
Appendix C

Rocky Branch (246) Subwatershed Project Conceptual Design Narratives

Project: Rocky Branch – Study of Kings Brook Home Owners Association Bioretention Facilities

Watershed:	Broad Run
Subwatershed Name:	Rocky Branch
Subwatershed Code:	246
Site ID:	246-243, 244, 364, 365
County Facility ID:	221, 222, 241, 242, 243, 244, 247, 248, 249, 250, 364, 365, 366, 367, 400
Facility Type:	BMP
Facility Description:	Bioretention
Project Type:	Investigation / Study
Drainage Area:	Variable for each BMP
GPIN/Owner:	243 and 244 (7496-11-9463), 364 and 365 (7496-13-7249)
Neighborhood/Address:	Kings Brooke Home Owners Association Inc. 13400 Cunard Court, Bristow 20136
GPS Coordinates:	N/A – Entire Kings Brook Neighborhood
SWM Subwatershed Ranking:	3
SWM Study Ranking:	--
Priority:	Moderate

Location: The BMPs to be studied are located in the Kings Brooke neighborhood on Kings Brooke Home Owners Association Inc. property.

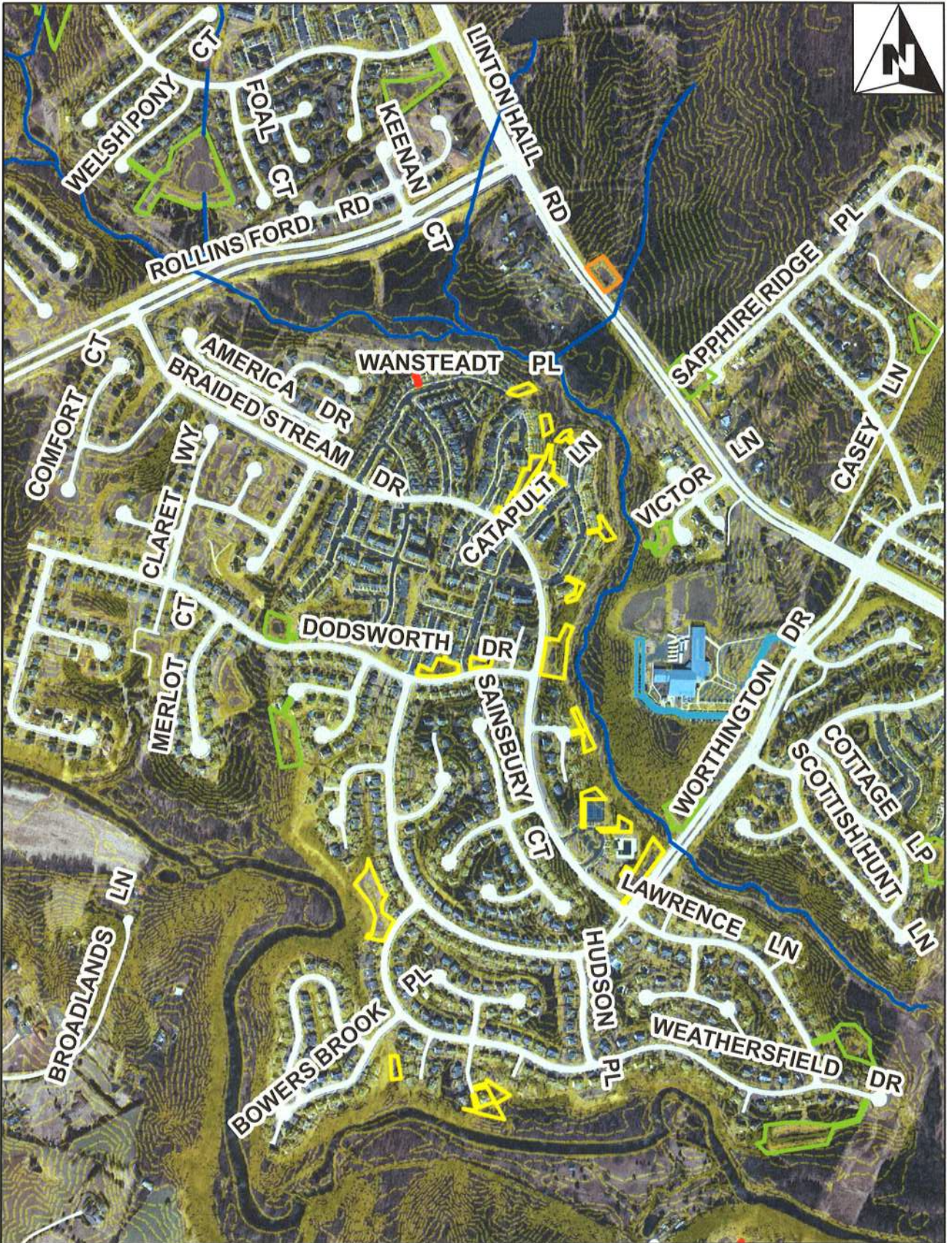
Problem Description: Four of the 17 Bioretention BMPs within this Kings Brook Home Owners Association property were inspected in the field. In two cases (243 & 244), the facility appears to be a simple outfall into a vegetated area without any features to generate retention, infiltration or other water quality or quantity treatment. In two other cases (364 & 365) the outfalls flow into landscaped areas without retention. In some cases there was a graded basin present, but the outfall did not discharge to the basin. Although all four facilities inspected were listed in the County database as bioretention facility, none of the facilities inspected conformed to current standards for bioretention. All of the BMP facilities were added to the County database between 1998 and 2002, when standards for bioretention were not well developed.

Project Description: A study is recommended to assess all 17 “bioretention” BMPs within this neighborhood to determine if sufficient levels of stormwater quality protection are being performed by the existing facilities. Where possible, modifications or retrofits to the facilities should be made to improve their water quality functioning and bring them more into conformance with current standards. In particular, landscaping and property maintenance practices that may have altered or degraded the original function of the facility should be identified.

Potential Benefits: This study will highlight if early attempts at Bioretention BMPS are providing effective water quality management.

Design Considerations and Constraints: The study should take into account the compatibility of any proposed retrofits with the HOAs existing landscaping and site conditions. Current standards for bioretention BMPs may not fit within the available space of the present facilities.

Cost Estimate: The estimated cost of this study is \$25,000.



Watershed: Rocky Branch
Site ID#: 246-243, 246-244, 246-364, 246-365
BMP #: 243, 244, 364, 365
ADC Map (25th edition): Map 7, Page 12, grid coordinate G8



Photo 1 (244): Typical example of outfall into vegetated swale classified as “Bioretention”



Photo 2 (364): Typical example of “Bioretention” facility lacking detention

Project: Rocky Branch 246-395 Repair or Water Quality Retrofit

Watershed: Broad Run
Subwatershed Name: Rocky Branch
Subwatershed Code: 246
Site ID: 246-395
County Facility ID: 395
Facility Type: BMP
Facility Description: Wet (conflicts with field condition)
Project Type: Water Quality Retrofit
Drainage Area: 5 acres estimate from GIS
GPIN/Owner: 7496-13-2468
Neighborhood/Address: Trafalgar House Property Inc.
13428 Wansteadt Place, Bristow 20136
GPS Coordinates: 38° 46' 01.00
77° 35' 40.86
SWM Subwatershed Ranking: 2
SWM Study Ranking: --
Priority: Moderate

Location: This site is located along Wansteadt Place north of Braided Stream Drive and on the property of Trafalgar House Property Inc..

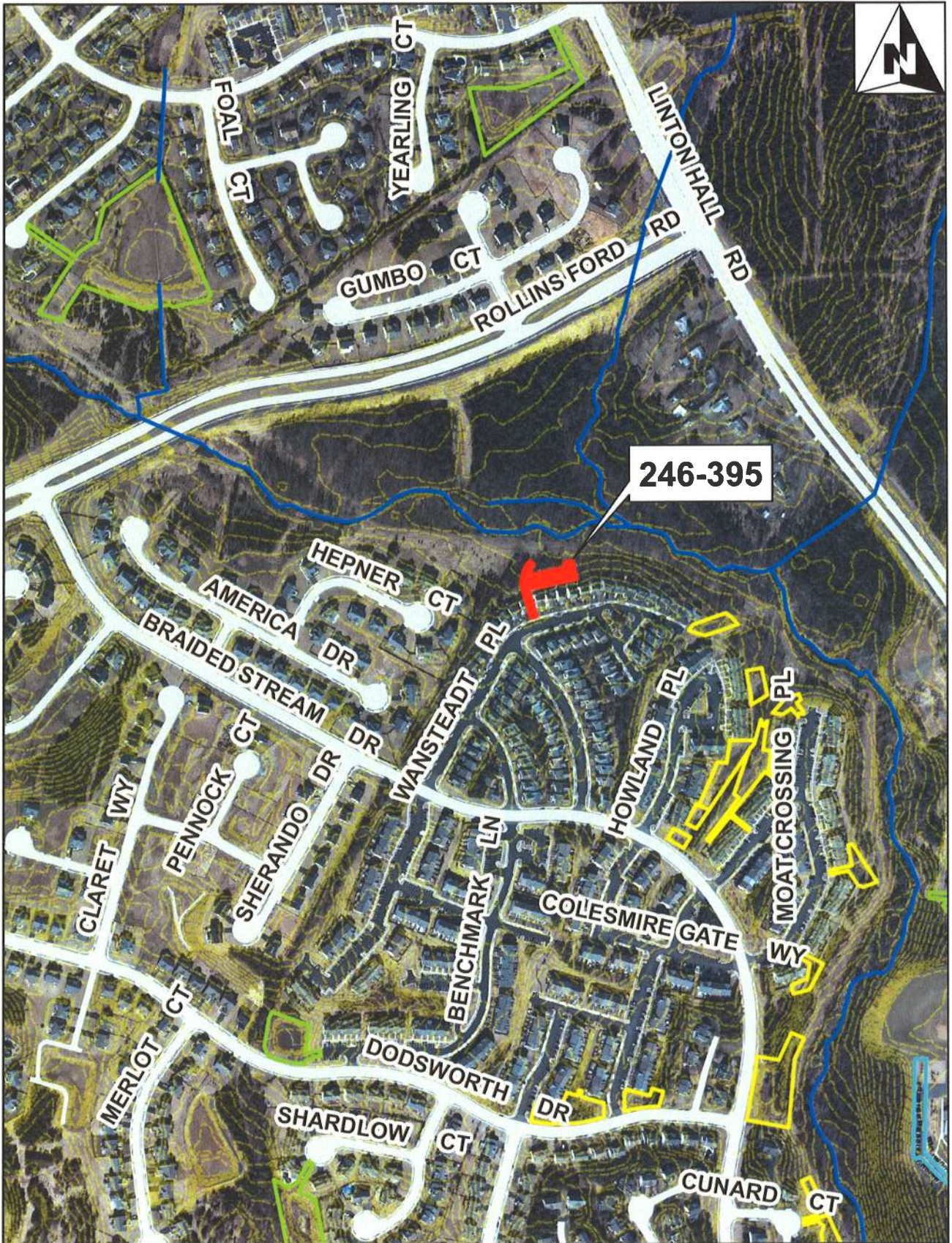
Problem Description: This BMP is listed as a wet pond in the County database with a 72 inch riser and constructed before 2002. Onsite inspection indicates it's a gravel filter with a forebay and underdrains. One inlet discharges to a forebay that is filled with sediment, litter and cattails. The forebay (1,000 sf) appears to remain ponded permanently. A riprap check dam separates the forebay from the gravel infiltration basin. The gravel filter basin (1,200 sf) has some vegetation, including one large sycamore tree. The surface of the basin appears compacted and probably clogged with fines. The four underdrains discharge to an open ditch that leads to the nearest stream channel. The whole facility is set within a basin that would allow up to several feet of ponding. There appears to be a splitter box to bypass high flows. The forebay has very little capacity left to capture or store sediment. The dense vegetation makes it hard to remove the litter that is accumulating in the site. With minimal maintenance over the past 10 years, the infiltration capacity of the basin may be greatly reduced.

Project Description: Recommendations are to renovate the forebay by removing the sediment, vegetation and litter. To restore the gravel infiltration basin, either replace the gravel or consider conversion to a bioretention basin. However, the existing facility, exclusive of the forebay, is only 1,200 sf. Based on 6 inch ponding for bioretention, this site could only provide treatment for 0.33 acres of impervious surface, or about 0.5 acres of high density housing. With a drainage area of approximately 5 acres of high density housing, this facility is significantly undersized regardless of the type of water quality treatment.

Potential Benefits: Cleaning out the forebay and replacing the gravel in the basin would bring this site back to its original function, but it would still be significantly undersized by any standard.

Design Considerations and Constraints: Construction access would be through an easement on residential land, although the access is constrained. Basin size limits options for retrofits that meet current design standards.

Cost Estimate: Repairs to the forebay and gravel infiltration basin are estimated at \$25,000. The conversion to a bioretention basin is estimated to cost approximately \$35,000. Neither option brings the facility to the proper sizing standards.



Watershed: Rocky Branch
Site ID#: 246-395
BMP #: 395
ADC Map (25th edition): Map 7, Page 12, grid coordinate F6



Existing Condition: Facility in need of maintenance and possible retrofit



Photo 1: Forebay ponded and supporting wetland vegetation

Project: Rocky Branch 246-5050 Water Quality Retrofit

Watershed:	Broad Run
Subwatershed Name:	Rocky Branch
Subwatershed Code:	246
Site ID:	246-5050
County Facility ID:	5050
Facility Type:	CSWMP/BMP
Facility Description:	Dry
Project Type:	Water Quality Retrofit
Drainage Area:	22.6 acres
GPIN/Owner:	7496-07-8757
Neighborhood/Address:	America Online Inc. 8217 Linton Hall Road, Bristow 20136
GPS Coordinates:	38° 46' 41.31 77° 35' 34.79
SWM Subwatershed Ranking:	1
SWM Study Ranking:	--
Priority:	Moderate

Location: The water quality retrofit site is located to the north west of the intersection of Linton Hall Road and Rollins Ford Road on the property of America Online Inc.. Access is from a gravel utility ROW road.

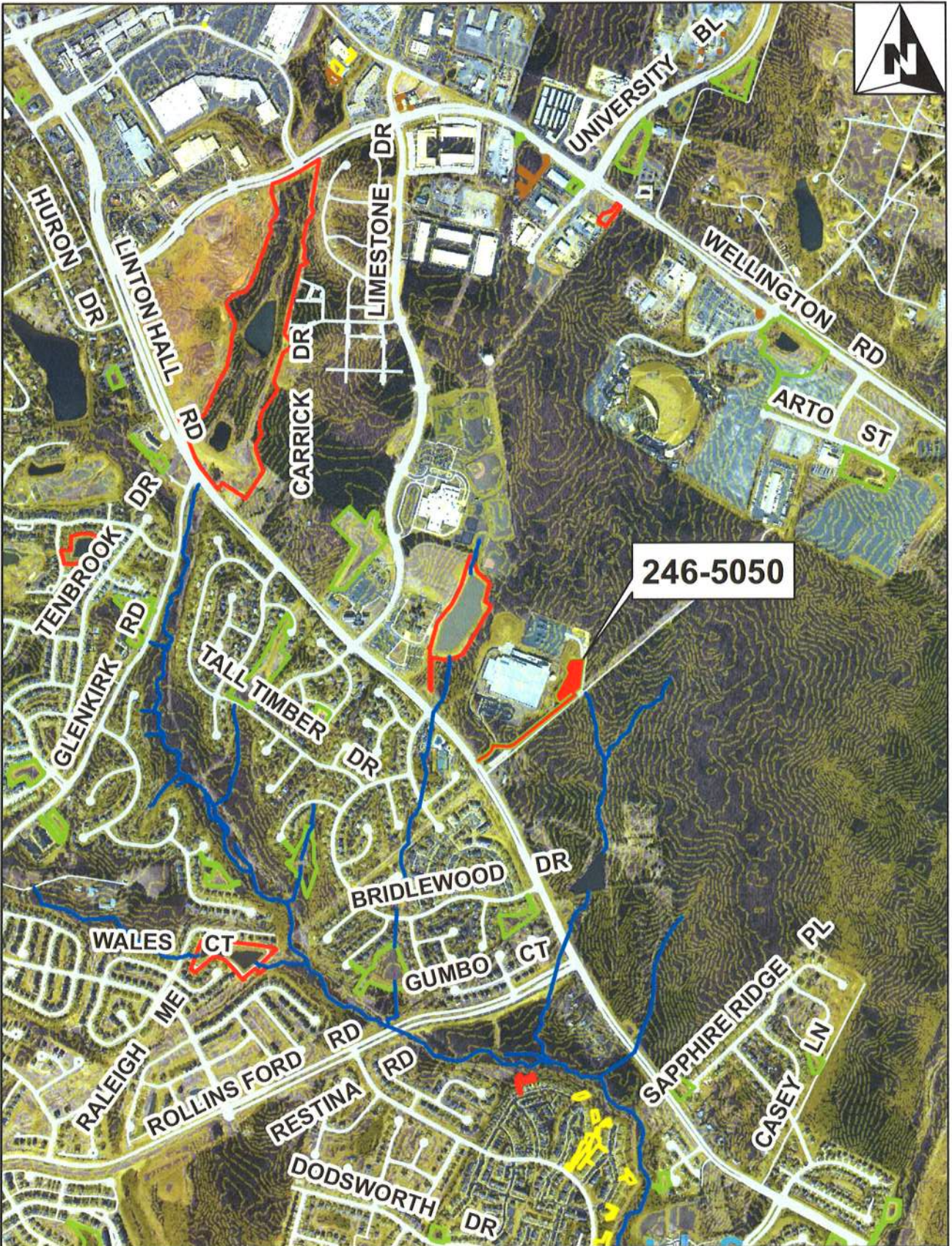
Problem Description: This facility is listed in the database as a County maintained dry basin constructed sometime before 2002. It has a 48 inch riser and drains approximately 23 acres of a large commercial building (11.4 acres impervious). The BMP is 30,900 square feet in area. The BMP is designed as a dry pond, however, under current conditions it contains approximately 12 inches of water across its entire footprint. Approximately 10-20% of the basin is supporting native wetland plants, including bulrush, indicating a permanently ponded condition. The facility does not have forebays and significant sediment accumulation can be seen at the three inlets and at the riser.

Project Description: This facility clearly shows the ability to support permanent wetland vegetation and a consistent pool elevation. Recommendations include adding sediment forebays to control sedimentation, and retrofitting the remaining basin into a constructed wetland with a larger amount of wetland vegetation, variation in water depths, and a micropool at the riser. The riser would be modified to allow for subsurface withdrawal which will minimize clogging.

Potential Benefits: Based on proposed DCR standards, assuming proper function as an extended detention pond, the existing basin provides only 15% P removal rate and 10% N removal. The retrofit to a constructed wetland would result in 50% P removal and 25% N removal. This retrofit would also improve the ease of maintenance, reduce clogging of the outlet structure at the riser, and extend the serviceable life of the facility.

Design Considerations and Constraints: The retrofit should take into account the original design calculations. Construction access and staging would be easily accomplished from the adjacent gravel road.

Cost Estimate: The retrofitting of this facility to a constructed wetland is estimated to cost approximately \$95,000. The average cost per acre of impervious surface would be \$8,400.



246-5050

Watershed: Rocky Branch
Site ID#: 246-5050
BMP #: 5050
ADC Map (25th edition): Map 7, Page 12, grid coordinate F5



Existing Conditions: Dry basin BMP with permanent pool and wetlands



Conceptual Plan: Convert dry basin to constructed stormwater wetland facility



Photo 1: Wetland covers a significant portion of this dry basin with 12” of water over the entire basin



Photo 2: Sediment accumulation visible in background

Project: Rocky Branch 246-2 Channel Enhancement

Watershed:	Broad Run
Subwatershed Name:	Rocky Branch
Subwatershed Code:	246
Site ID:	246-2
County Facility ID:	N/A
Project Type:	Channel Enhancement
Drainage Area:	Estimated from GIS at 40 acres
GPIN/Owner:	7396-76-4789
Neighborhood/Address:	Rocky Run Homeowners Association 13970 Dancing Twig Drive, Gainesville 20155
GPS Coordinates:	38° 46' 29.28 77° 36' 28.47
Stream Ranking:	2

Location: This site is located east of the intersection of Crackling Fire Drive and Dancing Twig Drive on the property of Rocky Run Homeowners Association.

Problem Description: The 42 inch stormwater outfall provides a continuous baseflow for much of the year. There is also a 30 inch and a 15 inch outfall which only flows during storm events. Wetland plant species typical of constant hydrology are growing along the stream channel and the channel supports a fish population, probably mosquito fish. The stream channel flows through a graded high flow drainage swale with a well-manicured lawn. The two smaller outfalls drain approximately 10 acres without stormwater management. The 42 inch outfall actually drains a large area (30 acres), including two significant BMPs (#576 and #5492).

The residents consider the poor drainage, soggy soils and ponding along the swale undesirable. They often mow the swale to keep the vegetation under control, and cleanout the channel to keep it flowing. Storm flows can be very deep with the channel. The stream channel has a high concentration of filamentous algae.

Project Description: Due to the large total drainage area and limited space at this site an outfall retrofit is not possible. However, the baseflow provides the opportunity to reconstruct the swale into an actual stream channel with a wetland floodplain and a woody riparian buffer. This work would convert the manicured lawn along the drainage swale into a more natural floodplain and riparian buffer, with a baseflow aquatic channel. Baseflows should be screened for illicit discharges based on the high concentration of filamentous algae in the stream channel and to determine the source of the baseflows. The baseflow channel would be limited to the lower 300 feet of the swale. The channel would be about 2 feet wide and only 0.5 feet deep, with a gravel/cobble bottom. The floodplain benches would be planted and seeded with wetland species. The side slopes of the swale would be planted with shrubs.

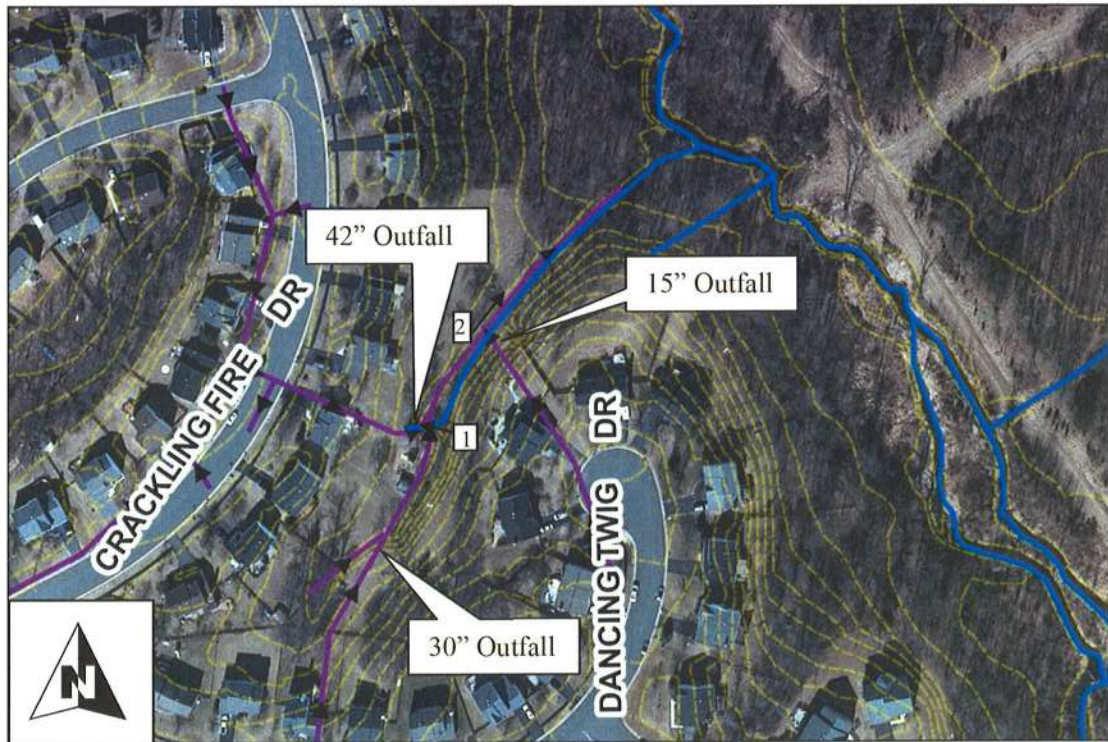
Potential Benefits: This project would resolve questions about the source of the baseflow, and provide a more natural and functional channel.

Design Considerations and Constraints: Although the site is located on HOA land, construction access would be through residential back yards. Adjacent residents often mow the site, so may not tolerate a change in vegetation or drainage condition. Residential lawns have been extended onto HOA property. Fencing may be needed to define the HOA property boundaries.

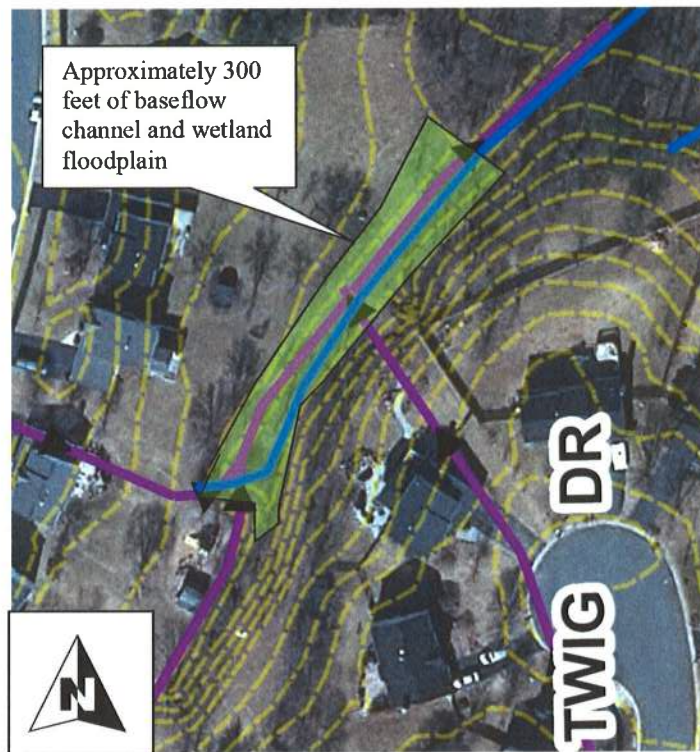
Cost Estimate: The channel enhancement is estimated to cost approximately \$32,000.



Watershed: Rocky Branch
Site ID#: 246-2
ADC Map (25th edition): Map 7, Page 12, grid coordinate D5



Existing Condition: Three outfalls discharge to a graded drainage swale



Conceptual Plan: Restore 300 linear feet of baseflow channel with wetland floodplain and riparian buffer



Photo 1: Continuous baseflow supports wetland plants (skunk cabbage)



Photo 2: Poorly draining grassed drainage channel is routinely mowed by adjacent landowners, note high algae load in channel