

**YEAR 5 (2016) ANNUAL MONITORING REPORT**

**WALL RIPARIAN BUFFER MITIGATION SITE**

RANDOLPH COUNTY, NORTH CAROLINA  
DMS PROJECT ID: 95007

Construction Completed March 2012  
Yr 5 (2016) Monitoring Data Collected October 2016  
Draft Monitoring Report Submitted October 2016  
NC DWR and DMS Site Visit January 2016  
Final Monitoring Report Submitted November 2016



**PREPARED BY:**

Restoration Systems, LLC  
1101 Haynes Street, Suite 211  
Raleigh, NC 27604

AND

Axiom Environmental, Inc.  
218 Snow Avenue  
Raleigh, NC 27603

**SUBMITTED TO:**

NCDEQ-DMS  
1652 Mail Service Center  
Raleigh, NC 27699-1652

## EXECUTIVE SUMMARY

Restoration Systems, LLC has established the Wall Riparian Buffer Mitigation Site (Site), designed specifically to assist in fulfilling the North Carolina Division of Mitigation Services (NCDMS) riparian buffer mitigation goals. The Site is located approximately 0.5 mile west of Randleman and three miles northwest of Asheboro, in northern Randolph County (Figure 1, Appendix A), and positioned within the 14-digit Cataloging Unit 03030003010070 of the Cape Fear River Basin. The Site is located within the Carolina Slate Belt ecoregion of the Piedmont province of North Carolina. This ecoregion is characterized by dissected irregular plains, some hills, linear ridges, and isolated monadnocks; low to moderate gradient streams with mostly boulder and cobble substrates (Griffith 2002). The Site watershed is characterized primarily by agriculture with forest land in riparian corridors and upper headwater depressions, and low-density residential development scattered along roadways. Unnamed Site streams drain to a reach of the Deep River that was listed on the NCDWQ final 2010 303(d) list for a standard violation due to reduced aquatic life integrity (NCDWQ 2010).

The original contract (#003997) dated, July 27, 2011 was for 11.3 RBMUs. During project permitting, RBMUs were scaled back to 9.8 based on one area deemed existing riparian buffer and not subject to restoration or enhancement. On January 19<sup>th</sup>, 2016, NC Division of Water Resources (NC DWR) Sue Homewood and Katie Merritt along with NCDMS project manager Lindsay Crocker and Restoration Systems representative Travis Hamrick conducted a site visit to verify subject streams had formed through the old farm pond. DWR staff concluded that streams had formed through the former farm pond bed. Furthermore, it was determined that Site riparian buffer restoration credits would be calculated in accordance with Randleman Buffer Rule 15A NCAC 02B .0252, and Site riparian buffer preservation credits would be calculated in accordance with the Consolidated Riparian Buffer Mitigation Rule 15A NCAC 02B .0295 adopted 11/1/2015. This results in an increase of RBMUs generated by the Site from 9.8 to 10.48 (10.39 RBMUs from restoration and 0.09 Units from preservation). This monitoring report, project figures, and tables have been updated accordingly. Additionally, these assets are depicted on Figure 2, Appendix A.

Measuring 12.6 acres and protected in perpetuity by a conservation easement, the Site includes five unnamed tributaries, which flow to the Deep River. Site streams were impacted from channel straightening, clearing of native forest vegetation, continual maintenance, and hoof shear through livestock grazing. The primary goal of this riparian buffer restoration project is to provide Riparian Buffer Mitigation Units (RBMUs) to the NCDMS. Success of this goal is based on the following criteria.

1. Removing nonpoint sources of pollution associated with agricultural production including a) removing livestock and b) ceasing the broadcast application of fertilizer, pesticides, and other agricultural materials into and adjacent to Site streams through treatment of runoff within the forested buffer.
2. Reducing sedimentation within onsite and downstream receiving waters by a) reducing bank erosion, vegetation maintenance, plowing, and hoof shear adjacent to Site streams and b) removing livestock from the Site.
3. Restoring and reestablishing natural community structure, habitat diversity, and functional continuity by the creation of a forested riparian buffer adjacent to stream channels.
4. Promoting floodwater attenuation by increasing frictional resistance on floodwaters crossing Site floodplains.
5. Improving aquatic habitat by enhancing stream bed shading and natural detritus input.
6. Providing a terrestrial wildlife corridor and refuge in an area extensively developed for agricultural production.
7. Protecting the Site's full potential of stream and riparian buffer functions and values in perpetuity.

Construction activities at the Site included the removal of a small farm pond and farm road, the installation of shallow marsh wetland treatment areas, and the restoration of 10.39 acres of riparian buffer by planting pasture with native forest vegetation. Earthwork associated with the Site Mitigation Plan (dam and road removal) was delayed; therefore, in an effort to meet the seasonal planting window, Site planting occurred prior to the initiation of earthwork. The total area associated with earthwork equaled 0.8 acres. Through agency correspondence it was deemed acceptable to proceed with planting prior to earthwork.

Areas disturbed by earthwork were planted with 40 3-gallon green ash (*Fraxinus pennsylvanica*) and 2100 bare root trees in February of 2013 as follows.

- 700 American elm (*Ulmus americana*)
- 500 Ironwood (*Carpinus caroliniana*)
- 300 Swamp chestnut oak (*Quercus michauxii*)
- 600 Green ash (*Fraxinus pennsylvanica*)

Four vegetation plots (10-meter by 10-meter in size; Plots 1-4) were established and permanently monumented following Site planting. During the comment and review process of the *Baseline Monitoring Document & As-built Baseline Report*, the North Carolina Division of Mitigation Services requested an additional four monitoring plots be installed. The additional monitoring plots (Plots 5-8) were installed and baseline data was collected on March 8, 2013 after year 1 (2012) monitoring. The addition of vegetation plots resulted in a total stem count increase between monitoring year 1 (2012) and year 2 (2013) monitoring years.

During year 2 monitoring, it was determined herbaceous growth throughout the Site was having a negative effect on planted stems, specifically the prevalence of fescue grass. In late February of 2014, a site-wide fescue treatment occurred. Two weeks later, 5000 bare root saplings of species from the original planting list were planted along UT 5, the upper portion of UT 1, and along UT 3 and 4. Planted stems throughout the Site appear vigorous, and though fescue has repopulated throughout much of the Site, the planted stems are expected to remain unaffected. The 2014 replanting also resulted in an increased stem count in the vegetation monitoring reports. Additional bare roots were planted in Plots 1 – 5.

All plots (Plots 1-8) were surveyed in October 2016 for the Year 5 (2016) monitoring season following guidelines established in *CVS-DMS Protocol for Recording Vegetation, Version 4.2* (Lee et al. 2008). Vegetation sampling across the Site was above the required average density with 764 planted stems per acre (excluding livestakes) surviving. In addition, each individual plot was above success criteria based on planted stems alone. Additional vegetation data can be found in Appendix B.

## TABLE OF CONTENTS

1.0	PROJECT BACKGROUND .....	1
1.1	Location and Setting .....	1
1.2	Project Goals/Objectives.....	1
1.3	Project Structure, Restoration Type, and Approach.....	2
2.0	ANNUAL MONITORING.....	3
2.1	Vegetation.....	3
2.1.1	Vegetation Success Criteria .....	3
2.1.2	Vegetative Contingency Plan.....	3
2.1.3	Vegetative Problem Areas .....	3
3.0	CONCLUSIONS .....	3
4.0	REFERENCES .....	4

## FIGURES

Figure 1.	Site Location Map .....	Appendix A
Figure 2.	Monitoring Plan View .....	Appendix A

## APPENDICES

### APPENDIX A. GENERAL TABLES AND FIGURES

Table 1.	Site Restoration Structures and Objectives
Table 2.	Project Activity and Reporting History
Table 3.	Project Contacts
Table 4.	Project Baseline Information and Attributes
Figure 1.	Site Location
Figure 2.	Current Conditions Plan View

### APPENDIX B. VEGETATION DATA

Table 5.	2016 (Year 5) Planted Stem and Natural Recruit Totals by Plot
	2016 (Year 5) Vegetation Monitoring Photographs
	2016 (Year 5) Photo Point Photographs

### APPENDIX C: AGENCY CORRESPONDENCE

### APPENDIX D: ADDITIONAL DATA

Figure 3.	Soils Map
	Preconstruction Photographs

## 1.0 PROJECT BACKGROUND

### 1.1 Location and Setting

Located approximately 0.5 mile west of Randleman and three miles northwest of Asheboro, in northern Randolph County (Figure 1, Appendix A), the Site is situated within the Carolina Slate Belt ecoregion of the Piedmont physiographic province of North Carolina, and within the United States Geological Survey (USGS) HUC 03030003 (North Carolina Division of Water Quality [NCDWQ] Subbasin Number 03-06-08) of the Cape Fear River Basin. The Site is positioned near the southwest corner of the 14-digit USGS Cataloging Unit 03030003010070.

The Carolina Slate Belt ecoregion is characterized by dissected irregular plains, some hills, linear ridges, and isolated monadnocks; low to moderate gradient streams with mostly boulder and cobble substrates (Griffith 2002). Onsite elevations range from 750 to 708 feet at the Site outfall (National Geodetic Vertical Datum, [NGVD]) (Randleman, North Carolina USGS 7.5-minute topographic quadrangle). The Site watershed is characterized primarily by agriculture with forest land in riparian corridors and upper headwater depressions, and low-density residential development scattered along roadways. Impervious surfaces account for less than two percent of the watershed land surface. Site streams were historically impacted from channel straightening, clearing of native forest vegetation with continual maintenance, and hoof shear through livestock grazing. Historical land use for the Site was primarily livestock grazing and hay production.

Directions to the Site from the City of Asheboro, NC:

- Travel north on I-73 for approximately 7.9 miles
- Exit onto US 311 toward High Point, NC
- Turn left onto US 311 North/US 311 Extension
- Travel north on US 311 for approximately 2.5 miles
- Turn right onto Wall Brothers Road
- Travel approximately 0.5 mile to Site entrance gate located on the left side of the road.
- Latitude: 35.825437°N, Longitude: 79.850840°W

### 1.2 Project Goals / Objectives

Project goals include the following:

- Improving Water Quality
  - Removing nonpoint sources of pollution associated with agricultural production including a) removing livestock and b) ceasing the broadcast application of fertilizer, pesticides, and other agricultural materials into and adjacent to Site streams through treatment of runoff within the forested buffer.
  - Reducing sedimentation within onsite and downstream receiving waters by a) reducing bank erosion, vegetation maintenance, plowing, and hoof shear adjacent to Site streams and b) removing livestock from the Site.
- Enhancing Flood Attenuation
  - Promoting floodwater attenuation by increasing frictional resistance on floodwaters crossing Site floodplains.
- Restoring Wildlife Habitat
  - Improving aquatic habitat by enhancing stream bed shading and natural detritus input.
  - Providing a terrestrial wildlife corridor and refuge in an area extensively developed for agricultural production.
  - Restoring and reestablishing natural community structure, habitat diversity, and functional continuity.
  - Protecting the Site's full potential of stream and riparian buffer functions and values in perpetuity.

Project goals will be accomplished by achievement of the following objectives.

Objective	Buffer Restoration Activity
Removing a pond impounding a reach of UT3 and UT4.	Pond removal occurred in April 2012 – see permanent photo point #4 on Figure 2 (Appendix B).
Removing a section of paved road at the upper reach of UT5.	Paved road removal occurred in April 2012 and planting of the area occurred in early 2013.
Removing invasive species along the upper reach of UT2.	Invasive species removal and monitoring will be ongoing throughout the monitoring period, with the first treatment in early 2013 and a site-wide treatment of fescue in the spring of 2014.
Installing shallow marsh wetland treatment areas on two ephemeral ditches entering the Site from Wall Brothers Road.	Shallow marsh wetland treatment areas were installed in April 2012 including log outfalls, planting with erosion control seed, and planting native forest vegetation.
Restoring riparian buffer by planting with native forest vegetation.	Site revegetation occurred in March 2012, with supplemental planting of disturbed areas in early 2013 (Appendix C).
Protecting the Site in perpetuity with a conservation easement.	The Site is protected by a conservation easement held by the State of North Carolina (SPO # 76-BD).

### 1.3 Project Structure, Restoration Type, and Approach

#### Project Structure

The Site includes 5 unnamed tributaries that drain to Randleman Lake and the Deep River (Figure 1, Appendix A). The lower reach of UT1 is depicted as a perennial stream on the USGS 7.5-minute topographic quadrangle while the upper reach of UT1 and the entirety of UT2 are depicted as intermittent streams [USGS Randleman, NC 7.5-minute topographic quadrangle (1981, 2010)]. UTs 3, 4, and 5 are not depicted on the USGS topographic quadrangle, but exhibited characteristics of ditched intermittent streams during field investigations. Geomorphology scores for these streams are generally low due to historical manipulation and disturbance.

#### Existing Stream Characteristics

Stream Reach	USGS Stream Order	<sup>1</sup> USGS Stream Classification	Field Stream Classification	NCDWQ Stream Identification Form Score
UT1	1-2	intermittent/perennial	Perennial	30.5
UT2	1	intermittent	Perennial	36.25
UT3	0-1	not shown/intermittent	Ephemeral / Intermittent	11/22
UT4	0	not shown	Ephemeral	11
UT5	0	not shown	Intermittent	22

<sup>1</sup> USGS Stream Classification: UT3 is depicted only downstream of the pond on the USGS 7.5-minute topographic quadrangle.

#### Restoration Type and Approach

Site restoration activities include the cessation of agricultural practices; removal of an agricultural pond and abandoned road crossing; installation of marsh treatment areas; and revegetation with native, forest communities. These activities will ultimately result in the generation of 10.48 Riparian Buffer Mitigation Units.

Completed project activities, reporting history, completion dates, and project contacts are summarized in Tables 1-3 (Appendix A).

## **2.0 ANNUAL MONITORING**

Monitoring of restoration efforts will be performed for a minimum of 5 years or until success criteria are fulfilled. Monitoring activities for the Site, including relevant structures, project features, specific project structures, and monitoring features are detailed in the monitoring plan view in Figure 2 (Appendix A).

### **2.1 Vegetation**

Monitoring of planted vegetation will follow the *Carolina Vegetation Survey (CVS)-North Carolina Division of Mitigation Services (DMS) Protocol for Recording Vegetation, Version 4.2* (Lee et al. 2008). The Site will be measured between June 1 and September 30 until the vegetation success criteria are achieved. A total of eight 10-meter by 10-meter vegetation plots have been installed within the restored riparian buffer (Figure 2, Appendix A). Vegetation will receive a visual evaluation on a periodic basis to ascertain the degree of overtopping of planted elements by nuisance species.

Invasive exotic species will be located and treated as needed, dependent upon species, by a NC Department of Agriculture & Consumer Services licensed pesticide applicator.

#### **2.1.1 Vegetation Success Criteria**

Success criteria have been established to verify that the vegetation component supports community elements necessary for forest development. Success criteria are dependent upon the density and growth of characteristic forest species. Additional success criteria are dependent upon the density and growth of “Characteristic Tree Species.” Characteristic Tree Species include planted species, species identified through visual inventory of an approved, relatively undisturbed, reference forest community, and species outlined in Schafale and Weakley (1990) for a Piedmont/Low Mountain Alluvial Forest. An average density of 320 stems per acre of Character Tree Species must be surviving after five monitoring years.

#### **2.1.2 Vegetative Contingency Plan**

If vegetation success criteria are not achieved based on average density calculations from combined plots over the entire restoration area, supplemental planting may be performed with tree species approved by regulatory agencies. Supplemental planting may be performed as needed until achievement of vegetation success criteria.

#### **2.1.3 Vegetative Problem Areas**

Earthwork associated with the Site Mitigation Plan (dam and road removal) was delayed; therefore, in an effort to meet the seasonal planting window Site planting occurred prior to the initiation of earthwork. The total area associated with earthwork equals 0.8 acre and it was deemed acceptable to proceed with planting prior to earthwork. Areas disturbed by earthwork were planted with 40 3-gallon Green ash (*Fraxinus pennsylvanica*) and 2100 bare root trees in February of 2013. In addition, portions of the Site with low stem densities were replanted with 5000 bare root plants in late 2013/early 2014, and Site-wide fescue treatments occurred in the spring of 2014 (Figure 2, Appendix A). Additional vegetation data can be found in Appendix B.

## **3.0 CONCLUSIONS**

Vegetation sampling across the Site was above the required average density with 764 planted stems per acre surviving. In addition, each individual plot was above success criteria based on planted stems alone.

### Summary of Planted Vegetation Plot Results

Plot	Planted Stems/Acre Counting Towards Success Criteria				
	Year 1 (2012)	Year 2 (2013)	Year 3 (2014)	Year 4 (2015)	Year 5 (2016)
1	648	324	728	688	769
2	567	567	1174	486	486
3	648	445	971	1052	1052
4	486	243	648	445	445
5*	--	202	648	769	769
6*	--	526	486	1133	1093
7*	--	1093	1093	931	850
8*	--	486	405	607	647
<b>Average of All Plots</b>	<b>587</b>	<b>486</b>	<b>769</b>	<b>764</b>	<b>764</b>

\*Plots 5-8 were installed in March 2013 prior to Year 2 (2013) monitoring in response to agency comments during the review of baseline documentation/data.

#### 4.0 REFERENCES

Griffith, G.E., J.M. Omernik, J.A. Comstock, M.P. Schafale, W.H. McNab, D.R. Lenat, T.F. MacPherson, J.B. Glover, and V.B. Shelbourne. 2002. Ecoregions of North Carolina and South Carolina. U.S. Geological Survey, Reston, Virginia.

Lee, Michael T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2008. CVS-DMS Protocol for Recording Vegetation, Version 4.2. (online). Available: <http://cvs.bio.unc.edu/methods.htm>.

North Carolina Division of Water Quality (NCDWQ). 2010. Final North Carolina Water Quality Assessment and Impaired Waters List (2010 Integrated 305(b) and 303(d) Report) (online). Available: [http://h2o.enr.state.nc.us/tmdl/documents/draft\\_2010\\_Cat\\_5.pdf](http://h2o.enr.state.nc.us/tmdl/documents/draft_2010_Cat_5.pdf) [February 1, 2011]. North Carolina Department of Environmental Quality, Raleigh, North Carolina.

Schafale, M.P. and A.S. Weakley. 1990. Classification of the Natural Communities of North Carolina: Third Approximation. North Carolina Natural Heritage Program, Division of Parks and Recreation, North Carolina Department of Environmental Quality. Raleigh, North Carolina.



## **Appendix A: General Tables and Figures**

Table 1. Site Restoration Structures and Objectives

Table 2. Project Activity and Reporting History

Table 3. Project Contacts

Table 4. Project Baseline Information & Attributes

Figure 1. Site Location

Figure 2. Monitoring Plan

**Table 1. Site Restoration Structure and Objectives**

Wall Riparian Buffer Restoration Site, Randolph County, DMS Contract #: 003985

Mitigation Credits*				
Riparian Buffer				
Restoration			Preservation	
10.39			0.09	
Projects Components				
Existing Acreage	Restoration/ Restoration Equivalent	Restoration / Preservation Acreage	Mitigation Ratio	Comment
10.39	Restoration	10.39	1:1	Cessation of current land use practices, removing an agricultural pond and road crossing, removing invasive species, and planting with native forest vegetation.
0.90	Preservation	0.90	10:1	Permanently protecting existing riparian buffer from cutting, clearing, filling, grading, and any similar activities that would affect the functionality of the riparian buffer.
Component Summation				
Restoration Level		Riparian Buffer (acreage)	Credit Ratio	RBMUs Mitigation Units
Restoration		10.39	1:1	10.39
Preservation		0.90	10:1	0.09
<b>Totals</b>		<b>11.29</b>	<b>--</b>	<b>10.48</b>

\* Restoration calculated in accordance with Randleman Buffer Rule 15A NCAC 02B .0252. Preservation calculated in accordance with the Consolidated Riparian Buffer Mitigation Rule 15A NCAC 02B .0295 adopted 11/1/2015.

**Table 2: Project Activity and Reporting History**

Wall Riparian Buffer Restoration Site, Randolph County, DMS Contract #: 003985

Activity or Report	Data Collection Complete	Completion or Delivery
CE Document	NA	February - 2012
Conservation Easement	NA	April - 2012
Mitigation Plan	NA	February - 2012
Construction	NA	March - 2012
Bare Root Planting	NA	March - 2012
Baseline Monitoring Document	April-2012	October 2012
Annual Monitoring Year 1 (2012)	September 2012	November 2012
Planting Disturbed Areas	NA	January/February 2013
Installation of 4 additional monitoring plots		March 2013
Annual Monitoring Year 2 (2013)	July 2013	October 2013
Fescue Treatment and Replant	NA	February / March 2014
Annual Monitoring Year 3 (2014)	August 2014	October 2014
Annual Monitoring Year 4 (2015)	October 2015	November 2015
Annual Monitoring Year 5 (2016)	October 2016	November 2016

**Table 3: Project Contacts Table**

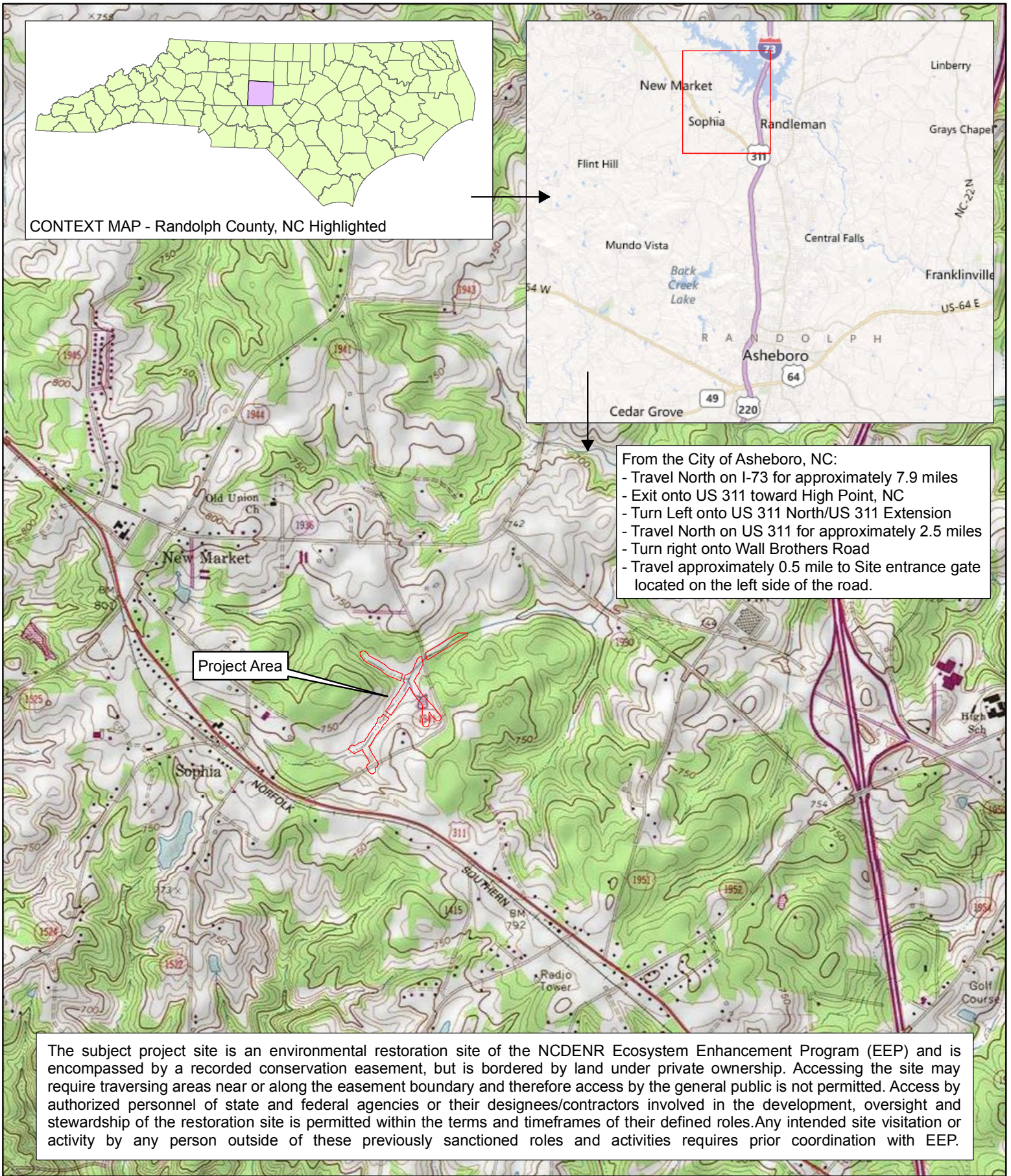
Wall Riparian Buffer Restoration Site, Randolph County, DMS Contract #: 003985

	<b>Firm</b>	<b>POC &amp; Address</b>
<b>Full Delivery Provider</b>	Restoration Systems, LLC	1101 Haynes Street, Suite 211 Raleigh, North Carolina 27604 George Howard and John Preyer 919-755-9490
<b>Designer:</b>	Axiom Environmental, Inc.	Grant Lewis; 919.215.1693 218 Snow Ave. Raleigh, NC 27603
<b>Construction Contractor:</b>	Axiom Green Build.	Grant Lewis; 919.215.1693 218 Snow Ave. Raleigh, NC 27603
<b>Planting Contractor:</b>	Carolina Silvics	Dwight McKinney 252.482.8491 908 Indian Trail Road Edenton, NC 27932
<b>Seeding Contractor:</b>	Axiom Green Build	Grant Lewis; 919.215.1693 218 Snow Ave. Raleigh, NC 27603
<b>Nursery Stock Suppliers:</b>	ArborGen	1.888.888.7158
<b>Baseline Data Collection</b>	Restoration Systems, LLC	Ray Holz; 919.604.9314 1101 Haynes St. Raleigh, NC 27604
<b>Annual Monitoring:</b>	Axiom Environmental, Inc	Grant Lewis; 919.215.1693 218 Snow Ave. Raleigh, NC 27603

**Table 4: Project Baseline Information & Attributes Table**

Wall Riparian Buffer Restoration Site, Randolph County, DMS Contract #: 003985

<b>Project Information</b>			
Project Name		Wall	
County		Randolph	
Project Area (acres)		12.6	
Project Coordinates (latitude and longitude)		35.4927319589, -79.5056974787 (NAD 83/WGS 84)	
<b>Project Watershed Summary Information</b>			
Physiographic Province		Northern Inner Piedmont section of Carolina Slate Belt	
River Basin		Cape Fear	
USGS Hydrologic Unit 8-digit	03030003	USGS Hydrologic Unit 14-digit	03030003010070
DWQ Sub-basin		03-06-08	
Project Drainage Area, Total Outfall (acres)		+/- 448	
Project Drainage Area Percentage of Impervious Area		< 5%	
CGIA Land Use Classification		Cropland and Pasture	
<b>Reach Summary Information</b>			
Parameters	UT 1 & UT 2	UT 3 & UT 4	UT 5
Length of reach (linear feet)	2,030	850	400
Valley classification	VIII	VIII	VIII
Drainage area (acres)	+/- 448		
NCDWQ stream identification score	UT 1 – 30.5 UT 2 – 35.25	UT 3 & UT 4 (above pond) – 11	UT 5 – 22
NCDWQ Water Quality Classification	Portion of Deep River where unnamed tributaries enter ( (Randleman Lake): WS-IV; CA		
Morphological description (stream type)	Perennial	Intermittent / Ephemeral	Intermittent
Drainage class	Rural	Rural	Rural
303d listed?	No	No	No
Upstream of a 303d listed	Yes	Yes	Yes
Dominant Soil Series	Georgeville silty clay loam	Badin-Tarrus complex	Georgeville silty clay loam
Soil Hydric status	Non-Hydric	Non-Hydric	Non-Hydric
Slope	8-15 %	2-8 %	8-15 %
Native vegetation community	Piedmont/Low Mountain Alluvial Forest (Schafale and Weakley 1990)		
Percent exotic invasive vegetation	< 5%		
<b>Regulatory Considerations</b>			
Regulation	Applicable?	Resolved?	Supporting Documentation
Waters of the United States – Section 404	No		
Waters of the United States – Section 401	No		
Endangered Species Act	No		
Historic Preservation Act	No		
Coastal Zone Management Act [CZMA/Coastal Area Management Act (CAMA)]	No		
FEMA Floodplain Compliance	No		
Essential Fisheries Habitat	No		
Sediment & Erosion Control Plan (S&EC)	No		



**RESTORATION SYSTEMS, LLC**  
 1101 HAYNES ST, SUITE 211  
 RALEIGH, NC 27604  
 PHONE : 919.755.9490  
 FAX : 919.755.9492

This map and all data contained within are supplied as is with no warranty. Restoration Systems, LLC expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map is compatible with the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

SCALE: 1 inch = 2,000 feet  
 DATE: June - 2012  
 PROJECT: Wall

**FIGURE 1:  
 SITE LOCATION MAP**

Figure indicates where the Site's physical location is along with directions to the Site

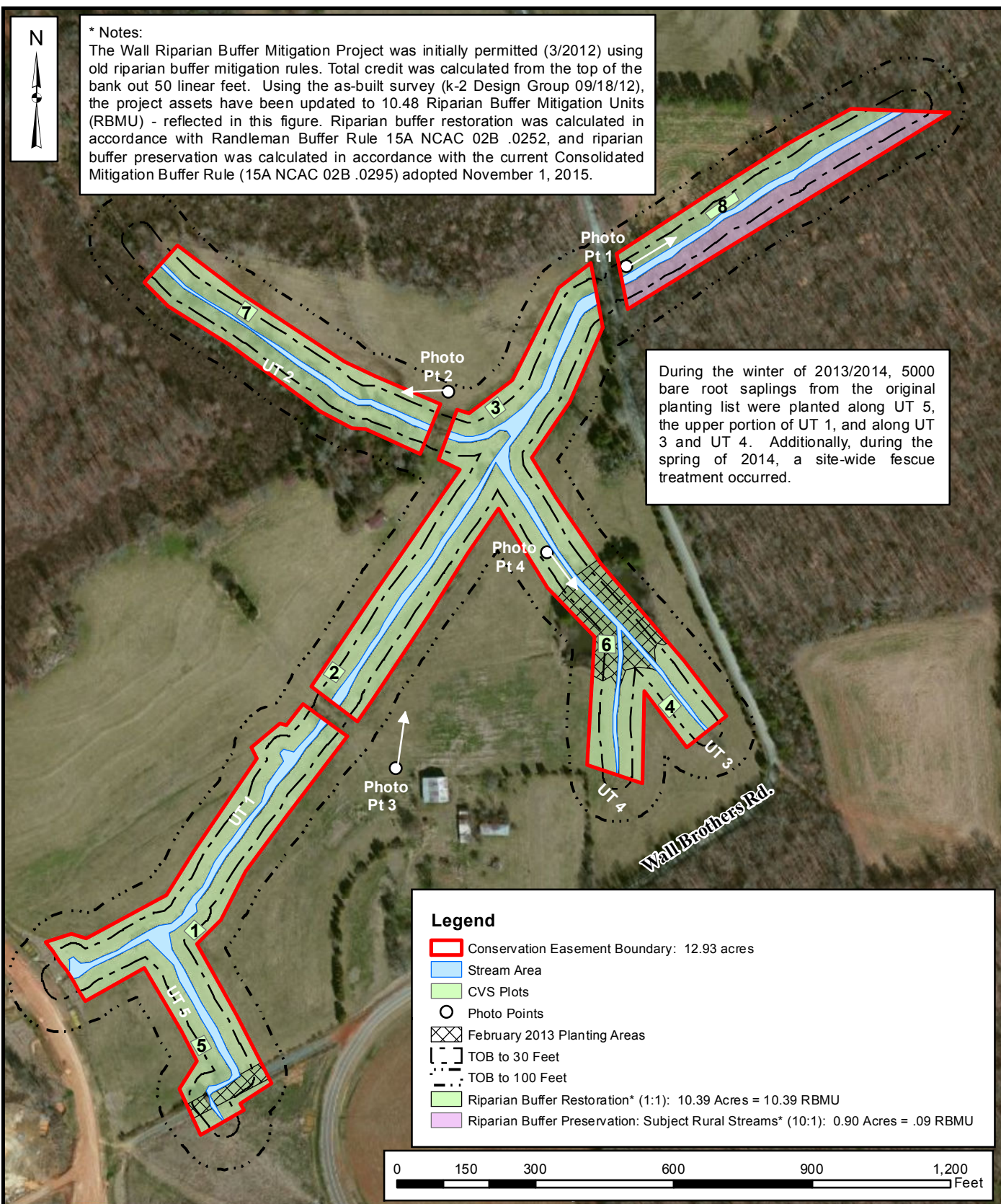
**Wall Riparian Buffer Mitigation Site**  
 RFP # 16-003571 Contract # 003985  
 Randolph County, North Carolina

Aerial Imagery USGS Topographical Map  
 COORDINATE SYSTEM: NAD 1983 NC FEET



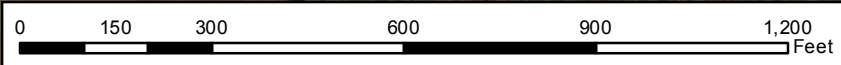
\* Notes:  
The Wall Riparian Buffer Mitigation Project was initially permitted (3/2012) using old riparian buffer mitigation rules. Total credit was calculated from the top of the bank out 50 linear feet. Using the as-built survey (k-2 Design Group 09/18/12), the project assets have been updated to 10.48 Riparian Buffer Mitigation Units (RBMU) - reflected in this figure. Riparian buffer restoration was calculated in accordance with Randleman Buffer Rule 15A NCAC 02B .0252, and riparian buffer preservation was calculated in accordance with the current Consolidated Mitigation Buffer Rule (15A NCAC 02B .0295) adopted November 1, 2015.

During the winter of 2013/2014, 5000 bare root saplings from the original planting list were planted along UT 5, the upper portion of UT 1, and along UT 3 and UT 4. Additionally, during the spring of 2014, a site-wide fescue treatment occurred.



**Legend**

- Conservation Easement Boundary: 12.93 acres
- Stream Area
- CVS Plots
- Photo Points
- February 2013 Planting Areas
- TOB to 30 Feet
- TOB to 100 Feet
- Riparian Buffer Restoration\* (1:1): 10.39 Acres = 10.39 RBMU
- Riparian Buffer Preservation: Subject Rural Streams\* (10:1): 0.90 Acres = .09 RBMU



Axiom Environmental  
218 Snow Ave  
Raleigh, NC 27603

Axiom Environmental, Inc.

CURRENT CONDITIONS PLAN VIEW  
WALL RIPARIAN BUFFER RESTORATION SITE  
Randolph County, North Carolina

Dwn. by:  
WGL/KRJ

Date:  
Nov 2016

Project:  
10-001

FIGURE  
**2**

## **APPENDIX B: VEGETATION DATA**

Table 5 - 2016 (Year 5) Planted Stem and Natural Recruit Totals by Plot  
2016 (Year 5) Vegetation Monitoring Photographs  
2016 (Year 5) Photo Point Photographs

**Table 5. 2016 (Year 5) Planted Stem and Natural Recruit Totals by Plot**  
**CVS Project Code Wall. Project Name: Wall Riparian Buffer Mitigation Site**

		Current Plot Data (MY5 2016)																								
Scientific Name	Common Name	Species Type	Wall-RS-0001			Wall-RS-0002			Wall-RS-0003			Wall-RS-0004			Wall-01-0005			Wall-01-0006			Wall-01-0007			Wall-01-0008		
			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 floridanum	Southern Sugar Maple,	Tree																						1	1	1
Acer rubrum	red maple	Tree																								1
Asimina triloba	pawpaw	Tree											3	3	3											
Baccharis halimifolia	baccharis	shrub			2																					
Betula nigra	river birch	Tree																								
Carpinus caroliniana	American hornbeam	Tree							1	1	1					1	1	1								
Carya ovata	shagbark hickory	Tree																						7	7	7
Cephalanthus occidentalis	common buttonbush	Shrub				7	7	8	1	1	1										9	9	10			
Cornus amomum	silky dogwood	Shrub														1	1	1								
Cornus florida	flowering dogwood	Tree																								
Diospyros virginiana	common persimmon	Tree	1	1	1																					
Fraxinus pennsylvanica	green ash	Tree	9	9	10	10	10	10	4	4	4	3	3	5	11	11	11	5	5	5	11	11	13	1	1	2
Liquidambar styraciflua	sweetgum	Tree																								15
Liriodendron tulipifera	tuliptree	Tree	1	1	1				5	5	5	1	1	1										1	1	8
Morus rubra	red mulberry	Tree																						1	1	1
Quercus	oak	Tree							1	1	1															
Quercus michauxii	swamp chestnut oak	Tree	1	1	1	5	5	5	7	7	7	9	9	9	3	3	3	6	6	6	3	3	3			
Quercus pagoda	cherrybark oak	Tree	6	6	6	5	5	5	2	2	2				3	3	3				2	2	2			
Salix nigra	black willow	Tree																								
Ulmus alata	winged elm	Tree																								
Ulmus americana	American elm	Tree	1	1	1			1									1	1	1	1	1	1				
		<b>Stem count</b>	19	19	22	27	27	29	21	21	21	16	16	18	19	19	19	12	12	12	26	26	30	11	11	34
		<b>size (ares)</b>	1			1			1			1			1			1			1			1		
		<b>size (ACRES)</b>	0.02			0.02			0.02			0.02			0.02			0.02			0.02					
		<b>Species count</b>	6	6	7	4	4	5	7	7	7	4	4	4	5	5	5	3	3	3	5	5	6	5	5	6
		<b>Stems per ACRE</b>	768.9	768.9	890.3	1093	1093	1174	849.8	849.8	849.8	647.5	647.5	728.4	768.9	768.9	768.9	485.6	485.6	485.6	1052	1052	1214	445.2	445.2	1376

**Color for Density**

- Exceeds requirements by 10%
- Exceeds requirements, but by less than 10%
- Fails to meet requirements, by less than 10%
- Fails to meet requirements by more than 10%

- PnoLS = Planted excluding livestakes
- P-all = Planting including livestakes
- T = All planted and natural recruits including livestakes
- T includes natural recruits



**Table 5. 2016 (Year 5) Planted Stem and Natural Recruit Totals by Plot (continued)**  
**CVS Project Code Wall. Project Name: Wall Riparian Buffer Mitigation Site**

Scientific Name	Common Name	Species Type	Annual Means																		
			MY5 (2016)			MY4 (2015)			MY3 (2014)			MY2 (2013)			MY1 (2012)			MY0 (2012)			
			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 floridanum	Southern Sugar Maple,	Tree	1	1	1	1	1	1	1	1	1	1	2	2	2			1	1	1	1
Acer rubrum	red maple	Tree			1			6			6			7							
Asimina triloba	pawpaw	Tree	3	3	3	3	3	3				1	1	1	1	1	1	1	1	1	1
Baccharis halimifolia	baccharis	shrub			2																
Betula nigra	river birch	Tree						1													
Carpinus caroliniana	American hornbeam	Tree	2	2	2	2	2	3	2	2	2	2	2	2	4	4	6	7	7	7	7
Carya ovata	shagbark hickory	Tree	7	7	7	7	7	7	6	6	14	9	9	9							
Cephalanthus occidentalis	common buttonbush	Shrub	17	17	19	17	17	18	16	16	16	9	9	9							
Cornus amomum	silky dogwood	Shrub	1	1	1	1	1	1	1	1	1	2	2	2							
Cornus florida	flowering dogwood	Tree										9	9	9	14	14	20	24	24	24	24
Diospyros virginiana	common persimmon	Tree	1	1	1	1	1	2	4	4	4										
Fraxinus pennsylvanica	green ash	Tree	54	54	60	55	55	60	56	56	56	21	21	21	2	2	2	3	3	3	3
Liquidambar styraciflua	sweetgum	Tree			15			35			35			15							
Liriodendron tulipifera	tuliptree	Tree	8	8	16	11	11	24	12	12	37	8	8	8	10	10	10	10	10	10	10
Morus rubra	red mulberry	Tree	1	1	1	1	1	1	1	1	1	1	1	1							
Quercus	oak	Tree	1	1	1	1	1	4	3	3	3	5	5	5							
Quercus michauxii	swamp chestnut oak	Tree	34	34	34	30	30	30	31	31	31	15	15	15	8	8	8	8	8	8	8
Quercus pagoda	cherrybark oak	Tree	18	18	18	18	18	18	16	16	16	8	8	8	6	6	7	8	8	8	8
Salix nigra	black willow	Tree						15			29			9							
Ulmus alata	winged elm	Tree										1	1	1							
Ulmus americana	American elm	Tree	3	3	4	3	3	5	3	3	5	3	3	3	2	2	3	4	4	4	4
<b>Stem count</b>			151	151	186	151	151	234	152	152	257	96	96	127	47	47	58	66	66	66	66
<b>size (ares)</b>			8			8			8			8			4			4			
<b>size (ACRES)</b>			0.20			0.20			0.20			0.20			0.10			0.10			
<b>Species count</b>			14	14	17	14	14	18	13	13	16	15	15	18	8	8	9	9	9	9	9
<b>Stems per ACRE</b>			763.8	763.8	940.9	763.8	763.8	1184	768.9	768.9	1300	485.6	485.6	642.4	475.5	475.5	586.8	667.7	667.7	667.7	667.7

**Color for Density**

- Exceeds requirements by 10%
- Exceeds requirements, but by less than 10%
- Fails to meet requirements, by less than 10%
- Fails to meet requirements by more than 10%

- PnoLS = Planted excluding livestakes
- P-all = Planting including livestakes
- T = All planted and natural recruits including livestakes
- T includes natural recruits

**Wall Buffer**  
**2016 (Year 5) Vegetation Monitoring Photographs**  
**Taken October 2016**



**Wall Buffer  
2016 (Year 5) Photo Point Photographs  
Taken October 2016**



## **APPENDIX C: AGENCY CORRESPONDENCE**

May 15, 2012

Ms. Kristie Corson  
DENR-Ecosystem Enhancement Program  
1652 Mail Service Center  
Raleigh, North Carolina  
27699-1652

Subject: Task IV Construction, Contact #: 003997

Dear Ms. Corson:

I wanted to provide you with an update regarding the status of construction and planting at the Wall Riparian Buffer Mitigation Project in Randolph County. Due to the late closing date on the property (April 11<sup>th</sup>), we opted to plant the site in March and then due the construction following closing. On March 22<sup>nd</sup>, Carolina Silvics planted the entire site except for two small areas totaling 0.8 acres. During the week of April 23<sup>rd</sup>, Axiom Green Build worked in these two areas to remove a) short section of gravel road along with a concrete culvert and b) a small earthen dam. Attached is a figure showing both the area planted and the area of construction.

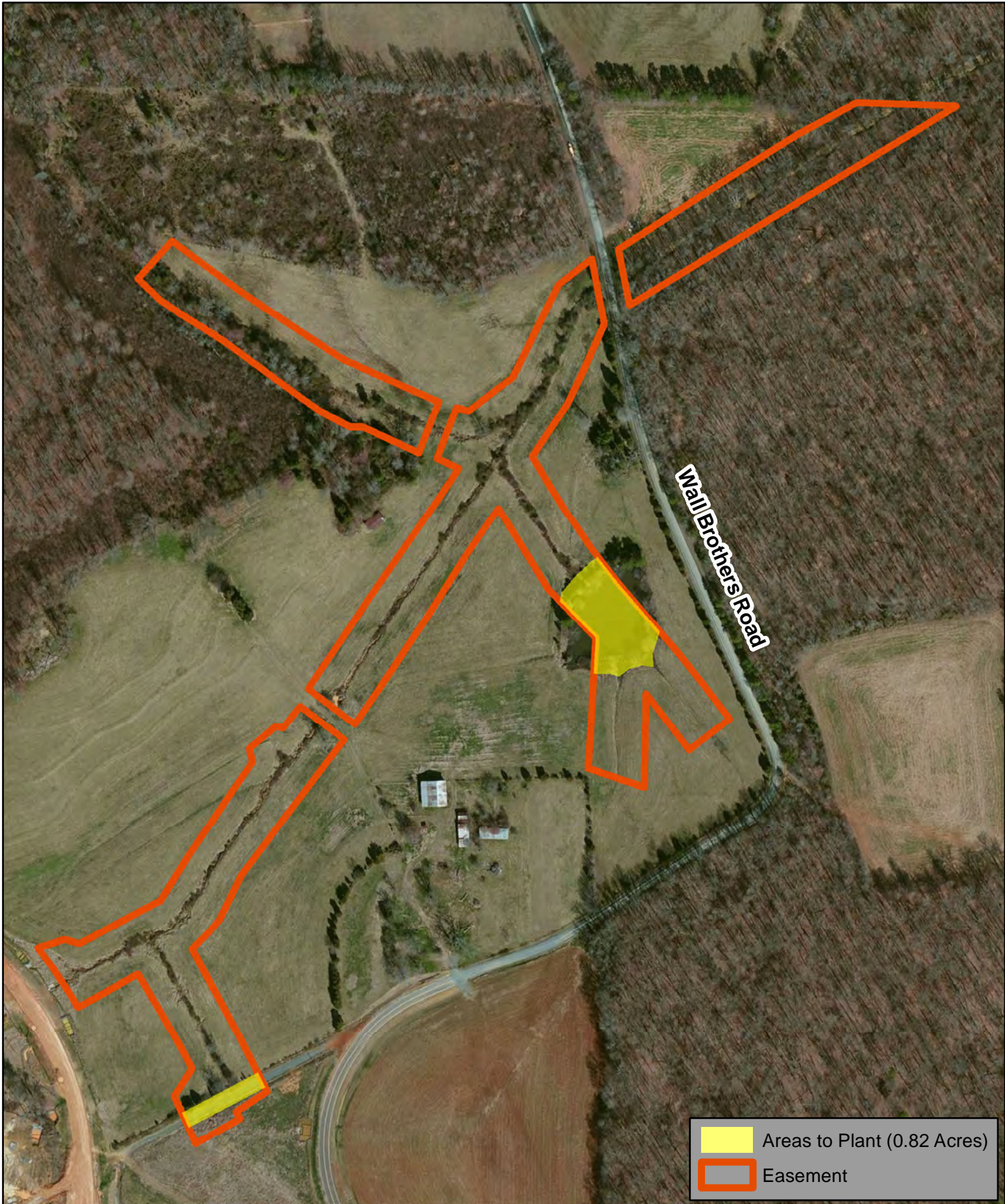
As a result of doing the construction after the planting season had passed, the two areas totaling 0.8 acres still need to be planted. I had hoped to do this immediately following construction but due to the unseasonably warm weather it simply would not be successful. If agreeable to you, I would like to use this year's growing season for the first year of monitoring with the stipulation that during the winter of 2012/2013 we will plant the 0.8 acre area with 1-gallon containerized trees (as opposed to bare root seedlings).



Removal of the road and dam were successful and we are waiting for the bottom of the impoundment to dry out a bit more before  
Please feel free to contact at me 919.334.9112 if you have any questions.

Sincerely,

Travis Hamrick, Project Manager

Attachments (3): Invoice Task IV  
Figure- Planting Needs  
Project History



	Areas to Plant (0.82 Acres)
	Easement

**RS**  
RESTORATION SYSTEMS, LLC

**Restoration Systems, LLC**  
1101 Haynes St. Suite 211  
Raleigh, NC 27604  
tel: 919.755.9490

**Figure 1:**  
Construction Status

**Wall Buffer Restoration Project**  
Randolph County, NC

1:3,188

 N

0 50 100 200 300 400 Feet

## Raymond Holz

---

**From:** Raymond Holz  
**Sent:** Monday, October 22, 2012 6:13 PM  
**To:** Kristie.Corson@ncdenr.gov  
**Cc:** Travis Hamrick (travis@restorationsystems.com)  
**Subject:** Wall Riparian Buffer Mitigation Site: Additional Vegetation Monitoring Plots  
**Attachments:** Additional Monitoring Plots at Wall.pdf

Afternoon Kristie,

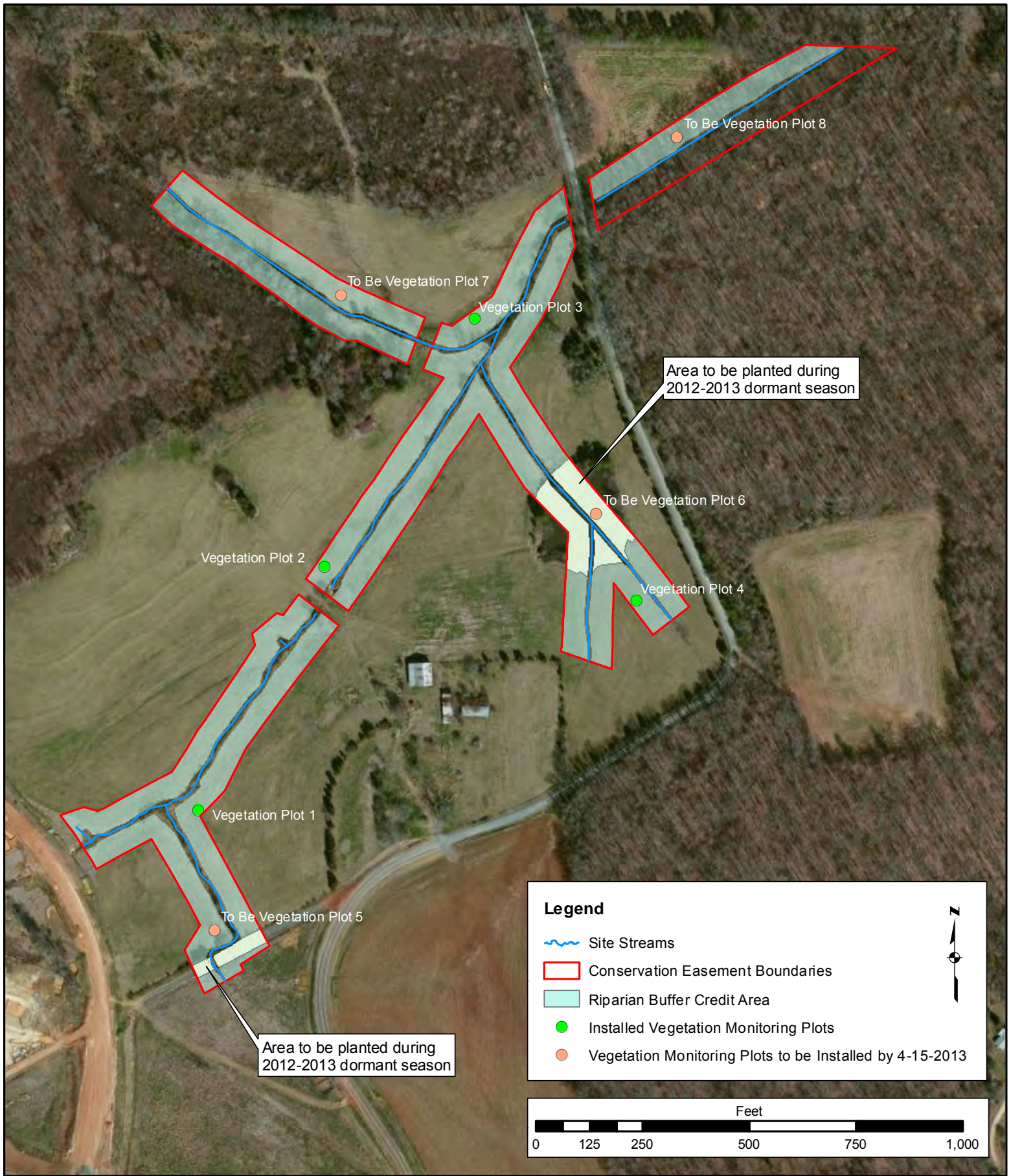
After receiving and reviewing the comments you provided regarding the Wall Riparian Buffer Mitigation Site's Draft Baseline Monitoring Document and As Built Baseline Report dated October 16, 2012 Restoration Systems (RS) is prepared to install an additional four (4) vegetation monitoring plots as requested. CVS protocol stipulates that baseline vegetation data be collected within 30 days of the project being planted. Additionally, 60 day must pass between vegetation baseline data collection and EEP as-built review. With this in mind and with an EEP on-site as built review already conducted (September 20, 2012), RS recommends the additional four monitoring plots be installed no later than April 1<sup>st</sup> of 2013.

Restoration Systems is recommending this timeline because an additional .80 acres of the Site must be planted during the 2012 – 2013 dormant season. It is planned that one of the four additional monitoring plots will be located in the soon to be planted area. Baseline vegetation data will be conducted simultaneously with the installation of the additional plots and will be included within the 2013, year 2, annual monitoring report. RS understands the addition of these monitoring plots will not prolong the vegetation monitoring of the Site, so long as all current and additional monitoring plots achieve the success criteria outlined in the Mitigation Plan. Installation of the additional monitoring plots will follow CVS protocol and will measure 10 by 10 meters. Please see the attached figure depicting the approximate location of these additional monitoring plots, as well as the areas to be planted during the 2012 – 2013 dormant season.

Thank you for your time, please contact me at 919.604.9314 if you have any questions.

Sincerely,

Raymond Holz



**RESTORATION SYSTEMS, LLC**

1101 HAYNES ST, SUITE 211  
 RALEIGH, NC 27604  
 PHONE : 919.755.9490  
 FAX : 919.755.9492

This map and all data contained within are supplied as is with no warranty. Restoration Systems, LLC expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map is compatible with the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

SCALE: 1 inch = 292 feet  
 DATE: October - 2012  
 PROJECT: Wall

**Location of Additional Vegetation Monitoring Plots**

Figure indicates where the physical location of all monitoring devices.

Wall Riparian Buffer Mitigation Site  
 RFP # 16-003571 Contract # 003985  
 Randolph County, North Carolina

Aerial Imagery USGS Topographical Map  
 COORDINATE SYSTEM: NAD 1983 NC FEET





North Carolina Department of Environment and Natural Resources

Division of Water Quality

Beverly Eaves Perdue  
Governor

Coleen H. Sullins  
Director

Dee Freeman  
Secretary

November 10, 2011

Kristie Corson  
NC Ecosystem Enhancement Program  
1652 Mail Service Center  
Raleigh, NC 27699-1652

Re: Wall Buffer Mitigation Site  
Randolph County

Dear Ms. Corson:

The Division of Water Quality (DWQ) Winston-Salem Regional Office has reviewed the additional information submitted by Restoration Systems submitted to EEP on October 11, 2011 (attached). This information accurately summarizes all discussions conducted during a site visit to the Wall Buffer Mitigation Site as well as all follow up correspondence.

The Division concurs that that the proposed buffer planting areas as depicted in the attached October 11, 2011 email and attached maps should qualify for buffer restoration credits in the Randleman Lake watershed provided that the plantings are shown to meet the buffer mitigation success criteria established in 15A NCAC 02B .0252. Please note that a small portion of buffers as shown in the attached map are dependent upon the relocation of the NCDOT maintained Wall Road. If this road is not relocated prior to buffer planting then the area within the existing NCDOT Right-of-Way will not be eligible for buffer restoration credit.

If you have any questions related to our comments or this mitigation project, please feel free to contact me at 336-771-4964 or [sue.homewood@ncdenr.gov](mailto:sue.homewood@ncdenr.gov).

Sincerely,

Sue Homewood  
DWQ Winston-Salem Regional Office

Cc: DWQ-WSRO

---

**From:** Travis Hamrick [mailto:travis@restorationsystems.com]  
**Sent:** Tuesday, October 11, 2011 2:05 PM  
**To:** Corson, Kristie  
**Cc:** Baumgartner, Tim  
**Subject:** RE: Wall Buffer Site

Kristie-

Attached are two figures that address the comments made during our field visit on 8/31/2011 of the Wall Buffer Site in Randolph County. The figure entitled "Wall Updated Credit Count" adjusts the total buffer credit amount and easement area downward to reflect the issue with the two linear drainage features feeding the small farm pond from the south. The buffer credit amount is now 10.4 Buffer Mitigation Units (previously 11.3) and the total easement area is 12.5 acres (down from 13.5).

The second figure entitled "Wall Tree Count" depicts the tree survey which was completed by Axiom Environmental along the right bank of the stream identified at "UT2" in the technical proposal. This survey resulted in a total of 56 trees with a DBH of 5" or greater within a 0.617 acre section within the proposed easement area. This equates to an average density of 91 trees per acre which is below the DWQ threshold.

If you have any questions please feel free to contact me at your convenience.

Travis

Travis L Hamrick | Project Manager | Restoration Systems  
1101 Haynes St. Suite 211 | Raleigh, NC 27604  
tel: 919.334.9112 | cell: 919.819.0014 | fax: 919.755.9492  
email: [travis@restorationsystems.com](mailto:travis@restorationsystems.com)

---

**From:** Corson, Kristie [mailto:kristie.corson@ncdenr.gov]  
**Sent:** Friday, September 09, 2011 10:29 AM  
**To:** Travis Hamrick  
**Cc:** Baumgartner, Tim; Pearce, Guy; Homewood, Sue  
**Subject:** Wall Buffer Site

Hey Travis,

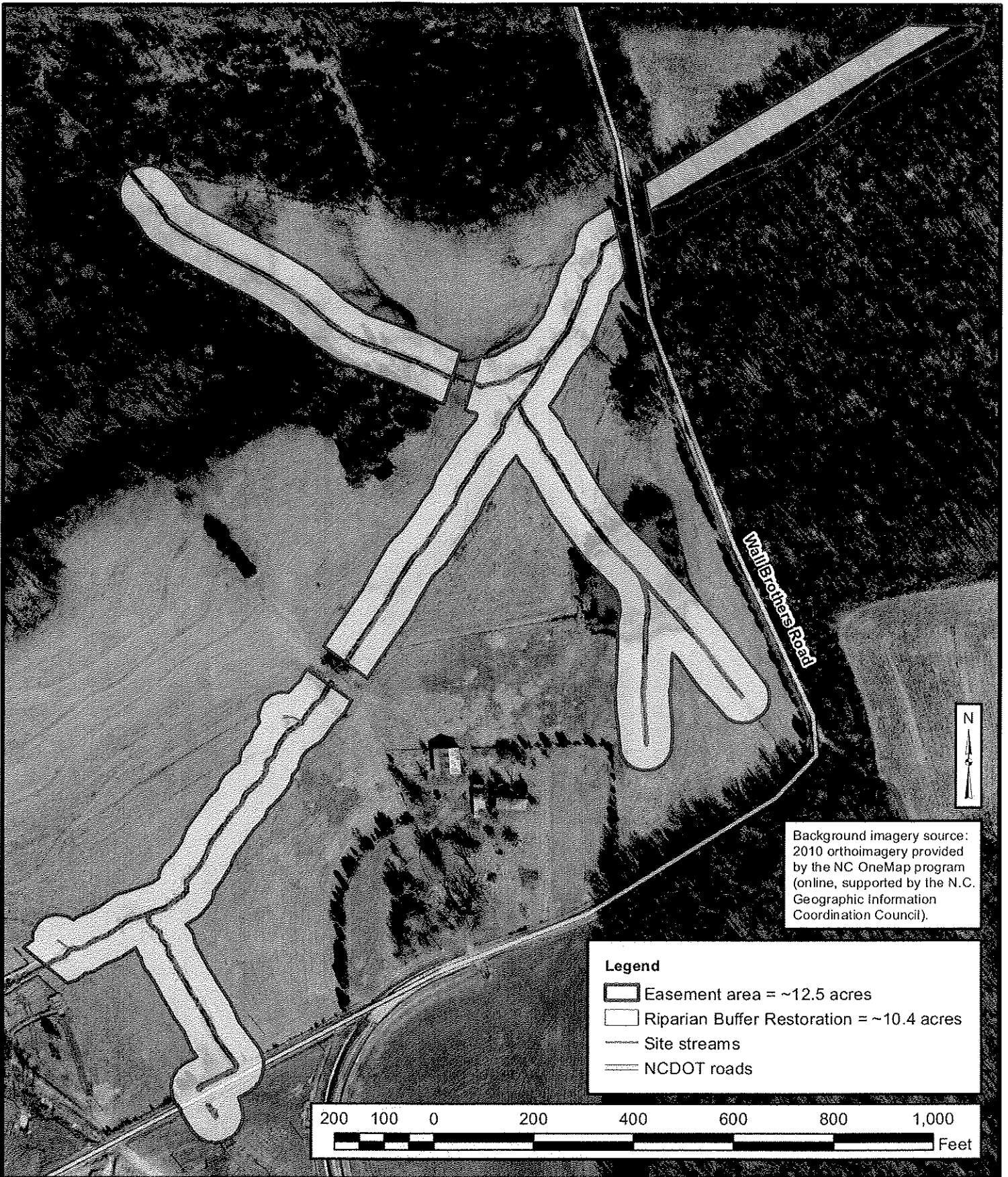
This email serves as a reminder to submit to EEP a map(s) depicting the jurisdictional stream calls made by Sue Homewood (DWQ) during the onsite meeting held on 8/31/11. Sue also requested stem counts be provided and shown on the map to determine the restoration/enhancement credits.

Please submit this information by email attachment to me, cc: Tim Baumgartner. Tim and I will review the information and forward it to Sue Homewood for her approval. Sue will provide written approval of the documented information. The map(s) and supporting information and written approval from DWQ must be included in the Mitigation Plan.



If you have any questions, please contact me.

Thanks,

**Kristie Corson**  
Project Manager  
(919) 715-1954 office



Prepared for:

Project:

**WALL  
RIPARIAN BUFFER  
MITIGATION SITE**

Randolph County, NC

Title:

**UPDATED  
RIPARIAN  
BUFFER**

Drawn by: SGD

Date: SEP 2010

Scale: 1:3000

Project No.: 09-002.15

**FIGURE  
1**



PAT MCCRORY

*Governor*

DONALD R. VAN DER VAART

*Secretary*

S. JAY ZIMMERMAN

*Director*

February 3, 2016

Division of Mitigation Services  
ATTN: Lindsay Crocker  
217 West Jones St  
Raleigh, NC 27603

Subject Property: Wall Buffer Mitigation Site, Randolph County

On-Site Determination for Applicability to the Randleman Buffer Rules (15A NCAC 2B .0252)

Dear Ms. Crocker:

On January 26, 2016, at your request and in your attendance, I conducted an on-site evaluation of a channel through a drained pond feature. The attached map shows the approximate location of the feature on the referenced property. The pond had been previously drained and you requested an evaluation to determine if a stream which would be subject to the Randleman Buffer Rules was present within the drained pond area.

During the site visit it was determined that there were was an intermittent stream present within the drained pond area. Please note that buffer mitigation credit along this feature is subject to meeting success criteria for a buffer restoration site.

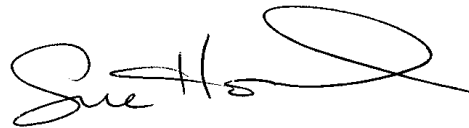
The owner (or future owners) should notify the DWR (and other relevant agencies) of this decision in any future correspondences concerning this property. This on-site determination shall expire five (5) years from the date of this letter.

Scott Mitchell  
January 6, 2016

Landowners or affected parties that dispute a determination made by the DWR or Delegated Local Authority that a surface water exists and that it is subject to the buffer rule may request a determination by the Director. A request for a determination by the Director shall be referred to the Director in writing c/o Cyndi Karoly, DWR, 401 Oversight/Express Review Permitting Unit, 2321 Crabtree Blvd., Suite 250, Raleigh, NC 27604-2260. Individuals that dispute a determination by the DWR or Delegated Local Authority that "exempts" surface water from the buffer rule may ask for an adjudicatory hearing. You must act within 60 days of the date that you receive this letter. Applicants are hereby notified that the 60-day statutory appeal time does not start until the affected party (including downstream and adjacent landowners) is notified of this decision. DWR recommends that the applicant conduct this notification in order to be certain that third party appeals are made in a timely manner. To ask for a hearing, send a written petition, which conforms to Chapter 150B of the North Carolina General Statutes to the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, N.C. 27699-6714. This determination is final and binding unless you ask for a hearing within 60 days.

This letter only addresses the applicability to the mitigation rules and the buffer rules and does not approve any activity within Waters of the United States or Waters of the State or their associated buffers. If you have any additional questions or require additional information please contact me at 336-776-9693 or sue.homewood@ncdenr.gov

Sincerely,

A handwritten signature in black ink, appearing to read "Sue Homewood". The signature is fluid and cursive, with a large loop at the end.

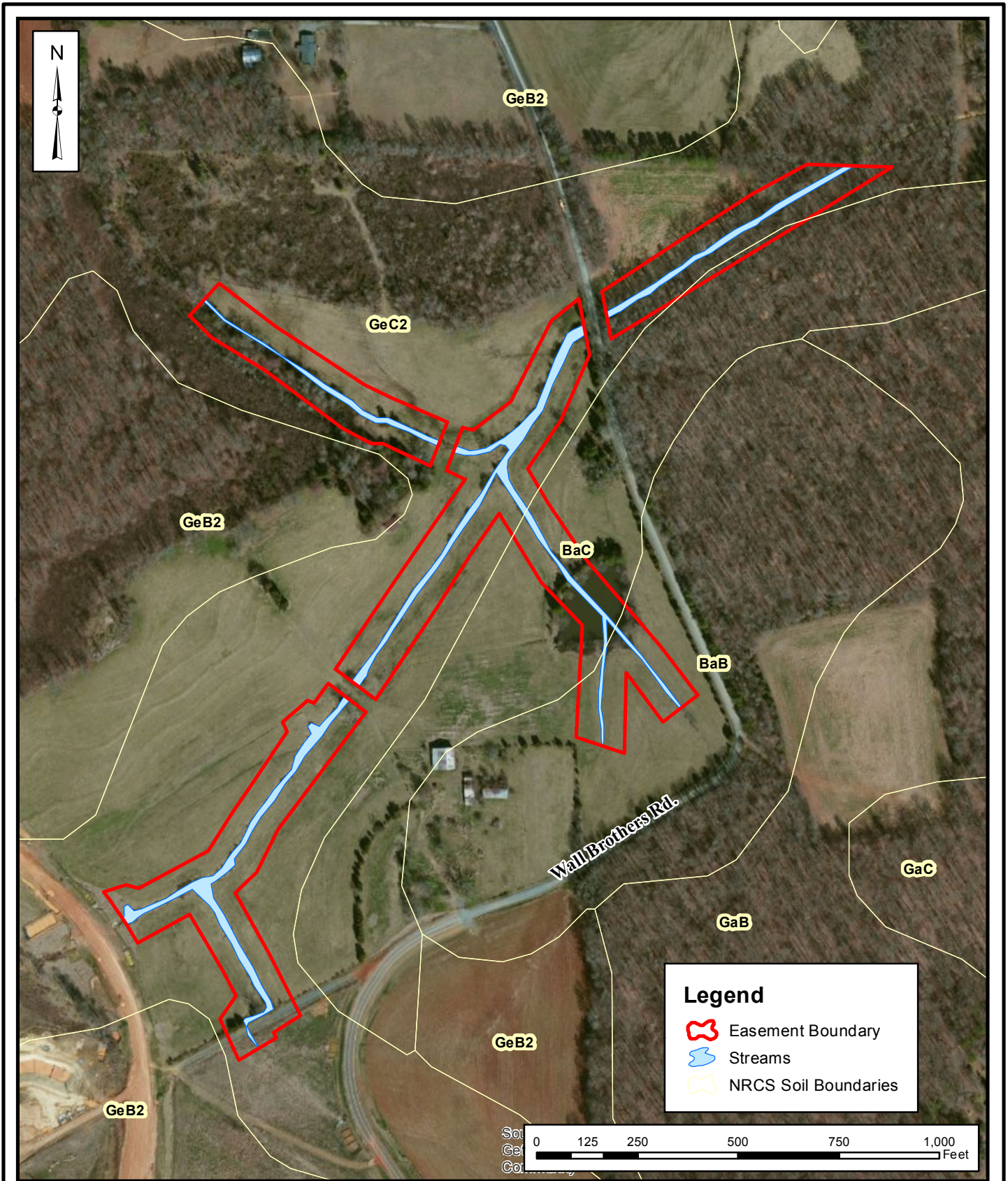
Sue Homewood  
DWR Winston-Salem Regional Office

Enclosures: Drained Pond Identification Map

Cc: Katie Merritt, DWR 401 & Buffer Permitting Unit.

## **APPENDIX D: ADDITIONAL DATA**

Figure 3. Soils Map  
Preconstruction Photographs



Axiom Environmental  
218 Snow Ave  
Raleigh, NC 27603

**SOIL MAP**  
**WALL RIPARIAN BUFFER RESTORATION SITE**  
Randolph County, North Carolina

Dwn. by:  
WGL/KRJ  
Date:  
Oct 2016  
Project:  
10-001

FIGURE  
**3**

**Preconstruction Photographs  
Extracted from Mitigation Plan  
(dated February 2012)**

