

AC9400 - Culvert Retrofit



Address: Under Queensberry Avenue, near the intersection of FlagRun Drive and Queensberry Avenue

Location: North Springfield

Land Owner: County - FCPA

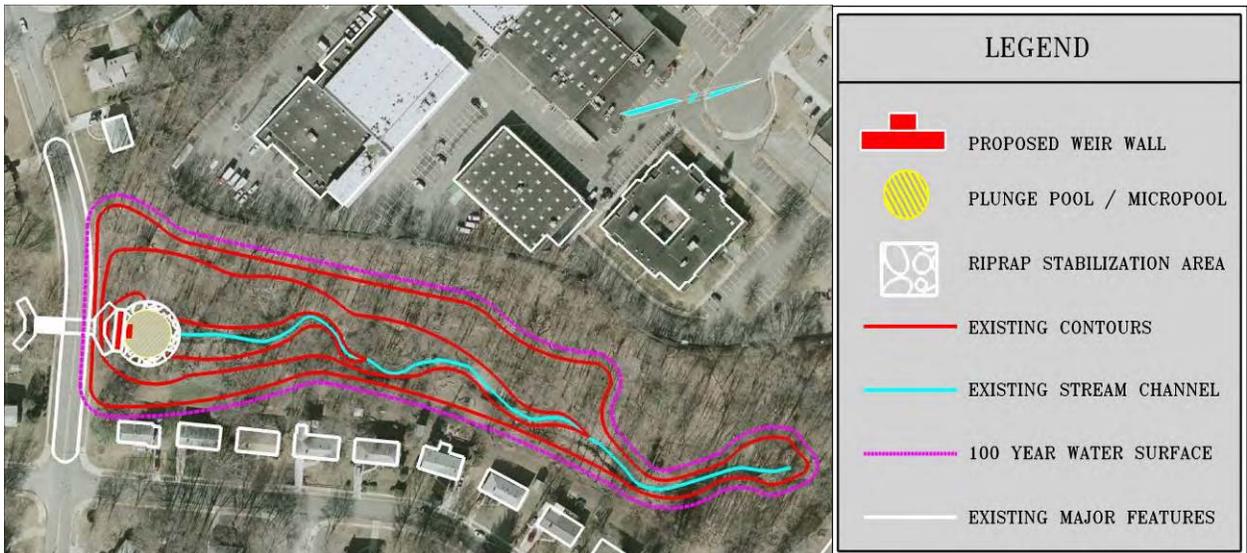
PIN: 0792 01 0001A

Control Type: Water Quality

Drainage Area: 99.86 acres

Receiving Waters: Flag Run

Description: This project is located on the upstream side of Queensberry Avenue between Flag Run Drive and Ravenel Lane. The upstream floodplain is flat and open with possible wetland areas. This culvert retrofit would add a control structure on the upstream side of the culvert to regulate discharge of the small, high frequency storm events.



Project Area Map: Conceptual plan showing potential project location

Project Benefits: This project has the potential to manage high frequency design storms with the addition of a control structure. The newly installed control structure will manage these frequent design storms to help prevent future downstream channel erosion that is currently present by reducing flow rates and discharge velocities back to pre-development conditions. This project will also improve downstream habitat and encourage the settling of suspended solids and floatables from entering downstream channels that drain to Lake Accotink. It is estimated that an annual total of 17,390 lbs of sediment, 126 lbs of total nitrogen and 19 lbs of total phosphorus would be reduced by this project.

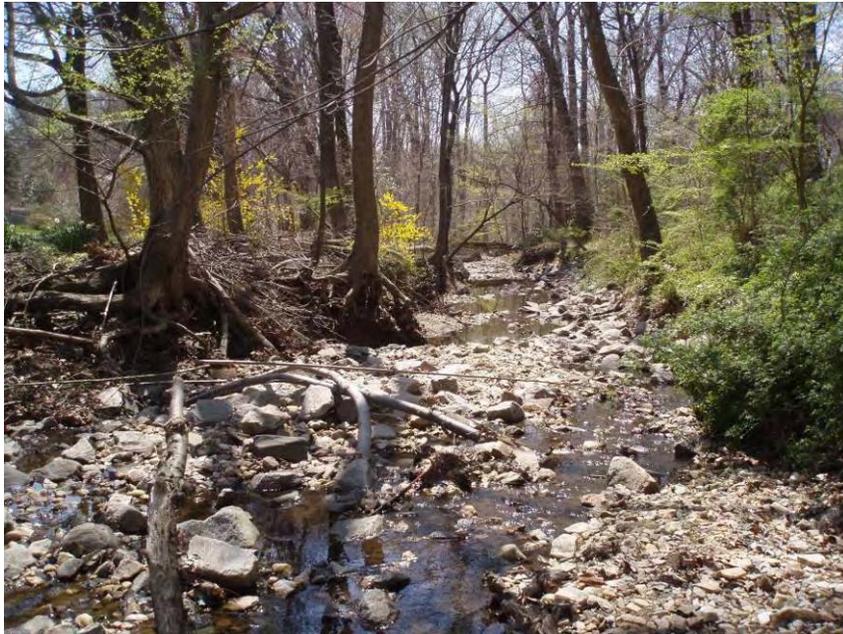
Project Design Considerations: The upstream floodplain is bordered by a commercial/industrial park and several single family homes, which are located within close proximity to the stream channel. By adding a control structure, water levels will rise on the upstream side of the embankment, which should be considered in the design and construction phases. Since this project is located within Lake Accotink Park property, the need for land purchase or acquisition will not be necessary. The base flow component of the control structure will require constant monitoring to prevent clogging. All components of the existing embankment and stream channel should be analyzed to ensure that the integrity is not compromised as a result of the change in hydraulics. Retrofitting this culvert must adhere to FEMA regulations if it is located within the 100 year floodplain. Environmental permitting issues are expected due to the in-stream location of this facility. Moderate tree loss is expected to obtain access and during construction. Existing utility conflicts are not anticipated with this retrofit. Access is good off of Queensberry Avenue.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Plungepool / Micropool	1	EA	\$400.00	\$400
New Control Structure - Weir	1	LS	\$12,000.00	\$12,000
Rip Rap Stabilization	200	SY	\$100.00	\$20,000
			Initial Project Costs	\$32,400
Plantings	1	LS	5% of Project	\$1,620
Ancillary Items	1	LS	5% of Project	\$1,620
Erosion and Sediment Control	1	LS	10% of Project	\$3,240
			Base Construction Costs	\$38,880
			Mobilization (5%)	\$1,944
			Subtotal 1	\$40,824
			Contingency (25%)	\$10,206
			Subtotal 2	\$51,030
			Engineering Design, Surveys, Land Acquisition, Utility Relocations, and Permits (45%)	\$22,964
			Estimated Project Cost	\$74,000



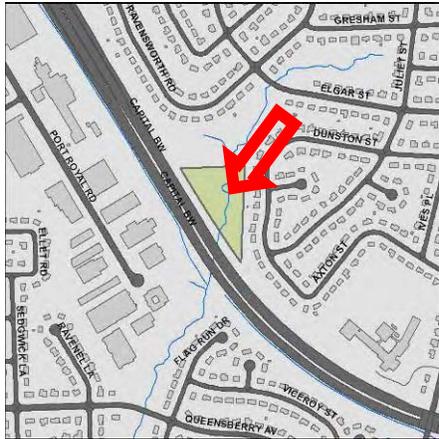
Site Photo: Downstream Side of Existing Culvert Crossing



Site Photo: Downstream of Existing Culvert

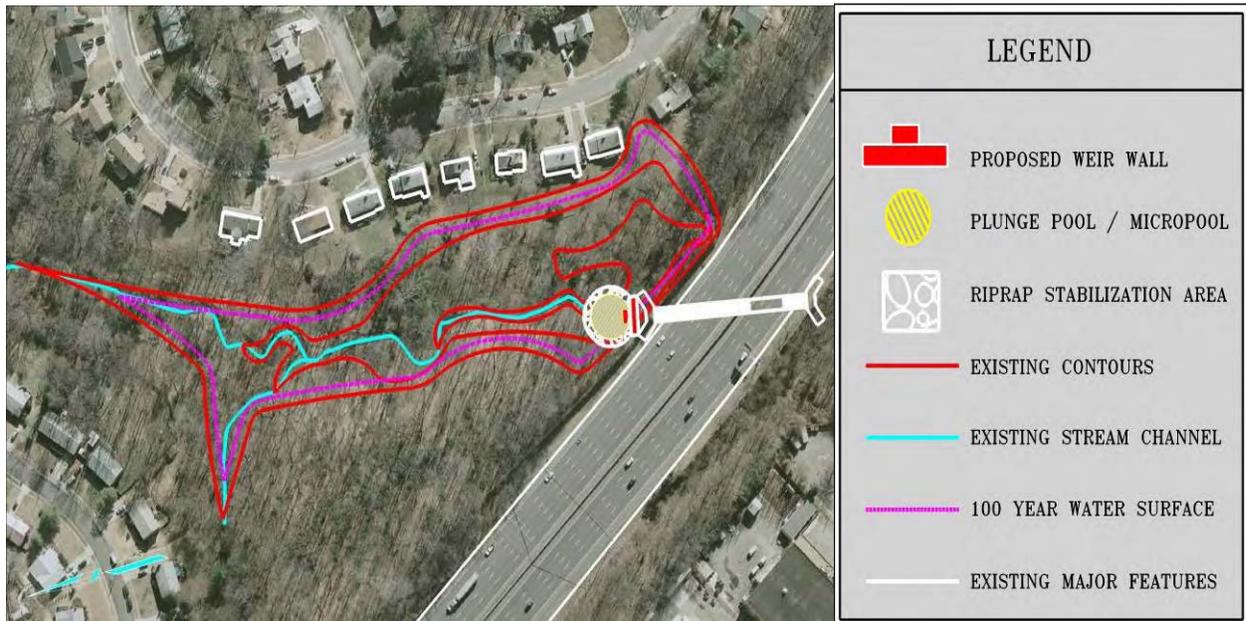
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AC9401 - Culvert Retrofit



Address: Under the Capital Beltway, near the intersection of Dunston Street and Juliet Street
Location: North Springfield
Land Owner: State - VDOT
PIN: 0792 01 0002
Control Type: Water Quality
Drainage Area: 203.03 acres
Receiving Waters: Flag Run

Description: This project is located on the upstream side of the Capital Beltway (I-495) between the Heming Avenue Bridge and Braddock Road interchange. The upstream floodplain is bordered by several single family homes along Dunston and Axton Streets that are relatively close to the stream channel. This culvert retrofit would add a control structure on the upstream side of the culvert to regulate discharge of the small, high frequency storm events.



Project Area Map: Conceptual plan showing potential project location

Project Benefits: This project has the potential to manage high frequency design storms with the addition of a control structure on the upstream side of the existing culvert. Since these design storms occur frequently, this will help to reduce flow rates and discharge velocities back to pre-development conditions, which will help to prevent further eroded conditions and improve the habitat in the downstream channel. Installation of a control structure may also improve the health of the downstream channel by allowing suspended solids and floatables to settle out and not be transported downstream to Lake Accotink. It is estimated that an annual total of 13,980 lbs of sediment, 148 lbs of total nitrogen and 27 lbs of total phosphorus would be reduced by this project.

Project Design Considerations: By adding a control structure, water levels will rise on the upstream side of the embankment, which should be considered into the design and construction phases. The base flow component of the control structure will require constant monitoring to prevent clogging. All components of the existing embankment and stream channel should be analyzed to ensure the integrity of the cross culvert/stream is not compromised as a result of the hydraulic changes. Most of this project appears to be on VDOT property since it is located adjacent to I-495; however, Flag Run Park property is within close proximity to this project and may lessen the need for land purchase or acquisition. Retrofitting this culvert must adhere to FEMA regulations if it is located within the 100 year floodplain. Environmental permitting issues are expected due to the in-stream location of this facility. Significant tree loss is expected to obtain access and during construction. Existing utility conflicts are not anticipated with this retrofit. Access to this culvert would require the use of an existing storm drain/utility easement off of Dunston Street, after which several hundred feet of forested floodplain will need to be navigated to get to the culvert.

Costs:				
ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Plungepool / Micropool	1	EA	\$400.00	\$400
New Control Structure - Weir	1	LS	\$16,000.00	\$16,000
Rip Rap Stabilization	200	SY	\$100.00	\$20,000
			Initial Project Costs	\$36,400
Plantings	1	LS	5% of Project	\$1,820
Ancillary Items	1	LS	5% of Project	\$1,820
Erosion and Sediment Control	1	LS	10% of Project	\$3,640
			Base Construction Costs	\$43,680
			Mobilization (5%)	\$2,184
			Subtotal 1	\$45,864
			Contingency (25%)	\$11,466
			Subtotal 2	\$57,330
			Engineering Design, Surveys, Land Acquisition, Utility Relocations, and Permits (45%)	\$25,799
			Estimated Project Cost	\$83,000



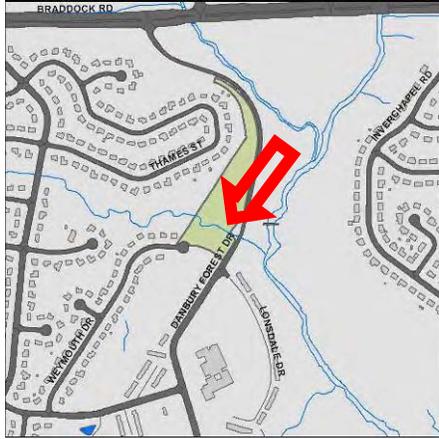
Site Photo: Downstream Side of Existing Culvert Crossing



Site Photo: Downstream of Existing Culvert

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AC9402 - Culvert Retrofit



Address: Under Danbury Forest Drive, near the intersection of Lonsdale Drive and Danbury Forest Drive

Location: Danbury Forest Section 3

Land Owner: County - FCPA

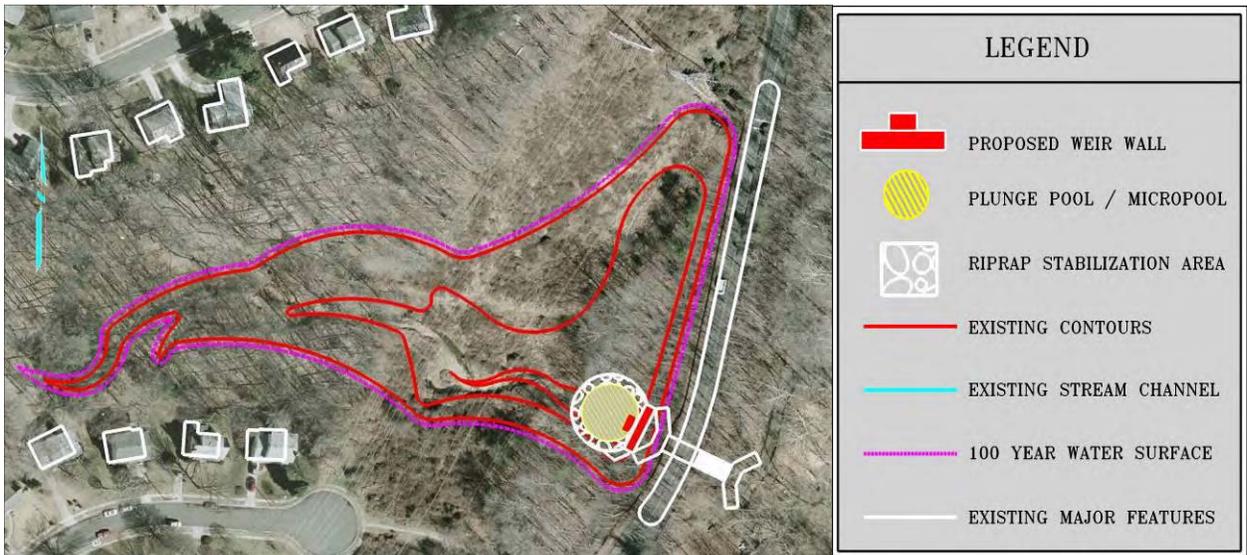
PIN: 0703 12 J

Control Type: Water Quality

Drainage Area: 67.11 acres

Receiving Waters: Unknown tributary of Accotink Creek

Description: This project is located on the upstream side of Danbury Forest Drive near Lonsdale Drive. The site has many trees in the immediate vicinity of the culvert, but there are no building structures nearby as this culvert is near a utility easement. This culvert retrofit would add a control structure on the upstream side of the culvert to regulate discharge of the small, high frequency storm events.



Project Area Map: Conceptual plan showing potential project location

Project Benefits: This project has the potential to manage high frequency design storms with the addition of a control structure. Managing the small design storms will help to reduce flow rates and discharge velocities back to pre-development conditions, which will reduce the potential for future downstream channel erosion since this design storm occurs frequently. Installation of a control structure will also improve the downstream habitat and encourage the settling of suspended solids and floatables such that they do not transport downstream to Lake Accotink. It is estimated that an annual total of 5,380 lbs of sediment, 54 lbs of total nitrogen and 10 lbs of total phosphorus would be reduced by this project.

Project Design Considerations: The upstream floodplain of the culvert underneath Danbury Forest Drive is mostly forested near the culvert; however, approximately 100 feet upstream from the culvert are overhead power lines, where most vertical vegetation has been cleared. These overhead lines are not anticipated to be a conflict. By adding a control structure, water levels will rise on the upstream side of the embankment; however, residential properties are not within close proximity, limiting safety concerns. The base flow component of the control structure will require constant monitoring to prevent clogging. Since this project is located within Lake Accotink Park property, the need for land purchase or acquisition will not be necessary. All components of the existing embankment and stream channel should be analyzed to ensure they can handle the change in hydraulics. Retrofitting this culvert must adhere to FEMA regulations if it is located within the 100 year floodplain. Environmental permitting issues are expected due to the in-stream location of this facility. Some tree loss is expected to obtain access and near the channel during construction. Access off of Danbury Forest Drive will be difficult due to the steep slopes.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Plungepool / Micropool	1	EA	\$400.00	\$400
New Riser	1	LS	\$8,000.00	\$8,000
Rip Rap Stabilization	200	SY	\$100.00	\$20,000
			Initial Project Costs	\$28,400
Plantings	1	LS	5% of Project	\$1,420
Ancillary Items	1	LS	5% of Project	\$1,420
Erosion and Sediment Control	1	LS	10% of Project	\$2,840
			Base Construction Costs	\$34,080
			Mobilization (5%)	\$1,704
			Subtotal 1	\$35,784
			Contingency (25%)	\$8,946
			Subtotal 2	\$44,730
			Engineering Design, Surveys, Land Acquisition, Utility Relocations, and Permits (45%)	\$20,129
			Estimated Project Cost	\$65,000



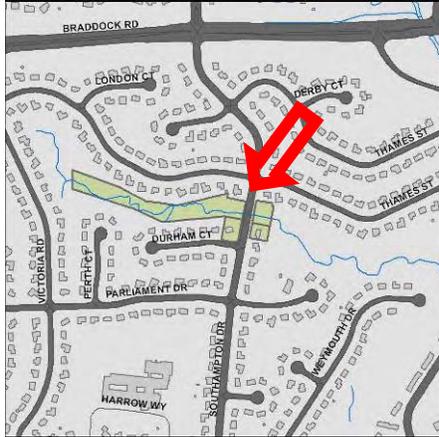
Site Photo: Existing Culvert



Site Photo: Downstream of Existing Culvert

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AC9403 - Culvert Retrofit



Address: Under Southamton Drive, near the intersection of Durham Court and Southamton Drive

Location: Kings Park

Land Owner: County - FCPA

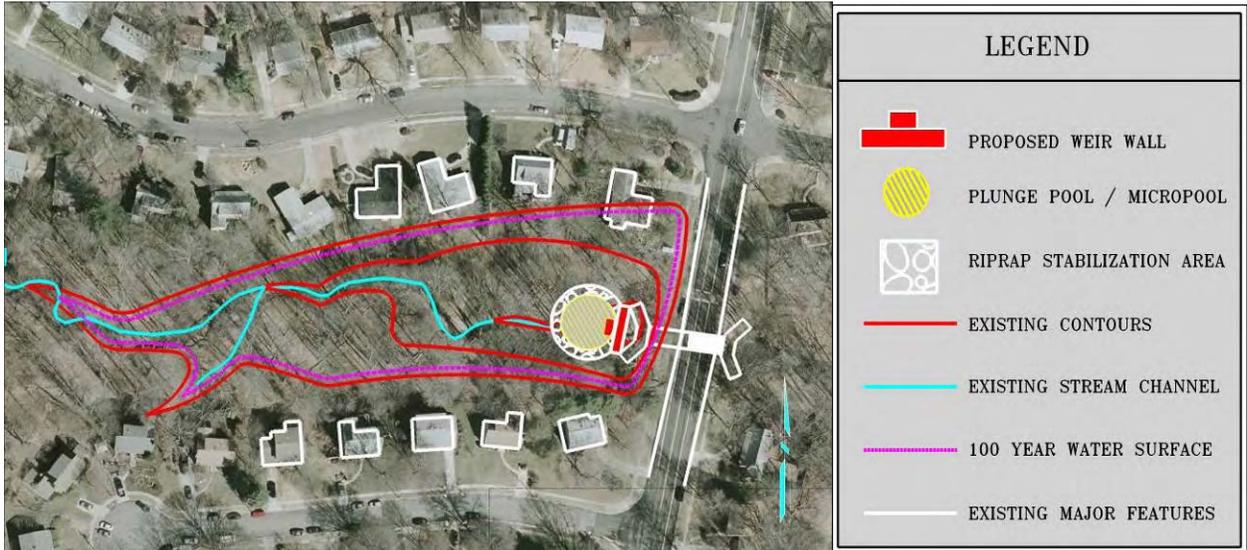
PIN: 0703 04 B

Control Type: Water Quality

Drainage Area: 198.15 acres

Receiving Waters: Unknown tributary of Accotink Creek

Description: This project is located on the upstream side of Southamton Drive between Durham Court and Thames Street. The site is mostly flat with trees in the vicinity of the stream. Houses are on either side of the stream, on both the upstream and downstream side of the culvert. There is some streambank erosion on the downstream side of the culvert. This culvert retrofit would add a control structure on the upstream side of the culvert to regulate discharge of the small, high frequency storm events.



Project Area Map: Conceptual plan showing potential project location

Project Benefits: This project has the potential to manage high frequency design storms. Since these design storms occur frequently, this will help to reduce flow rates and discharge velocities back to pre-development conditions, which would prevent further erosion and improve the downstream habitat. Installation of a control structure may also improve the health of the downstream channel by allowing suspended solids and floatables to settle out and not be transported downstream. It is estimated that an annual total of 6,790 lbs of sediment, 73 lbs of total nitrogen and 13 lbs of total phosphorus would be reduced by this project.

Project Design Considerations: The upstream floodplain of the culvert underneath Southampton Drive is bordered by many single family homes within close proximity to the stream channel. By adding a control structure, water levels will rise on the upstream side of the embankment, which must be considered in the design and construction phases. Since this project is located within Lake Accotink Park property, the need for land purchase or acquisition will not be necessary. The base flow component of the control structure will require constant monitoring to prevent clogging. All components of the existing embankment and stream channel should be analyzed to ensure they are safe. Retrofitting this culvert must adhere to FEMA regulations if it is located within the 100 year floodplain. Environmental permitting issues are expected due to the in-stream location of this facility. Moderate tree loss is expected for access and for the retrofit. Existing utility conflicts are not anticipated with this retrofit. Access is good off of Southampton Drive.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Plungepool / Micropool	1	EA	\$400.00	\$400
New Control Structure - Weir	1	LS	\$16,000.00	\$16,000
Rip Rap Stabilization	200	SY	\$100.00	\$20,000
			Initial Project Costs	\$36,400
Plantings	1	LS	5% of Project	\$1,820
Ancillary Items	1	LS	5% of Project	\$1,820
Erosion and Sediment Control	1	LS	10% of Project	\$3,640
			Base Construction Costs	\$43,680
			Mobilization (5%)	\$2,184
			Subtotal 1	\$45,864
			Contingency (25%)	\$11,466
			Subtotal 2	\$57,330
			Engineering Design, Surveys, Land Acquisition, Utility Relocations, and Permits (45%)	\$25,799
			Estimated Project Cost	\$83,000



Site Photo: Upstream of Existing Culvert



Site Photo: Existing Culvert

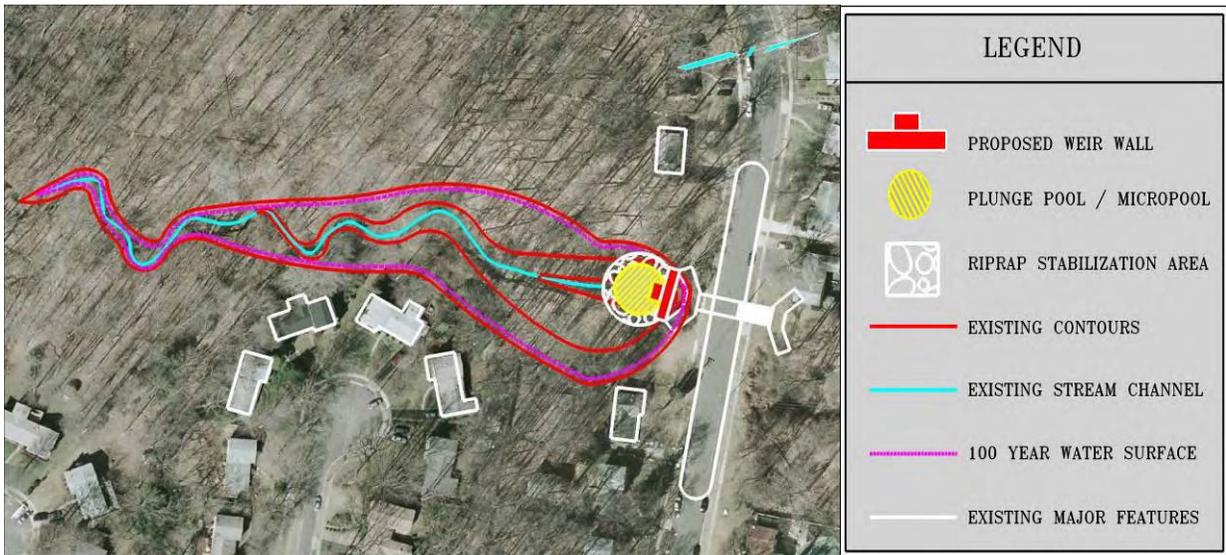
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AC9404 - Culvert Retrofit



Address: Under Red Fox Drive, near the intersection of Andrea Avenue and Red Fox Drive
Location: Red Fox Forest
Land Owner: County - FCPA
PIN: 0694 06 A
Control Type: Water Quality
Drainage Area: 55.66 acres
Receiving Waters: Unknown tributary of Long Branch

Description: This project is located on the upstream side of Red Fox Drive between Sabra Lane and Andrea Avenue. The upstream floodplain is bordered by several single family homes that are located within close proximity to the stream channel. This culvert retrofit would add a control structure on the upstream side of the culvert to regulate discharge of the small, high frequency storm events.



Project Area Map: Conceptual plan showing potential project location

Project Benefits: This project has the potential to manage high frequency design storms with the addition of a control structure on the upstream side of the existing culvert. The newly installed control structure will manage these frequent design storms to help prevent future severe channel erosion that is currently present in the channel by reducing flow rates and discharge velocities back to pre-development conditions. Channel restoration or stabilization along with this culvert retrofit will also help to reduce sediment transport, improve the instream habitat, and reduce future erosion. This project will also encourage the settling of suspended solids and floatables from entering Long Branch. It is estimated that an annual total of 3,600 lbs of sediment, 36 lbs of total nitrogen and seven lbs of total phosphorus would be reduced by this project.

Project Design Considerations: By adding a control structure, water levels will rise on the upstream side of the embankment, which is recommended to be properly addressed, specially along Red Fox Drive and Falling Creek Court. The base flow component of the control structure will require constant monitoring to prevent clogging. Since this project is located within Red Fox Forest Park property, the need for land purchase or acquisition will not be necessary. All components of the existing embankment and stream channel should be analyzed to ensure that the integrity is not compromised as a result of the change in hydraulics. Retrofitting this culvert must adhere to FEMA regulations if it is located within the 100 year floodplain. Environmental permitting issues are expected due to the in-stream location of this facility. Moderate tree loss is expected to obtain access and around the channel during construction. Existing utility conflicts are not anticipated with this retrofit; however, an existing sanitary sewer utility is present on the floodplain. Access is good off of Red Fox Drive.

Costs:

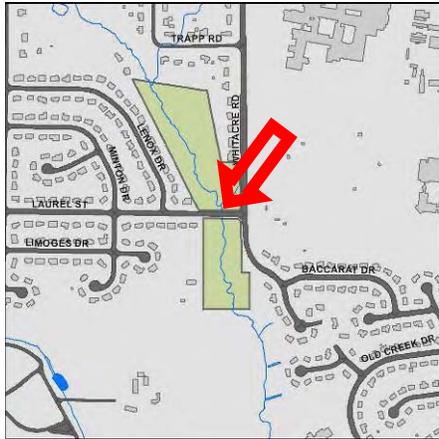
ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Plungepool / Micropool	1	EA	\$400.00	\$400
New Control Structure - Weir	1	LS	\$8,000.00	\$8,000
Rip Rap Stabilization	200	SY	\$100.00	\$20,000
			Initial Project Costs	\$28,400
Plantings	1	LS	5% of Project	\$1,420
Ancillary Items	1	LS	5% of Project	\$1,420
Erosion and Sediment Control	1	LS	10% of Project	\$2,840
			Base Construction Costs	\$34,080
			Mobilization (5%)	\$1,704
			Subtotal 1	\$35,784
			Contingency (25%)	\$8,946
			Subtotal 2	\$44,730
			Engineering Design, Surveys, Land Acquisition, Utility Relocations, and Permits (45%)	\$20,129
			Estimated Project Cost	\$65,000



Site Photo: Downstream Floodplain of Culvert

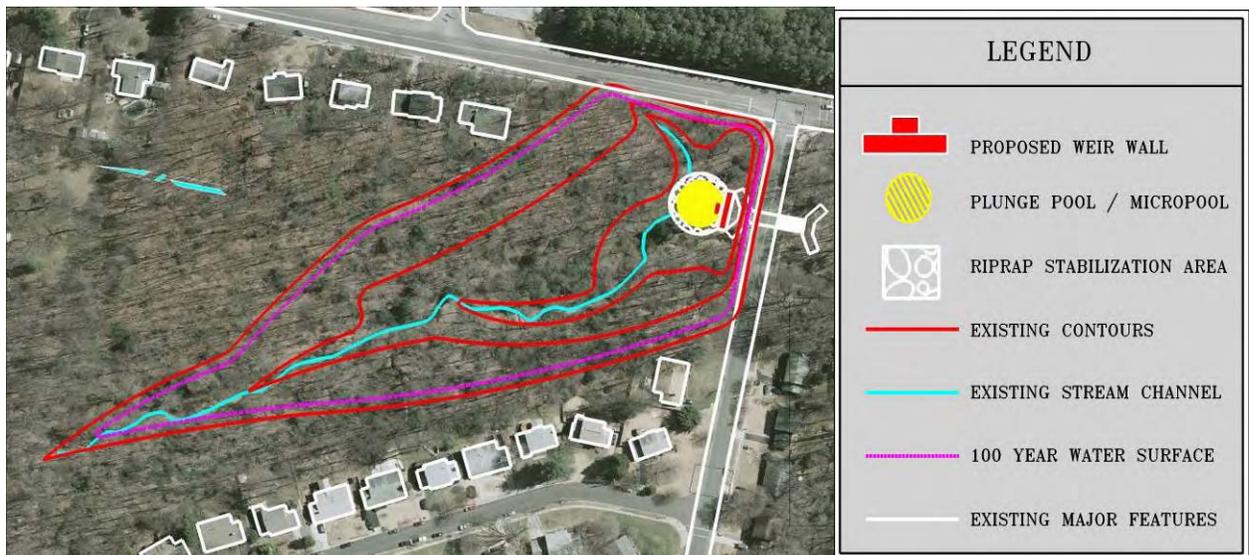
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AC9406 - Culvert Retrofit



Address: Under Laurel Street, near the intersection of Whitacre Road and Laurel Street
Location: Somerset
Land Owner: County - FCPA
PIN: 0583 01 0004
Control Type: Water Quality
Drainage Area: 161.16 acres
Receiving Waters: Long Branch

Description: This project is located on the upstream side of Laurel Street between Lenox Drive and Whitacre Road. The upstream floodplain is bordered by several single family homes along Lenox Drive, which are located relatively close to the stream channel. This culvert retrofit would add a control structure on the upstream side of the culvert to regulate discharge of the small, high frequency storm events.



Project Area Map: Conceptual plan showing potential project location

Project Benefits: This project has the potential to manage high frequency design storms with the addition of a control structure. Since these design storms occur frequently, managing this will help to reduce flow rates and discharge velocities back to pre-development conditions, which will help to prevent further eroded conditions in the downstream channel and improving in-stream habitat. Installation of a control structure may also improve the health of the downstream channel by allowing suspended solids and floatables to settle out and not be transported downstream to Long Branch. It is estimated that an annual total of 9,220 lbs of sediment, 88 lbs of total nitrogen and 18 lbs of total phosphorus would be reduced by this project.

Project Design Considerations: Since this project is located within park property, the need for land purchase or acquisition will not be necessary. By adding a control structure, water levels will rise on the upstream side of the embankment, which must be taken into consideration during the design and construction phases. The base flow component of the control structure will require constant monitoring to prevent clogging. All components of the existing embankment and stream channel should be analyzed to ensure that the integrity of the cross culvert/stream is not compromised with the change in hydraulic characteristics. Retrofitting this culvert must adhere to FEMA regulations if it is located within the 100 year floodplain. Environmental permitting issues are expected due to the in-stream location of this facility. Moderate tree loss is expected for access and along the channel. Existing utility conflicts are not anticipated with this retrofit. Access is good off of Laurel Street.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Plungepool / Micropool	1	EA	\$400.00	\$400
New Control Structure - Weir	1	LS	\$16,000.00	\$16,000
Rip Rap Stabilization	200	SY	\$100.00	\$20,000
			Initial Project Costs	\$36,400
Plantings	1	LS	5% of Project	\$1,820
Ancillary Items	1	LS	5% of Project	\$1,820
Erosion and Sediment Control	1	LS	10% of Project	\$3,640
			Base Construction Costs	\$43,680
			Mobilization (5%)	\$2,184
			Subtotal 1	\$45,864
			Contingency (25%)	\$11,466
			Subtotal 2	\$57,330
			Engineering Design, Surveys, Land Acquisition, Utility Relocations, and Permits (45%)	\$25,799
			Estimated Project Cost	\$83,000



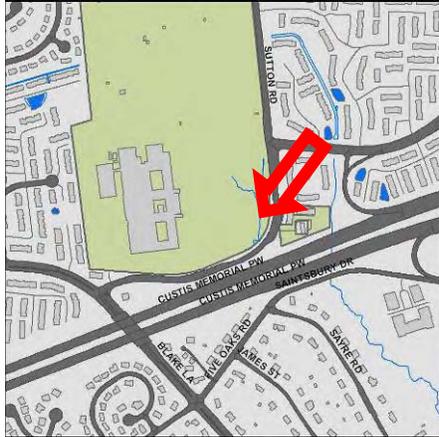
Site Photo: Downstream Floodplain of Culvert



Site Photo: Existing Culvert

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AC9409 - Culvert Retrofit



Address: Under Sutton Road, near the intersection of Sutton Green Court and Sutton Road

Location:

Land Owner: County - FCPS

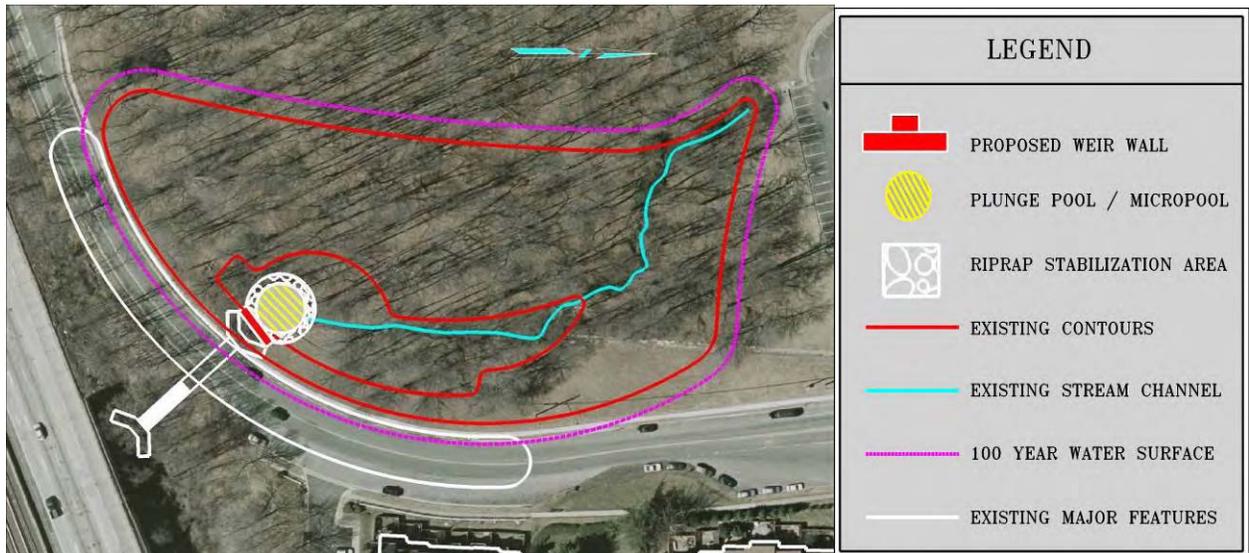
PIN: 0481 01 0111

Control Type: Water Quality

Drainage Area: 42.10 acres

Receiving Waters: Unknown tributary of Accotink Creek

Description: This project is located on the upstream side of Sutton Road near Oakton High School. The floodplain upstream of Sutton Road is mostly forested in the area of the cross culvert. This culvert retrofit would add a control structure on the upstream side of the culvert to regulate discharge of the small, high frequency storm events.



Project Area Map: Conceptual plan showing potential project location

Project Benefits: This project has the potential to manage high frequency design storms with the addition of a control structure. The newly installed control structure will manage these frequent design storms to help prevent future downstream channel erosion by reducing flow rates and discharge velocities back to pre-development conditions. This project will also improve downstream habitat and encourage the settling of suspended solids and floatables from entering downstream channels. This project also provides an excellent environmental education/stewardship opportunity for students and parents of Oakton High School. It is estimated that an annual total of 4,180 lbs of sediment, 42 lbs of total nitrogen and nine lbs of total phosphorus would be reduced by this project.

Project Design Considerations: Moderate tree removal is expected to obtain access off of Sutton Road, to clear the upstream embankment, and around the channel during construction. By adding a control structure, water levels will rise on the upstream side of the embankment; however, students or residents are not within close proximity, limiting safety concerns. Since this project is located on County property, the need for land purchase or acquisition will not be necessary. The base flow component of the control structure will require constant monitoring to prevent clogging. All components of the existing embankment and stream channel should be analyzed to ensure that the integrity is not compromised. Retrofitting this culvert must adhere to FEMA regulations if it is located within the 100 year floodplain. Environmental permitting issues are expected due to the in-stream location of this facility.

Costs:

ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Plungepool / Micropool	1	EA	\$400.00	\$400
New Control Structure - Weir	1	LS	\$8,000.00	\$8,000
Rip Rap Stabilization	200	SY	\$100.00	\$20,000
			Initial Project Costs	\$28,400
Plantings	1	LS	5% of Project	\$1,420
Ancillary Items	1	LS	5% of Project	\$1,420
Erosion and Sediment Control	1	LS	10% of Project	\$2,840
			Base Construction Costs	\$34,080
			Mobilization (5%)	\$1,704
			Subtotal 1	\$35,784
			Contingency (25%)	\$8,946
			Subtotal 2	\$44,730
			Engineering Design, Surveys, Land Acquisition, Utility Relocations, and Permits (45%)	\$20,129
			Estimated Project Cost	\$65,000



Site Photo: Erosion in Upstream Channel

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