Dye Branch II
Stream Restoration
MY8 Monitoring Report (2019)
NCDMS Project Number: 92255

Submitted to
North Carolina Division of Mitigation Services
North Carolina Department of Environmental Quality
March 2020

1652 Mail Service Center
Raleigh, NC 27699

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March 5, 2020

Matthew Reid
Western Project Manager
NCDENR – Division of Mitigation Services 5
Ravenscroft Dr., Suite 102
Asheville, NC 28801
(828)231-7912 Mobile
matthew.reid@ncdenr.gov

Re: Monitoring Year 8 Draft Report for the
Dye Branch II Stream Restoration Site
Yadkin River Basin – CU# 03040105–Iredell County
EEP Project ID No. 92255
Monitoring Contract # 004523

Dear Mr. Reid,

I have outlined our responses to the comments on the Draft Monitoring Year 8 report for the Dye Branch II Stream Restoration Site in (Red).

Executive Summary:

- Please revise sentence regarding treatments since 2015 to read nine instead of seven to account for the 2019 invasive work. Updated to nine recorded treatments.
- Please revise the sentence referencing June and September of 2018 (MY7) invasive treatment and replace with the following 2019 dates: July and September of 2019 (MY8). Revised sentence.

Table 2:

- Please add the following invasive treatment dates to the table: June 2018, September 2018, July 2019 and September 2019. Table 2 edited.

CCPV

- The CCPV invasive polygon has not been updated since MY5. A contractor has spent a considerable amount of time on the site treating invasives to meet a threshold that will be acceptable for regulatory closure. While there may still be some invasives present, this polygon does not represent the current site conditions based on DMS site inspections of the contractor's work. DMS will continue treating the site through regulatory close out. Please update the invasive polygon to reflect current site conditions. CCPV updated to reflect MY8 treatments.

Appendix A

- Footers in Appendix A reference MY7 Please update to MY8 and QA/QC document for other occurrences. Reviewed and edited where applicable.

Appendix C

- The photo description for Vegetation Monitoring Plot 7 is highlighted green inthe draft hard copy. Please correct for final. Revised photo highlight

Appendix F:

- Please include the attached invasive species treatment logs in Appendix F. Attached to App F

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balance through proper planning

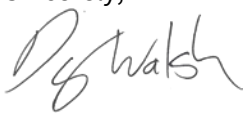
Digital Deliverable File Review:

DMS is conducting digital file audits on all projects. Below are missing or incomplete digital deliverables for the project. If you have any questions or need clarification regarding these items, please contact Greg Melia.

- CVS file provided is missing observation/survey dates for certain plots, and in other plots x y coordinates exceed the bounds of the selected plot dimensions. Please resolve these errors and resubmit so DMS can enter these data into our database.
  Observation/survey dates added. Plot dimensions reformatted so that x,y coordinates are within bounds.

- Although it is indicated that bank height ratio (BHR) was calculated using a fixed bankfull area, it appears that the MY8 bankfull elevation was used as opposed to using the bankfull elevation that achieves the fixed as built bankfull cross sectional area. For example, the BHR for XS 4 using the method outlined in the Technical Workgroup Memorandum should be equal to 0.83, with a low bank height elevation of 824.5 and a bankfull elevation of 824.997, which produces the as built bankfull cross sectional area of 32.5. Please ensure that calculations are done using the bankfull elevation that achieves the fixed as-built bankfull cross sectional area.
  The bankfull elevation that achieves the fixed as-built bankfull cross-sectional area was used for all cross-sections except XS5 and XS9. The stream in the area of these cross-sections was reconstructed during MY6. For cross-sections XS5 and XS9, the bankfull elevation that achieves the fixed Post-Repair MY6 bankfull cross-sectional area.
- DMS does not have any spatial features for Dye Branch II. As-built features are not properly segmented, or are continuous points and cannot be converted into lines, while prior geodatabases containing monitoring features and stream thalwegs are compromised and no longer contain features that can be rendered in arcmap. Please provide features that characterize the creditable assets that have been reported for Dye Branch II, ensuring that features are segmented and attributed as they are in the asset table and that feature lengths match the linear feet reported. Also please include the monitoring features for this project (i.e. cross sections, crest gage locations, veg plots). Geodatabase updated to include thalweg and monitoring features.

Sincerely,



Danvey Walsh
Environmental Scientist

Monitoring Firm

37 Haywood Street, Suite 100
Asheville, North Carolina 28801
Phone: 828-253-6856

Project Contact: Danvey Walsh
Email: danvey@equinoxenvironmental.com

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Dye Branch II Stream Restoration
2019 MY8 Monitoring Report

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Appendices

1.0 EXECUTIVE SUMMARY / PROJECT ABSTRACT

The goals and objectives stated in the Dye Branch Stream Restoration Plan (NCEEP 2005) are as follows:

- Provide a stable system of stream channels that neither aggrade nor degrade while maintaining dimension, pattern, and profile with the capacity to transport the watershed's water and sediment load;
- Improve the overall water quality and aquatic habitat by reducing sediment and waste inputs into the stream caused by bank erosion, mass-wasting, and stormwater runoff through stabilization of the stream channel and creation of a stormwater wetland; and
- Improve the overall viability of the riparian vegetative communities through establishment of native species and elimination of invasive exotic species.

This is the third monitoring report for the Dye Branch Stream Restoration Project since the completion of Monitoring Year 5 (MY5) in 2015. A MY6 Post-Repair Monitoring Report was completed in February 2018 that documented the repairs and plantings completed in 2017. As a part of the repairs, two small areas were repaired on Upper Dye Branch and five small areas were repaired on Lower Dye Branch. The repairs consisted of repairing failed structures, installation of brush toes, streambank grading, installation of coir matting, riffle construction, and grading of the channel to reestablish the thalweg for proper flow through the new alignment. A supplemental planting was also performed to revegetate the areas that were graded during the repairs. A temporary seed mix and 420 bare root seedlings were planted in areas affected by the repairs to help revegetate.

This report incorporates data associated with MY8 monitoring and includes a qualitative vegetation and stream assessment consisting of vegetation monitoring of seven (7) annual monitoring plots, four (4) random/temporary vegetation plots, morphological monitoring of ten (10) cross-sections, and hydrologic monitoring. This report also includes a visual assessment which incorporates multiple photo points, visual assessment of the vegetation, easement, and stream channel to document any problem areas that arise. These problem areas are documented in Tables 5 and 6 and depicted in Figure 2, the Current Condition Plan View. This is the final monitoring report for the Dye Branch project with closeout activities planned in 2020.

Vegetation monitoring of the Dye Branch Stream Restoration Project includes annual monitoring of seven permanent vegetation plots, four temporary vegetation plots, and visual assessment of the easement as a whole. Planted stems range from 3 to 23 per plot with 7 to 49 stems observed when volunteers are included. Based on the MY8 vegetation data, the average stem density for planted stems across all plots is approximately 364 stems per acre. This meets the year 8 success criteria of 210 planted stems per acre. When all planted and natural stems are combined, the average stem density is 977 stems per acre, which also meets the success criteria. Four random vegetation plot transects were also performed to evaluate stems throughout the easement as a whole. The stem counts for the random vegetation transects were 10, 20, 26, and 18 which extrapolate out to 500, 1000, 1300, and 900 stems per acre respectively.

Regarding invasive-exotics, a contractor was hired to treat the invasive-exotic vegetation in November 2015. Since 2015 nine treatments have occurred at the Dye Branch site. Treatments occurred in July and September of 2019 (MY8) and have been effective. Recent treatments consisted of cut and stump sprays of a 50% glyphosate solution targeting Callery pear, (*Pyrus calleryana*), kudzu (*Pueraria montana*), privet *(Ligustrum spp.*), and multiflora rose (*Rosa multiflora*), mist blower treatments sprays of 2% clopyralid solution targeting kudzu and lespedeza (*Lespedeza spp.*), basal bark in a 15% solution with diesel fuel targeting kudzu, privet, and multiflora rose, and foliar backpack spray of a 3% glyphosate solution targeting kudzu and privet, multiflora rose. While treatments have been effective, populations of invasive-exotics of lesser concern, specifically Japanese honeysuckle (*Lonicera japonica*), still persist in areas throughout the easement. Invasive-exotics will be monitored during future site visits and invasive-exotic treatments will continue until project closeout in 2020. Visual assessment of the stream channel was performed to document signs of instability, such as eroding banks, structural instability, or excessive sedimentation. A few areas of bank erosion were noted on all reaches in 2019 (Figure 2, CCPV). All of the implemented repairs completed in late 2017 are intact and performing as designed. Photos of stream problem areas can be seen in the digital submission.

MY8 morphologic monitoring of the Dye Branch Site included ten (10) cross-sections. Cross-sectional overlays are located in Appendix D and a summary of the data is located in Table 11a and 11b. Cross-sections remained relatively stable between the Post-Construction data and MY8 monitoring. Cross-section 5 continues to undergo change, as it has taken on a riffle-like geometry. Cross-sections 7 and 8, which were noted as aggrading in the MY7 report, appear to be trending back to their as-built geometry. Riffle dimensions for the three different reaches also remained relatively stable during MY8. Dimensional changes for Cemetery Branch were a decrease in the bankfull width by 0.3 foot and lowering of the width/ depth ratio by 0.3. Dye Branch Upstream exhibits little dimensional change from MY7, Dye Branch Downstream underwent an increase in bankfull width of 0.3 feet and the width/ depth ratio also increased by 0.3.

A water level logger was installed in December of 2010 and has since recorded a total of 14 bankfull events. An equipment malfunction led to the loss of pressure transducer between MY5 (2015) and Post-Repair Monitoring (2018). A crest gauge was installed in February 2018 to monitor for evidence of bankfull events. Wrack lines well above the bankfull elevation were observed on Dye Branch Upstream, at Station 3+00, during a site visit on May 31st, 2018. While the crest gauge did not have a reading above bankfull during this visit, consistent wrack lines throughout the project area indicate a bankfull event occurred. Cross-referenced with gauge data from NCCRONOS, the suspected date was 4/24/2018. Wrack lines observed on January 25th, 2019 indicated an additional bankfull event. This was at least the sixteenth bankfull event since the project completion.

Summary information/data related to the occurrence of items such as beaver or easement encroachment and statistics related to performance of various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting information formerly found in these reports can be found in the mitigation and

restoration plan documents available on the NCDMS website. All raw data supporting tables and figures in the appendices are available from NCDMS upon request.

2.0 Methodology

The stream monitoring methodologies utilized in Post-Repair Monitoring replicate those employed during the previous monitoring years and are based on standard guidance and procedures documents (Rosgen 1996; USACE 2003).

Geomorphic measurements were taken during low flow conditions using a Nikon NPR 332 Total Station. Three-dimensional coordinates associated with cross-sections were collected in the field and geo-referenced (NAD83 North Carolina State Plane feet FIPS 3200). Geomorphic data included 10 cross-sections.

Vegetation monitoring follows the CVS-EEP Level 2 Protocol for Recording Vegetation, Version 4.2 (Lee et al. 2008) and includes analysis of composition and density of planted species. Data is processed using the CVS data entry tool. In the field, the four corners of each plot were permanently marked with rebar and photos of each plot taken from the origin each monitoring year.

3.0 References

Harrelson, Cheryl, C. Rawlins and J. Potyondy. 1994. Stream Channel Reference Sites: An Illustrated Guide to Field Technique. Gen. Tech. Rep. RM-245. Rocky Mountain Forest and Range Experiment Station. USDA Forest Service. Fort Collins, Colorado

Lee, M.T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation. Version 4.2. The University of North Carolina at Chapel Hill, Department of Biology.

NCEEP (North Carolina Ecosystem Enhancement Program). 2005. Dye Branch Stream Restoration Plan. Raleigh.

Rosgen, D.L. 1996. Applied River Morphology. Wildland Hydrology Books. Pagosa Springs, Colorado.

USACE (U.S. Army Corps of Engineers). 2003. Stream Mitigation Guidelines. U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, North Carolina Wildlife Resources Commission, North Carolina Department of Environment and Natural Resources-Division of Water Quality. Wilmington District.

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Appendix A
Project Vicinity Map and Background Tables

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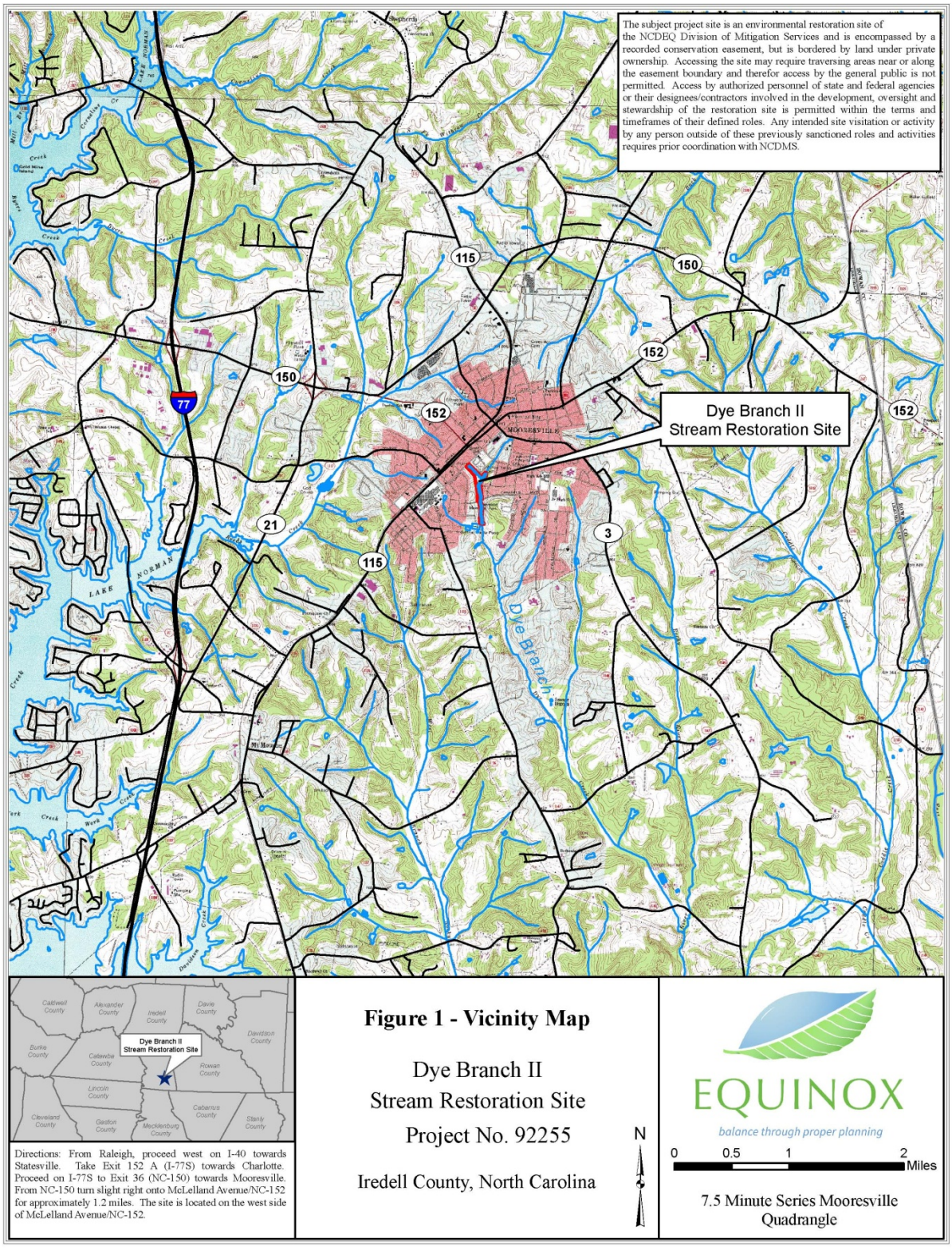
The subject project site is an environmental restoration site of the NCDEQ Division of Mitigation Services and is encompassed by a recorded conservation easement, but is bordered by land under private ownership. Accessing the site may require traversing areas near or along the easement boundary and therefor access by the general public is not permitted. Access by authorized personnel of state and federal agencies or their designees/contractors involved in the development, oversight and stewardship of the restoration site is permitted within the terms and timeframes of their defined roles. Any intended site visitation or activity by any person outside of these previously sanctioned roles and activities requires prior coordination with NCDMS.
Dye Branch II Stream Restoration Site
77
150
152
115
21
3
LAKE NORMAN
Dye Branch
MOORESVILLE
Dye Branch II Stream Restoration Site
Directions: From Raleigh, proceed west on I-40 towards Statesville. Take Exit 152 A (I-77S) towards Charlotte. Proceed on I-77S to Exit 36 (NC-150) towards Mooresville. From NC-150 turn slight right onto McLelland Avenue/NC-152 for approximately 1.2 miles. The site is located on the west side of McLelland Avenue/NC-152.
Figure 1 - Vicinity Map
Dye Branch II
Stream Restoration Site
Project No. 92255
Iredell County, North Carolina
N
EQUINOX
balance through proper planning
0 0.5 1 2
Miles
7.5 Minute Series Mooresville Quadrangle

Table 1a. Project Components Dye Branch II / Project No. 92255								
Project Component or Reach ID	**Existing Feet/Acres**	**Restoration Level**	**Approach**	**Footage or Acreage**	**Stationing**	**Buffer Acres**	**BMP Elements**	**Comment**
Cemetery Branch	968 lf	R	P3	1,014 lf	0+00 - 10+14		Stormwater wetlands	
Dye Branch Upstream	1,772 lf	R	P2	1,500 lf	0+00 - 15+00		Stormwater wetlands	
Dye Branch Downstream	1,232 lf	R	P2	1,171 lf	16+00 - 27+71			

- Information unavailable
=Non-Applicable

Table 1b. Component Summations Dye Branch II / Project No. 92255							
Restoration Level	**Stream (lf)**	**Riparian Wetland (ac)**		**Non-Riparian (ac)**	**Upland (ac)**	**Buffer (ac)**	**BMP**
		Riverine	**Non-Riverine**				
Restoration	3,685	0.0	0.0				
Enhancement		0.0	0.0				
Enhancement I	0						
Enhancement II	0						
Creation		0.0	0.0				
Preservation	0	0.0	0.0				
HQ Preservation	0	0.0	0.0				
		0.0	0.0				
Totals	**3,685**	**0**		**0**	**0**	**0**	**3**

=Non-applicable

Table 2. Project Activity & Reporting History Dye Branch II / Project No. 92255		
Activity or Report	**Data Collection Complete**	**Actual Completion or Delivery**
Restoration Plan	-	Oct 2005
Final Design - Construction Plans	-	April 2006
Final Design - Repair Plans	-	July 2010
Construction Repairs	-	Dec 2010
Temporary S&E mix applied	-	Summer 2010
Permanent seed mix applied	-	Summer 2010
Planting	-	Feb 2011
Mitigation Plan / As-built (Year 0 Monitoring - Baseline)	Mar 2011	Aug 2011
Year 1 Monitoring	Nov 2011	Jan 2012
Year 2 Monitoring	Dec 2012	Jan 2013
Year 3 Monitoring	Nov 2013	Dec 2013
Year 4 Monitoring	Dec 2014	Dec 2014
Year 5 Monitoring	Nov 2015	Nov 2015
Invasive-Exotic Vegetation Treatment	-	Nov 2015
Invasive-Exotic Vegetation Treatment	-	Mar 2017
Invasive-Exotic Vegetation Treatment	-	Apr 2017
Invasive-Exotic Vegetation Treatment	-	July 2017
Invasive-Exotic Vegetation Treatment	-	Aug 2017
2017 Repair - Stream	-	Nov 2017
2017 Repair - Planting	-	Feb 2018
Year 6 Monitoring - Post Repair	Feb 2018	Feb 2018
Invasive-Exotic Vegetation Treatment	-	June 2018
Invasive-Exotic Vegetation Treatment	-	Sep 2018
Year 7 Monitoring	Oct 2018	Nov 2018
Year 8 Monitoring	Jul 2019	Nov 2019
Invasive-Exotic Vegetation Treatment	-	Jul 2019
Invasive-Exotic Vegetation Treatment	-	Sep 2019

- Information unavailable.

N/A - Item does not apply.

Table 3. Project Contacts Dye Branch II / Project No. 92255	
Designer Primary Project Design POC	Mulkey Engineers & Consultants 6750 Tryon Road Cary NC, 27518 Emmett Perdue (919) 858-1874
Construction Contractor Construction Contractor POC	Fluvial Solutions P.O. Box 28749 Raleigh, NC 27611 Peter Jelenevsky (919) 605-6134
Repair Construction/ Planting Contractor **2018** Repair Construction Contractor POC	Baker Grading 970 Bat Cave Rd Old Fort, NC 28762 Charles Baker (828) 668-7659
Planting Contractor Planting Contractor POC	Fluvial Solutions P.O. Box 28749 Raleigh, NC 27611 Peter Jelenevsky (919) 605-6134
Seeding Contractor Seeding Contractor POC	Fluvial Solutions P.O. Box 28749 Raleigh, NC 27611 Peter Jelenevsky (919) 605-6134
Seed Mix Sources	Hanes Geo Components Winston-Salem, NC 27101
Nursery Stock Suppliers	North Carolina Forest Service Goldsboro, NC 27530
Monitoring Performers (MY0-MY8) **2010 - 2015, 2017 - 2019**	Equinox Environmental 37 Haywood Street, Suite 100 Asheville, North Carolina 28801
Stream Monitoring POC	Danvey Walsh (828) 253-6856
Vegetation Monitoring POC	Danvey Walsh (828) 253-6856
Post-Repair Monitoring Performers (MY6) **2017**	Equinox Environmental 37 Haywood Street, Suite 100 Asheville, North Carolina 28801
Stream Monitoring POC	Danvey Walsh (828) 253-6856
Vegetation Monitoring POC	Danvey Walsh (828) 253-6856

Table 4. Project Attributes Dye Branch II / Project No. 92255		
Project County	Iredell	
Physiographic Region	Piedmont	
Ecoregion	Southern Outer Piedmont	
River Basin	Yadkin - Pee Dee	
USGS HUC	03040105010010	
NCDWQ Sub-Basin	03-07-11	
Within Extent of EEP Watershed Plan	Upper Rocky River Local Watershed Plan	
WRC Class	Warm	
% of Project Easement Fenced or Demarcated	100%	
Beaver Activity Observed During Design Phase	No	
Restoration Component Attributes		
	Dye Branch	**Cemetery Branch**
Drainage Area (sq.mi.)	0.60	0.06
Stream Order	First / Second	First
Restored Length (feet)	2,671	1,014
Perennial or Intermittent	Perennial	Perennial
Watershed Type	Urban	
Watershed LULC Distribution		
Urban	85%	
Other	15%	
Watershed Impervious Cover	-	
NCDWQ AU/Index Number	13-17-2	
NCDWQ Classification	C	
303d Listed	Yes	
Upstream of 303d Listed Segment	Yes	
Reasons for 303d Listing or Stressor	Poor Bioclassification	
Total Acreage of Easement	12.0	
Total Vegetated Acreage within Easement	12.0	
Total Planted Acreage as Part of Restoration	8.9	
Rosgen Classification of Pre-Existing	E4 / G4c	E4
Rosgen Classification of As-Built	C	C
Valley Type	-	-
Valley Slope	0.0097 / 0.0125	0.0217
Valley Side Slope Range	-	-
Valley Toe Slope Range	-	-
Cowardin Classification	N/A	N/A
Trout Waters Designation	No	No
Species of Concern, Endangered, Etc.	None	
Dominant Soil Series and Characteristics		
Series	Chewacla / Cecil / Colfax	
Depth	-	-
Clay%	-	-
K	-	-
T	-	-

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N/A - Item does not apply.

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Appendix B
Visual Assessment Data

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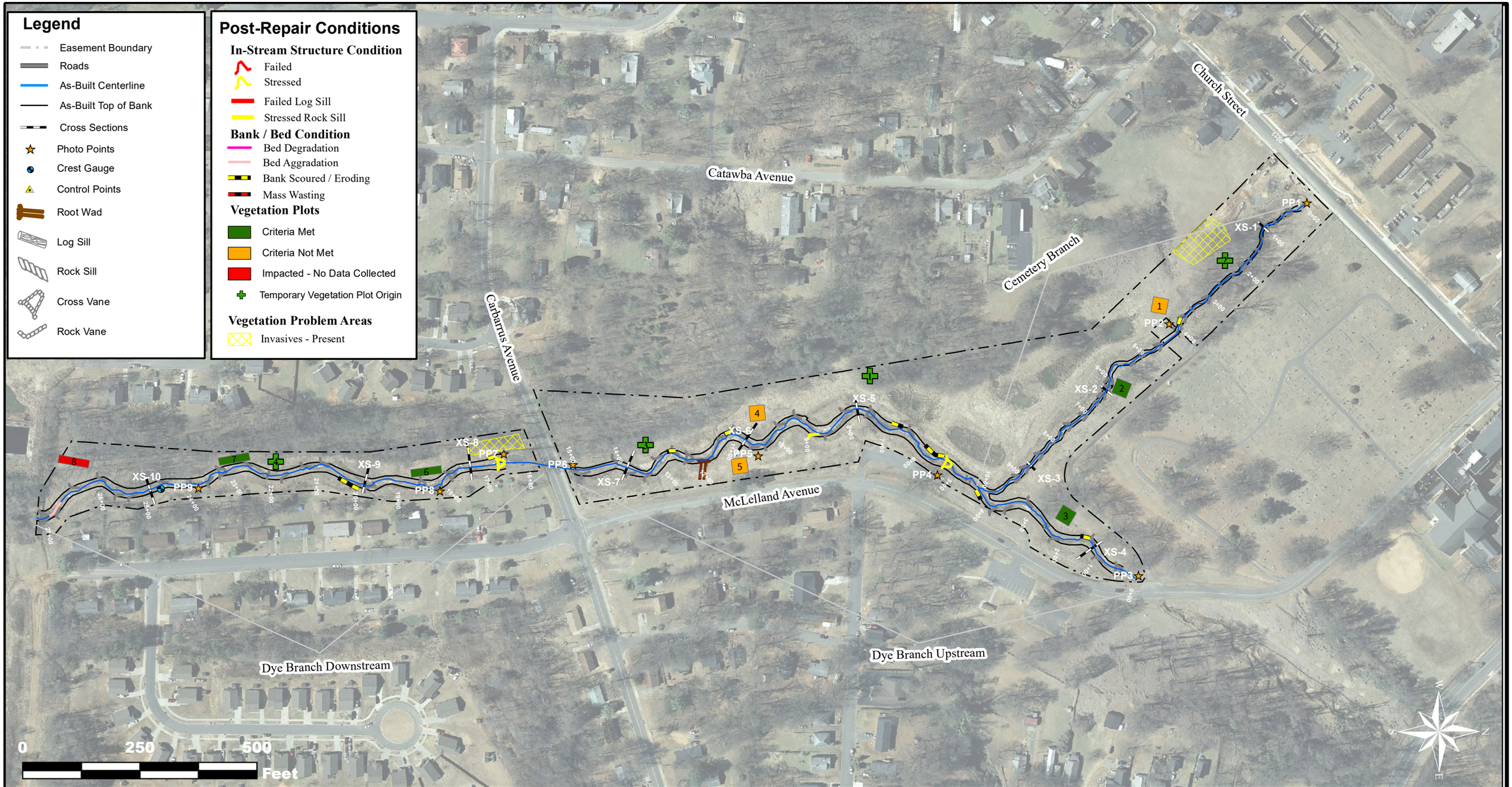
Figure 2. Integrated Current Condition Plan View



Prepared for NC Mitigation Services ENVIRONMENTAL QUALITY	**Project:** Dye Branch Stream Restoration Monitoring Year 8 - Integrated Current Condition Plan View Iredell County, North Carolina	Notes: 1) Base Map Data Provided by Mulkey Engineers & Consultants 2) NC OneMap 2010 Aerial Photo 3) Areas of Lonicera japonica also on site
	Sheet 1 of 1	
	March 2020	Project Number
		NCDMS # 92255

Prepared by
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Table 5. Visual Stream Morphology Stability Assessment
Dye Branch II / Project No. 92255 - Cemetery Branch
Assessed Length 1,014 feet

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability** (Riffle and Run Units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars).			0	0	100%			
		2. Degradation - Evidence of downcutting.			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate.	14	14			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6).	15	15			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	15	15			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	15	15			100%			
		2. Thalweg centering at downstream of meander bend (Glide).	14	14			100%			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			1	12	99%	0	0	0%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	0%
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	0	0	0%
				Totals	1	12	99%	0	0	0%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	32	32			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	28	28			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	28	28			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does NOT exceed 15%.	4	4			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	13	13			100%			

Table 5 cont'd. Visual Stream Morphology Stability Assessment
Dye Branch II / Project No. 92255 - Dye Branch - Upstream
Assessed Length 1,500 feet

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability** (Riffle and Run Units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars).			0	0	100%			
		2. Degradation - Evidence of downcutting.			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate.	17	17			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6).	20	20			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	16	20			80%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	17	17			100%			
		2. Thalweg centering at downstream of meander bend (Glide).	16	16			100%			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			6	152	95%	0	0	95%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	0	0	100%
				Totals	6	152	95%	0	0	95%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	29	30			97%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	8	8			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	8	8			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does NOT exceed 15%.	21	23			91%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	5	5			100%			

Table 5 cont'd. Visual Stream Morphology Stability Assessment
Dye Branch II / Project No. 92255 - Dye Branch - Downstream
Assessed Length 1,171 feet

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability** (Riffle and Run Units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars).			1	34	97%			
		2. Degradation - Evidence of downcutting.			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate.	11	11			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6).	10	10			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	10	10			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	10	10			100%			
		2. Thalweg centering at downstream of meander bend (Glide).	10	10			100%			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			2	62	97%	0	0	0%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	0%
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	0	0	0%
				Totals	2	62	97%	0	0	97%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	21	22			95%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	7	8			88%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	8	8			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does NOT exceed 15%.	14	14			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	5	5			100%			

Table 6. Vegetation Condition Assessment
Dye Branch II / Project No. 92255
Planted Acreage 9.0

Vegetation Category	Definitions	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbaceous material.	Stipple Black Dots White Background	0	0.00	0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY7 stem count criteria.	N/A	0	0.00	0%
		Totals	0	0.00	0%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	N/A	0	0.00	0%
		Cumulative Totals	0	0.00	0%

Easement Acreage 12.01

Vegetation Category	Definitions	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
4. Invasive Areas of Concern	Areas or points (if too small to render as polygons at map scale).	Cross Hatch (Red - Dense/Yellow - Present)	2	0.22	2%
5. Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale).	Stipple Orange Dots White Background	0	0.00	0.0%

Cemetery Branch – Permanent Photo Station 1
Downstream

Cemetery Branch – Permanent Photo Station 2
Upstream

Cemetery Branch – Permanent Photo Station 2
Downstream

Dye Branch – Permanent Photo Station 3
Downstream

Dye Branch – Permanent Photo Station 4
Upstream

Dye Branch – Permanent Photo Station 5
Upstream

Dye Branch – Permanent Photo Station 6
Upstream

Dye Branch – Permanent Photo Station 7
Downstream

Dye Branch – Permanent Photo Station 8
Upstream

Dye Branch – Permanent Photo Station 9
Upstream

Dye Branch – Permanent Photo Station 10
Upstream Repair Area 6 STA 10+50 (Photo form 2018)

Dye Branch – Permanent Photo Station 11
Downstream Repair Area STA 19+00 (Photo from 2018)

Appendix C
Vegetation Plot Data

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Table 7. Vegetation Plot Criteria Attainment Dye Branch II / Project No. 92255		
Vegetation Plot ID	**Vegetation Survival Threshold Met?**	**Tract Mean**
1	No	57%
2	Yes	
3	Yes	
4	No	
5	No	
6	Yes	
7	Yes	

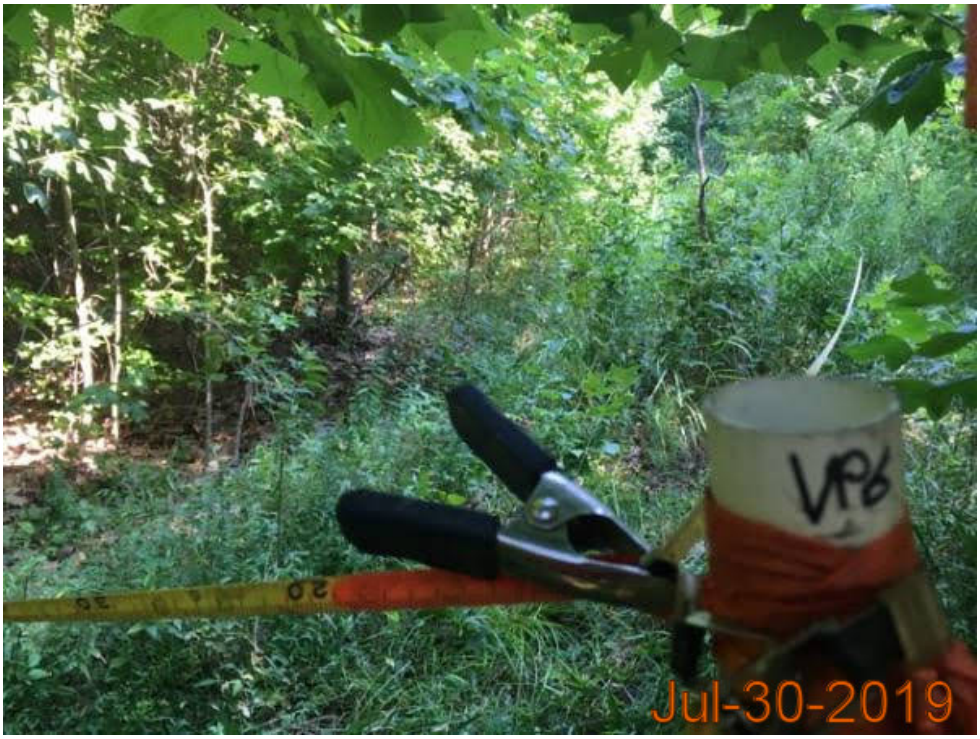
Vegetation Monitoring Plot 1
MY8 Monitoring – July 30th, 2019

Vegetation Monitoring Plot 2
MY8 Monitoring – July 30th, 2019

Vegetation Monitoring Plot 3
MY8 Monitoring – July 30th, 2019

Vegetation Monitoring Plot 4
MY8 Monitoring – July 30th, 2019

Vegetation Monitoring Plot 5
MY8 Monitoring – July 30th, 2019



Vegetation Monitoring Plot 6
MY8 Monitoring – July 30th, 2019

Vegetation Monitoring Plot 7
MY8 Monitoring – July 30th, 2019

Table 8. CVS Vegetation Plot Metadata Dye Branch II / Project No. 92255	
Report Prepared By	Danvey Walsh
Date Prepared	10/22/2019 15:22:15 PM
Database name	Equinox-2018-A-DyeBranch_MY6_2018.mdb
Database location	Z:\ES\NRI&M\EEP Monitoring\Dye Branch\DB-MY8-2019\Data\Veg
Computer name	FIELD-PC3
File size	46333952
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Proj, planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Proj, total stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
ALL Stems by Plot and spp	A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.
PROJECT SUMMARY	
Project Code	92255
project Name	Dye Branch
Description	
River Basin	Yadkin-Pee Dee
Length(ft)	
Stream-to-Edge Width (ft)	
Area (sq m)	
Required Plots (calculated)	
Sampled Plots	7

Table 9. Planted Stem and Total Stem Counts (Species by Plot)
Dye Branch

			Current Plot Data (MY8 2019)																				
			VP1			VP2			VP3			VP4			VP5			VP6			VP7		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer rubrum	Red Maple	Tree									6							1	1	1	1	1	1
Betula nigra	River Birch	Tree			1	1	1	1													8	8	8
Carpinus caroliniana	American Hornbeam	Tree									1			1			1	2	2	2	1	1	1
Cercis canadensis	Eastern Redbud	Tree													1	1	1				2	2	2
Cornus amomum	Silky Dogwood	Shrub																2	2	2			
Diospyros virginiana	Common Persimmon	Tree			2				1	1	4	1	1	1						4			13
Fraxinus pennsylvanica	Green Ash	Tree				3	3	3	1	1	1			3			1	4	4	4	9	9	11
Juglans nigra	Black Walnut	Tree	1	1	1																		
Juniperus virginiana var. virginiana	Eastern Redcedar	Tree										1	1	1	2	2	2						
Liriodendron tulipifera	Tuliptree	Tree												5			6			18			7
Liriodendron tulipifera var. tulipifera	Tulip-tree, Yellow Poplar, Whitewood	Tree				1	1	1															
Nyssa sylvatica	Blackgum	Tree												4						13			
Pinus virginiana	Virginia Pine	Tree	2	2	2										1	1	1						
Platanus occidentalis	American Sycamore	Tree						1			2							1	1	1			
Platanus occidentalis var. occidentalis	Sycamore, Plane-tree	Tree				1	1	1															
Quercus	Oak	Tree																			2	2	2
Quercus nigra	Water Oak	Tree										1	1	3			1						
Quercus phellos	Willow Oak	Tree				1	1	1	7	7	11							2	2	3			4
Quercus velutina	Black Oak	Tree	1	1	1				1	1	1												
		Stem count	4	4	7	7	7	8	10	10	26	3	3	18	4	4	13	12	12	48	23	23	49
		size (ares)	1			1			1			1			1			1			1		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.02		
		Species count	3	3	5	5	5	6	4	4	7	3	3	7	3	3	7	6	6	9	6	6	9
		Stems per ACRE	162	162	283	283	283	324	405	405	1052	121	121	728	162	162	526	486	486	1942	931	931	1983

[1]PnoLS: No livestakes included in tally; P-all: All planted stems included in tally; T: Total stems including recruitment.

Table 9 Con't. Planted Stem and Total Stem Counts (Species by Plot)
Dye Branch / Project No. 92255

			Annual Means																									
			MY8 (2019)			MY7 (2018)			MY6 (2018)			MY5 (2015)			MY4 (2014)			MY3 (2013)			MY2 (2012)			MY1 (2011)			MY0 (2011)		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	boxelder	**Tree**									3			13									1						
Acer negundo var. negundo	boxelder	Tree															7			7									
Acer rubrum	red maple	Tree	2	2	8	11	11	16	13	13	16			4									2						
Acer rubrum var. rubrum	red maple	Tree															5			5									
Albizia julibrissin	silktree	Exotic																		2									
Betula nigra	river birch	Tree	9	9	10	3	3	6	3	3	5	1	1	2	1	1	2	1	1	2	1	1	1	1	1	1			
Carpinus caroliniana	American hornbeam	Tree	3	3	6				1	1	1																		
Carya	hickory	Tree												7			9			4			5						
Carya alba	mockernut hickory	Tree																									1	1	1
Carya ovata	shagbark hickory	Tree																								1			
Cercis canadensis	eastern redbud	Tree	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	2	2	2	2	2
Cornus amomum	silky dogwood	Shrub	2	2	2												3												
Cornus florida	flowering dogwood	Tree									1			4															
Cornus kousa	Kousa dogwood													6															
Crataegus	hawthorn	Tree															1												
Diospyros virginiana	common persimmon	Tree	2	2	24	2	2	4	2	2	4	2	2	4	1	1	4	1	1	5	1	1	1			1			
Fagus grandifolia var. grandifolia	American beech	Tree															1												
Fraxinus pennsylvanica	green ash	Tree	17	17	23	18	18	29	18	18	20	4	4	8	5	5	9	5	5	5	4	4	4	4	4	4	4	4	4
Hibiscus	rosemallow	Shrub															1												
Juglans nigra	black walnut	Tree	1	1	1	1	1	2	1	1	7	1	1	2	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1
Juniperus virginiana var. virginiana	eastern redcedar	Tree	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	9	9	9
Liquidambar styraciflua	sweetgum	Tree						42			53			51			44			43			14			17			
Liriodendron	tuliptree													42															
Liriodendron tulipifera	tuliptree	Tree			36			24			28			13															
Liriodendron tulipifera var. tulipifera	Tulip-tree, Yellow Poplar, Whitewood	Tree	1	1	1	1	1	1	1	1	1	3	3	3	2	2	54	3	3	95	3	3	50	4	4	30	8	8	8
Nyssa sylvatica	blackgum	Tree			17												1												
Pinus virginiana	Virginia pine	Tree	3	3	3	5	5	5	5	5	5	5	5	5	6	6	6	7	7	7	10	10	10	11	11	11	14	14	14
Platanus occidentalis	American sycamore	Tree	1	1	4	3	3	12	5	5	15			9						1			6						
Platanus occidentalis var. occidentalis	Sycamore, Plane-tree	Tree	1	1	1	1	1	1	1	1	1	1	1	3	1	1	8	1	1	3						1	1	1	1
Populus deltoides	eastern cottonwood	Tree																					1						
Prunus	plum	Shrub or Tree																								5			
Prunus serotina	black cherry	Tree																					8						
Prunus serotina var. serotina	black cherry	Tree															12			6									
Prunus serrulata	Japanese flowering cherry										7			6															
Pyrus calleryana	Callery pear	Exotic															1									2			
Quercus	oak	Tree	2	2	2												5			1	1	1	1	9	9	13	19	19	19
Quercus alba	white oak	Tree															3												
Quercus coccinea	scarlet oak	Tree									5																		
Quercus falcata	southern red oak	Tree																1	1	1	1	1	1	2	2	2	2	2	2
Quercus nigra	water oak	Tree	1	1	4	2	2	7	2	2	5	3	3	12	3	3	9	3	3	3	8	8	9	2	2	2	2	2	2
Quercus pagoda	cherrybark oak	Tree															1												
Quercus phellos	willow oak	Tree	10	10	19	11	11	13	11	11	20	13	13	23	13	13	18	13	13	13	8	8	26	4	4	7	4	4	4
Quercus rubra	northern red oak	Tree																					4						
Quercus velutina	black oak	Tree	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	4	4	15									
Salix caroliniana	coastal plain willow	Tree												6			3												
Salix nigra	black willow	Tree						5																					
Sambucus canadensis	Common Elderberry	Shrub									5									8									
Unknown		Shrub or Tree																						3	3	3	9	9	9
		Stem count	63	63	169	66	66	175	72	72	211	43	43	233	43	43	218	47	47	234	46	46	153	47	47	107	76	76	76
		size (ares)	7			7			7			7			7			7			7			7			7		
		size (ACRES)	0.17			0.17			0.17			0.17			0.17			0.17			0.17			0.17			0.17		
		Species count	17	17	19	14	14	17	15	15	22	12	12	23	12	12	27	13	13	22	12	12	20	12	12	18	13	13	13
		Stems per ACRE	364	364	977	382	382	1012	416	416	1220	249	249	1347	249	249	1260	272	272	1353	266	266	885	272	272	619	439	439	439

Table 9 Con't. Total Planted and Natural Stem Recruits (Temporary Random Plots)
Dye Branch II / Project No. 92255

	Temporary Plot 1 10m x 10m	Temporary Plot 2 10m x 10m	Temporary Plot 3 10m x 10m	Temporary Plot 4 5m x 20m
Stem Count	10	20	26	18
Size (Ares)	1	1	1	1
Size (Acres)	0.02	0.02	0.02	0.02
Stems Per Acre	500	1000	1300	900

* Specific species were not collected per plot however the majority of the stems included *Betula Nigra* , *Liriodendron tulipifera* , *Acer rubrum* , *Plantanus occidentalis* , *Acer negundo* , and *Liquidambar styraciflua* .

[1]PnoLS: No livestakes included in tally; P-all: All planted stems included in tally; T: Total stems including recruitment.

Appendix D
Stream Survey Data

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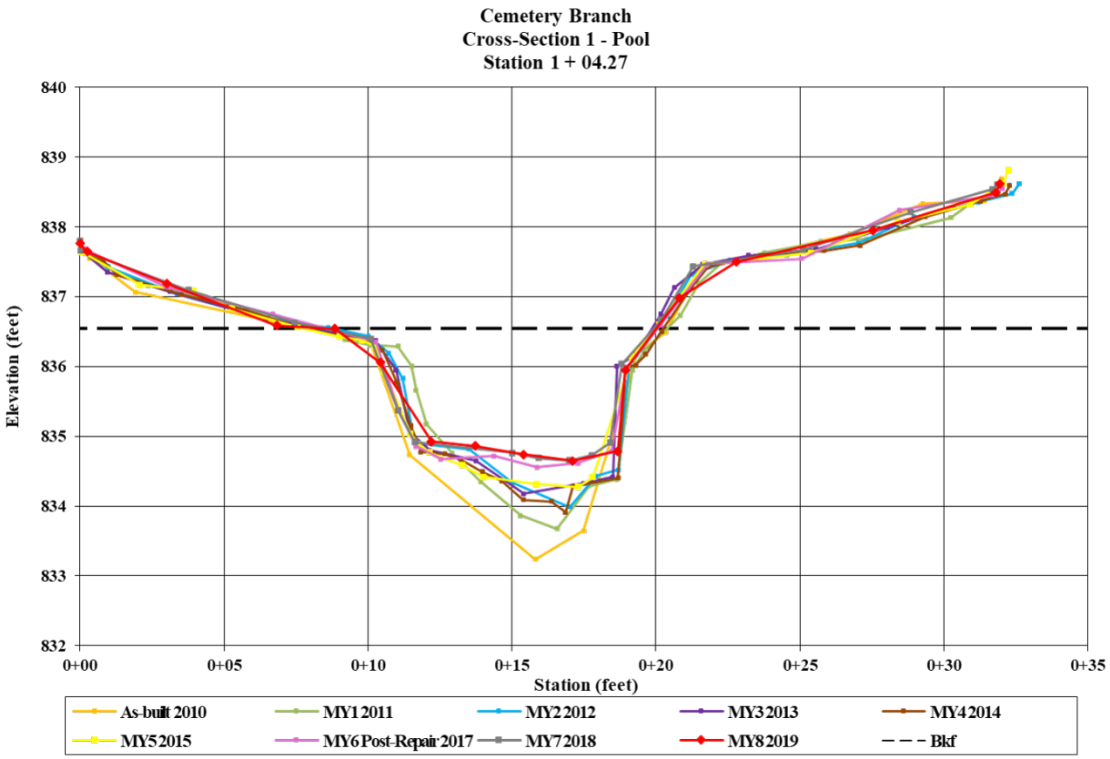
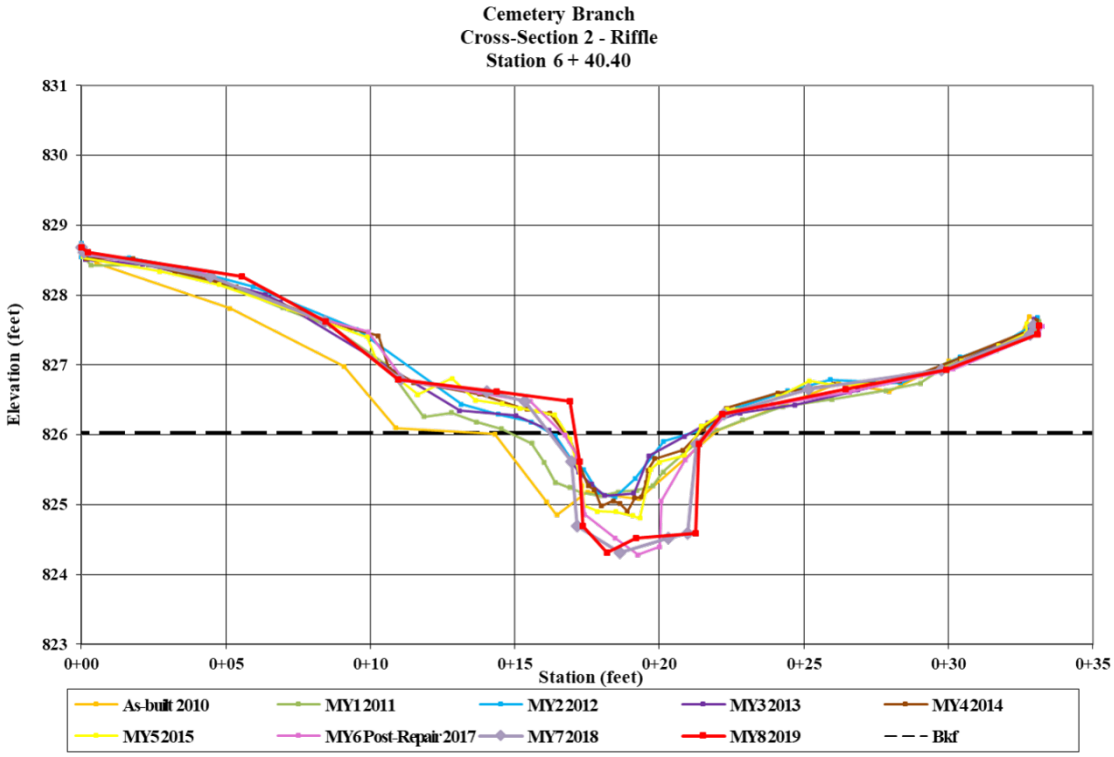


Left Descending Bank

Right Descending Bank

Upstream

Downstream

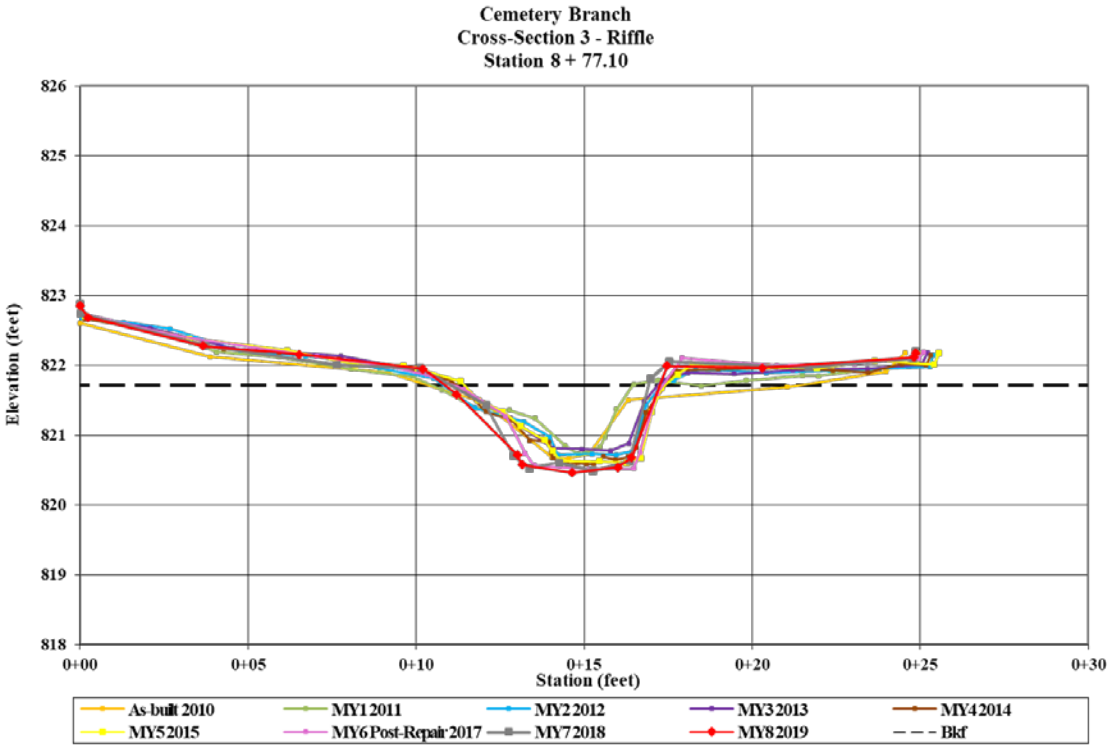



Left Descending Bank


Right Descending Bank


Upstream


Downstream

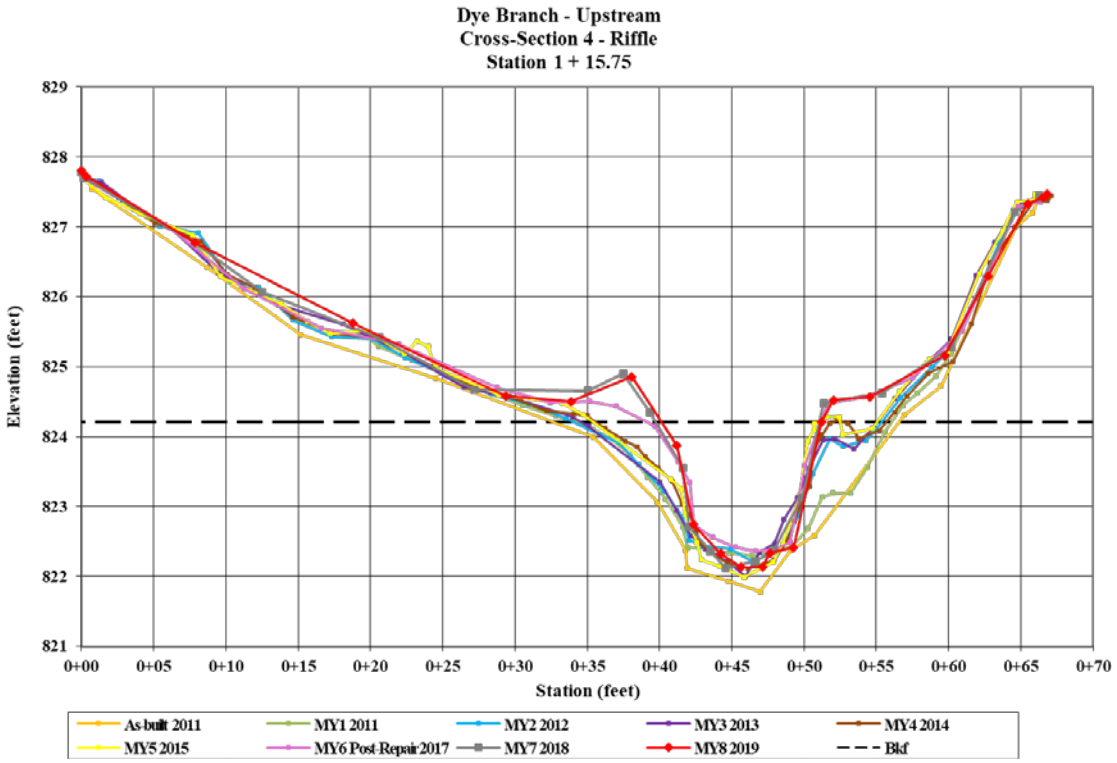


Left Descending Bank

Right Descending Bank

Upstream

Downstream

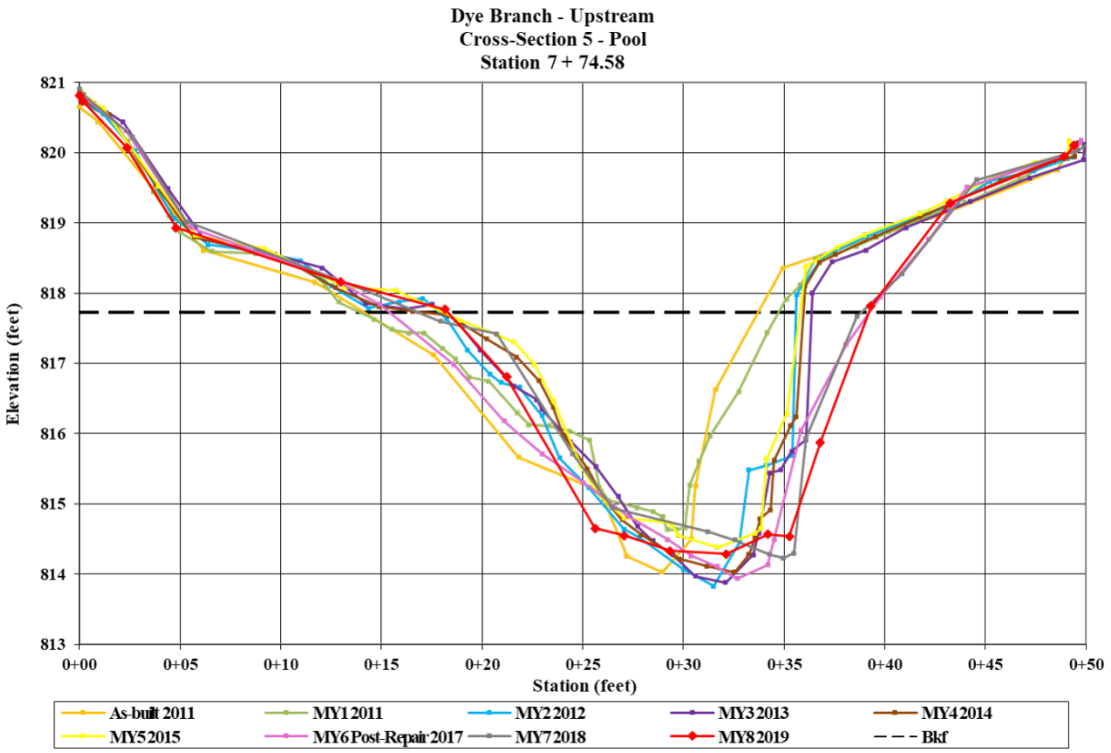



Left Descending Bank


Right Descending Bank


Upstream


Downstream

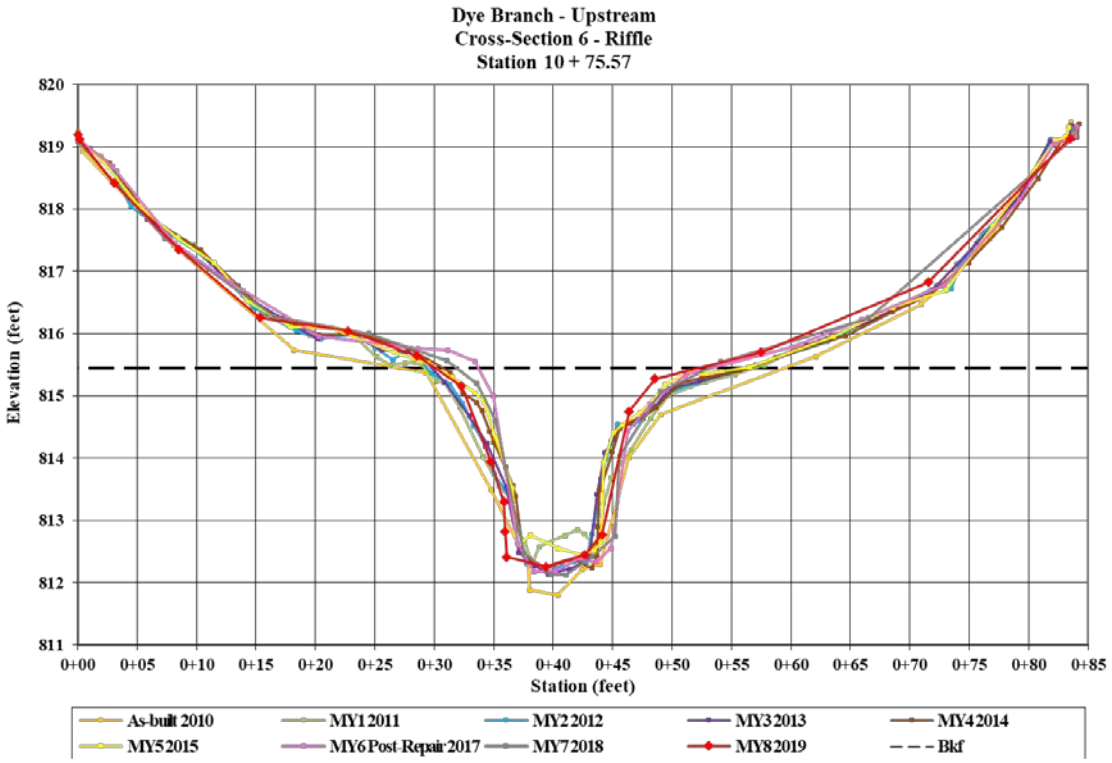


Left Descending Bank

Right Descending Bank

Upstream

Downstream

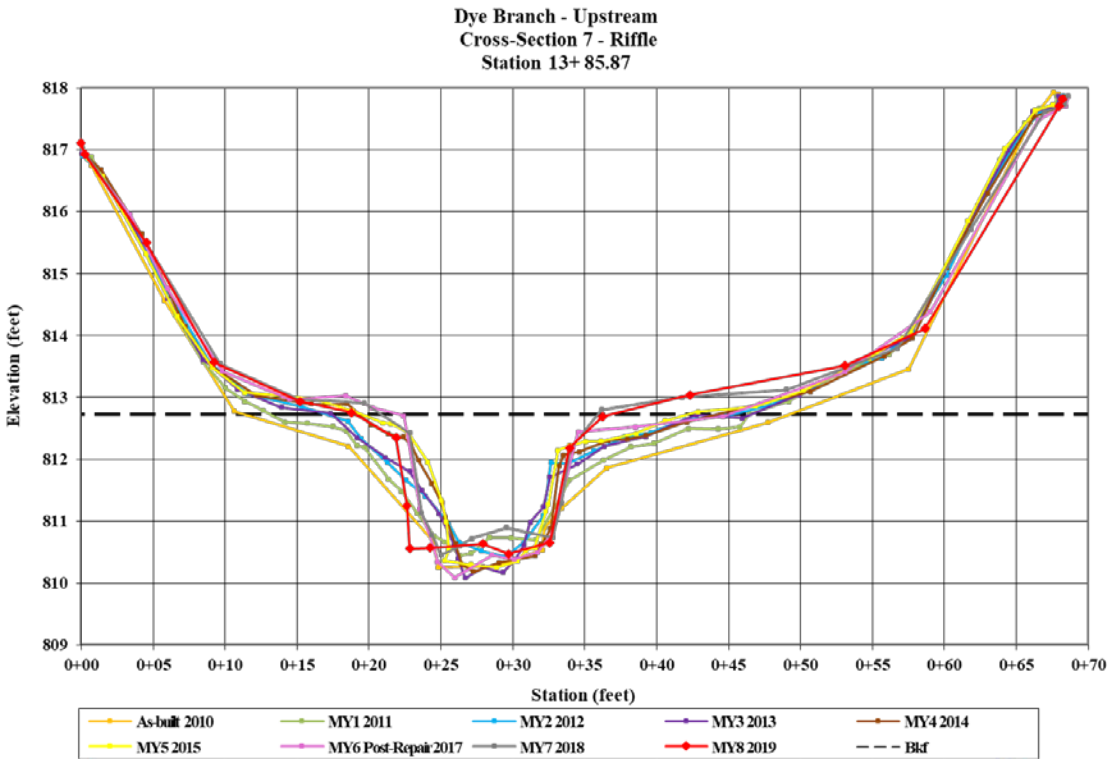



Left Descending Bank


Right Descending Bank


Upstream


Downstream

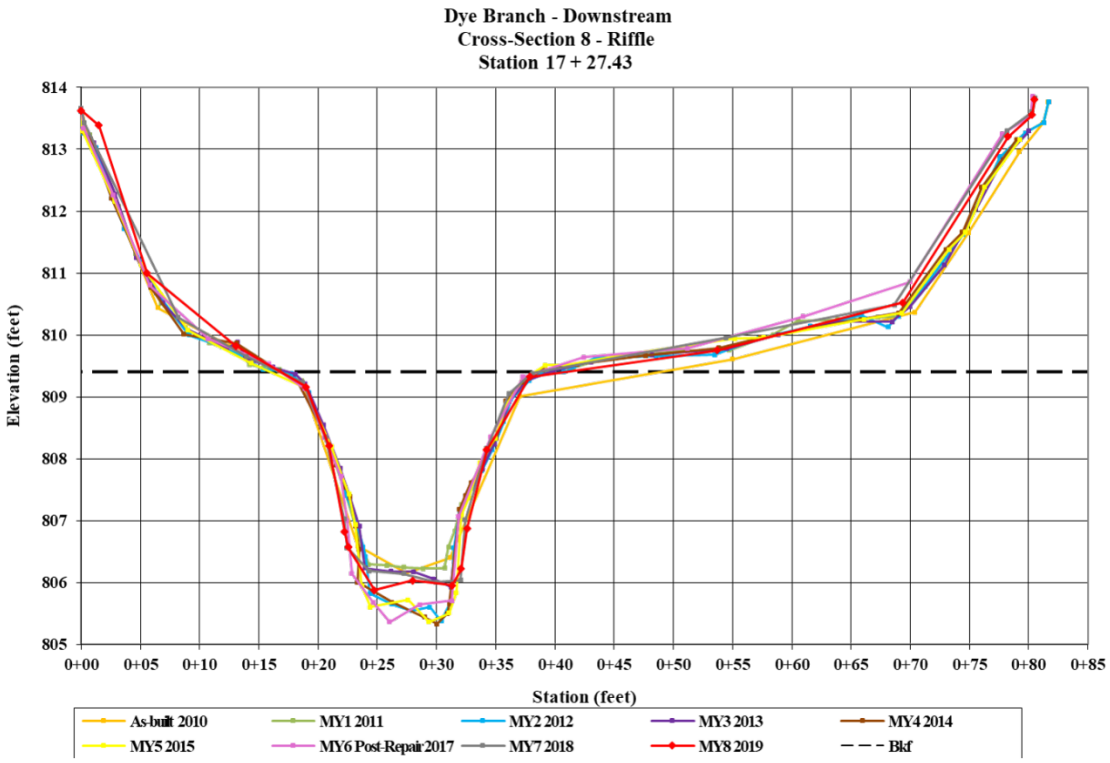



Left Descending Bank


Right Descending Bank


Upstream


Downstream

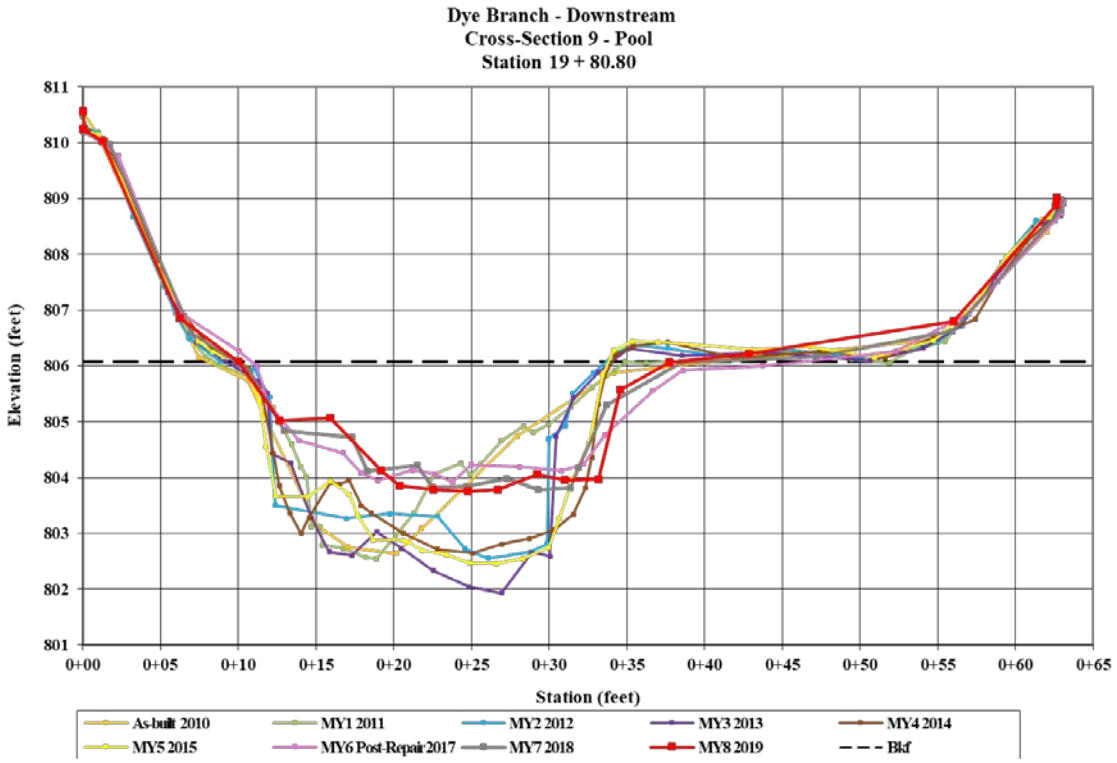



Left Descending Bank


Right Descending Bank


Upstream


Downstream

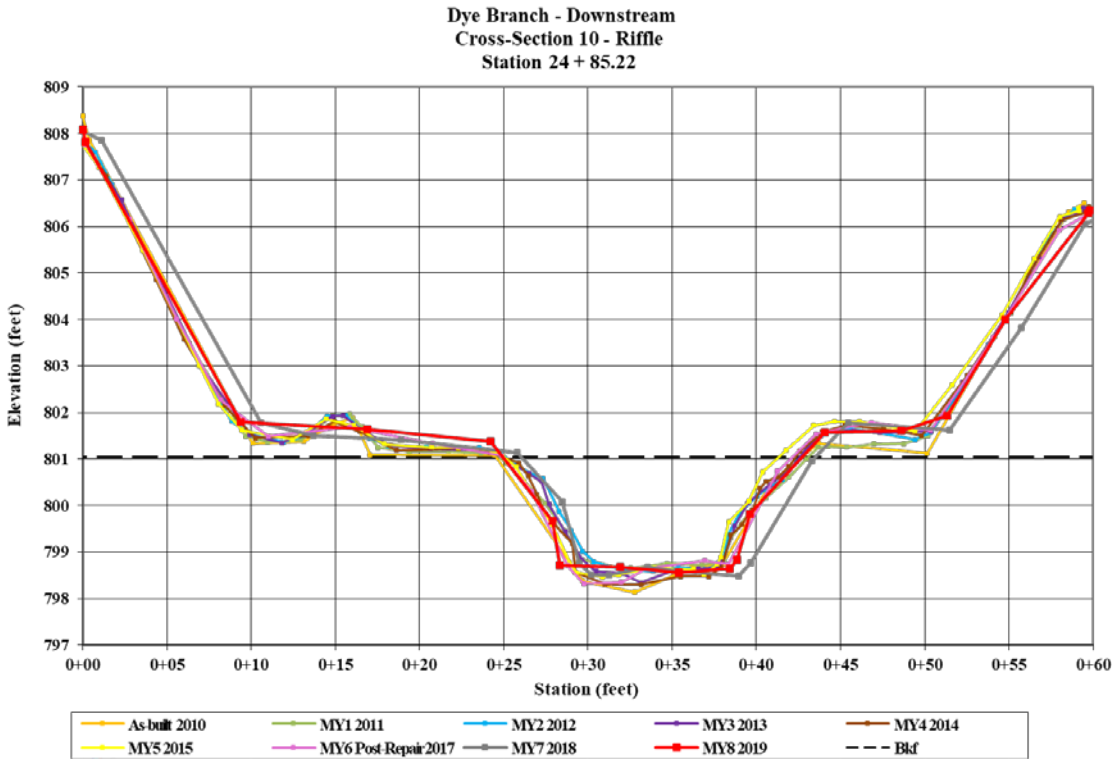


Left Descending Bank

Right Descending Bank

Upstream

Downstream




Left Descending Bank


Right Descending Bank


Upstream

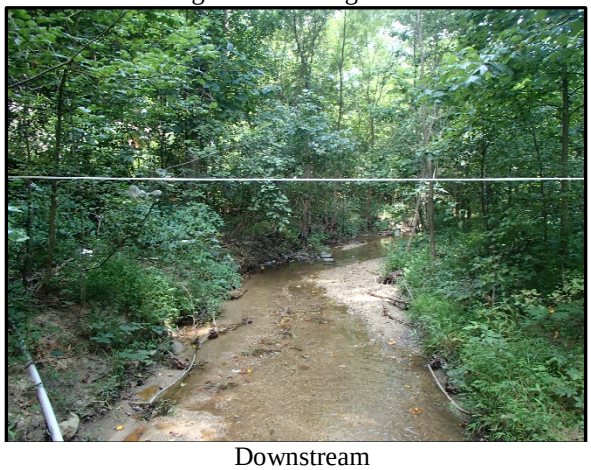

Downstream

Table 10a. Baseline Stream Data Summary
Dye Branch II / Project No. 92255 - Cemetery Branch (977 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data						Design			Monitoring Baseline					
Dimension & Substrate - Riffle	**LL**	**UL**	**Eq.**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Max**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**
Bankfull Width (ft)	-	-	-	7.0	7.0	7.0	7.0	N/A	1	8.9	11.1	11.3	14.1	1.8	7	-	10.0	-	5.5	7.2	7.2	8.9	N/A	2
Floodprone Width (ft)				14.2	14.2	14.2	14.2	N/A	1	19.0	54.0	36.0	100.0	38.1	5	-	28.0	-	>30	>30	>30	>30	N/A	2
Bankfull Mean Depth (ft)	-	-	-	1.0	1.0	1.0	1.0	N/A	1	0.7	0.9	0.8	1.6	0.3	7	-	0.7	-	0.5	0.7	0.7	0.8	N/A	2
Bankfull Max Depth (ft)				1.5	1.5	1.5	1.5	N/A	1	1.0	1.5	1.3	2.4	0.5	7	0.8	1.1	1.6	1.0	1.2	1.2	1.4	N/A	2
Bankfull Cross Sectional Area (ft^2)	-			6.8	6.8	6.8	6.8	N/A	1	6.8	9.6	8.4	18.4	3.9	7	-	7.0	-	3.0	5.0	5.0	7.0	N/A	2
Width/Depth Ratio				7.2	7.2	7.2	7.2	N/A	1	6.9	11.2	11.7	15.0	NA	3	-	14.3	-	10.3	10.8	10.8	11.2	N/A	2
Entrenchment Ratio				2.0	2.0	2.0	2.0	N/A	1	3.8	6.8	7.7	8.9	NA	3	-	2.8	-	>3.4	>4.4	>4.4	>5.4	N/A	2
Bank Height Ratio				1.5	1.5	1.5	1.5	N/A	1	1.0	1.1	1.0	1.2	NA	3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	N/A	2
Profile																								
Riffle Length (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.8	23.4	19.5	53.9	14.84	14
Riffle Slope (ft/ft)				0.012	0.034	-	0.088	-	-	0.006	0.027	0.026	0.052	0.016	6	-	0.048	-	0.004	0.023	0.022	0.049	0.01	14
Pool Length (ft)				4.7	8.2	-	11.9	-	-	3.5	19.3	19.6	32.8	11.5	6	13.8	20.7	27.6	5.8	16.2	16.9	39.1	7.17	24
Pool Max Depth (ft)				-	2.6	-		-	-	1.8	2.6	2.9	3.2	0.5	7	-	2.0	-	1.8	3.0	2.9	3.7	0.48	18
Pool Spacing (ft)				22.8	86.0	-	228.2	-	-	18.0	52.7	40.2	140.8	41.7	7	18.4	27.6	32.2	4.5	38.7	36.4	111.0	24.40	24
Pattern																								
Channel Belt Width (ft)				5.3	10.8	-	22.6	-	-	26.0	49.1	40.0	119.0	29.8	9	23.0	32.2	41.4	11.3	30.6	37.0	46.7	12.3	16
Radius of Curvature (ft)				3.9	19.6	-	37.0	-	-	5.0	23.8	22.0	48.0	14.6	9	18.4	27.6	36.8	8.3	13.7	12.0	29.9	5.7	16
Rc: Bankfull Width (ft/ft)				0.6	2.8	-	5.3	-	-	0.6	2.1	1.8	4.3	1.3	9	1.8	2.8	3.7	2.4	2.4	2.4	2.4	N/A	1
Meander Wavelength (ft)				13.6	42.0	-	71.0	-	-	26.0	72.9	69.0	155.0	47.6	9	46.0	55.2	64.4	38.8	77.4	79.1	167.0	36.1	11
Meander Width Ratio				0.8	1.5	-	3.2	-	-	2.5	4.7	3.6	10.1	2.7	7	2.3	3.2	4.1	4.9	6.6	6.6	8.2	N/A	2
Transport Parameters																								
Reach Shear Stress (Competency) lb/ft^2				-						-						-			-					
Max Part Size (mm) Mobilized at Bankfull				45 - 180						-						-			-					
Stream Power (Transport Capacity) W/m^2				-						-						-								
Additional Reach Parameters																								
Rosgen Classification				E4						E4 / C4 / C5						C4			C					
Bankfull Velocity (fps)				6.6 - 7.8						4.1 - 7.0						5.5 - 6.7								
Bankfull Discharge (cfs)				44.3 - 52.8						35.0 - 128.1						38.4 - 46.6								
Valley Length (ft)				-						-						-								
Channel Thalweg Length (ft)				-						-						-			977					
Sinuosity				1.14						1.15 - 2.22						1.14			1.08					
Water Surface Slope (ft/ft)				0.0190						0.0057 - 0.0130						0.0190			-					
Bankfull Slope (ft/ft)				-						-						-			0.0191					
Bankfull Floodplain Area (acres)				-						-						-								
% of Reach with Eroding Banks				-						-														
Channel Stability or Habitat Metric				-						-														
Biological or Other				-						-														

- Information unavailable.
N/A - Item does not apply.
Non-Applicable.

Table 10a. Baseline Stream Data Summary
Dye Branch II / Project No. 92255 - Dye Branch-Upstream (1,465 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data UT to Ostin Creek						Design			Monitoring Baseline					
Dimension & Substrate - Riffle	**LL**	**UL**	**Eq.**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Max**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**
Bankfull Width (ft)	-	-	-	-	11.2	-	-	-	-	16.0	18.5	-	20.6	-	-	-	20.1	-	25.7	28.4	26.9	32.7	N/A	3
Floodprone Width (ft)				-	89.5	-	-	-	-	67.2	70.2	-	72.8	-	-	70.9	76.9	88.8	54.4	64.9	58.6	81.8	N/A	3
Bankfull Mean Depth (ft)	-	-	-	-	1.6	-	-	-	-	1.6	1.6	-	1.7	-	-		1.5		1.1	1.3	1.3	1.4	N/A	3
Bankfull Max Depth (ft)				-	2.8	-	-	-	-	1.5	1.9	-	2.4	-	-	1.5	1.8	2.2	2.2	2.8	2.5	3.6	N/A	3
Bankfull Cross Sectional Area (ft^2)	-			18.1	20.2	19.7	22.9	NA	3	27.4	30.3	-	33.4	-	-		31.0		29.5	36.3	32.5	46.9	N/A	3
Width/Depth Ratio				6.2	7.0	7.0	7.9	NA	3	9.3	11.4	-	12.7	-	-		13.0		20.3	22.6	22.8	24.6	N/A	3
Entrenchment Ratio				>3.2	>4.4	>5.0	>5.0	NA	3	3.5	3.8	-	4.4	-	-	3.5	3.8	4.4	2.0	2.3	2.3	2.5	N/A	3
Bank Height Ratio				-	1.0	-	-	-	-	1.0	1.2	-	1.4	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	N/A	3
Profile																								
Riffle Length (ft)				-	-	-	-	-	-	6.1	17.6	-	30.2	-	-	6.6	19.1	32.7	20.1	51.6	47.1	97	29.5	8
Riffle Slope (ft/ft)				0.002	0.014	-	0.042	-	-	0.006	0.028	-	0.066	-	-	0.007	0.030	0.070	0.002	0.006	0.005	0.016	0.005	8
Pool Length (ft)				-	-	-	-	-	-	18.3	35.1	-	62.9	-	-	19.9	38.1	68.1	8.76	24.6	22.4	66.4	13	20
Pool Max Depth (ft)				-	-	-	-	-	-	2.2	2.9	-	3.3	-	-	2.1	2.7	3.1	2.1	3.44	3.61	4.48	0.67	20
Pool Spacing (ft)				-	-	-	-	-	-	50.3	78.9	-	105.8	-	-	54.5	85.5	114.7	24.1	66.8	65.3	125	28.6	19
Pattern																								
Channel Belt Width (ft)				6.6	24.3	-	56.9	-	-	36.0	67.0	-	150.0	-	-	39.0	72.6	162.6	28.5	45.0	48.4	54.1	8.34	17
Radius of Curvature (ft)				14.5	52.4	-	148.8	-	-	19.0	49.0	-	115.0	-	-	20.6	53.1	124.6	23.6	31.3	31.2	39.6	4.75	14
Rc: Bankfull Width (ft/ft)				1.3	4.7	-	13.3	-	-	1.0	2.7	-	6.2	-	-	1.0	2.7	6.2	2.3	2.3	2.3	2.3	N/A	1
Meander Wavelength (ft)				40.1	79.7	-	172.7	-	-	33.0	94.0	-	155.0	-	-	35.8	102	168.0	100.5	130.0	138.2	153.3	18.2	12
Meander Width Ratio				0.6	2.2	-	5.1	-	-	1.9	3.6	-	8.1	-	-	1.9	3.6	8.1	1.7	1.9	1.9	2.1	0.21	3
Transport Parameters																								
Reach Shear Stress (Competency) lb/ft^2							-						-				-					-		
Max Part Size (mm) Mobilized at Bankfull							30 - 100						-				-					-		
Stream Power (Transport Capacity) W/m^2							-						-				-							
Additional Reach Parameters																								
Rosgen Classification							E4						C4				C5					C		
Bankfull Velocity (fps)		-					6.2 - 6.9						4.2				3.5							
Bankfull Discharge (cfs)		-					112.2 - 124.8						128				110							
Valley Length (ft)							-						-				-							
Channel Thalweg Length (ft)							2,086						1,034				2,405					2,455		
Sinuosity							1.04						1.20				1.20					1.21		
Water Surface Slope (Channel) (ft/ft)							0.0090						0.0088				0.0080					0.0080		
Bankfull Slope (ft/ft)							-						-				-					0.0083		
Bankfull Floodplain Area (acres)							-						-				-							
% of Reach with Eroding Banks							-						-											
Channel Stability or Habitat Metric							-						-											
Channel Stability or Habitat Metric							-						-											
Biological or Other							-						-											

- Information unavailable.
N/A - Item does not apply.
Non-Applicable.

Table 10a. Baseline Stream Data Summary
Dye Branch II / Project No. 92255 - Dye Branch-Downstream (870 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data UT to Ostin Creek						Design			Monitoring Baseline					
Dimension & Substrate - Riffle	**LL**	**UL**	**Eq.**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Max**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**
Bankfull Width (ft)	-	-	-	14.8	14.8	14.8	14.8	NA	1	16.0	18.5	-	20.6	-	-	-	20.1	-	18.4	18.6	18.6	18.8	N/A	3
Floodprone Width (ft)				22.0	22.0	22.0	22.0	NA	1	67.2	70.2	-	72.8	-	-	70.9	76.9	88.8	48.7	61.8	61.8	74.8	N/A	3
Bankfull Mean Depth (ft)	-	-	-	1.2	1.2	1.2	1.2	NA	1	1.6	1.6	-	1.7	-	-		1.5		1.9	2.0	2.0	2.0	N/A	3
Bankfull Max Depth (ft)				2.4	2.4	2.4	2.4	NA	1	1.5	1.9	-	2.4	-	-	1.5	1.8	2.2	2.9	3.0	3.0	3.1	N/A	3
Bankfull Cross Sectional Area (ft^2)		-		17.4	17.4	17.4	2.4	NA	1	27.4	30.3	-	33.4	-	-		31.0		34.0	36.1	36.1	38.1	N/A	3
Width/Depth Ratio				12.5	12.5	12.5	2.4	NA	1	9.3	11.4	-	12.7	-	-		13.0		9.3	9.6	9.6	9.9	N/A	3
Entrenchment Ratio				1.5	1.5	1.5	2.4	NA	1	3.5	3.8	-	4.4	-	-	3.5	3.8	4.4	2.7	3.4	3.4	4.0	N/A	3
Bank Height Ratio				4.9	4.9	4.9	2.4	NA	1	1.0	1.2	-	1.4	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	N/A	3
Profile																								
Riffle Length (ft)				-	-	-	-	-	-	6.1	17.6	-	30.2	-	-	6.6	19.1	32.7	15.7	50.3	55.7	79.3	20.2	7
Riffle Slope (ft/ft)				0.003	0.021	-	0.121	-	-	0.006	0.028	-	0.066	-	-	0.007	0.030	0.070	0.001	0.006	0.006	0.014	0.004	7
Pool Length (ft)				2.9	24.8	-	120	-	-	18.3	35.1	-	62.9	-	-	19.9	38.1	68.1	10.1	19.9	15.9	39.6	8.91	14
Pool Max Depth (ft)				-	3.1	-	-	-	-	2.2	2.9	-	3.3	-	-	2.1	2.7	3.1	3.3	3.91	3.77	5.05	0.59	12
Pool Spacing (ft)				79.0	162.0	-	261.0	-	-	50.3	78.9	-	105.8	-	-	54.5	85.5	114.7	15.3	57.5	38.8	130	41.5	14
Pattern																								
Channel Belt Width (ft)				15.6	30.6	-	67.7	-	-	36.0	67.0	-	150.0	-	-	39.0	72.6	162.6	28.3	49.2	57.5	65.4	15.4	9
Radius of Curvature (ft)				11.0	42.1	-	81.9	-	-	19.0	49.0	-	115.0	-	-	20.6	53.1	124.6	32.7	40.7	42.2	50.1	5.6	7
Rc: Bankfull Width (ft/ft)				0.7	2.9	-	5.6	-	-	1.0	2.7	-	6.2	-	-	1.0	2.7	6.2	1.7	1.7	1.7	1.7	N/A	1
Meander Wavelength (ft)				62.0	103.0	-	157	-	-	33.0	94.0	-	155.0	-	-	35.8	102	168.0	138.9	162.2	157.3	210.5	27.2	6
Meander Width Ratio				1.1	2.1	-	4.6	-	-	1.9	3.6	-	8.1	-	-	1.9	3.6	8.1	2.4	2.8	2.8	3.1	0.51	2
Transport Parameters																								
Reach Shear Stress (Competency) lb/ft^2						-						-					-				-			
Max Part Size (mm) Mobilized at Bankfull						30 - 100						-					-				-			
Stream Power (Transport Capacity) W/m^2						-						-					-							
Additional Reach Parameters																								
Rosgen Classification						G4c						C4					C5				C			
Bankfull Velocity (fps)		-				6.1 - 7.2						4.2					3.5							
Bankfull Discharge (cfs)		-				105.4 - 126.0						128					110							
Valley Length (ft)						-						-					-							
Channel Thalweg Length (ft)						-						-					-				870			
Sinuosity						1.14						1.46					1.09				1.10			
Water Surface Slope (ft/ft)						0.0110						0.0090					0.0095				-			
Bankfull Slope (ft/ft)						-						-					-				0.0106			
Bankfull Floodplain Area (acres)						-						-					-							
% of Reach with Eroding Banks						-						-												
Channel Stability or Habitat Metric						-						-												
Biological or Other						-						-												

- Information unavailable.
N/A - Item does not apply.
Non-Applicable.

Table 10b. Baseline Stream Data Summary
(Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions)
Dye Branch II / Project No. 92255 - Cemetery Branch (977 feet)

Parameter	Pre-Existing Condition							Reference Reach Data							Design							Monitoring Baseline						
Ri% / Ru% / P% / G% / S%	-	-	-	-	-			-	-	-	-	-			-	-	-	-	-			35%	4%	42%	13%	7%		
SC% / Sa% / G% / C% / B% / Be%	-	-	-	-	-	-		-	-	-	-	-	-															
d16 / D35 / d50 / d84 / d95 / di^{p} / di^{sp} (mm)	0.9	1.2	2.0	8.0	10.1	88.9	-	0.21	0.5	3.5	13.9	26.6	45.0	-														
Entrenchment Class <1.5 / 1.5 - 1.99 / 2 - 4.9 / 5.0 - 9.9 / >10	-	-	-	-	-			-	-	-	-	-																
Incision Class <1.2 / 1.2 - 1.49 / 1.5 - 1.99 / >2.0	-	-	-	-				-	-	-	-																	

- Information unavailable.
N/A - Item does not apply.
Non-Applicable.

Table 10b. Baseline Stream Data Summary
(Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions)
Dye Branch II / Project No. 92255 - Dye Branch-Upstream (1,465 feet)

Parameter	Pre-Existing Condition							Reference Reach Data							Design							Monitoring Baseline						
Ri% / Ru% / P% / G% / S%	-	-	-	-	-			-	-	-	-	-			-	-	-	-	-	-	-	28%	15%	34%	20%	3%		
SC% / Sa% / G% / C% / B% / Be%	-	-	-	-	-	-		-	-	-	-	-	-															
d16 / D35 / d50 / d84 / d95 / di^{p} / di^{sp} (mm)	0.15	0.4	3.3	10.3	13.7	45.7	-	-	-	-	-	-	-	-														
Entrenchment Class <1.5 / 1.5 - 1.99 / 2 - 4.9 / 5.0 - 9.9 / >10	-	-	-	-	-			-	-	-	-	-																
Incision Class <1.2 / 1.2 - 1.49 / 1.5 - 1.99 / >2.0	-	-	-	-				-	-	-	-																	

- Information unavailable.
Non-Applicable.

Table 10b. Baseline Stream Data Summary
(Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions)
Dye Branch II / Project No. 92255 - Dye Branch-Downstream (870 feet)

Parameter	Pre-Existing Condition							Reference Reach Data							Design							Monitoring Baseline						
Ri% / Ru% / P% / G% / S%	-	-	-	-	-			-	-	-	-	-			-	-	-	-	-	-	-	43%	6%	34%	13%	3%		
SC% / Sa% / G% / C% / B% / Be%	-	-	-	-	-	-		-	-	-	-	-	-															
d16 / D35 / d50 / d84 / d95 / di^{p} / di^{sp} (mm)	0.15	0.28	0.56	10.7	13.0	45.7	-	-	-	-	-	-	-	-														
Entrenchment Class <1.5 / 1.5 - 1.99 / 2 - 4.9 / 5.0 - 9.9 / >10	-	-	-	-	-			-	-	-	-	-																
Incision Class <1.2 / 1.2 - 1.49 / 1.5 - 1.99 / >2.0	-	-	-	-				-	-	-	-																	

- Information unavailable.
N/A - Item does not apply.
Non-Applicable.

Table 11a. Baseline Morphology & Hydraulic Monitoring Summary
Dye Branch II / Project No. 92255 - Cemetery Branch (971 Feet)

Parameter	Cross Section 1 Pool									Cross Section 2 Riffle									Cross Section 3 Riffle								
Dimension	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Post-Repair MY6**	**MY7**	**MY8**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Post-Repair MY6**	**MY7**	**MY8**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Post-Repair MY6**	**MY7**	**MY8**
Record Elevation (datum) Used	836.3	836.3	836.3	836.3	836.3	836.3	836.3	836.4	836.4	826.3	826.3	826.3	826.3	826.3	826.3	826.3	826.0	826.1	821.7	821.7	821.7	821.7	821.7	821.7	821.7	821.7	821.6
Low Bank Height Elevation (datum) Used	-	-	-	-	-	-	-	836.4	836.5	-	-	-	-	-	-	-	826.3	826.3	-	-	-	-	-	-	-	821.9	821.9
Bankfull Width (ft)	9.7	10.2	9.4	9.2	9.2	9.3	9.4	10.0	10.1	8.9	10.6	8.0	8.4	5.9	6.0	6.4	5.5	5.3	5.5	6.0	6.5	6.1	5.7	5.8	6.2	5.9	7.2
Floodprone Width (ft)	>50	>50	>50	>50	>50	>50	>50	>50	>50	>30	>30	>30	>30	>30	>30	>30	>30	>30	>30	>30	>30	>30	>30	>30	>30	>30	>30
Bankfull Mean Depth (ft)	1.9	1.5	1.5	1.5	1.6	1.5	1.4	1.3	1.2	0.8	0.6	0.5	0.5	0.7	0.8	1.0	1.2	1.4	0.5	0.5	0.6	0.6	0.7	0.7	0.8	0.8	1.0
Bankfull Max Depth (ft)	3.1	2.7	2.4	2.2	2.4	2.1	1.8	1.8	1.8	1.4	1.2	1.2	1.2	1.4	1.5	2.0	1.7	2.0	1.0	1.0	1.0	0.9	1.1	1.1	1.2	1.2	1.5
Bankfull Cross Sectional Area (ft^2)	18.9	15.2	14.3	14.0	15.1	14.2	13.1	13.1	13.1	7.0	6.3	3.9	4.1	4.2	4.7	6.6	6.6	6.6	3.0	2.8	4.0	3.6	4.2	4.3	5.0	5.0	5.0
Bankfull Width/Depth Ratio	5.0	6.8	6.2	6.1	5.6	6.2	6.7	7.7	8.6	11.2	18.1	16.4	17.3	8.3	7.5	6.3	4.6	5.2	10.3	12.7	10.6	10.4	7.6	7.9	7.7	7.0	7.2
Bankfull Entrenchment Ratio	>5.1	>4.9	>5.3	>5.4	>5.5	>5.4	>5.3	>5	>4.7	>3.4	>2.8	>3.8	>3.6	>5.1	>5.0	>4.7	>5.5	>5.7	>5.4	>5.0	>4.6	>4.9	>5.3	>5.1	>4.8	>5.1	>4.1
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.2	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.3
d50 (mm)	N/A	5.7	4.8	4.1	1.5	1.1	-	-	-	N/A	8.4	14.0	2.1	4.7	48	-	-	-	N/A	6.0	5.0	6.0	6.2	1.7	-	-	-

* Beginning in MY7 (2018), the bankfull elevation and Bank Height Ratio have been calculated using a fixed Abkf associated with the Post-Repair MY6 Report rather than a fixed Abkf associated with the Baseline Report.

Table 11a. Baseline Morphology & Hydraulic Monitoring Summary
Dye Branch II / Project No. 92255 - Dye Branch-Upstream (1,471 Feet)

Parameter	Cross Section 4 Riffle									Cross Section 5									Pool									Cross Section 6 Riffle									Cross Section 7 Riffle								
Dimension	Base	MY1	MY2	MY3	MY4	MY5	Post-Repair MY6	MY7	MY8	Base	MY1	MY2	MY3	MY4	MY5	Post-Repair MY6	MY7	MY8	Base	MY1	MY2	MY3	MY4	MY5	Post-Repair MY6	MY7	MY8	Base	MY1	MY2	MY3	MY4	MY5	Post-Repair MY6	MY7	MY8	Base	MY1	MY2	MY3	MY4	MY5	Post-Repair MY6	MY7	MY8
Record Elevation (datum) Used	824.3	824.3	824.3	824.3	824.3	824.3	824.3	824.2	824.1	817.4	817.4	817.4	817.4	817.4	817.4	817.4	817.7	817.4	815.5	815.5	815.5	815.5	815.5	815.5	815.5	815.5	815.4	812.5	812.5	812.5	812.5	812.5	812.5	812.5	812.7	812.5
Low Bank Height Elevation (datum) Used	-	-	-	-	-	-	-	824.5	824.5	-	-	-	-	-	-	-	817.4	817.8	-	-	-	-	-	-	-	815.1	815.3	-	-	-	-	-	-	-	812.4	812.5
Bankfull Width (ft)	25.7	23.8	22.9	20.8	21.5	20.7	13.2	11.3	12.9	17.1	17.0	16.8	16.4	15.6	15.1	21.8	22.0	19.6	32.7	28.7	27.7	26.9	26.7	27.2	17.5	21.3	17.4	26.9	24.1	21.3	20.1	19.9	17.1	12.0	15.0	15.8
Floodprone Width (ft)	>58.6	>52.8	>52.8	>52.8	>52.8	>52.8	>52.8	>52.8	>52.8	>50	>47.1	>47.1	>47.1	>47.1	>47.1	>47.1	>47.1	>47.1	>81.8	>78.2	.78.2	>78.2	>78.2	>78.2	>78.2	>78.2	>78.2	>54.4	>52.6	>52.6	>52.6	>52.6	>52.6	>52.6	>52.6	>52.6
Bankfull Mean Depth (ft)	1.3	1.1	1.0	1.1	1.0	1.0	1.2	1.4	1.5	1.7	1.4	2.1	2.1	2.1	2.0	1.9	1.9	2.3	1.4	1.3	1.3	1.3	1.3	1.2	2.0	1.6	1.8	1.1	1.0	0.9	1.1	1.0	1.0	1.8	1.4	1.4
Bankfull Max Depth (ft)	2.5	2.0	2.1	2.3	2.2	2.3	1.9	2.1	2.4	3.4	2.8	3.6	3.6	3.4	3.0	3.5	3.5	3.5	3.6	3.2	3.2	3.3	3.3	3.0	3.3	3.3	3.0	2.2	2.0	2.1	2.4	2.3	2.2	2.4	2.3	2.1
Bankfull Cross Sectional Area (ft^2)	32.5	27.1	23.1	22.4	21.1	21.0	15.8	15.8	15.8	28.8	23.7	35.0	35.1	33.1	29.7	41.9	41.9	41.9	46.9	37.5	36.2	36.0	34.2	31.3	34.2	34.2	34.2	29.5	24.2	19.9	21.3	19.4	17.9	21.1	21.1	21.1
Bankfull Width/Depth Ratio	20.3	20.9	22.6	19.3	21.9	20.4	11.0	8.1	8.4	10.2	12.2	8.1	7.7	7.4	7.7	11.3	11.5	9.0	22.8	22.0	21.2	20.0	20.8	23.6	9.0	13.2	9.5	24.6	24.0	22.9	18.9	20.4	16.3	6.8	10.6	11.0
Bankfull Entrenchment Ratio	>2.3	>2.2	>2.3	>2.5	>2.5	>2.6	>4.0	>4.7	>4.1	>2.9	>2.8	>2.8	>2.9	>3.0	>3.1	>2.2	>2.1	2.2	>2.5	>2.7	>2.8	>2.9	>2.9	>2.9	>4.5	>3.7	>4.5	>2.0	>2.2	>2.5	>2.6	>2.6	>3.1	>4.4	>3.5	>3.3
Bankfull Bank Height Ratio*	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.2	1.0	1.0	1.0	1.0	1.0	1.0	1.1	0.9	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.1	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.0
d50 (mm)	N/A	1.2	1.2	1.0	1.9	0.42	-	-	-	N/A	6.0	1.7	13.0	1.6	1.9	-	-	-	N/A	1.9	4.5	1.6	1.2	1.5	-	-	-	N/A	2.7	8.0	7.4	2.4	1.3	-	-	-

* Beginning in MY7 (2018), the bankfull elevation and Bank Height Ratio dimensions have been calculated using a fixed Abkf associated with the Post-Repair MY6 Report rather than a fixed Abkf associated with the Baseline Report.

Table 11a. Baseline Morphology & Hydraulic Monitoring Summary
Dye Branch II / Project No. 92255 - Dye Branch-Downstream (869 Feet)

Parameter	Cross Section 8 Riffle									Cross Section 9 Pool									Cross Section 10 Riffle								
Dimension	Base	MY1	MY2	MY3	MY4	MY5	Post-Repair MY6	MY7	MY8	Base	MY1	MY2	MY3	MY4	MY5	Post-Repair MY6	MY7	MY8	Base	MY1	MY2	MY3	MY4	MY5	Post-Repair MY6	MY7	MY8
Record Elevation (datum) Used	809.3	809.3	809.3	809.3	809.3	809.3	809.3	809.4	809.3	806.1	806.1	806.1	806.1	806.1	806.1	806.1	806.1	806.1	801.1	801.1	801.1	801.1	801.1	801.1	801.1	801.0	801.1
Low Bank Height Elevation (datum) Used	-	-	-	-	-	-	-	809.1	809.3	-	-	-	-	-	-	-	806.1	806.1	-	-	-	-	-	-	-	801.1	801.5
Bankfull Width (ft)	18.8	18.8	19.6	18.6	19.6	19.6	19.3	22.1	18.9	26.3	26.3	24.3	24.6	23.8	23.7	27.7	29.2	27.5	18.4	18.5	17.7	17.9	17.8	16.6	17.4	17.4	19.7
Floodprone Width (ft)	>74.8	>73.5	>73.5	>73.5	>73.5	>73.5	>73.5	>73.5	>73.5	>70	>70	>70	>70	>70	>70	>70	>70	>70	>48.7	>47.6	>47.6	>47.6	>47.6	>47.6	>47.6	>47.6	>47.6
Bankfull Mean Depth (ft)	2.0	1.9	2.1	2.0	2.2	2.1	2.2	1.9	2.2	1.8	1.7	2.3	2.6	2.6	2.6	1.5	1.4	1.5	1.9	1.6	1.6	1.6	1.8	1.8	1.8	1.8	2
Bankfull Max Depth (ft)	3.1	3.0	3.9	3.3	3.9	3.9	3.9	3.4	3.4	3.5	3.5	3.5	4.1	3.4	3.6	2.1	2.3	2.3	2.9	2.4	2.5	2.7	2.8	2.6	2.8	2.6	2.9
Bankfull Cross Sectional Area (ft^2)	38.1	35.9	41.0	36.8	43.2	41.8	42.3	42.3	42.3	48.4	43.6	55.3	63.5	61.1	62.7	42.1	42.1	42.1	34.0	29.5	27.8	29.4	31.6	29.4	32.0	32.0	32.0
Bankfull Width/Depth Ratio	9.3	9.9	9.3	9.4	8.9	9.2	8.8	11.6	8.4	14.3	15.9	10.7	9.6	9.3	9.0	18.2	20.3	18.0	9.9	11.7	11.3	11.0	10.0	9.4	9.4	9.4	12.1
Bankfull Entrenchment Ratio	>4.0	>3.9	>3.8	>4.0	>3.8	>3.7	>3.8	>3.3	>3.4	>2.7	>2.7	2.9	>2.8	>2.9	>2.9	>2.5	>2.4	>2.5	>2.7	>2.6	>2.7	>2.7	>2.7	>2.9	>2.7	>2.7	>2.2
Bankfull Bank Height Ratio*	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.2
d50 (mm)	N/A	1.3	1.1	0.9	2.0	0.26	-	-	-	N/A	0.72	6.4	1.7	1.4	0.32	-	-	-	N/A	1.0	0.9	0.1	1.8	2.7	-	-	-

* Beginning in MY7 (2018), the bankfull elevation and Bank Height Ratio dimensions have been calculated using a fixed Abkf associated with the Post-Repair MY6 Report rather than a fixed Abkf associated with the Baseline Report.

Table 11b. Monitoring Data - Stream Reach Data Summary
Dye Branch II / Project No. 92255 - Cemetery Branch (971 feet)

Parameter	Baseline						MY - 1						MY - 2						MY - 3						MY - 4						MY - 5						MY - 6						MY - 7						MY - 8					
Dimension & Substrate - Riffle	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**
Bankfull Width (ft)	5.5	7.2	7.2	8.9	N/A	2	6.0	8.3	8.3	10.6	N/A	2	6.5	7.3	7.3	8.0	N/A	2	6.1	7.3	7.3	8.4	N/A	2	5.9	6.0	6.0	6.1	N/A	2	5.8	5.9	5.9	6.0	N/A	2	6.2	6.3	6.3	6.4	N/A	2	5.5	5.7	5.7	5.9	N/A	2	6.5	6.9	6.9	7.2	N/A	2
Floodprone Width (ft)	>30	>30	>30	>30	N/A	2	>30	>30	>30	>30	N/A	2	>30	>30	>30	>30	N/A	2	>30	>30	>30	>30	N/A	2	>30	>30	>30	>30	N/A	2	>30	>30	>30	>30	N/A	2	30.0	30.0	30.0	30.0	N/A	2	30.0	30.0	30.0	30.0	N/A	2	30.0	30.0	30.0	30.0	N/A	2
Bankfull Mean Depth (ft)	0.5	0.7	0.7	0.8	N/A	2	0.5	0.6	0.6	0.6	N/A	2	0.5	0.6	0.6	0.6	N/A	2	0.5	0.6	0.6	0.6	N/A	2	0.7	0.7	0.7	0.7	N/A	2	0.7	0.8	0.8	0.8	N/A	2	0.8	0.9	0.9	1.0	N/A	2	0.8	1.0	1.0	1.2	N/A	2	1.0	1.1	1.1	1.2	N/A	2
Bankfull Max Depth (ft)	1.0	1.2	1.2	1.4	N/A	2	1.0	1.1	1.1	1.2	N/A	2	1.0	1.1	1.1	1.2	N/A	2	0.9	1.1	1.1	1.2	N/A	2	1.1	1.3	1.3	1.4	N/A	2	1.1	1.3	1.3	1.5	N/A	2	1.2	1.6	1.6	2.0	N/A	2	1.2	1.5	1.5	1.7	N/A	2	1.5	1.8	1.8	2.1	N/A	2
Bankfull Cross-Sectional Area (ft^2)	3.0	5.0	5.0	7.0	N/A	2	2.8	4.6	4.6	6.3	N/A	2	3.9	4.0	4.0	4.0	N/A	2	3.6	3.9	3.9	4.1	N/A	2	4.2	4.2	4.2	4.2	N/A	2	4.3	4.5	4.5	4.7	N/A	2	5.0	5.8	5.8	6.6	N/A	2	5.0	5.8	5.8	6.6	N/A	2	5.0	5.8	5.8	6.6	N/A	2
Width/Depth Ratio	10.3	10.8	10.8	11.2	N/A	2	12.7	15.4	15.4	18.1	N/A	2	10.6	13.5	13.5	16.4	N/A	2	10.4	13.9	13.9	17.3	N/A	2	8.3	8.5	8.5	8.7	N/A	2	7.5	7.7	7.7	7.9	N/A	2	6.3	7.0	7.0	7.7	N/A	2	4.6	5.8	5.8	7.0	N/A	2	5.2	6.2	6.2	7.2	N/A	2
Entrenchment Ratio	>3.4	>4.4	>4.4	>5.4	N/A	2	>2.8	>3.9	>3.9	>5.0	N/A	2	>3.8	>4.2	>4.2	>4.6	N/A	2	3.6	4.3	4.3	4.9	N/A	2	4.9	5.0	5.0	5.1	N/A	2	5.0	5.1	5.1	5.1	N/A	2	4.7	4.8	4.8	4.8	N/A	2	5.1	5.3	5.3	5.5	N/A	2	4.9	6.0	5.6	6.3	N/A	2
Bank Height Ratio	1.0	1.0	1.0	1.0	N/A	2	1.0	1.0	1.0	1.0	N/A	2	1.0	1.0	1.0	1.0	N/A	2	1.0	1.0	1.0	1.0	N/A	2	1.0	1.0	1.0	1.0	N/A	2	1.0	1.0	1.0	1.0	N/A	2	1.0	1.1	1.1	1.1	N/A	2	1.1	1.2	1.2	1.2	N/A	2	1.1	1.2	1.2	1.3	N/A	2
Profile																																																						
Riffle Length (ft)	6.8	23.4	19.5	53.9	14.8	14	6.9	22.9	22.7	50.3	13.3	17	6.4	24.3	15.2	53.7	17.0	13	8.4	24.4	13.2	53.7	17.8	12	7.7	23.4	18.2	48.8	15.2	12	5.2	27.2	29.1	48.7	17.6	9																		
Riffle Slope (ft/ft)	0.004	0.023	0.022	0.049	0.013	14	0.002	0.020	0.018	0.052	0.015	17	0.002	0.027	0.022	0.064	0.020	13	0.005	0.025	0.021	0.057	0.017	12	0.005	0.019	0.018	0.037	0.011	12	0.006	0.017	0.014	0.029	0.009	9																		
Pool Length (ft)	5.8	16.2	16.9	39.1	7.2	24	4.9	13.0	12.5	38.9	6.8	25	8.4	16.5	14.8	39.0	6.9	26	6.8	16.6	14.8	39.2	7.2	26	5.1	16.4	14.3	37.5	7.3	26	4.5	16.4	14.7	39.8	7.7	27																		
Pool Max Depth (ft)	1.8	3.0	2.9	3.7	0.5	18	1.0	2.8	2.9	3.4	0.6	19	1.0	2.5	2.5	3.6	0.8	24	0.8	2.2	2.4	3.4	0.8	24	1.0	2.2	2.2	3.2	0.7 [1]	25 [1]	1.2	2.5	2.8	3.5	0.8	26																		
Pool Spacing (ft)	4.5	38.7	36.4	111.0	24.4	24	12.0	39.1	33.3	110.2	24.0	24	12.0	36.9	30.1	86.7	20.6	25	11.0	36.7	27.9	96.6	22.5	25	14.9	36.6	27.8	89.3	20.9	25	9.9	35.6	28.6	93.4	20.4	26																		
Pattern																																																				
Channel Belt Width (ft)	11.3	30.6	37.0	46.7	12.26	16																																														
Radius of Curvature (ft)	8.3	13.7	12.0	29.9	5.70	16																																													
Rc: Bankfull Width (ft/ft)	2.4	2.4	2.4	2.4	N/A	1																																													
Meander Wavelength (ft)	38.8	77.4	79.1	167.0	36.08	11																																													
Meander Width Ratio	4.2	5.4	5.4	6.7	N/A	2																																													
Additional Reach Parameters																																																			
Rosgen Classification	C						C4						C4						C4						C4						C4																						
Channel Thalweg Length (ft)	977						971						970						969						970						958																						
Sinuosity (ft)	1.08						1.08						1.08						1.07						1.12						1.06																						
Water Surface Slope (Channel) (ft/ft)	-						0.0200						0.0203						0.0203						0.0177						0.0186																						
Bankfull Slope (ft/ft)	0.0191						0.0195						0.0198						0.0189						0.0183						0.0190																						
Ri% / Ru% / P% / G% / S%	35%	4%	42%	13%	7%		42%	6%	34%	13%	6%		34%	4%	46%	11%	6%		32%	3%	47%	13%	6%		31%	4%	47%	12%	6%		27%	4%	48%	15%	6%																		
SC% / SA% / G% / C% / B% / Be%*							0%	38%	54%	7%	0%	0%	0%	30%	67%	3%	0%	0%	1%	41%	53%	4%	0%	0%	0%	49%	45%	6%	0%	0%	0%	52.5%	26.2%	21.1%	0%	0%																		
d16 / d35 / d50 / d84 / d95 (mm)																									0.86	1.5	4.1	7.0	28.3	71.7	0.2	1.35	24.85	65	93																		
% of Reach with Eroding Banks	0%						0%						0%						0%						1%						1%																						
Channel Stability or Habitat Metric	N/A						N/A						N/A						N/A						N/A						N/A																						
Biological or Other	N/A						N/A						N/A						N/A						N/A						N/A																						

N/A - Information does not apply.

Table 11b. Monitoring Data - Stream Reach Data Summary
Dye Branch II / Project No. 92255 - Dye Branch-Upstream (1,471 feet)

Parameter	Baseline						MY - 1						MY - 2						MY - 3						MY - 4						MY - 5						MY - 6						MY - 7						MY - 8					
Dimension & Substrate - Riffle	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**
Bankfull Width (ft)	25.7	28.4	26.9	32.7	N/A	3	23.8	25.5	24.1	28.7	N/A	3	21.3	24.0	22.9	27.7	N/A	3	20.1	22.6	20.8	26.9	N/A	3	19.9	22.6	21.5	26.5	N/A	3	17.1	21.7	20.7	27.2	N/A	3	12.0	14.2	13.2	17.5	3.0	3	11.3	15.9	15.0	21.3	5.1	3	18.2	20.0	20.0	21.7	1.9	3
Floodprone Width (ft)	54.4	64.9	58.6	81.8	N/A	3	52.6	61.2	52.8	78.2	N/A	3	52.6	61.2	52.8	78.2	N/A	3	52.6	61.2	52.8	78.2	N/A	3	52.6	61.2	52.8	78.2	N/A	3	52.6	61.2	52.8	78.2	N/A	3	52.6	61.2	52.8	78.2	15.0	3	52.6	61.2	52.8	78.2	14.7	3	47.6	61.2	61.2	74.8	12.0	3
Bankfull Mean Depth (ft)	1.1	1.3	1.3	1.4	N/A	3	1.0	1.1	1.1	1.3	N/A	3	0.9	1.1	1.0	1.3	N/A	3	1.1	1.2	1.1	1.3	N/A	3	1.0	1.1	1.0	1.3	N/A	3	1.0	1.1	1.0	1.2	N/A	3	1.2	1.7	1.8	2.0	0.4	3	1.4	1.5	1.4	1.6	0.1	3	1.8	2.0	2.0	2.1	0.2	3
Bankfull Max Depth (ft)	2.2	2.8	2.5	3.6	N/A	3	2.0	2.4	2.0	3.2	N/A	3	2.1	2.5	2.1	3.2	N/A	3	2.3	2.7	2.4	3.3	N/A	3	2.2	2.6	2.3	3.3	N/A	3	2.2	2.5	2.3	3.0	N/A	3	1.9	2.5	2.4	3.3	0.7	3	2.1	2.6	2.3	3.3	0.6	3	2.9	3.1	3.1	3.2	0.4	3
Bankfull Cross-Sectional Area (ft^2)	29.5	36.3	32.5	46.9	N/A	3	24.2	29.6	27.1	37.5	N/A	3	19.9	26.4	23.1	36.2	N/A	3	21.3	26.6	22.4	36.0	N/A	3	19.4	24.9	21.1	34.2	N/A	3	17.9	23.4	21.0	31.3	N/A	3	15.8	23.7	21.1	34.2	9.5	3	15.8	23.7	21.1	34.2	9.5	3	15.8	23.7	21.1	34.2	7.8	3
Width/Depth Ratio	20.3	22.6	22.8	24.6	N/A	3	20.9	22.3	22.0	24.0	N/A	3	21.2	22.2	22.6	22.9	N/A	3	18.9	19.4	19.3	20.0	N/A	3	20.4	21.0	20.8	21.9	N/A	3	16.3	20.1	20.4	23.6	N/A	3	6.8	8.9	9.0	11.0	2.1	3	8.1	10.6	10.6	13.2	2.6	3	8.7	10.4	10.4	12.1	1.0	3
Entrenchment Ratio	2.0	2.3	2.3	2.5	N/A	3	2.2	2.4	2.2	2.7	N/A	3	2.3	2.5	2.5	2.8	N/A	3	2.5	2.7	2.6	2.9	N/A	3	2.5	2.7	2.6	2.9	N/A	3	2.6	2.9	2.9	3.1	N/A	3	4.0	4.3	4.4	4.5	0.3	3	3.5	4.0	3.7	4.7	0.6	3	2.2	2.8	2.8	3.3	0.5	3
Bank Height Ratio	1.0	1.0	1.0	1.0	N/A	3	1.0	1.0	1.0	1.0	N/A	3	1.0	1.0	1.0	1.0	N/A	3	1.0	1.0	1.0	1.0	N/A	3	1.0	1.0	1.0	1.0	N/A	3	1.0	1.0	1.0	1.0	N/A	3	1.0	1.1	1.1	1.1	0.1	3	0.9	1.0	0.9	1.1	0.1	3	1.0	1.0	1.0	1.2	0.1	3
Profile																																																						
Riffle Length (ft)	20.1	51.6	47.1	97.0	29.5	8	17.5	40.6	33.3	75.1	19.0	11	15.5	37.5	34.6	58.6	14.4	9	16.8	41.4	47.0	54.0	16.2	6	19.4	40.3	39.6	63.9	18.1	6	10.1	32.9	25.6	58.3	21.1	7																		
Riffle Slope (ft/ft)	0.002	0.006	0.005	0.016	0.005	8	0.002	0.007	0.005	0.019	0.005	11	0.001	0.007	0.004	0.016	0.005	9	0.002	0.008	0.006	0.016	0.006	6	0.003	0.007	0.005	0.016	0.005	6	0.004	0.011	0.007	0.031	0.010	7																		
Pool Length (ft)	8.8	24.6	22.4	66.4	13.0	20	10.7	29.8	27.3	75.6	15.9	20	8.8	29.5	23.2	76.3	18.7	20	7.7	26.2	21.8	81.6	17.7	21	8.9	26.9	20.6	85.8	19.4	21	8.1	28.3	21.7	94.0	19.5	21																		
Pool Max Depth (ft)	2.1	3.4	3.6	4.5	0.7	20	1.8	3.3	3.4	4.7	0.8	20	2.2	3.7	3.8	5.0	0.8	20	1.6	3.1	3.1	4.3	0.8	20	1.4	3.0	3.4	4.4	0.9	20	2.00	3.55	3.64	4.88	0.84	20																		
Pool Spacing (ft)	24.1	66.8	65.3	124.9	28.6	19	31.7	67.7	69.0	128.2	27.5	19	20.7	62.1	55.7	127.6	29.6	19	13.2	65.1	64.0	127.5	30.7	18	11.7	58.7	48.2	118.6	30.8	20	15.1	57.9	45.8	114.4	30.1	20																		
Pattern																																																				
Channel Belt Width (ft)	28.5	45.0	48.4	54.1	8.3	17																																														
Radius of Curvature (ft)	23.6	31.3	31.2	39.6	4.7	14																																													
Rc: Bankfull Width (ft/ft)	2.0	2.0	2.0	2.0	N/A	1																																												
Meander Wavelength (ft)	100.5	130.0	138.2	153.3	18.2	12																																												
Meander Width Ratio	1.5	1.7	1.8	1.9	N/A	3																																												
Additional Reach Parameters																																																		
Rosgen Classification	C						C5						C4						C4						C4						C4																					
Channel Thalweg Length (ft)	1,465						1,471						1,465						1,447						1,448 [1]						1,437																					
Sinuosity (ft)	1.15						1.16						1.15						1.14						1.13 [1]						1.13																					
Water Surface Slope (Channel) (ft/ft)	-						0.0092						0.0091						0.0092						0.0093						0.0092																					
Bankfull Slope (ft/ft)	0.0091						0.0094						0.0095						0.0091						0.0094						0.0093																					
Ri% / Ru% / P% / G% / S%	28%	15%	34%	20%	3%		31%	10%	41%	15%	4%		23%	14%	40%	19%	3%		17%	15%	38%	26%	3%		17%	23%	39%	17%	4%		16%	23%	42%	16%	4%																		
SC% / SA% / G% / C% / B% / Be%*							0%	50%	47%	3%	0%	0%	2%	45%	50%	3%	0%	0%	3%	43%	48%	6%	0%	0%	5%	58%	35%	2%	0%	0%	2.3%	77.5%	19%	1.1%	0%	0%																		
d16 / d35 / d50 / d84 / d95 (mm)																									0.48	1.08	1.8	3.3	6.7	23.0	0.235	0.89	1.07	3.47	23.7																		
% of Reach with Eroding Banks	0%						0%						7%						10%						10%						9%																					
Channel Stability or Habitat Metric	N/A						N/A						N/A						N/A						N/A						N/A																					
Biological or Other	N/A						N/A						N/A						N/A						N/A						N/A																					

N/A - Information does not apply.
Ri = Riffle / Ru = Run / P = Pool / G = Glide / S = Step
SC = Silt-Clay / SA = Sand / G = Gravel / C = Cobble / B = Boulder / Be = Bedrock
*Percentages based on riffle and pool pebble counts.

Table 11b. Monitoring Data - Stream Reach Data Summary
Dye Branch II / Project No. 92255 - Dye Branch-Downstream (869 feet)

Parameter	Baseline						MY - 1						MY - 2						MY - 3						MY - 4						MY - 5						MY - 6						MY - 7						MY - 8					
Dimension & Substrate - Riffle	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**
Bankfull Width (ft)	18.4	18.6	18.6	18.8	N/A	2	18.5	18.7	18.7	18.8	N/A	2	17.7	18.7	18.7	19.6	N/A	2	17.9	20.4	18.6	24.6	N/A	2	17.8	18.7	18.7	19.6	N/A	2	16.60	18.10	18.10	19.60	N/A	2	17.4	18.4	18.4	19.3	N/A	2	17.4	19.8	19.8	22.1	N/A	2	18.2	20.0	20.0	21.7	N/A	2
Floodprone Width (ft)	48.7	61.8	61.8	74.8	N/A	2	47.6	60.6	60.6	73.5	N/A	2	47.6	60.6	60.6	73.5	N/A	2	47.6	63.7	70.0	73.5	N/A	2	47.6	60.6	60.6	73.5	N/A	2	47.60	60.55	60.55	73.50	N/A	2	47.6	60.6	60.6	73.5	N/A	2	47.6	60.6	60.6	73.5	N/A	2	47.6	61.2	61.2	74.8	N/A	2
Bankfull Mean Depth (ft)	1.9	2.0	2.0	2.0	N/A	2	1.6	1.8	1.8	1.9	N/A	2	1.6	1.9	1.9	2.1	N/A	2	1.6	2.1	2.0	2.6	N/A	2	1.8	2.0	2.0	2.2	N/A	2	1.80	1.95	1.95	2.10	N/A	2	1.8	2.0	2.0	2.2	N/A	2	1.8	1.9	1.9	1.9	N/A	2	1.8	2.0	2.0	2.1	N/A	2
Bankfull Max Depth (ft)	2.9	3.0	3.0	3.1	N/A	2	2.4	2.7	2.7	3.0	N/A	2	2.5	3.2	3.2	3.9	N/A	2	2.7	3.4	3.3	4.1	N/A	2	2.8	3.4	3.4	3.9	N/A	2	2.60	3.25	3.25	3.90	N/A	2	2.8	3.4	3.4	3.9	N/A	2	2.6	3.0	3.0	3.4	N/A	2	2.9	3.1	3.1	3.2	N/A	2
Bankfull Cross-Sectional Area (ft^2)	34.0	36.1	36.1	38.1	N/A	2	29.5	32.7	32.7	35.9	N/A	2	27.8	34.4	34.4	41.0	N/A	2	29.4	43.2	36.8	63.5	N/A	2	31.6	37.4	37.4	43.2	N/A	2	29.40	35.60	35.60	41.80	N/A	2	32.0	37.2	37.2	42.3	N/A	2	32.0	37.2	37.2	42.3	N/A	2	34.0	36.1	36.1	38.1	N/A	2
Width/Depth Ratio	9.3	9.6	9.6	9.9	N/A	2	9.9	10.8	10.8	11.7	N/A	2	9.3	10.3	10.3	11.3	N/A	2	9.4	10.0	9.6	11.0	N/A	2	8.9	9.5	9.5	10.0	N/A	2	9.20	9.30	9.30	9.40	N/A	2	8.8	9.1	9.1	9.4	N/A	2	9.4	10.5	10.5	11.6	N/A	2	8.7	10.4	10.4	12.1	N/A	2
Entrenchment Ratio	2.7	3.4	3.4	4.0	N/A	2	2.6	3.3	3.3	3.9	N/A	2	2.7	3.3	3.3	3.8	N/A	2	2.7	3.2	2.8	4.0	N/A	2	2.7	3.3	3.3	3.8	N/A	2	2.90	3.30	3.30	3.70	N/A	2	2.7	3.3	3.3	3.8	N/A	2	2.7	3.0	3.0	3.3	N/A	2	2.2	2.8	2.8	3.3	N/A	2
Bank Height Ratio	1.0	1.0	1.0	1.0	N/A	2	1.0	1.0	1.0	1.0	N/A	2	1.0	1.0	1.0	1.0	N/A	2	1.0	1.0	1.0	1.0	N/A	2	1.0	1.0	1.0	1.0	N/A	2	1.00	1.00	1.00	1.00	N/A	2	1.0	1.0	1.0	1.0	N/A	2	0.9	1.0	1.0	1.0	N/A	2	1.0	1.0	1.0	1.0	N/A	2
Profile																																																						
Riffle Length (ft)	15.7	50.3	55.7	79.3	20.2	7	14.4	48.7	43.0	87.0	24.1	7	14.7	37.3	39.9	54.7	18.2	4	18.9	42.8	41.0	70.4	23.4	4	18.1	43.4	39.0	77.7	26.5	4	18.7	46.6	44.0	77.2	29.3	3																		
Riffle Slope (ft/ft)	0.001	0.006	0.006	0.014	0.004	7	0.001	0.003	0.003	0.006	0.002	7	0.003	0.007	0.007	0.010	0.004	4	0.001	0.005	0.005	0.008	0.004	4	#####	0.004	0.001	0.014	0.007	4	0.002	0.007	0.004	0.015	0.007	3																		
Pool Length (ft)	10.1	19.9	15.9	39.6	8.9	14	9.7	17.6	17.5	26.1	5.8	15	7.6	26.2	31.4	44.2	13.0	14	8.7	26.6	30.2	56.6	15.7	15	8.0	23.4	23.7	43.3	10.7	16	5.9	23.1	20.2	57.9	15.0	16																		
Pool Max Depth (ft)	3.3	3.9	3.8	5.1	0.6	12	3.2	3.9	4.0	4.9	0.5	13	3.0	4.2	3.8	6.7	1.0	13	3.0	3.9	3.8	5.3	0.7	12	1.8	3.4	3.4	5.0	0.8	14	3.4	4.3	4.2	5.8	0.7	14																		
Pool Spacing (ft)	15.3	57.5	38.8	130.2	41.5	14	10.8	56.8	40.6	129.1	40.4	14	10.0	60.6	61.6	109.9	34.9	13	12.0	57.3	48.3	114.8	36.8	14	9.7	53.4	39.2	122.8	38.0	15	10.9	53.5	38.4	116.5	36.2	15																		
Pattern																																																				
Channel Belt Width (ft)	28.3	49.2	57.5	65.4	15.4	9																																														
Radius of Curvature (ft)	32.7	40.7	42.2	50.1	5.6	7																																														
Rc: Bankfull Width (ft/ft)	1.6	1.6	1.6	1.6	N/A	1																																														
Meander Wavelength (ft)	138.9	162.2	157.3	210.5	27.2	6																																														
Meander Width Ratio	3.1	3.1	3.1	3.1	N/A	2																																														
Additional Reach Parameters																																																			
Rosgen Classification	C						C5						C5						C5						C5						C5																					
Channel Thalweg Length (ft)	870						869						875						867						868						855																					
Sinuosity (ft)	1.10						1.09						1.10						1.09						1.09						1.07																					
Water Surface Slope (Channel) (ft/ft)	-						0.0099						0.0094						0.0099						0.0098						0.0095																					
Bankfull Slope (ft/ft)	0.0106						0.0104						0.0101						0.0089						0.0103						0.0088																					
Ri% / Ru% / P% / G% / S%	43%	6%	34%	13%	3%		39%	10%	31%	18%	2%		17%	19%	42%	19%	3%		20%	11%	46%	20%	4%		20%	14%	43%	20%	3%		19%	19%	42%	18%	2%																		
SC% / SA% / G% / C% / B% / Be%*							3%	75%	22%	0%	0%	0	3%	59%	38%	0%	0%	0%	12%	52%	36%	0%	0%	0%	5%	56%	38%	1%	0%	0%	24.6%	46.5%	27.9%	0.9%	0%	0%																		
d16 / d35 / d50 / d84 / d95 (mm)																									1.1	1.5	1.9	3.9	8.3	31	0.062	0.705	1.48	4.72	8.955																		
% of Reach with Eroding Banks	0%						0%						8%						10%						10%						11%																					
Channel Stability or Habitat Metric	N/A						N/A						N/A						N/A						N/A						N/A																					
Biological or Other	N/A						N/A						N/A						N/A						N/A						N/A																					

N/A - Information does not apply.
Ri = Riffle / Ru = Run / P = Pool / G = Glide / S = Step
SC = Silt-Clay / SA = Sand / G = Gravel / C = Cobble / B = Boulder / Be = Bedrock
*Percentages based on riffle and pool pebble counts.

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Appendix E
Hydrologic Data

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Table 12. Verification of Bankfull Events Dye Branch II / Project No. 92255		
Date of Occurrence	**Method**	**Feet Above Average Bankfull Elevation**
7/8/2011	Water level logger	1.07
9/21/2011	Water level logger	1.14
9/24/2011	Water level logger	0.52
5/16/2012	Water level logger	1.63
7/11/2012	Water level logger	0.21
9/29/2012	Water level logger	0.22
4/12/2013	Water level logger	0.08
6/28/2013	Water level logger	0.81
6/30/2013	Water level logger	0.72
7/9/2013	Water level logger	1.62
7/31/2013	Water level logger	0.53
1/11/2014	Water level logger	1.29
5/14/2014	Water level logger	0.07
6/8/2014	Water level logger	0.21
Between 6/5/2015 and 11/7/2015	Wrack Lines	0.5
4/24/2018	Wrack Lines	Unknown
1/25/2019	Wrack Lines	Unknown

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Appendix F
Invasive Species Treatment Logs

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Summary of Late Growing Season 2019 Treatments at Invasive Vegetation Management 2015-02 Sites

Species Treated/Treatment Type	Dye Branch (2255)		
	Foliar	Basal Bark	Cut Stump Spray
Celastrus orbiculatus			
Fallopia japonica			
Lespedeza spp.			
Ligustrum spp.	X	X	X
Lonicera japonica			
Phyllostachys aurea			
Pueraria lobata	X	X	X
Pyrus calleryana			
Rosa multiflora	X	X	X
Typha spp.			

Carolina Silvics, Inc. Pesticide Application Log

CarSilv - 0652

Client	NC Division of Mitigation Services		
Project Site	Dye Branch II (NCDMS #92255)		
Date	07-01-2019		
Start Time	15:00	End Time	16:10
Only PAL for Site for This Day?	No	If NO, this is PAL # of ##	3 of 3
Sky Cover	Clear	Temp (F)	90
Wind Direction	NNW	Wind Speed	1-5 mph
Applicators	Grainger Coughtrey (NC 026-34612)		
Application Method	Basal Bark		
Herbicide	Garlon® 3A (triclopyr)		
Herbicide Rate (%)	15	Total Concentrate	30 fl oz
Surfactant or Adjuvant (1)			
Surfactant/Adjudivant 1 Rate (%)			
Other			
Other Rate/Amt			
Diluent	Diesel fuel		
Total Solution	1.5 fl oz		
Species Controlled	Kudzu Privet spp. Multiflora Rose		
Area Description	Basal barked target species within the easement south of Carbarrus Ave. The Privet and Rose were scattered but the Kudzu was concentrated to one pocket at the centered of the that area.		
Additional Comments			

Carolina Silvics, Inc. Pesticide Application Log

CarSilv - 0650

Client	NC Division of Mitigation Services		
Project Site	Dye Branch II (NCDMS #92255)		
Date	07-01-2019		
Start Time	10:00	End Time	15:00
Only PAL for Site for This Day?	No	If NO, this is PAL # of ##	1 of 3
Sky Cover	Clear	Temp (F)	90
Wind Direction	NNW	Wind Speed	1-5 mph
Applicators	Joshua G Merritt (NC 026-33717) Grainger Coughtrey (NC 026-34612)		
Application Method	Cut and Stump Spray		
Herbicide	Roundup® Custom (glyphosate)		
Herbicide Rate (%)	50	Total Concentrate	50 fl oz
Surfactant or Adjuvant (1)			
Surfactant/Adjudivant 1 Rate (%)			
Other			
Other Rate/Amt			
Diluent	Water		
Total Solution	100 fl oz		
Species Controlled	Callery Pear Kudzu Privet spp. Multiflora Rose		
Area Description	Mainly Cut and Stump Sprayed Kudzu within the easement north of Carbarrus Ave. The kudzu was mostly contained to small pockets throughout the easement. Privet, Rose, and Callery Pear were found scattered within the easement. Overall the site is looking great.		
Additional Comments			

Carolina Silvics, Inc. Pesticide Application Log

CarSilv - 0651

Client	NC Division of Mitigation Services		
Project Site	Dye Branch II (NCDMS #92255)		
Date	07-01-2019		
Start Time	15:00	End Time	16:00
Only PAL for Site for This Day?	No	If NO, this is PAL # of ##	2 of 3
Sky Cover	Clear	Temp (F)	90
Wind Direction	NNW	Wind Speed	1-5 mph
Applicators	Joshua G Merritt (NC 026-33717)		
Application Method	Mist Blower		
Herbicide	Transline® (clopyralid)		
Herbicide Rate (%)	2	Total Concentrate	3.8 fl oz
Surfactant or Adjuvant (1)	Agri-Dex®		
Surfactant/Adjudivant 1 Rate (%)	1		
Other			
Other Rate/Amt			
Diluent	Water		
Total Solution	1.5		
Species Controlled	Kudzu Lespedeza spp.		
Area Description	Foliar treated the ground cover portions of the small pockets of Kudzu found within the easement.		
Additional Comments			

Carolina Silvics, Inc. Pesticide Application Log

CarSilv - 0710

Client	NC Division of Mitigation Services		
Project Site	Dye Branch		
Date	09-26-2019		
Start Time	9:30	End Time	15:00
Only PAL for Site for This Day?	No	If NO, this is PAL # of ##	1 of 3
Sky Cover	Clear	Temp (F)	86
Wind Direction	SW	Wind Speed	6-10 mph
Applicators	Joshua G Merritt (NC 026-33717)		
Application Method	Basal Bark		
Herbicide	Garlon® XRT		
Herbicide Rate (%)	15	Total Concentrate	76 fl oz
Surfactant or Adjuvant (1)			
Surfactant/Adjudivant 1 Rate (%)			
Other			
Other Rate/Amt			
Diluent	Diesel fuel		
Total Solution	4 gallons		
Species Controlled	Kudzu Privet spp. Multiflora Rose		
Area Description	Some kudzu vines still present near the stream. Small Privet and Multiflora Rose treated throughout the site.		
Additional Comments			

Carolina Silvics, Inc. Pesticide Application Log

CarSilv - 0711

Client	NC Division of Mitigation Services		
Project Site	Dye Branch		
Date	09-26-2019		
Start Time	9:30	End Time	12:30
Only PAL for Site for This Day?	No	If NO, this is PAL # of ##	2 of 3
Sky Cover	Clear	Temp (F)	86
Wind Direction	SW	Wind Speed	6-10 mph
Applicators	Grainger Coughtrey (NC 026-34612)		
Application Method	Cut and Stump Spray		
Herbicide	Roundup® Custom (glyphosate)		
Herbicide Rate (%)	50	Total Concentrate	20 fl oz
Surfactant or Adjuvant (1)			
Surfactant/Adjudivant 1 Rate (%)			
Other			
Other Rate/Amt			
Diluent	Water		
Total Solution	40 fl oz		
Species Controlled	Kudzu Privet spp. Multiflora Rose		
Area Description	Some Kudzu vines still alive mostly along the stream. Small Privet and Multiflora Rose present through the site.		
Additional Comments			

Carolina Silvics, Inc. Pesticide Application Log

CarSilv - 0712

Client	NC Division of Mitigation Services		
Project Site	Dye Branch		
Date	09-26-2019		
Start Time	12:30	End Time	15:00
Only PAL for Site for This Day?	No	If NO, this is PAL # of ##	3 of 3
Sky Cover	Clear	Temp (F)	86
Wind Direction	SW	Wind Speed	6-10 mph
Applicators	Grainger Coughtrey (NC 026-34612)		
Application Method	Foliar Spray (Backpack)		
Herbicide	Roundup® Custom (glyphosate)		
Herbicide Rate (%)	3	Total Concentrate	4 fl oz
Surfactant or Adjuvant (1)	Agri-Dex®		
Surfactant/Adjudivant 1 Rate (%)	1		
Other			
Other Rate/Amt			
Diluent	Water		
Total Solution	1 gallon		
Species Controlled	Kudzu Privet spp. Multiflora Rose		
Area Description	Small Privet and Multiflora Rose present I'm the small section of the easement across the street. A few Kudzu vines were also present.		
Additional Comments			