

### **Project ID: BMP\_17**

Total Treated Drainage Area: 0.69 acre

Total Treated Impervious Area: 0.47 acre

Total Water Quality Volume (WQV):

~1,647 cubic feet; 0.04 acre-foot

Rainfall Depth Treated (Pe): 1 inch

Annual Nutrient Removal:

- TN: 2.7 lbs
- TP: 0.2 lb
- TSS: 0.1 ton

### ***Existing Site Description***

The existing infiltration trench is at the northwest end of the Georgetown Plaza, a commercial property on Bay Ridge Road. A curb cut at the northwest end of the parking lot, adjacent to the infiltration trench, collects stormwater runoff from the western portion of the parking lot and discharges to the infiltration trench. Excess flow from the infiltration trench is captured by the yard inlet located at the northeast end of the property. A portion of open area located northwest of the property also drains to the infiltration trench. The open area currently has some trees. The infiltration trench was constructed in 1986, prior to the current Maryland stormwater management standards, and therefore does not receive any credit for stormwater management.

A wooden fence surrounds the perimeter of the infiltration trench. Neither sanitary sewer lines nor water lines were identified in the vicinity of the infiltration trench. The soils in the drainage area are hydrologic soil groups C and D, and the infiltration trench is located over hydrologic group C soils. The infiltration trench is located on a parcel owned by a private owner. Figure 22 shows the existing conditions map with drainage area.

### ***Proposed Project Description***

The proposed project would convert the existing infiltration trench to a bioretention facility. A bioretention would be designed using MDE's *Stormwater Design Manual*. The existing curb cut at the northwest end of the property would serve as one inlet to the proposed bioretention. A second inlet would be created by adding a curb cut to the parking lot. Pretreatment sediment basins will be excavated at the two inlets to reduce sedimentation within the bioretention. A weir would be constructed to convey runoff from the sediment basins to the bioretention facility, and an underdrain would be installed within the bioretention facility with a two cleanout pipes for maintenance of the system. The new weir would provide overflow from the bioretention (for flows greater than the water quality storm) to the yard inlet at the north east end of the property. A ponding depth of 1 foot would accumulate in the bioretention to capture and treat the design water quality volume. Excavation of the existing infiltration trench and adjacent open area will result in removal of approximately four existing trees in the open area.

Implementation of the bioretention would reduce pollutants such as TN, TP, and TSS. This project will help the City of Annapolis achieve approximately 0.47 acre of impervious area credits toward its upcoming NPDES MS4 requirements. Figure 23 provides the schematic of the proposed bioretention system, and Figure 24 provides a typical profile.

***Feasibility Assessment***

<b>Property Ownership</b>	The property is privately owned; the City would need to coordinate with the property owner to obtain permission to implement this project.
<b>Construction Access</b>	The site can be accessed from the parking lot of Georgetown Plaza located on Bay Ridge Road. Area is available to stage construction activities. Existing slopes are navigable by construction equipment.
<b>Utility Conflicts</b>	There are no sanitary sewer lines or water lines in the project area. Though there were no indicators of underground electric utilities at the project site (i.e., no light poles or utility boxes), confirmation should be obtained during final design.
<b>Environmental Impacts</b>	There are approximately 4 trees in the open space adjacent to the infiltration trench that would be affected by this project.
<b>Design/Construction</b>	Geotechnical investigation will be required to determine the groundwater elevation and the infiltration rate in the project area during final design. If the infiltration rate is 0.52 inch per hour or greater, then the underdrain may not be required.

***Plans and Permits***

The following plans and permits may be required for the implementation of this project:

- Site/Schematic Development Application
- Stormwater Management Plan
- Grading and Erosion Sediment Control Plan

*Cost Estimate*

**Table 13: Cost Estimate for BMP 17 Retrofit**

<b>Item</b>	<b>Quantity</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total</b>
Clear and Grub	500	SY	\$2.00	\$1,000.00
Excavation and Hauling	410	CY	\$50.00	\$20,500.00
Grading	410	SY	\$3.50	\$1,435.00
Tree Removal	4	EA	\$800.00	\$3,200.00
Rip-Rap	100	CY	\$130.00	\$13,000.00
Stabilized Construction Entrance	1	EA	\$2,000.00	\$2,000.00
Gravel Bed	40	TON	\$38.00	\$1,520.00
Bioretention Soil Mix	110	CY	\$150.00	\$16,500.00
Mulch	140	SY	\$7.00	\$980.00
Bioretention Plantings – Trees	4	EA	\$300.00	\$1,200.00
Bioretention Plantings – Shrubs	20	EA	\$57.40	\$1,148.00
Bioretention Plantings – Herbaceous Plants	270	EA	\$7.00	\$1,890.00
6-inch Perforated PVC Underdrains	110	LF	\$15.00	\$1,650.00
Cleanout Pipes	1	EA	\$240.00	\$480.00
CY - Cubic Yards				
SY - Square Yards				
EA - Each			Initial Project Costs	\$66,503
LF - Linear Feet				
		Contingency	20%	\$13,301
		Erosion and Sediment Control	15%	\$9,975
		Base Construction Costs		\$89,779
		Mobilization	10%	\$8,978
		<b>Total Construction Cost<sup>13</sup></b>		<b>\$98,757</b>
		20 Years Life Cycle Maintenance Cost <sup>14</sup> (Average Annual Maintenance Cost of \$1,531)		\$30,620

<sup>13</sup> Additional cost of approximately \$100,000 for design, environmental services, geotechnical investigation, survey, and permitting is assumed.

<sup>14</sup> University of Maryland. October 2011. Cost of Stormwater Management Practices in Maryland Counties.

*Computations*

**Table 14: Water Quality Volume (WQ<sub>v</sub>) Calculations**

<b>Design Parameters</b>	<b>Site Value</b>
Treated Drainage Area (acres), A	0.69
Percent Impervious Cover, I	68%
Rainfall Depth (inches), P	1
Volumetric Runoff Coefficient, R <sub>v</sub>	0.66
<b>Water Quality Volume (acre-feet), WQ<sub>v</sub></b>	<b>0.04</b>
<b>Water Quality Volume (cubic-feet), WQ<sub>v</sub></b>	<b>1,647</b>



Figure 22: Existing Conditions and Drainage Area



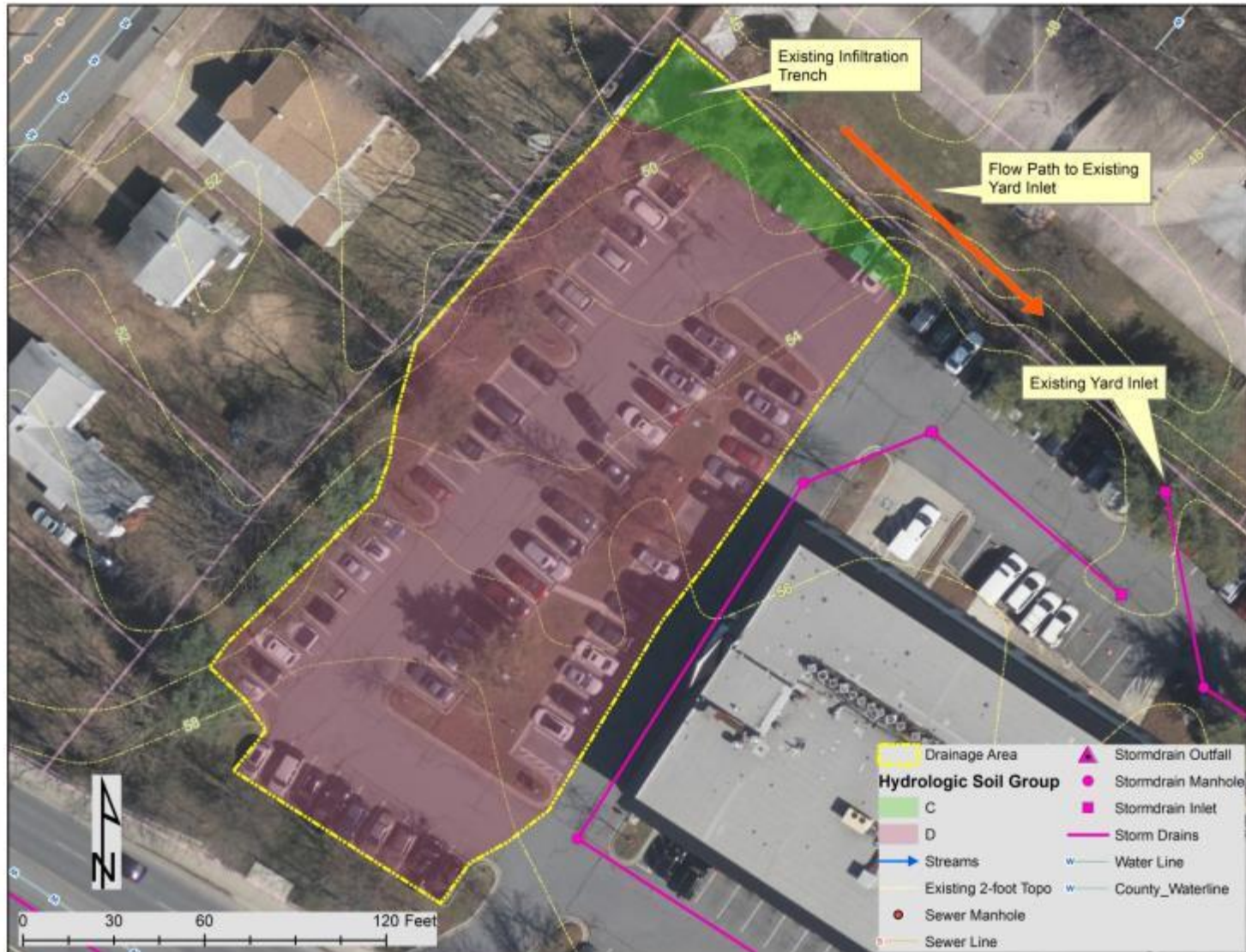


Figure 23: Proposed Retrofit Concept Design

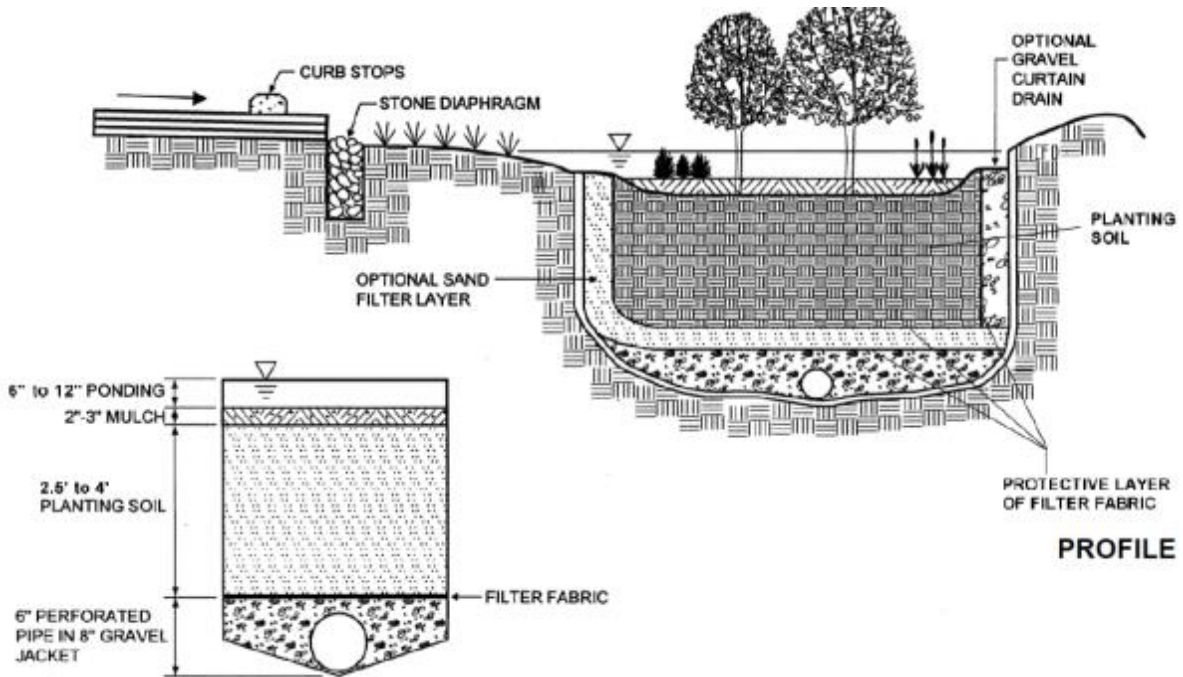


Figure 24: Typical Profile of Bioretention (MDE 2000 *Stormwater Design Manual*)

*Site Photographs*



Existing Infiltration Trench at the North End of Georgetown Plaza