water quality volume for the site.

Potential Project Constraints:

Environmental	Environmental permitting issues would not be anticipated for this project.
Facility Access	Access to the site is very good from roads and parking areas.
Design / Construction	No design or construction issues were identified.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
LID Structural Control	5,283.0	SY	\$120.00	\$633,960
Base Construction Cost				\$633,960
Mobilization (5%)				\$31,698
Subtotal 1				\$665,658
Contingency (25%)				\$166,415
Subtotal 2				\$832,073
Engineering, Survey, Land Acquisition, Utility Relocations and Permits (45%)				\$374,433
Estimated Project Cost				\$1,207,000

Concept Sketch

