Dye Branch II
Stream Restoration
MY7 Monitoring Report (2018)
NCDMS Project Number: 92255

Submitted to
North Carolina Division of Mitigation Services
North Carolina Department of Environmental Quality
November 2018

1652 Mail Service Center
Raleigh, NC 27699

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November 28, 2018

Matthew Reid
Project Manager
DENR Ecosystem Enhancement Program
5 Ravenscroft Dr., #102
Asheville, NC 28801

Subject: Dye Branch Stream Restoration Project #92255 – 2018 MY7 Monitoring Report Comments

Dear Mr. Reid:

The North Carolina Division of Mitigation Services (DMS) contracted the services of Equinox Environmental to perform MY7 monitoring services for the Dye Branch Stream Restoration Project Site. Comments provided by DMS are listed below with the red text indicating how each was addressed by Equinox within the final report.

General

- DMS would prefer to call this the MY7 report. The 2017 Port Repair Report can be referred to as the MY6 Post Repair Monitoring Report. The data collected in that report was not a reduced effort and contains the same cross-sections, veg plots and visual assessment. Please update references of MY6 to MY7 in this 2018 report (footers, tables, CCPV title, etc.). These changes have been made throughout the report, footers, tables, CCPV included.

Executive Summary

- Please add the following sentence to the first paragraph on page 5: "Invasive species treatment will continue until project closeout in 2020." The above sentence has been added to the end of the first paragraph on page 5.

Table 2:

- Please change "2017 Repair Monitoring" to "Year 6 Monitoring – Post Repair." Please change "2018 Monitoring" to "Year 7 Monitoring". 2017 Repair Monitoring has been changed to Year 6 Monitoring – Post Repair and 2018 Monitoring has been changed to Year 7 Monitoring.

CCPV:

- Please update title to "Monitoring Year 7 – Integrated Current Condition Plan View". The title of the CCPV has been updated to reflect Monitoring Year 7.
- Please include a call out for the planted/ total stems for vegetation plots (ex: 260/1100) and update legend. Call outs for the planted and total stems for vegetation plots has been added to the CCPV and the legend has been updated.
- Please add locations of the 4 temporary plots and include call out for total stems. The 4 temporary vegetation plots have been added to the CCPV along with call outs for total stems.

Cross Sections:

- Please add "MY6" before "Post Repair 2017" and change "MY6 2018" to "MY7 2018" in legend. "MY6" has been added before "Post Repair 2017" and "MY6 2018" has been changed to "MY7 2018" in the legend of the cross section overlays.

Table 11a:

- Please confirm that the MY7 (2018) BHRs have been calculated based on the attached DMS technical guidance. Please add a note on the table that beginning in MY7, the bankfull elevation and channel cross section dimensions are calculated using a fixed Abkf as described in the Standard Measurement of the BHR Monitoring Parameter provided by NCIRT and NCDMS (9/2018). BHRs have been calculated according to the guidance starting in MY7. A note has been added to the bottom of Table 11a.

Appendix F:

- Please include the attached invasive species treatment logs in the new Appendix F. The attached treatment logs were added to the report as "Appendix F – Invasive Species Treatment Logs."

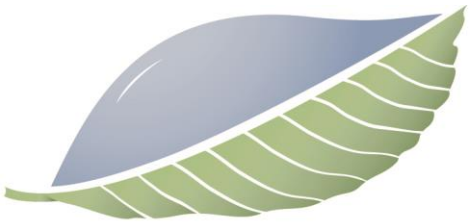
The project manager for this project is Mr. Drew Alderman. His contact information is as follows:

Drew Alderman
Natural Resource Specialist
Equinox
37 Haywood Street
Asheville, NC 28801
828-253-6856 ext. 213 office
828-253-8256 fax

Sincerely,

Drew Alderman

Monitoring Firm



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

Project Contact: Drew Alderman
Email: drew@equinoxenvironmental.com

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Dye Branch II Stream Restoration
2018 MY7 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 first 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 and documented the repairs and plantings that were 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 toe, 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 that is associated with MY7 monitoring and includes a qualitative vegetation and stream assessment including 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. In addition to this MY7 monitoring, one additional year of monitoring will be conducted during 2019 with closeout activities conducted 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. The site includes a diverse assemblage of 15 planted species of native trees and shrubs. Planted stems range from 4 to 22 per plot with 5 to 57 stems observed when volunteers are included. Based on the MY7 vegetation data, the average stem density for planted stems across all plots is approximately 382 stems per acre. This meets the year 7 success criteria of 210 planted stems per acre. When all planted and natural stems are combined, the average stem density is 1,012 stems per acre, and all seven plots meet the year seven 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 9, 17, 12, and 32 which extrapolate out to 450, 850, 600, and 1600 stems per acre respectively.

Regarding invasive-exotics, a contractor was hired to treat the invasive-exotic vegetation in November 2015. Since 2015 seven treatments have occurred at the Dye Branch site. Treatments occurred in June and September of 2018 (MY7) and have been effective. Treatments consisted of cut and stump sprays of a 50% glyphosate solution targeting Japanese honeysuckle (*Lonicera japonica*), kudzu (*Pueraria montana*), privet sp, Tree-of-Heaven (*Ailanthus altissima*), and multiflora rose (*Rosa multiflora*), mist blower treatments and foliar backpack sprays of a 2% clopyralid solution targeting kudzu and lespedeza (*Lespedeza cuneate*), basal bark in a 15% solution with diesel fuel targeting Callery pear (*Pryus calleryana*), Japanese honeysuckle, kudzu, mimosa (*Albizia julibrissin*), Privet sp., and multiflora rose, and foliar backpack spray of a 3% glyphosate solution targeting kudzu and privet sp. While treatments have been effective, populations of invasive-exotics, specifically kudzu, still persist throughout the easement, although in smaller quantities. Invasive-exotic treatments will continue until project closeout in 2020. Invasive-exotics will be monitored during future site visits.

Visual assessment of the stream channel was performed to document signs of instability, such as eroding banks, structural instability, or excessive sedimentation. Multiple areas of bank erosion were noted on all reaches (Figure 2, CCPV). All of these problem areas have existed since before the repair work was completed in late 2017. All of the implemented repairs completed in late 2017 are intact and performing as designed. Photos of all stream problem areas can be seen in the digital submission.

MY7 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 the MY7 Monitoring efforts. Cross-section 5 showed the most substantial change, where a depositional bar formed along the left descending bank. Cross-sections 7 and 8 also slightly aggraded from Post-Repair to MY7. Riffle dimensions for the three different reaches also remained relatively stable during MY7. The most substantial dimensional changes for Cemetery Branch were a decrease in the bankfull width by 0.6 foot and lowering of the width/ depth ratio by 1.2. Dye Branch Upstream also saw a few dimensional changes, most notably the bankfull width decreased 1.7 feet and the width/ depth ratio increased by 1.6. Dye Branch Downstream showed an increase in bankfull width of 1.4 feet and the width/ depth ratio also increased by 1.4.

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. This was at least the fifteenth bankfull event since the project completion. The crest gauge will be monitored in future site visits.

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 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 success is being monitored using 7 permanent monitoring plots and 4 random temporary transects. 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

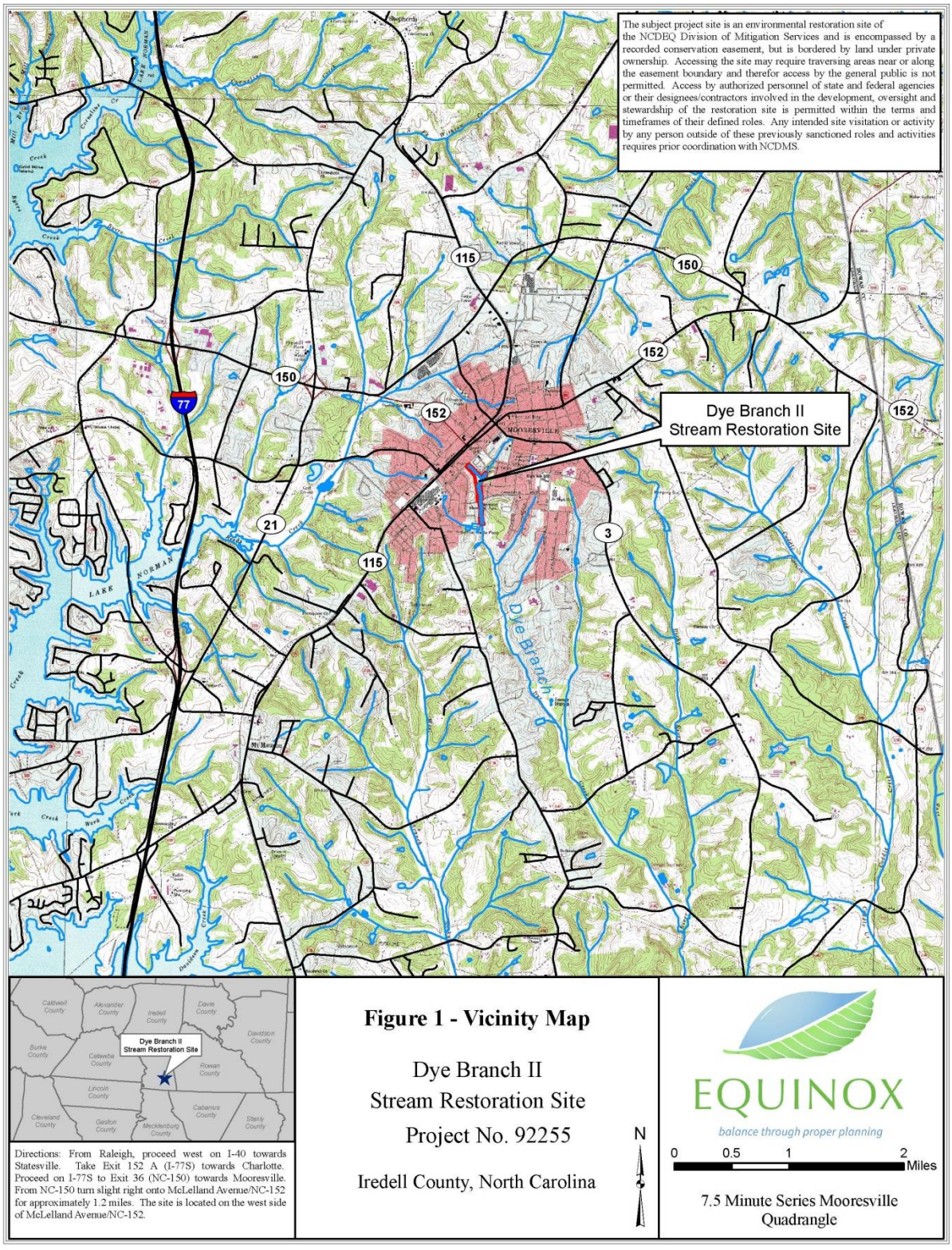
Lee, M.T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation. Version 4.2. The University of North Carolina at Chapel Hill, Department of Biology.

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.

Appendix A
Project Vicinity Map and Background Tables


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
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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

- 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-MY7) **2010 - 2015, 2017 - 2018**	Equinox Environmental 37 Haywood Street, Suite 100 Asheville, North Carolina 28801
Stream Monitoring POC	Drew Alderman (828) 253-6856
Vegetation Monitoring POC	Drew Alderman (828) 253-6856
Post-Repair Monitoring Performers (MY6) **2017**	Equinox Environmental 37 Haywood Street, Suite 100 Asheville, North Carolina 28801
Stream Monitoring POC	Drew Alderman (828) 253-6856
Vegetation Monitoring POC	Drew Alderman (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.

Appendix B
Visual Assessment Data

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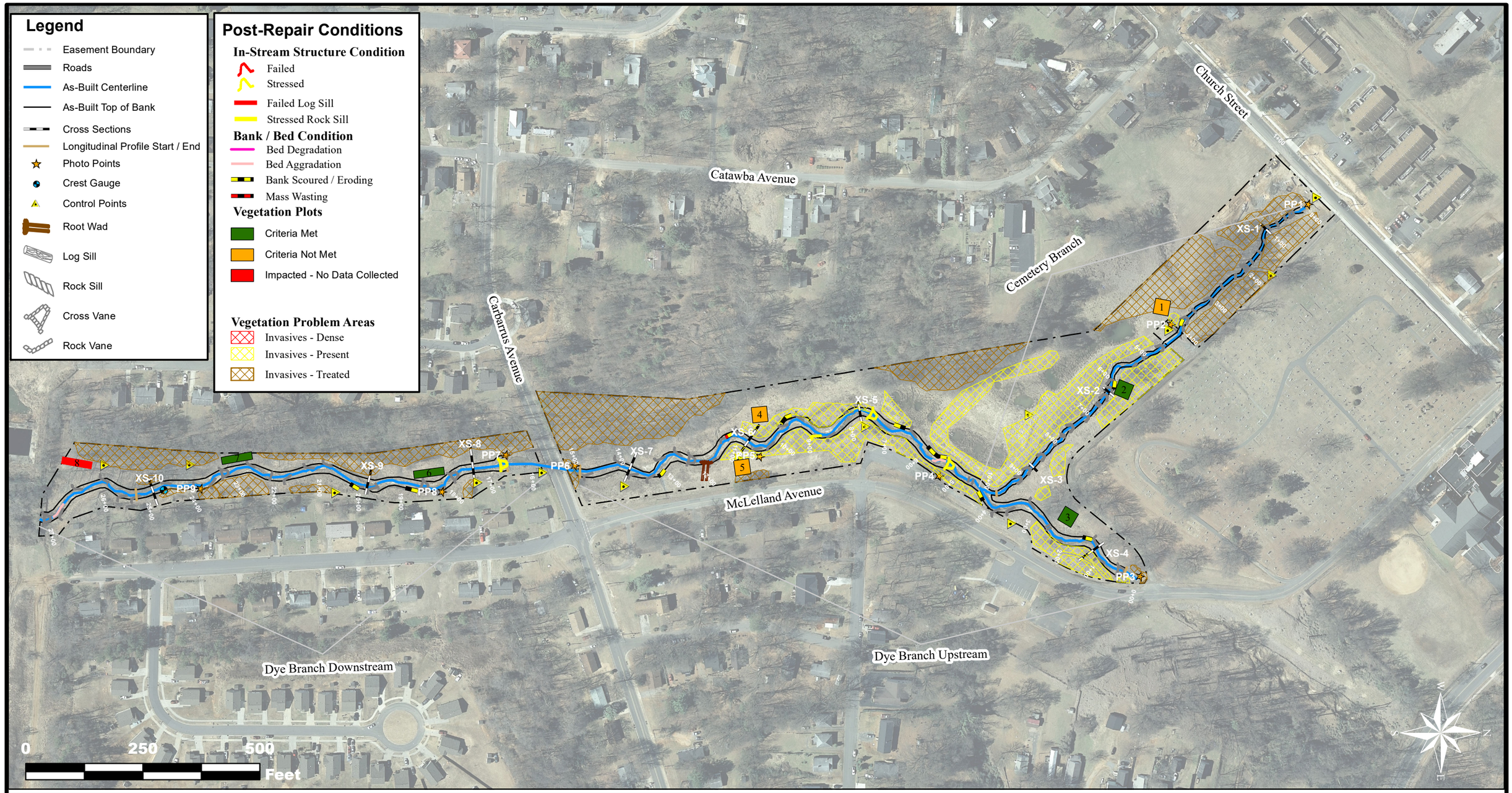
Figure 2. Integrated Current Condition Plan View



Prepared for			Prepared by
NC Nothing Compares NORTH CAROLINA	**Project:** Dye Branch Stream Restoration Post Repair - 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) Dominant Invasive Species Include Ligustrum sp., Lonicera japonica, Pueraria montana var. lobata, and Lespedeza cuneata.	EQUINOX
	Sheet 1 of 1		
	October 2018	Project Number	
		NCDMS # 92255	

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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%			

N/A - Item does not apply.

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).			1	28	98%			
		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.			9	224	93%	0	0	93%
	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	9	224	93%	0	0	93%
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.	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%.	20	23			87%			
	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%			

N/A - Item does not apply.

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.			3	82	96%	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	3	82	96%	0	0	96%
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%			

N/A - Item does not apply.

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)	10	1.84	15%
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%

N/A - Item does not apply.

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

Dye Branch – Permanent Photo Station 11
Downstream Repair Area STA 19+00

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Appendix C
Vegetation Plot Data

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
MY7 Monitoring – October 9th, 2018
(MY6 2017 Photo) (2018 Photo Missing)

Vegetation Monitoring Plot 2
MY7 Monitoring – October 9th, 2018

Vegetation Monitoring Plot 3
MY7 Monitoring – October 9th, 2018

Vegetation Monitoring Plot 4
MY7 Monitoring – October 9th, 2018

Vegetation Monitoring Plot 5
MY7 Monitoring – October 9th, 2018

Vegetation Monitoring Plot 6
MY7 Monitoring – October 9th, 2018

Vegetation Monitoring Plot 7
MY7 Monitoring – October 9th, 2018

Table 8. CVS Vegetation Plot Metadata Dye Branch II / Project No. 92255	
Report Prepared By	Drew Alderman
Date Prepared	10/22/2018 12:32
Database name	Equinox-2018-A-DyeBranch_MY6_2018.mdb
Database location	Z:\ES\NRI&M\EEP Monitoring\Dye Branch\DB-MY6-2018\Data\Veg
Computer name	FIELD-PC
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 / Project No. 92255

			Current Plot Data (MY7 2018)																				
			Plot 1			Plot 2			Plot 3			Plot 4			Plot 5			Plot 6			Plot 7		
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 negundo	Boxelder	Tree																					
Acer negundo var. negundo	Boxelder	Tree																					
Acer rubrum	Red Maple	Tree									4			1				3	3	3	8	8	8
Acer rubrum var. rubrum	Red Maple	Tree																					
Albizia julibrissin	Silktree	Exotic																					
Betula nigra	River Birch	Tree				1	1	2						2				1	1	1	1	1	1
Carpinus caroliniana	American Hornbeam	Tree																					
Carya	Hickory	Tree																					
Carya alba	Mockernut Hickory	Tree																					
Carya ovata	Shagbark Hickory	Tree																					
Cercis canadensis	Eastern Redbud	Tree													1	1	1				2	2	2
Cornus amomum	Silky Dogwood	Shrub																					
Cornus florida	Flowering Dogwood	Tree																					
Cornus kousa	Kousa Dogwood																						
Crataegus	Hawthorn	Tree																					
Diospyros virginiana	Common Persimmon	Tree			1				1	1	2	1	1	1									
Fagus grandifolia var. grandifolia	American Beech	Tree																					
Fraxinus pennsylvanica	Green Ash	Tree				3	3	3	1	1	1			4			2	5	5	5	9	9	14
Hibiscus	Rosemallow	Shrub																					
Juglans nigra	Black Walnut	Tree	1	1	1									1									
Juniperus virginiana var. virginiana	Eastern Redcedar	Tree										1	1	1	2	2	2						
Liquidambar styraciflua	Sweetgum	Tree												5						14			23
Liriodendron	Tuliptree																						
Liriodendron tulipifera	Tuliptree	Tree						1						6			5			6			6
Liriodendron tulipifera var. tulipifera	Tulip-tree, Yellow Poplar, Whitewood	Tree				1	1	1															
Nyssa sylvatica	Blackgum	Tree																					
Pinus virginiana	Virginia Pine	Tree	2	2	2							1	1	1	2	2	2						
Platanus occidentalis	American Sycamore	Tree									3							1	1	6	2	2	3
Platanus occidentalis var. occidentalis	Sycamore, Plane-tree	Tree				1	1	1															
Populus deltoides	Eastern Cottonwood	Tree																					
Prunus	Plum	Shrub or Tree																					
Prunus serotina	Black Cherry	Tree																					
Prunus serotina var. serotina	Black Cherry	Tree																					
Prunus serrulata	Japanese Flowering Cherry																						
Pyrus calleryana	Callery Pear	Exotic																					
Quercus	Oak	Tree																					
Quercus alba	White Oak	Tree																					
Quercus coccinea	Scarlet Oak	Tree																					
Quercus falcata	Southern Red Oak	Tree																					
Quercus nigra	Water Oak	Tree										2	2	5			2						
Quercus pagoda	Cherrybark Oak	Tree																					
Quercus phellos	Willow Oak	Tree				1	1	1	7	7	7							3	3	5			
Quercus rubra	Northern Red Oak	Tree																					
Quercus velutina	Black Oak	Tree	1	1	1				1	1	1												
Salix caroliniana	Coastal Plain Willow	Tree																					
Salix nigra	Black Willow	Tree									5												
Sambucus canadensis	Common Elderberry	Shrub																					
Unknown		Shrub or Tree																					
Stem count			4	4	5	7	7	9	10	10	23	5	5	27	5	5	14	13	13	40	22	22	57
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	4	5	5	6	4	4	7	4	4	10	3	3	6	5	5	7	5	5	7
Stems per ACRE			162	162	202	283	283	364	405	405	931	202	202	1093	202	202	567	526	526	1619	890	890	2307

[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 (Annual Means)
Dye Branch / Project No. 92255

			Annual Means																							
			MY7 (2018)			MY6 (2017)			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
Acer negundo	Boxelder	Tree						3			13									1						
Acer negundo var. negundo	Boxelder	Tree												7			7									
Acer rubrum	Red Maple	Tree	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	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				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	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												3												
Cornus florida	Flowering Dogwood	Tree						1			4															
Cornus kousa	Kousa Dogwood										6															
Crataegus	Hawthorn	Tree												1												
Diospyros virginiana	Common Persimmon	Tree	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	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	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	9	9	9
Liquidambar styraciflua	Sweetgum	Tree			42			53			51			44			43			14			17			
Liriodendron	Tuliptree										42															
Liriodendron tulipifera	Tuliptree	Tree			24			28			13															
Liriodendron tulipifera var. tulipifera	Tulip-tree, Yellow Poplar, Whitewood	Tree	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												1												
Pinus virginiana	Virginia Pine	Tree	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	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	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												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	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	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	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	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		
		size (ACRES)	0.17			0.17			0.17			0.17			0.17			0.17			0.17			0.17		
		Species count	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	382	382	1012	416	416	1220	249	249	1347	249	249	1260	272	272	1353	266	266	885	272	272	619	439	439	439

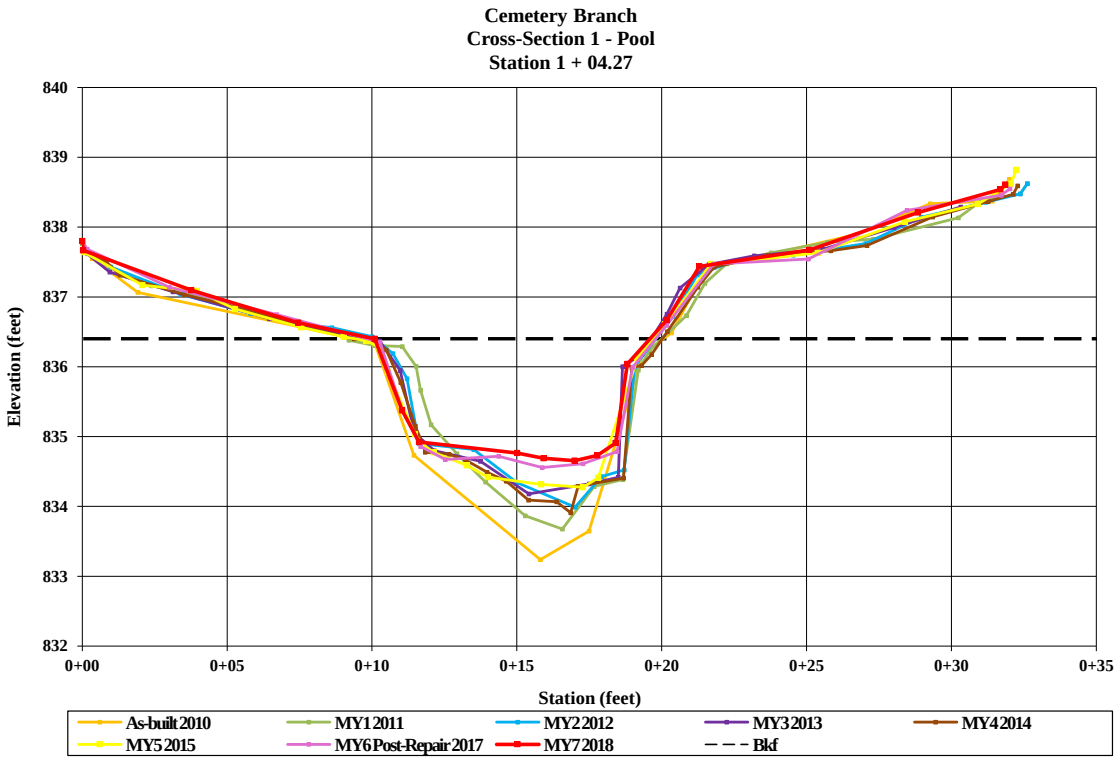
[1]PnoLS: No livestakes included in tally; P-all: All planted stems included in tally; T: Total stems including recruitment.

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 10m x 10m
Stem Count	9	17	12	32
Size (Ares)	1	1	1	1
Size (Acres)	0.02	0.02	0.02	0.02
Stems Per Acre	450	850	600	1600

*Specific species were not collected per plot however the majority of the stems included *Plantanus occidentalis,Betula nigra, Acer rubrum, Salix nigra, Juglans nigra, Quercus phellos, Liriodendron tulipifera,* and *Liquidambar styraciflua*.

Appendix D
Stream Survey Data

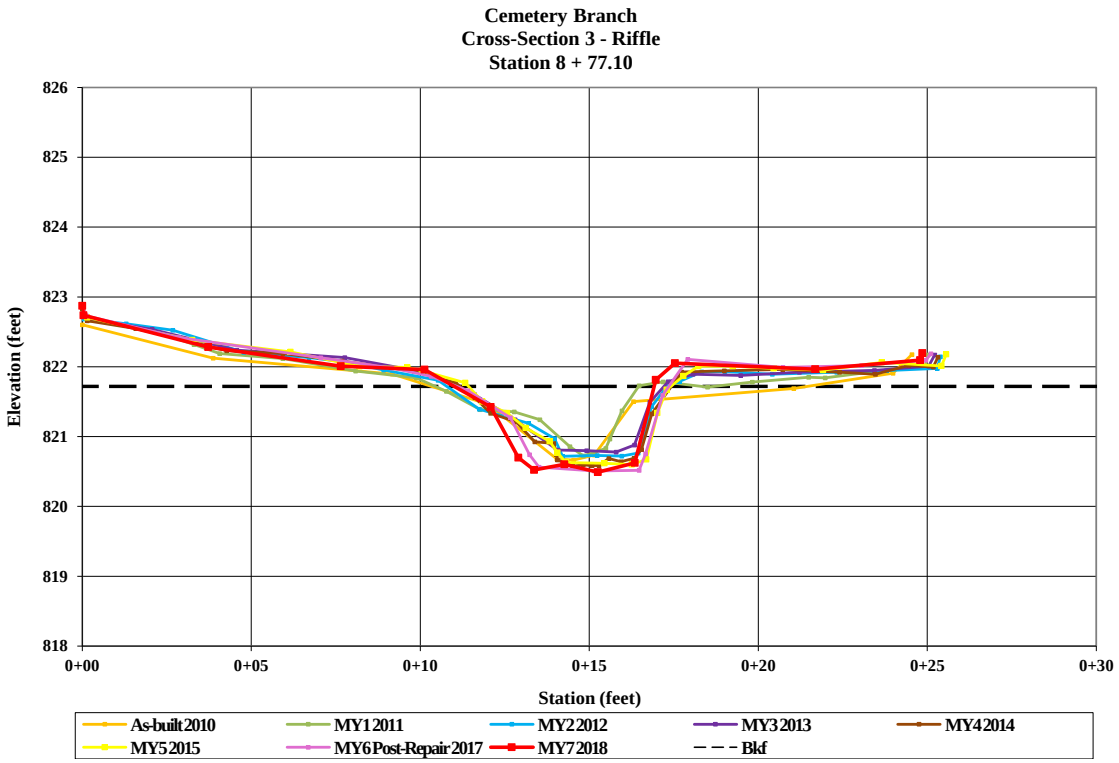


Left Descending Bank

Right Descending Bank

Upstream

Downstream

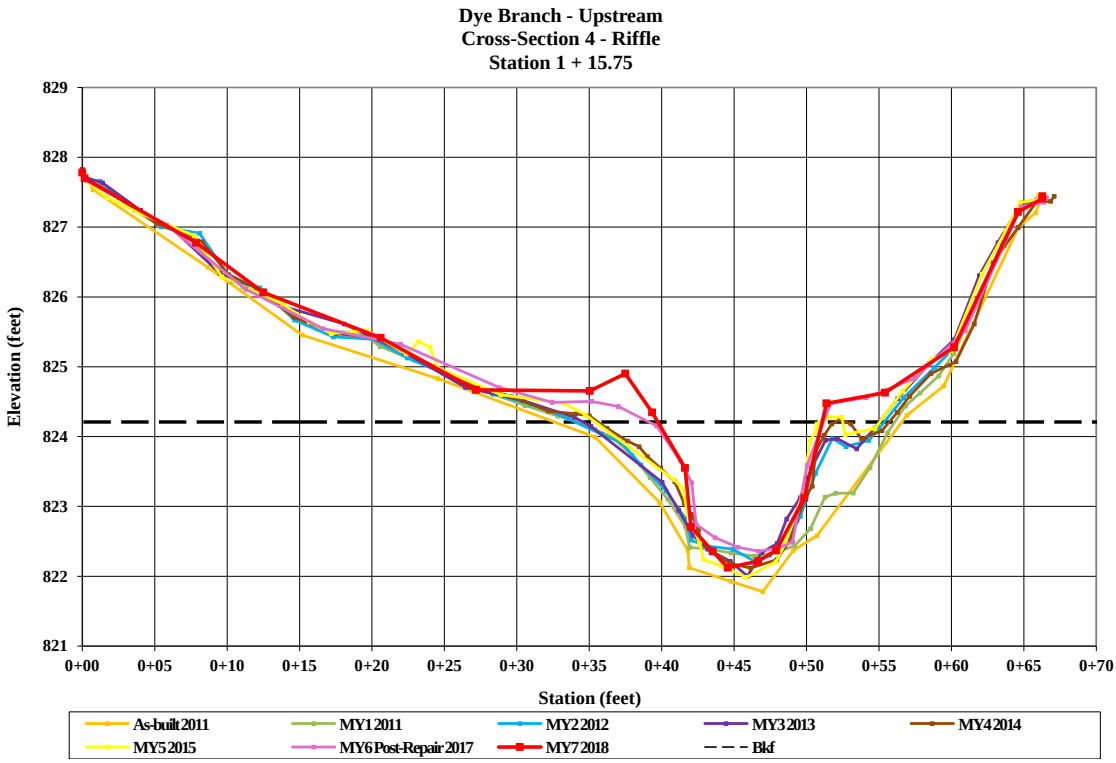


Left Descending Bank

Right Descending Bank

Upstream

Downstream

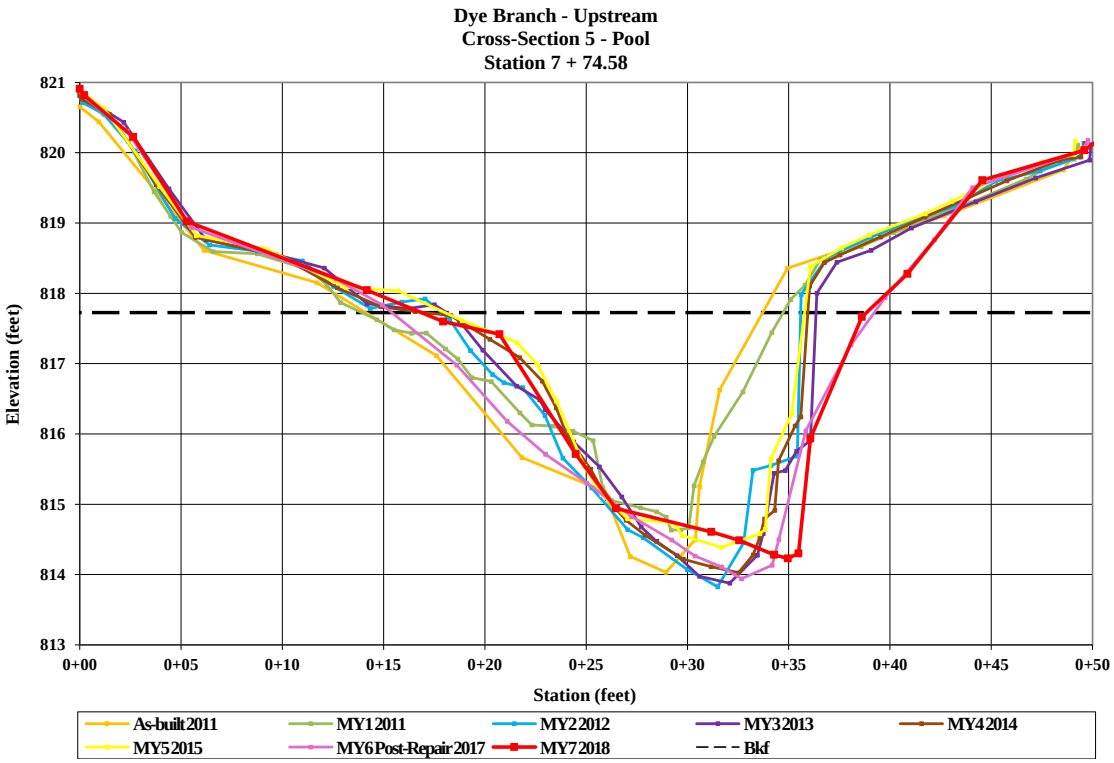


Left Descending Bank

Right Descending Bank

Upstream

Downstream

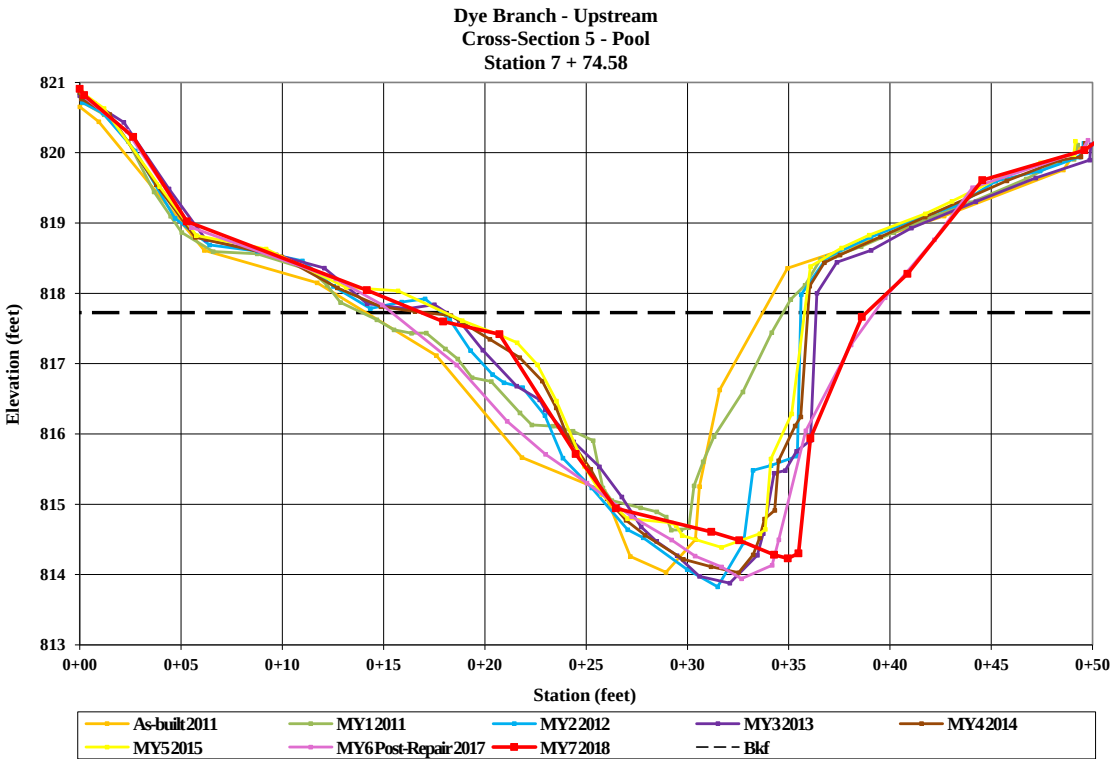


Left Descending Bank

Right Descending Bank

Upstream

Downstream

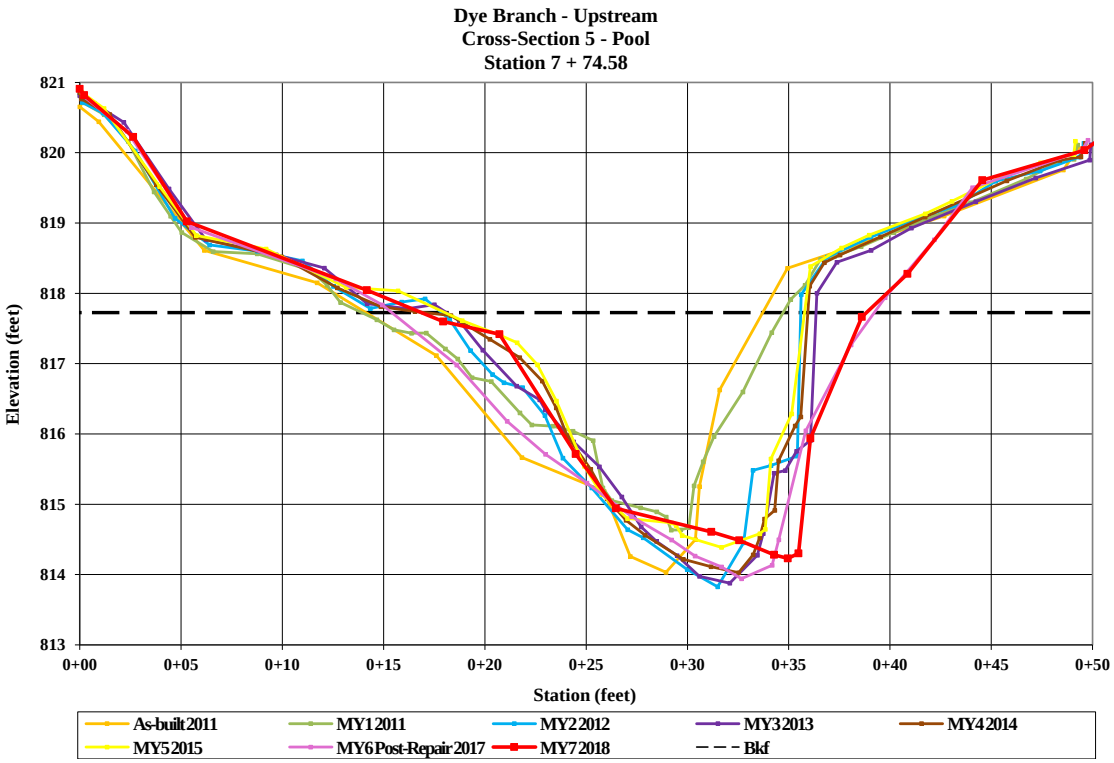


Left Descending Bank

Right Descending Bank

Upstream

Downstream

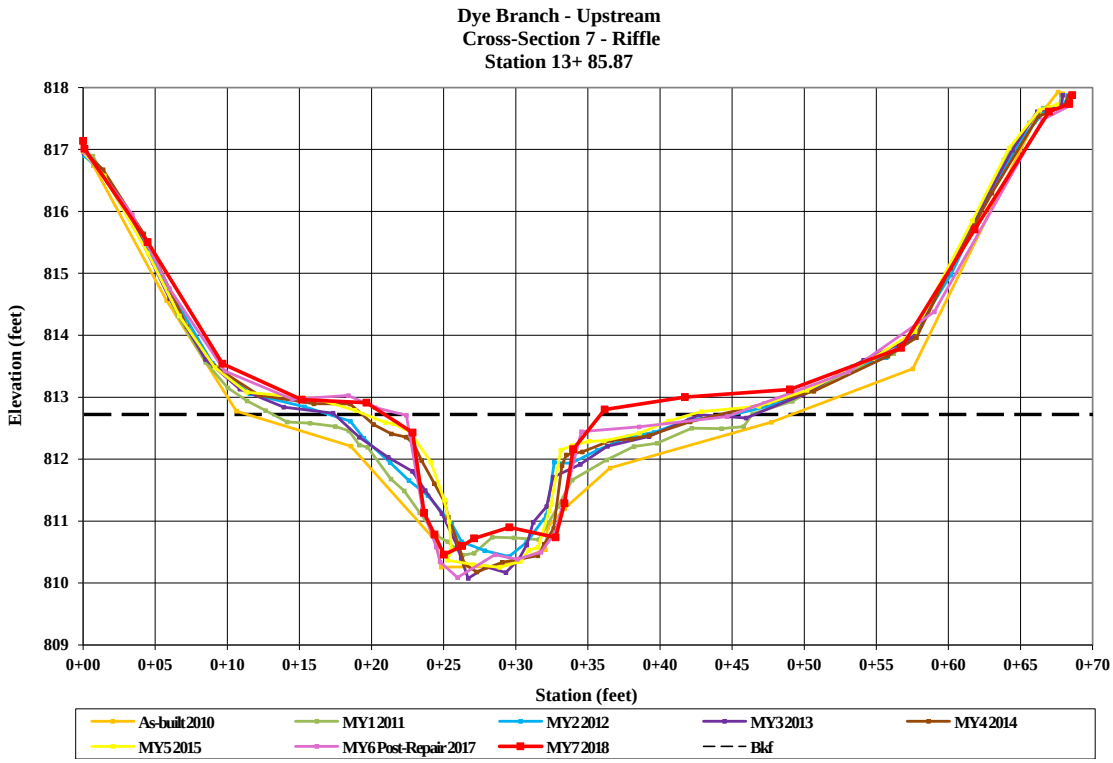


Left Descending Bank

Right Descending Bank

Upstream

Downstream

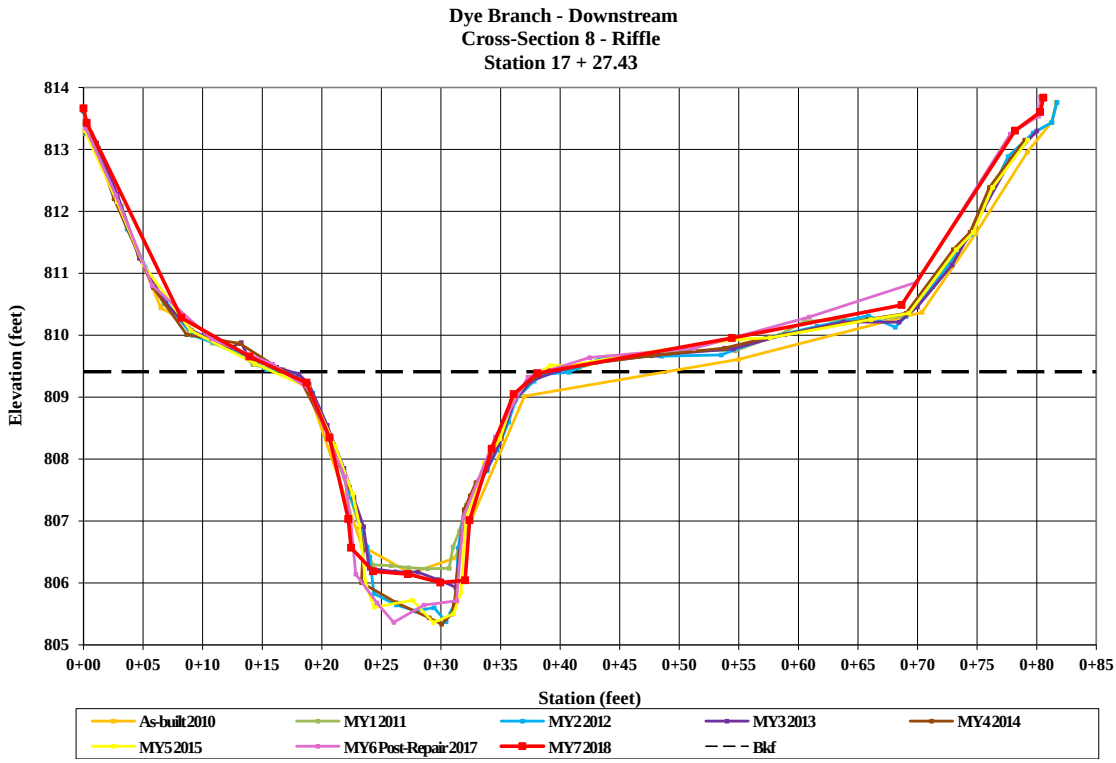


Left Descending Bank

Right Descending Bank

Upstream

Downstream

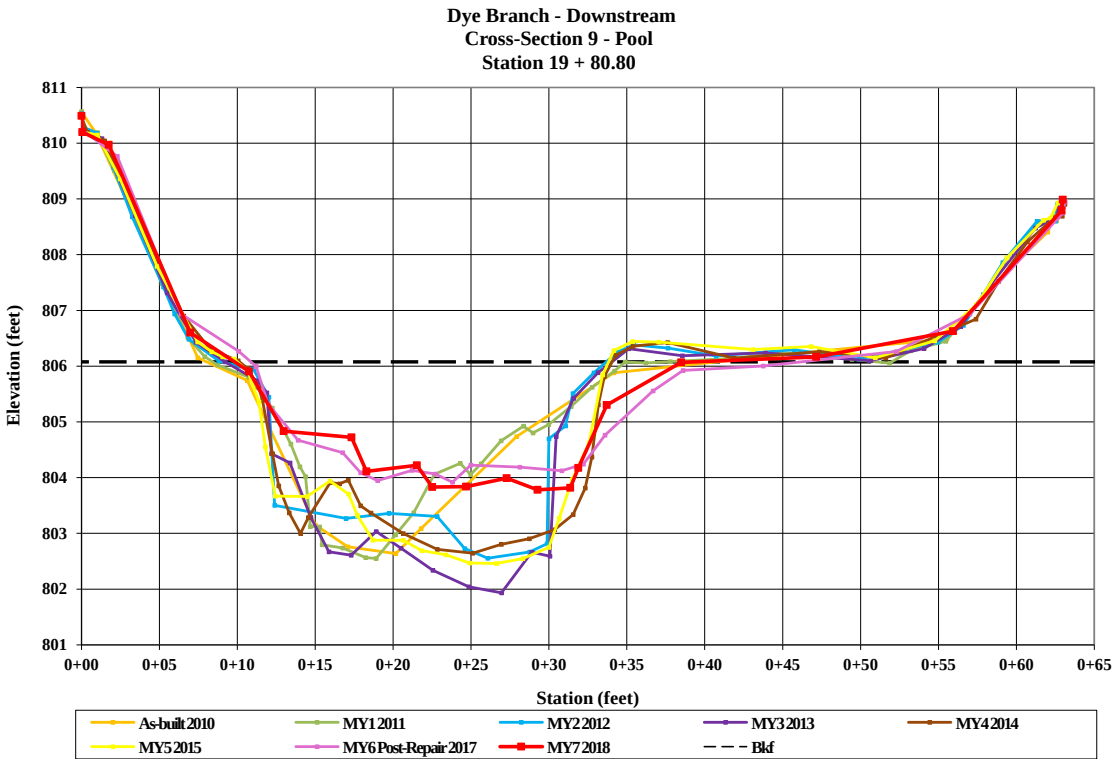


Left Descending Bank

Right Descending Bank

Upstream

Downstream

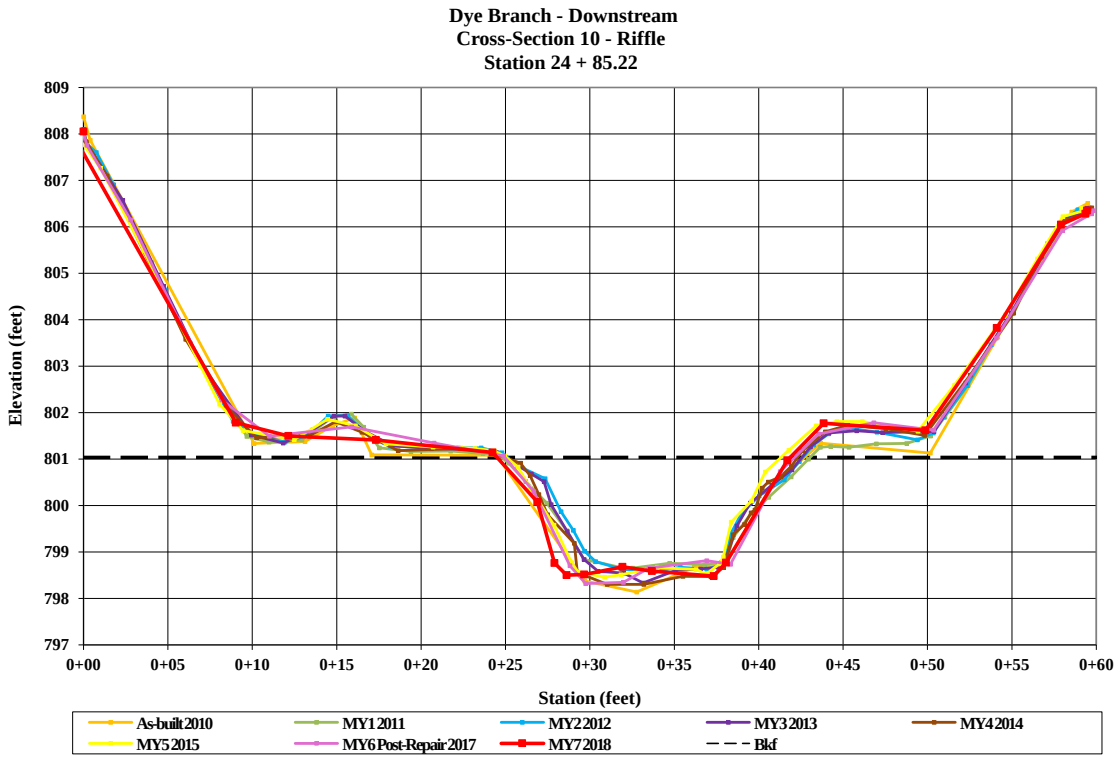


Left Descending Bank

Right Descending Bank

Upstream

Downstream



Left Descending Bank

Right Descending Bank

Upstream

Downstream

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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		826.3	826.3	826.3	826.3	826.3	826.3	826.3	826.0		821.7	821.7	821.7	821.7	821.7	821.7	821.7	821.7	
Low Bank Height Elevation (datum) Used	-	-	-	-	-	-	-	836.4		-	-	-	-	-	-	-	826.3		-	-	-	-	-	-	-	821.9	
Bankfull Width (ft)	9.7	10.2	9.4	9.2	9.2	9.3	9.4	10.0		8.9	10.6	8.0	8.4	5.9	6.0	6.4	5.5		5.5	6.0	6.5	6.1	5.7	5.8	6.2	5.9	
Floodprone Width (ft)	>50	>50	>50	>50	>50	>50	>50	>50		>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		0.8	0.6	0.5	0.5	0.7	0.8	1.0	1.2		0.5	0.5	0.6	0.6	0.7	0.7	0.8	0.8	
Bankfull Max Depth (ft)	3.1	2.7	2.4	2.2	2.4	2.1	1.8	1.8		1.4	1.2	1.2	1.2	1.4	1.5	2.0	1.7		1.0	1.0	1.0	0.9	1.1	1.1	1.2	1.2	
Bankfull Cross Sectional Area (ft^2)	18.9	15.2	14.3	14.0	15.1	14.2	13.1	13.1		7.0	6.3	3.9	4.1	4.2	4.7	6.6	6.6		3.0	2.8	4.0	3.6	4.2	4.3	5.0	5.0	
Bankfull Width/Depth Ratio	5.0	6.8	6.2	6.1	5.6	6.2	6.7	7.7		11.2	18.1	16.4	17.3	8.3	7.5	6.3	4.6		10.3	12.7	10.6	10.4	7.6	7.9	7.7	7.0	
Bankfull Entrenchment Ratio	>5.1	>4.9	>5.3	>5.4	>5.5	>5.4	>5.3	>5		>3.4	>2.8	>3.8	>3.6	>5.1	>5.0	>4.7	>5.5		>5.4	>5.0	>4.6	>4.9	>5.3	>5.1	>4.8	>5.1	
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	1.2		1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	
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	-	-	

N/A - Item does not apply.
* Beginning in MY7 (2018), the bankfull elevation and channel cross-section dimensions have been calculated using a fixed Abkf as described in the Standard Measurement of the BHR Monitoring Parameter provided by NCIRT and NCDM

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**
Record Elevation (datum) Used	824.3	824.3	824.3	824.3	824.3	824.3	824.3	824.2		817.4	817.4	817.4	817.4	817.4	817.4	817.4	817.7		815.5	815.5	815.5	815.5	815.5	815.5	815.5	815.5		812.5	812.5	812.5	812.5	812.5	812.5	812.5	812.7	
Low Bank Height Elevation (datum) Used	-	-	-	-	-	-	-	824.5		-	-	-	-	-	-	-	817.4		-	-	-	-	-	-	-	815.1		-	-	-	-	-	-	-	812.4	
Bankfull Width (ft)	25.7	23.8	22.9	20.8	21.5	20.7	13.2	11.3		17.1	17.0	16.8	16.4	15.6	15.1	21.8	22.0		32.7	28.7	27.7	26.9	26.7	27.2	17.5	21.3		26.9	24.1	21.3	20.1	19.9	17.1	12.0	15.0	
Floodprone Width (ft)	>58.6	>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		>81.8	>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	
Bankfull Mean Depth (ft)	1.3	1.1	1.0	1.1	1.0	1.0	1.2	1.4		1.7	1.4	2.1	2.1	2.1	2.0	1.9	1.9		1.4	1.3	1.3	1.3	1.3	1.2	2.0	1.6		1.1	1.0	0.9	1.1	1.0	1.0	1.8	1.4	
Bankfull Max Depth (ft)	2.5	2.0	2.1	2.3	2.2	2.3	1.9	2.1		3.4	2.8	3.6	3.6	3.4	3.0	3.5	3.5		3.6	3.2	3.2	3.3	3.3	3.0	3.3	3.3		2.2	2.0	2.1	2.4	2.3	2.2	2.4	2.3	
Bankfull Cross Sectional Area (ft^2)	32.5	27.1	23.1	22.4	21.1	21.0	15.8	15.8		28.8	23.7	35.0	35.1	33.1	29.7	41.9	41.9		46.9	37.5	36.2	36.0	34.2	31.3	34.2	34.2		29.5	24.2	19.9	21.3	19.4	17.9	21.1	21.1	
Bankfull Width/Depth Ratio	20.3	20.9	22.6	19.3	21.9	20.4	11.0	8.1		10.2	12.2	8.1	7.7	7.4	7.7	11.3	11.5		22.8	22.0	21.2	20.0	20.8	23.6	9.0	13.2		24.6	24.0	22.9	18.9	20.4	16.3	6.8	10.6	
Bankfull Entrenchment Ratio	>2.3	>2.2	>2.3	>2.5	>2.5	>2.6	>4.0	>4.7		>2.9	>2.8	>2.8	>2.9	>3.0	>3.1	>2.2	>2.1		>2.5	>2.7	>2.8	>2.9	>2.9	>2.9	>4.5	>3.7		>2.0	>2.2	>2.5	>2.6	>2.6	>3.1	>4.4	>3.5	
Bankfull Bank Height Ratio*	1.0	1.0	1.0	1.0	1.0	1.0	1.1	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	1.1	0.9		1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	
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	-	-	

N/A - Item does not apply.
* Beginning in MY7 (2018), the bankfull elevation and channel cross-section dimensions have been calculated using a fixed Abkf as described in the Standard Measurement of the BHR Monitoring Parameter provided by NCIRT and NCDMS (9/2018)

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		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	
Low Bank Height Elevation (datum) Used	-	-	-	-	-	-	-	809.1		-	-	-	-	-	-	-	806.1		-	-	-	-	-	-	-	801.1	
Bankfull Width (ft)	18.8	18.8	19.6	18.6	19.6	19.6	19.3	22.1		26.3	26.3	24.3	24.6	23.8	23.7	27.7	29.2		18.4	18.5	17.7	17.9	17.8	16.6	17.4	17.4	
Floodprone Width (ft)	>74.8	>73.5	>73.5	>73.5	>73.5	>73.5	>73.5	>73.5		>70	>70	>70	>70	>70	>70	>70	>70		>48.7	>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		1.8	1.7	2.3	2.6	2.6	2.6	1.5	1.4		1.9	1.6	1.6	1.6	1.8	1.8	1.8	1.8	
Bankfull Max Depth (ft)	3.1	3.0	3.9	3.3	3.9	3.9	3.9	3.4		3.5	3.5	3.5	4.1	3.4	3.6	2.1	2.3		2.9	2.4	2.5	2.7	2.8	2.6	2.8	2.6	
Bankfull Cross Sectional Area (ft^2)	38.1	35.9	41.0	36.8	43.2	41.8	42.3	42.3		48.4	43.6	55.3	63.5	61.1	62.7	42.1	42.1		34.0	29.5	27.8	29.4	31.6	29.4	32.0	32.0	
Bankfull Width/Depth Ratio	9.3	9.9	9.3	9.4	8.9	9.2	8.8	11.6		14.3	15.9	10.7	9.6	9.3	9.0	18.2	20.3		9.9	11.7	11.3	11.0	10.0	9.4	9.4	9.4	
Bankfull Entrenchment Ratio	>4.0	>3.9	>3.8	>4.0	>3.8	>3.7	>3.8	>3.3		>2.7	>2.7	2.9	>2.8	>2.9	>2.9	>2.5	>2.4		>2.7	>2.6	>2.7	>2.7	>2.7	>2.9	>2.7	>2.7	
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	0.9	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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	-	-	

N/A - Item does not apply.

* Beginning in MY7 (2018), the bankfull elevation and channel cross-section dimensions have been calculated using a fixed Abkf as described in the Standard Measurement of the BHR Monitoring Parameter provided by NCIRT and NCDMS

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						
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						
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						
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						
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						
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						
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						
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						
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.
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.

[1]Corrected Values

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						
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						
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						
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						
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						
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						
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						
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						
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.

[1]Corrected Values

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						
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						
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						
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						
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						
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						
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						
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						
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

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

Appendix F
Invasive Species Treatment Logs

Carolina Silvics, Inc. Pesticide Application Log

CarSilv - 0551

Client	NC Division of Mitigation Services		
Project SIte	Dye Branch II (NCDMS #92255)		
Date	06-04-2018		
Start Time	10:00	**End Time**	16:30
Only PAL for Site for This Day?	Yes	**If NO, this is PAL # of ##**	
Sky Cover	Clear	**Temp (F)**	78
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	Refuge® (glyphosate)		
Herbicide Rate (%)	50	**Total Concentrate**	40 fl oz
Surfactant or Adjuvant (1)			
Surfactant/Adjudivant 1 Rate (%)			
Other			
Other Rate/Amt			
Diluent	Water		
Total Solution	80 fl oz		
Species Controlled	Jap. Honeysuckle Kudzu Privet spp. Tree-of-Heaven Multiflora Rose		
Area Description	Som kudzu vines still alive throughout the site. Patches of privet along the edge of the easement.		
Additional Comments			

Carolina Silvics, Inc. Pesticide Application Log

CarSilv - 0552

Client	NC Division of Mitigation Services		
Project SIte	Dye Branch II (NCDMS #92255)		
Date	06-05-2018		
Start Time	9:00	**End Time**	10:00
Only PAL for Site for This Day?	No	**If NO, this is PAL # of ##**	1 of 3
Sky Cover	Clear	**Temp (F)**	80
Wind Direction	SE	**Wind Speed**	1-5 mph
Applicators	Joshua G Merritt (NC 026-33717)		
Application Method	Mist Blower		
Herbicide	Transline® (clopyralid)		
Herbicide Rate (%)	2	**Total Concentrate**	8 fl oz
Surfactant or Adjuvant (1)	Hel-fire®		
Surfactant/Adjudivant 1 Rate (%)	.5		
Other			
Other Rate/Amt			
Diluent	Water		
Total Solution	3 gallons		
Species Controlled	Kudzu Lespedeza spp.		
Area Description	Both Kudzu and Lepedeza were found growing sporadically throughout the entire easement. Most of the Kudzu vinese were regrowth from previous treatments. Overall the site was in great shape.		
Additional Comments			

Carolina Silvics, Inc. Pesticide Application Log

CarSilv - 0553

Client	NC Division of Mitigation Services		
Project SIte	Dye Branch II (NCDMS #92255)		
Date	06-05-2018		
Start Time	9:00	**End Time**	15:00
Only PAL for Site for This Day?	No	**If NO, this is PAL # of ##**	2 of 3
Sky Cover	Clear	**Temp (F)**	80
Wind Direction	SE	**Wind Speed**	1-5 mph
Applicators	Grainger Coughtrey (NC 026-34612)		
Application Method	Foliar Spray (Backpack)		
Herbicide	Refuge® (glyphosate)		
Herbicide Rate (%)	3	**Total Concentrate**	15.5 fl oz
Surfactant or Adjuvant (1)	Hel-fire®		
Surfactant/Adjudivant 1 Rate (%)	.5		
Other	Blue Dye		
Other Rate/Amt	1 fl oz		
Diluent	Water		
Total Solution	4 gallons		
Species Controlled	Jap. Honeysuckle Johnson Grass Privet spp. Multiflora Rose		
Area Description	Most of the species mentioned were sapling regrowth from previous treatments.		
Additional Comments			

Carolina Silvics, Inc. Pesticide Application Log

CarSilv - 0554

Client	NC Division of Mitigation Services		
Project SIte	Dye Branch II (NCDMS #92255)		
Date	06-05-2018		
Start Time	11:00	**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)**	80
Wind Direction	SE	**Wind Speed**	1-5 mph
Applicators	Joshua G Merritt (NC 026-33717)		
Application Method	Basal Bark		
Herbicide	Other (see comments)		
Herbicide Rate (%)	15	**Total Concentrate**	38 fl oz
Surfactant or Adjuvant (1)			
Surfactant/Adjudivant 1 Rate (%)			
Other	Blue Dye		
Other Rate/Amt	1 fl oz		
Diluent	Diesel fuel		
Total Solution	2 gallons		
Species Controlled	Callery Pear Jap. Honeysuckle Kudzu Mimosa Privet spp. Multiflora Rose		
Area Description	There were large Callery Pear Treets growing sporadically throughout the easement. Most of the species we small rewgrowth plants from previous treatments. Downstream the root nodes for kudzu were basal barked. I am not sure how effective this will be but I wanted to try it out.		
Additional Comments	Garlon XRT was the chemical used for basal barking		

Carolina Silvics, Inc. Pesticide Application Log

CarSilv - 0586

Client	NC Division of Mitigation Services		
Project SIte	Dye Branch II (NCDMS #92255)		
Date	09-11-2018		
Start Time	12:00	**End Time**	16:30
Only PAL for Site for This Day?	Yes	**If NO, this is PAL # of ##**	
Sky Cover	Clear	**Temp (F)**	80
Wind Direction	ESE	**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**	51 fl oz
Surfactant or Adjuvant (1)			
Surfactant/Adjudivant 1 Rate (%)			
Other			
Other Rate/Amt			
Diluent	Water		
Total Solution	102 fl oz		
Species Controlled	Kudzu Privet spp. Multiflora Rose		
Area Description	Small kudzu patches found along the stream of the main branch and the cemetery branch.		
Additional Comments			

Carolina Silvics, Inc. Pesticide Application Log

CarSilv - 0587

Client	NC Division of Mitigation Services		
Project SIte	Dye Branch II (NCDMS #92255)		
Date	09-12-2018		
Start Time	7:30	**End Time**	12:00
Only PAL for Site for This Day?	No	**If NO, this is PAL # of ##**	1 of 2
Sky Cover	Cloudy	**Temp (F)**	76
Wind Direction	NE	**Wind Speed**	1-5 mph
Applicators	Joshua G Merritt (NC 026-33717) Grainger Coughtrey (NC 026-34612)		
Application Method	Foliar Spray (Backpack)		
Herbicide	Transline® (clopyralid)		
Herbicide Rate (%)	2	**Total Concentrate**	23 fl oz
Surfactant or Adjuvant (1)	Hel-fire®		
Surfactant/Adjudivant 1 Rate (%)	.5		
Other			
Other Rate/Amt			
Diluent	Water		
Total Solution	9 gallons		
Species Controlled	Kudzu Lespedeza spp.		
Area Description	Small patches of kudzu along the stream of the main branch and the cemetery branch.		
Additional Comments			

Carolina Silvics, Inc. Pesticide Application Log

CarSilv - 0588

Client	NC Division of Mitigation Services		
Project SIte	Dye Branch II (NCDMS #92255)		
Date	09-12-2018		
Start Time	11:00	**End Time**	12:00
Only PAL for Site for This Day?	No	**If NO, this is PAL # of ##**	2 of 2
Sky Cover	Cloudy	**Temp (F)**	76
Wind Direction	NE	**Wind Speed**	1-5 mph
Applicators	Joshua G Merritt (NC 026-33717) Grainger Coughtrey (NC 026-34612)		
Application Method	Foliar Spray (Backpack)		
Herbicide	Roundup® Custom (glyphosate)		
Herbicide Rate (%)	3	**Total Concentrate**	6 fl oz
Surfactant or Adjuvant (1)	Hel-fire®		
Surfactant/Adjudivant 1 Rate (%)	.5		
Other			
Other Rate/Amt			
Diluent	Water		
Total Solution	1.5 gal.		
Species Controlled	Kudzu Privet spp.		
Area Description	Treated the smaller branch across the street, small privets were scarce but scattered along the branch. Some smaller kudzu vines were present.		
Additional Comments			