

**As-Built Baseline Monitoring Report**

**FINAL**

**Bucky's Branch Mitigation Project**

**DMS Project #: 100109 | Contract #: 7861 | DWR # 2019-1404 | RFP: 16-007703**

Randolph County, North Carolina  
Cape Fear River Basin  
Randleman Lake Watershed  
HUC 03030003



**Prepared By:**



Resource Environmental Solutions, LLC  
For Environmental Banc and Exchange, LLC

**Prepared For:**

NC Department of Environmental Quality  
Division of Mitigation Services

**June 2020**



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June 8, 2020

Jeremiah Dow  
NC DEQ Division of Mitigation Services  
217 West Jones Street  
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RE: Bucky's Branch Mitigation Site: As-Built Baseline Monitoring Report (NCDMS ID 100109)

Listed below are comments provided by DMS on June 4, 2020 regarding the Bucky's Branch Mitigation Site Draft As-Built Monitoring Report and RES' responses.

**Section 1.5** – States that planted tree species can be found in Table 2. Please change reference to Table 2 to Table 5.

[This reference has been updated in Section 1.5.](#)

**Figure 3** – Any fencing installed at the site should be shown on the As-built Map.

[The As-Built map has been updated to show fencing.](#)

**Table 5** – Green Ash planted with 700 stems constitutes approximately 9.7% of planting. DWR has been requesting that Green Ash be planted at no more than 5% of total planted stems due to concerns over the emerald ash borer.

[RES acknowledges that in the planting plan, green ash accounted for more than 5% of overall planting; however, within the vegetation plots there were no green ash recorded. Moving forward, RES will continue to abide by the 5% threshold for planting green ash.](#)

**General** – Bucky's Branch was contracted (#7861) for 183,317.000 BMUs. Currently the project is set to deliver 183,312.294 BMUs which is 4.706 BMUs below contract. Please reduce the Task 4 invoice by \$13.41 (4.706 BMUs \* \$2.85 Unit Cost) to \$78,354.54, and include this explanation on your invoice.

Please make the requested revisions and provide one (1) pdf copy of the revised report, the required digital data and a response to comments letter for DMS review. Once DMS verifies all revisions have been made and the required digital files have been submitted, RES will be instructed when to submit the final copies of the Task 3 deliverable. Also include a letter stating RES notes the shortfall in credits, explains the shortfall, and agrees with adjusting the Task 3 and subsequent payments accordingly. At this time, the contract will not be amended to reflect the expected credit shortfall.

## Table of Contents

1	Project Summary .....	1
1.1	Project Location and Description .....	1
1.2	Monitoring Protocol and Project Success Criteria .....	1
1.3	Project Components .....	2
1.4	Riparian Mitigation Approach.....	3
1.5	Construction and As-Built Conditions .....	3
1.6	Baseline Monitoring Performance.....	3
2	Reference.....	4

### **Appendix A: Background Tables and Site Maps**

Table 1: Buffer Project Areas and Assets
Table 2: Project Activity and Reporting History
Table 3: Project Contacts Table
Table 4: Project Background Information
Figure 1: Site Location Map
Figure 2: Current Conditions Plan View
Figure 3: As-Built Map

### **Appendix B: Vegetation Assessment Data**

Table 5: Plant Species Summary
Table 6: Vegetation Plot Mitigation Success Summary Table
Table 7: Stem Count Total and Planted by Plot Species

### **Appendix C: Vegetation Monitoring Plot Photos**

# **1 Project Summary**

## ***1.1 Project Location and Description***

The Bucky's Branch Project is within the Randleman Lake Watershed of the Cape Fear River Basin within the 8-digit Hydrologic Unit Code (HUC) 03030003, 14-digit HUC 03030003010060 and DWR Subbasin Number 03-06-08.

The Project is located in Randolph County approximately 3 miles southeast of Glenola, North Carolina (**Figure 1**). To access the Project head east on Banner Whitehead Road from I-74 and turn left on Farlowe Davis Drive; the Project is approximately 0.25 miles north on the left. The coordinates are 35.859 °N and -79.881 °W.

Environmental Banc & Exchange, LLC (EBX), a wholly owned subsidiary of Resource Environmental Solutions (RES), is pleased to provide this Monitoring Report for the Bucky's Branch Riparian Buffer Mitigation Project (Project) as a full-delivery buffer mitigation project for the Division of Mitigation Services (DMS) (DMS #100109). This Project provides riparian buffer mitigation credits for unavoidable impacts due to development within the Randleman Lake Watershed of the Cape Fear River Basin, United States Geological Survey (USGS) 8-digit Hydrologic Unit Code (HUC – 03030003) (**Figure 1**). The Project is in accordance with the Consolidated Buffer Mitigation Rule 15A NCAC 02B .0295 and the Randleman Lake Water Supply Watershed Buffer Rule 15A NCAC 02B .0250.

The conservation easement of the Bucky's Branch Project totals approximately 6.17 acres and includes one unnamed tributary that drains into Randleman Lake approximately 0.75 miles downstream of the Project. Land use within the Project is primarily non-forested pasture and grazed riparian forest. The Project area has been used extensively for agricultural purposes for over 70 years. The lack of forested riparian buffer, long-term presence of livestock, and past land management actions are all contributing water quality stressors and have led to the loss of bank stabilizing vegetation.

The goal of the Project is to restore and enhance ecological function to the existing stream and riparian area by establishing appropriate plant communities while minimizing temporal and land disturbing impacts. Restoration of a native hardwood forest to the riparian buffer and surrounding areas and the removal of livestock aid in filtering runoff from agricultural fields, thereby reducing nutrient and sediment loads to Project channels and the overall watershed. Restoration and enhancement of the Randleman Lake riparian buffer and surrounding area (as defined in 15A NCAC 02B .0250) results in a reduction of the water quality stressors that affected the Project: livestock access and a lack of vegetated riparian buffer. Immediate water quality benefits and pollutant removal within the vicinity of the Project include the exclusion of livestock access to streams and reduction in nutrient loads from agricultural land-uses. This Project is consistent with the management strategy for maintaining and protecting riparian areas in the Randleman Lake watershed. Project attributes are summarized in **Table 1**.

## ***1.2 Monitoring Protocol and Project Success Criteria***

Annual vegetation monitoring and visual assessments will be conducted. Riparian vegetation monitoring is based on the "Carolina Vegetation Survey-Ecosystem Enhancement Program Protocol for Recording Vegetation: Level 2 Plot Sampling Only Version 4.2". Monitoring plots were installed a minimum of 100 meters squared in size and cover at least two percent of the planted mitigation area. These plots were randomly placed throughout the planted riparian buffer mitigation area (4.83 acres) and are representative

of the riparian restoration and enhancement areas where applicable (i.e. when enhancement credit is being generated from supplemental planting under 15A NCAC 02B .0295 (n)). The following data is recorded for all trees in the plots: species, height, planting date (or volunteer), and grid location. All stems in plots are flagged with flagging tape. Data is processed using the CVS data entry tool. In the field, the four corners of each plot were permanently marked with PVC at the origin and metal conduit at the other corners. Photos of each plot are to be taken from the origin each monitoring year. There are four fixed vegetation monitoring plots (**Figure 2**).

Photos are to be taken at all vegetation plot origins each monitoring year and be provided in the annual reports. Visual inspections and photos will be taken to ensure that enhancement areas are being maintained and compliant. The measures of vegetative success for the Project are the survival of at least four native hardwood tree species, where no one species is greater than 50 percent of stems, at a density of at least 260 stems per acre at the end of Year 5. Native volunteer species may be included to meet the performance standards as determined by NC Division of Water Resources (DWR).

A visual assessment of the conservation easement is also performed each year to confirm:

- Fencing is in good condition throughout the site;
- No livestock access within the conservation easement area;
- No encroachment has occurred;
- No invasive species in areas where invasive species were treated,
- Diffuse flow is being maintained in the conservation easement areas; and
- There has not been any cutting, clearing, filling, grading, or similar activities that would negatively affect the functioning of the buffer.

Component/ Feature	Monitoring	Maintenance through project close-out
Vegetation	Annual vegetation monitoring	Vegetation shall be maintained to ensure the health and vigor of the targeted plant community. Routine vegetation maintenance and repair activities may include supplemental planting, pruning, mulching, and fertilizing. Exotic invasive plant species shall be treated by mechanical and/or chemical methods. Any vegetation requiring herbicide application will be performed in accordance with NC Department of Agriculture (NCDA) rules and regulations. Vegetation maintenance activities will be documented and reported in annual monitoring reports. Vegetation maintenance will continue through the monitoring period.
Invasive and Nuisance Vegetation	Visual Assessment	Invasive and noxious species will be monitored and treated so that none become dominant or alter the desired community structure of the Project. Locations of invasive and nuisance vegetation will be mapped.
Project Boundary	Visual Assessment	Project boundaries were identified in the field to ensure clear distinction between the mitigation project and adjacent properties. Boundaries shall be marked with signs identifying the property as a mitigation project and will include the name of the long-term steward and a contact number. Boundaries may be identified by fence, marker, bollard, post, tree-blazing, or other means as allowed by Project conditions and/or conservation easement. Boundary markers disturbed, damaged, or destroyed will be repaired and/or replaced on an as-needed basis. Easement monitoring and staking/ <u>signage maintenance will continue in perpetuity as a stewardship activity.</u>
Livestock Fencing	Visual Assessment	Livestock fencing was placed outside the easement limits. Maintenance of fencing is the responsibility of the landowner.

### 1.3 Project Components

This Project generates approximately 183,312.294 ft<sup>2</sup> (4.21 acres) of riparian buffer mitigation credits within a 6.17-acre conservation easement. These are derived from buffer restoration and buffer

enhancement. The riparian buffer mitigation credits generated service Randleman Lake buffer impacts within the Randleman Lake Watershed. The total mitigation credits that the Bucky's Branch Mitigation Project generate are summarized below and a more detailed table is in **Appendix A**.

<b>Mitigation Totals</b>	<b>Used Area Square Feet</b>	<b>Credits</b>
Restoration	210,571	161,815.794
Enhancement via Cattle Exclusion	42,993	21,496.500
<b>Total Riparian Buffer</b>	<b>253,564</b>	<b>183,312.294</b>

### ***1.4 Riparian Mitigation Approach***

Restoration activities included planting a composition of native bare-root tree species based on reference reach data and excluding livestock from the stream and buffer area. The restoration of plant communities within the Project not only provide stabilization and improve water quality within the easement limits but also provide ecological benefits to the entire watershed.

Enhancement occurred in forested areas within the Project, along BY1, where grazing occurred adjacent to the stream in accordance with the Consolidated Buffer Mitigation Rule 15A NCAC 02B .0295 (o)(6) (**Figure 3**). All livestock was removed from the easement and the fence was installed to exclude access to riparian areas and their associated streams.

### ***1.5 Construction and As-Built Conditions***

Revegetation of the Site included treating invasive species and planting native hardwood bare root trees. Prior to planting, RES prepped the site by spraying and ripping the easement. Piedmont Alluvial Forest is the target community type for the riparian restoration areas. The community is defined by Schafale (2012). The planting of bare root trees occurred in May 2020. Deviations from the initial planting plan were due to bare root availability. A list of the planted species can be found in **Table 5**. Additionally, a temporary and permanent seed mixture was applied in areas where cattle caused bare areas. The mixture included black-eyed susan (*Rudbeckia hirta*) which is a perennial, pollinator species.

### ***1.6 Baseline Monitoring Performance***

Monitoring of the four permanent vegetation plots was completed on May 7, 2020. Vegetation tables are in **Appendix B** and associated photos are in **Appendix C**. MY0 monitoring data indicates that all plots are exceeding the interim success criteria of 320 planted stems per acre. Planted stem densities ranged from 809 to 1,457 planted stems per acre with a mean of 1,083 planted stems per acre across all plots. A total of 14 species were documented within the plots. Volunteer species were not noted at baseline monitoring but are expected to establish in upcoming years. The average tree height observed was 1.5 feet.

Visual assessment of vegetation outside of the monitoring plots indicates that the herbaceous vegetation is becoming well established throughout the project and no invasive species were observed. The fence has been installed, is in good condition, and is maintaining cattle exclusion. Additionally, there were no signs of encroachment or concentrated flow in the easement area.

## **2   Reference**

- Lee Michael T., Peet Robert K., Roberts Steven D., and Wentworth Thomas R., 2008. *CVS-EEP Protocol for Recording Vegetation Level*. Version 4.2
- NC Environmental Management Commission. 2010. Rule 15A NCAC 02B .0250 - Randleman Lake Water Supply Watershed: Protection and Maintenance of Existing Riparian Buffers.
- NC Environmental Management Commission. 2014. Rule 15A NCAC 02B.0295 - Mitigation Program Requirements for the Protection and Maintenance of Riparian Buffers.
- Resource Environmental Solutions, LLC (2020). Bucky’s Branch Mitigation Project – Final Mitigation Plan.
- Schafale, M.P. 2012. Classification of the Natural Communities of North Carolina, Fourth Approximation. North Carolina Natural Heritage Program, Division of Parks and Recreation, NCDENR, Raleigh, NC.

# **Appendix A**

## **Project Background Tables and Site Maps**



**Table 1. Buffer Project Areas and Assets**

Credit Type	Location	Subject?	Feature Type	Mitigation Activity	Min-Max Buffer Width (ft)	Feature Name	Total Area (sf)	Creditable Area (sf)	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits
Buffer	Rural	Yes	I / P	Restoration	0-100	BY1	137,802	137,802	1	100%	1	137,802.000
Buffer	Rural	Yes	I / P	Enhancement via Cattle Exclusion	0-100	BY1	42,993	42,993	2	100%	2	21,496.500
Buffer	Rural	Yes	I / P	Restoration	101-200	BY1	72,769	72,769	1	33%	3.0303	24,013.794
<b>Total</b>							<b>253,564</b>					<b>183,312.294</b>

**Table 2. Project Activity and Reporting History  
Bucky's Branch Site**

**Elapsed Time Since planting complete:      2 weeks**  
**Number of reporting Years<sup>1</sup>:                      0**

<b>Activity or Deliverable</b>	<b>Data Collection Complete</b>	<b>Completion or Delivery</b>
Restoration Plan	NA	Jan-20
Final Design – Construction Plans	NA	NA
Stream Construction	NA	NA
Containerized, bare root and B&B plantings	NA	May-20
As-built (Year 0 Monitoring – baseline)	May-20	May-20
Year 1 Monitoring		
Year 2 Monitoring		
Year 3 Monitoring		
Year 4 Monitoring		
Year 5 Monitoring		

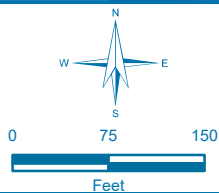
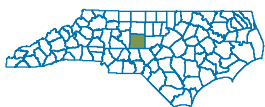
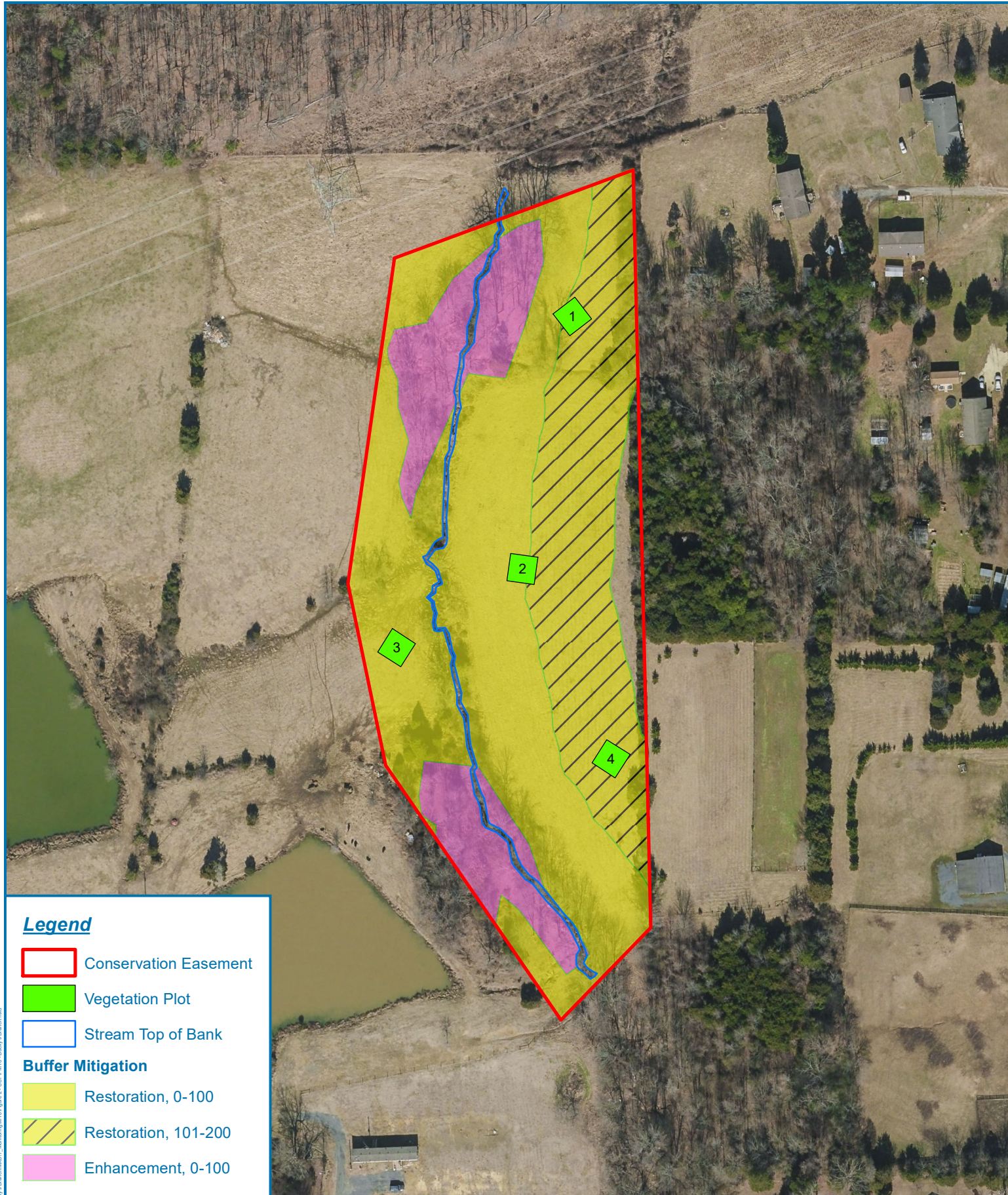
<sup>1</sup> = The number of reports or data points produced excluding the baseline

<b>Table 3. Project Contacts Table</b> <b>Bucky's Branch Site</b>	
<b>Planting Contractor</b>	H&J Forestry
Planting contractor POC	Matt Hitch
<b>Nursery Stock Suppliers</b>	Arborgen
<b>Monitoring Performers</b>	RES / 3600 Glenwood Ave, Suite 100, Raleigh, NC 27612
Monitoring POC	Ryan Medric (919) 741-6268

Table 4. Project Background Information			
Project Name		Bucky's Branch	
County		Randolph	
Project Area (acres)		6.17	
Project Coordinates (latitude and longitude)		Latitude: 35.859 N Longitude: -79.881 W	
Planted Acreage (Acres of Woody Stems Planted)		4.83	
Project Watershed Summary Information			
Physiographic Province		Southern Outer Piedmont	
River Basin		Cape Fear	
USGS Hydrologic Unit 8-digit	03030003	USGS Hydrologic Unit 14-digit	03030003010060
DWR Sub-basin		03-06-08	







**Figure 2 - Current Conditions Plan View**

**Bucky's Branch Mitigation Site  
MY0 2020**

**Randolph County, North Carolina**

Date: 5/8/2020

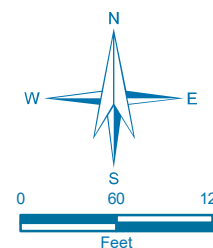
Drawn by: EJU

Checked by: RTM

1 inch = 150 feet



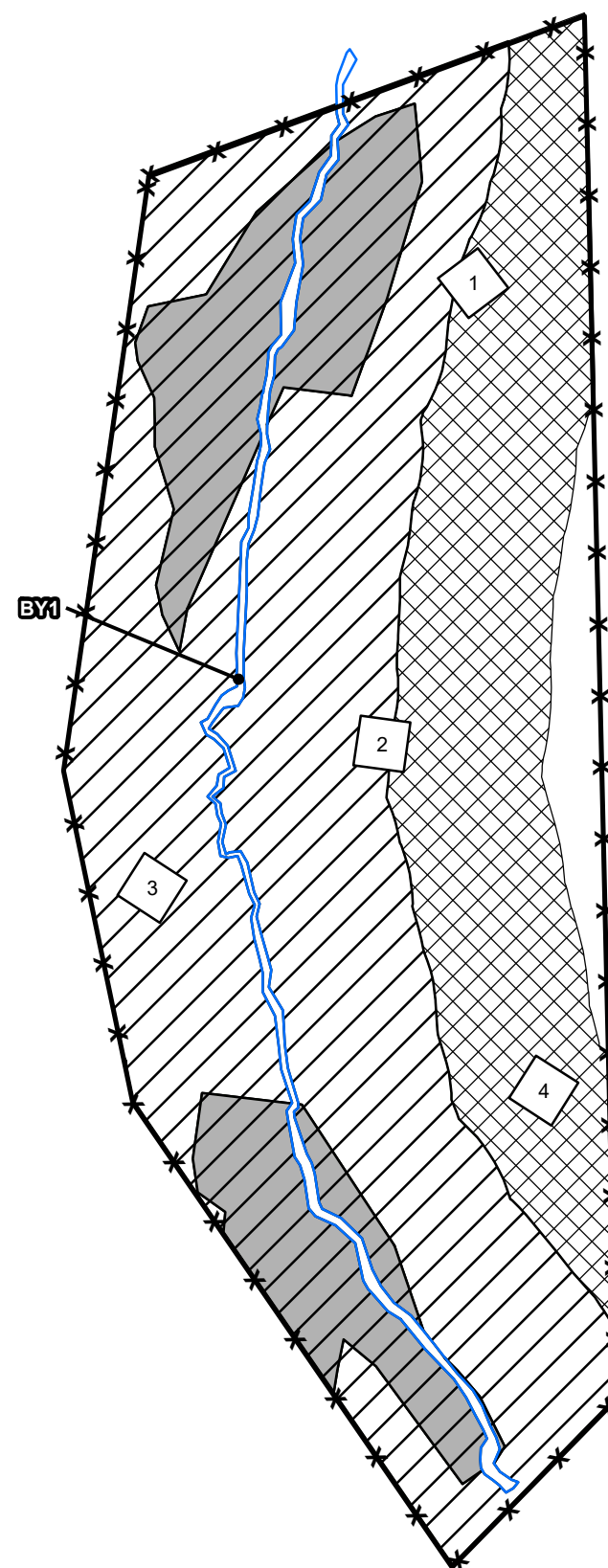
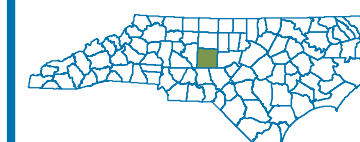




Date: 6/8/2020	Drawn by: EJU
	1 in = 120 feet

	Conservation Easement
	Cattle Exclusion Fencing
	Vegetation Plot
	Top of Bank
	Restoration, 0-100
	Restoration, 101-200
	Enhancement, 0-100

1) Horizontal Datum is NAD83 UTM Zone 17N  
2) Map Projection is NAD\_1983\_StatePlane\_North Carolina FIPS 3200 Feet



Sealed Conservation Easement Boundaries were provided by WSP USA Inc. (NC LICENSE # F-0891, J. Brandon Hicks L-5219), dated 08/15/19. Top of bank linework is based on field measurements also performed by WSP USA Inc. dated 08/15/19.

# **Appendix B**

## **Vegetation Assessment Data**



**Table 5. Bucky's Branch Planted Species Summary**

Common Name	Scientific Name	Total Stems Planted
Sycamore	<i>Platanus occidentalis</i>	1,000
Tulip Poplar	<i>Liriodendron tulipifera</i>	900
Willow Oak	<i>Quercus phellos</i>	900
Green Ash	<i>Fraxinus pennsylvanica</i>	700
Northern Red Oak	<i>Quercus rubra</i>	600
River Birch	<i>Betula nigra</i>	500
White Oak	<i>Quercus alba</i>	500
Water Oak	<i>Quercus nigra</i>	500
Eastern Redbud	<i>Cercis canadensis</i>	400
Black Walnut	<i>Juglans nigra</i>	400
Southern Crabapple	<i>Malus angustifolia</i>	400
Persimmon	<i>Diospyros virginiana</i>	200
American Plum	<i>Prunus americana</i>	100
Elderberry	<i>Sambucus canadensis</i>	100
<b>Total</b>		<b>7,200</b>

**Table 6. Bucky's Branch Vegetation Plot Mitigation Success Summary**

Plot #	Planted Stems/Acre	Volunteer Stems/Acre	Total Stems/Acre	Success Criteria Met?	Average Planted Stem Height (ft)
<b>1</b>	931	0	931	Yes	1.6
<b>2</b>	809	0	809	Yes	1.2
<b>3</b>	1457	0	1457	Yes	1.7
<b>4</b>	1133	0	1133	Yes	1.5
<b>Project Avg</b>	<b>1083</b>	<b>0</b>	<b>1083</b>	<b>Yes</b>	<b>1.5</b>

Table 7. Bucky’s Branch Stem Count Total and Planted by Plot Species

Bucky's Branch			Current Plot Data (MYO 2020)												Annual Means		
Scientific Name	Common Name	Species Type	100109-01-0001			100109-01-0002			100109-01-0003			100109-01-0004			MYO (2020)		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Betula nigra	river birch	Tree	8	8	8	2	2	2				3	3	3	13	13	13
Cercis canadensis	eastern redbud	Tree				1	1	1	1	1	1	3	3	3	5	5	5
Diospyros virginiana	common persimmon	Tree				6	6	6	1	1	1				7	7	7
Fraxinus pennsylvanica	green ash	Tree	1	1	1										1	1	1
Juglans nigra	black walnut	Tree				1	1	1	2	2	2				3	3	3
Liriodendron tulipifera	tuliptree	Tree	1	1	1	2	2	2	1	1	1	1	1	1	5	5	5
Malus angustifolia	southern crabapple	Tree	3	3	3	4	4	4	1	1	1	3	3	3	11	11	11
Platanus occidentalis	American sycamore	Tree				1	1	1	4	4	4	1	1	1	6	6	6
Prunus americana	American plum	Tree				1	1	1	1	1	1	5	5	5	7	7	7
Quercus alba	white oak	Tree	1	1	1	1	1	1	1	1	1	1	1	1	4	4	4
Quercus nigra	water oak	Tree							6	6	6	1	1	1	7	7	7
Quercus phellos	willow oak	Tree	8	8	8				14	14	14	8	8	8	30	30	30
Quercus rubra	northern red oak	Tree	1	1	1	1	1	1	3	3	3				5	5	5
Sambucus canadensis	Common Elderberry	Shrub							1	1	1	2	2	2	3	3	3
Stem count size (ares) size (ACRES) Species count Stems per ACRE			23	23	23	20	20	20	36	36	36	28	28	28	107	107	107
			1			1			1			1			4		
			0.02			0.02			0.02			0.02			0.10		
			7	7	7	10	10	10	12	12	12	10	10	10	14	14	14
			931	931	931	809	809	809	1457	1457	1457	1133	1133	1133	1083	1083	1083

# **Appendix C**

## **Vegetation Monitoring Plot Photos**



## Bucky's Branch Vegetation Monitoring Plot Photos



Vegetation Plot 1 (05/07/2020)



Vegetation Plot 2 (05/07/2020)



Vegetation Plot 3 (05/07/2020)



Vegetation Plot 4 (05/07/2020)