

ANNUAL MONITORING REPORT
YEAR 5 (2014)
FOX RUN RIPARIAN BUFFER MITIGATION SITE
PITT COUNTY, NORTH CAROLINA
EEP Project #94016 (Contract No. 002281)
DWR Project #10-0690



Prepared for:

**NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
ECOSYSTEM ENHANCEMENT PROGRAM
RALEIGH, NORTH CAROLINA**



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November 2014

EXECUTIVE SUMMARY

Restoration Systems, LLC has completed riparian buffer restoration at the Fox Run Riparian Buffer Mitigation Site (hereafter referred to as the “Site”) through the North Carolina Ecosystem Enhancement Program (NCEEP) Full Delivery Process (RFP 16-001383) to provide 43.61 Riparian Buffer Mitigation Units. The Site is located approximately 2.5 miles southeast of Farmville in western Pitt County. The Site is located in United States Geological Survey Hydrologic Unit and Targeted Local Watershed 03020203070030 (North Carolina Division of Water Quality Subbasin 03-04-07) of the Neuse River Basin. Site streams drain to Little Contentnea Creek (Stream Index 27-86-26), which is included on the draft 2008 and 2010 303(d) lists for impaired biological integrity and low dissolved oxygen resulting from agricultural crop production.

Prior to construction, the Site was characterized by ditched agricultural land used for row crop production, which included an unnamed tributary to Little Contentnea Creek and several lateral drainage ditches. The unnamed tributary was determined to be at least intermittent by NCDWQ representative Chris Pullinger (Appendix D). Land use practices including the maintenance and removal of vegetation, regular plowing, and use of agricultural chemicals had resulted in degraded water quality.

The goals and objectives of this project focused on improving local water quality, enhancing flood attenuation, and restoring aquatic and riparian habitat. These goals were accomplished by the following.

1. Removing nonpoint sources of pollution associated with agriculture by a) ceasing the application of agricultural herbicides, pesticides, fertilizers, and other agricultural materials into and adjacent to Site surface waters and b) providing a vegetated buffer adjacent to surface waters to treat surface runoff that may be laden with sediment and/or agricultural pollutants.
2. Reducing sedimentation/siltation within on-Site and downstream receiving waters by a) increasing retention time for surface waters entering and leaving the Site, b) reducing erosion associated with vegetation maintenance and agricultural plowing adjacent to Site surface waters, and c) planting a forested vegetated buffer adjacent to Site surface waters.
3. Promoting floodwater attenuation by ripping compacted soils and revegetating the Site to increase frictional resistance on floodwaters crossing the Site.
4. Providing terrestrial wildlife habitat including a forested riparian corridor within an area that was previously cleared and highly dissected by agricultural land use.

This project was constructed in late winter/early spring 2010. Planting of the entire 46.48-acre Site resulted in 43.61 Riparian Buffer Mitigation Units. As a whole, densities of vegetation plots across the Site were above the required 320 stems per acre with an average of 505 planted hardwood trees per acre based on riparian buffer success criteria in the Fifth Monitoring Year (2014). Each individual plot met success criteria based on planted hardwood trees counting towards riparian buffer success alone with the exception of Plots, 12, 16, and 20. Plots 12 and 16 were one stem shy when considering planted hardwood trees counting towards riparian buffer success alone; however, when taking into account naturally recruited hardwood trees such as red maple (*Acer rubrum*) and tulip poplar (*Liriodendron tulipifera*) Plots 12 and 16 were above success criteria. In addition, when considering all planted stems Plots 12 and 16 were above success criteria. Plot 20 is dry with poor soil fertility, which has contributed to poor stem survival. This issue is isolated to the area immediately surrounding Plot 20. It has been monitored closely and appears to be improving; however to ensure success, Restoration Systems will plant several 5-gallon containerized trees with added nutrients in this area during winter 2014/2015. Planted stems throughout the remainder of the Site are vigorous.

In coordination with NCEEP, Restoration Systems altered the Conservation Easement easement access location to match existing farm activities; Figure 2 (Appendix B) has been updated accordingly. Replanting occurred in the previous/original access easement (denoted in green on Figure 2, Appendix B) when the easement was updated during the winter of 2013/2014 with 3-gallon containerized stems as follows.

35 river birch (*Betula nigra*)
30 swamp black gum (*Nyssa sylvatica* var. *biflora*)
15 swamp chestnut oak (*Quercus michauxii*)
51 willow oak (*Quercus phellos*)
10 American elm (*Ulmus americana*)
20 northern red oak (*Quercus rubra*)
50 American hazelnut (*Corylus americana*)
211 TOTAL

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1.0 INTRODUCTION

1.1 Location and Setting

Restoration Systems, LLC has completed riparian buffer restoration at the Fox Run Riparian Buffer Mitigation Site (hereafter referred to as the “Site”) through the North Carolina Ecosystem Enhancement Program (NCEEP) Full Delivery Process (RFP 16-001383) to provide 43.61 Riparian Buffer Mitigation Units. The Site is located approximately 2.5 miles southeast of Farmville in western Pitt County (Figure 1, Appendix A). The Site is located in United States Geological Survey Hydrologic Unit and Targeted Local Watershed 03020203070030 (North Carolina Division of Water Quality Subbasin 03-04-07) of the Neuse River Basin (USGS 1974).

Directions to the Site from Farmville, North Carolina:

- Take Maye-Turnage Road east
- After passing Chinquapin Road the Site is ~ 2 miles ahead on left
- Site coordinates:
 - Latitude 35.5702°N, Longitude 77.54272°W (NAD83/WGS84)

1.2 Project Goals and Objectives

The goals and objectives of this project focused on improving local water quality, enhancing flood attenuation, and restoring aquatic and riparian habitat. These goals were accomplished by the following.

1. Removing nonpoint sources of pollution associated with agriculture by a) ceasing the application of agricultural herbicides, pesticides, fertilizers, and other agricultural materials into and adjacent to Site surface waters and b) providing a vegetated buffer adjacent to surface waters to treat surface runoff that may be laden with sediment and/or agricultural pollutants.
2. Reducing sedimentation/siltation within on-Site and downstream receiving waters by a) increasing retention time for surface waters entering and leaving the Site, b) reducing erosion associated with vegetation maintenance and agricultural plowing adjacent to Site surface waters, and c) planting a forested vegetated buffer adjacent to Site surface waters.
3. Promoting floodwater attenuation by ripping compacted soils and revegetating the Site to increase frictional resistance on floodwaters crossing the Site.
4. Providing terrestrial wildlife habitat including a forested riparian corridor within an area that was previously cleared and highly dissected by agricultural land use.

1.3 Project Structure, Restoration Type, and Approach

Prior to construction, the Site was characterized by ditched agricultural land used for row crop production, which included an unnamed tributary to Little Contentnea Creek and several lateral drainage ditches. The unnamed tributary was determined to be at least intermittent by NCDWQ representative Chris Pullinger (Appendix D). Land use practices including the maintenance and removal of vegetation, regular plowing, and use of agricultural chemicals had resulted in degraded water quality.

As constructed, Site activities restored historic riparian buffer functions by planting the entire 46.48-acre Site with native riparian vegetation. This resulted in 43.61 Riparian Buffer Mitigation Units (Table 1, Appendix B and Figure 2, Appendix A). Approximately 2.03 acres of the Site is surface water and 0.70 acre of the Site occurs outside of the 200-foot buffer area or within areas of nondiffuse flow. During monitoring year 5 (2014), in coordination with NCEEP, Restoration Systems altered the Conservation Easement easement access location to match existing farm activities, resulting in 0.03 acres of additional creditable area. Additionally, the landowner and Restoration systems came to an agreement that he may

continue the use of an 8-foot wide road along the ditch on the west side of the easement area (Figure 2, Appendix A). This area (0.14 acre) was deducted from the creditable area (Table 1, Appendix B). The target natural community consisted of Coastal Plain Bottomland Hardwood Forest (Schafale and Weakley 1990). Completed project activities, reporting history, completion dates, project contacts, and background information are summarized in Tables 2-4 (Appendix B). Table 5 (Appendix C) outlines woody species planted within the Site.

2.0 MONITORING PLAN

Monitoring of Site restoration efforts will be performed for vegetation components of the Site for five years or until success criteria are fulfilled. After planting was completed, an initial evaluation was performed to verify planting methods were successful and to determine initial species composition and density. Twenty-five sample vegetation plots (10-meter by 10-meter) were installed within the Site as per guidelines established in *CVS-EEP Protocol for Recording Vegetation, Version 4.0* (Lee et al. 2006). In each sample plot, vegetation parameters to be monitored include species composition and species density. Visual observations of the percent cover of shrub and herbaceous species will also be documented by photograph.

2.1 Vegetation Success Criteria

An average density of 320 hardwood stems per acre must be surviving after five monitoring years in accordance with North Carolina Division of Water Quality Administrative Code 15A NCAC 02B.0242 (*Neuse River Basin, Mitigation Program for Protection and Maintenance of Existing Riparian Buffers*) (NCDWQ 2007).

2.2 Maintenance and Contingency

In the event that success criteria are not fulfilled, a mechanism for contingency will be implemented. 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 will be performed as needed until achievement of vegetation success criteria.

2.3 Vegetation Sampling Results and Comparison to Success Criteria

Quantitative sampling of vegetation was conducted in October 2014. Results are provided in Appendix C. Vegetation success criteria for year 5 (320 hardwood stems per acre) were exceeded for the 2014 annual monitoring year with an average density of 505 planted hardwood trees per acre based on riparian buffer success criteria across the Site.

3.0 CONCLUSIONS

The following table summarizes planted stem data collected throughout the monitoring period.

Summary of Planted Hardwood Stem Vegetation Plot Results (based on Riparian Buffer Success)

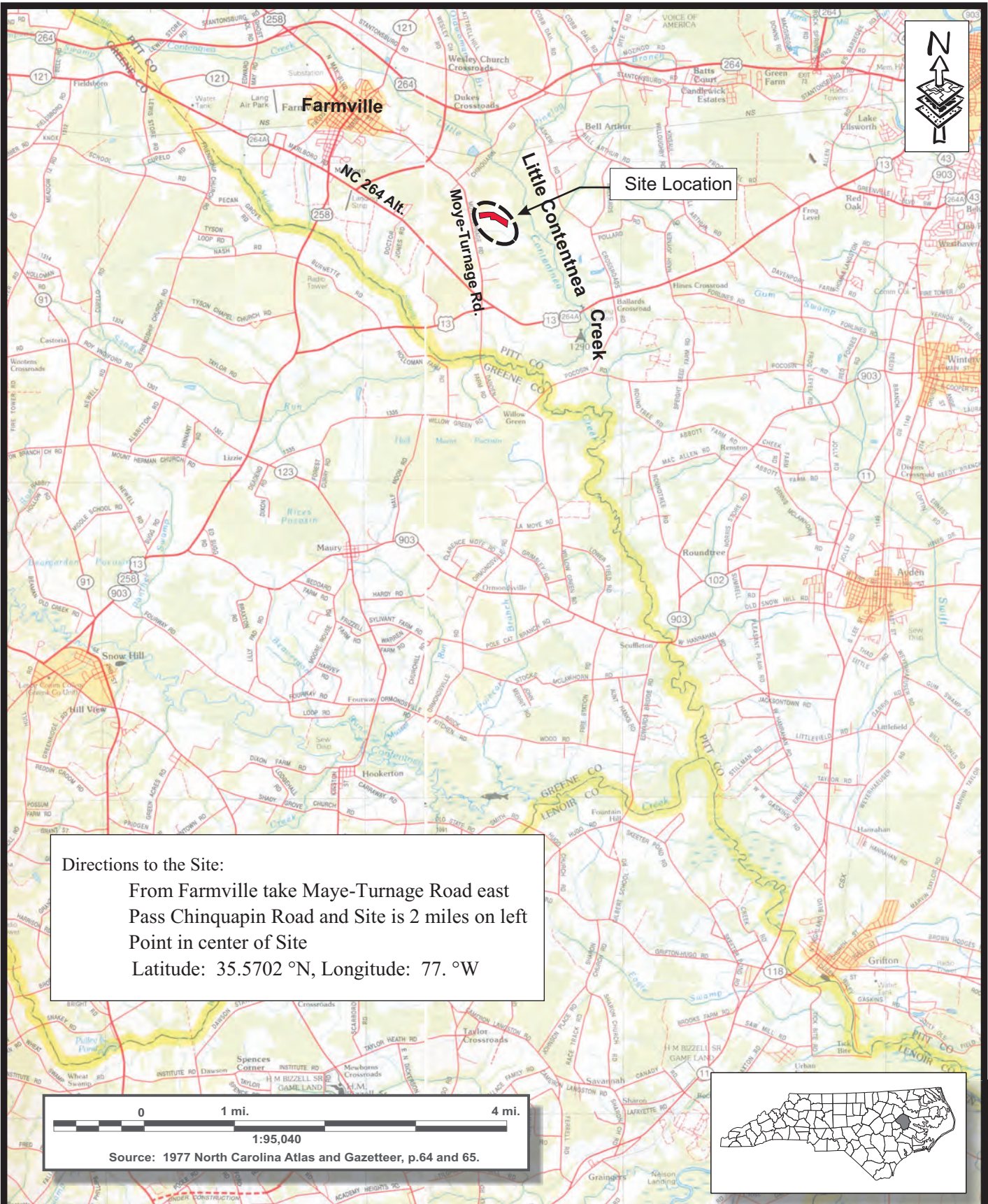
Plot	Planted Stems/Acre				
	Year 1 (2010)	Year 2 (2011)	Year 3 (2012)	Year 4 (2013)	Year 5 (2014)
1	688	688	607	364	364
2	769	729	729	607	607
3	809	729	688	526	486
4	688	810	769	607	607
5	850	810	810	688	607
6	607	729	729	324	324
7	931	850	931	688	607
8	688	810	769	486	526
9	728	769	729	526	486
10	769	607	567	526	486
11	971	931	931	850	850
12	688	648	607	445	283
13	769	810	769	688	648
14	769	769	729	688	648
15	728	769	769	648	648
16	688	810	729	324	283
17	567	607	607	324	324
18	567	607	607	445	445
19	688	769	729	445	445
20	607	648	648	162	161
21	1133	1053	1053	769	729
22	728	729	729	567	486
23	809	769	769	526	526
24	728	648	648	445	445
25	931	931	972	729	648
Average Plots 1-25	756	761	745	536	505

4.0 REFERENCES

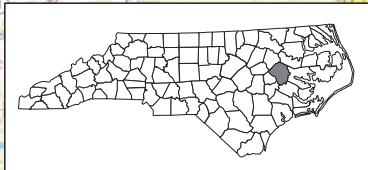
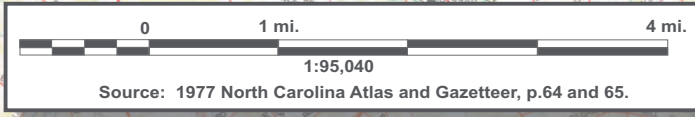
- Lee, M.T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2006. CVS-EEP Protocol for Recording Vegetation. Version 4.0. North Carolina Department of Environment and Natural Resources, Ecosystem Enhancement Program. Raleigh, North Carolina.
- North Carolina Division of Water Quality (NCDWQ). 2007. Redbook, Surface Waters and Wetlands Standards. North Carolina Department of Environment and Natural Resources, Division of Water Quality. Raleigh, North Carolina.
- North Carolina Division of Water Quality (NCDWQ). 2008a. Draft North Carolina Water Quality Assessment and Impaired Waters List (2008 Integrated 305(b) and 303(d) Report) (online). Available: <http://h2o.enr.state.nc.us/tmdl/documents/B.Draft2008303dList.pdf> [November 10, 2008]. North Carolina Department of Environment and Natural Resources, Raleigh, North Carolina.
- North Carolina Division of Water Quality (NCDWQ). 2008b. Draft Basinwide Planning Program: Neuse River Basinwide Water Quality Plan-June 2008. North Carolina Department of Environment and Natural Resources, Division of Water Quality. Raleigh, North Carolina.
- North Carolina Division of Water Quality (NCDWQ). 2010. Draft North Carolina Water Quality Assessment and Impaired Waters List (2010 Integrated 305(b) and 303(d) Report) (online). Available: http://portal.ncdenr.org/c/document_library/get_file?uuid=33a71505-6cdf-4497-b090-aadf79b1f02c&groupId=38364 [August 23, 2010]. North Carolina Department of Environment and Natural Resources, 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 Environment, Health, and Natural Resources. Raleigh, North Carolina.
- United States Geological Survey (USGS). 1974. Hydrologic Unit Map - 1974. State of North Carolina.

**Appendix A.
Figures**

Figure 1. Site Location
Figure 2. Monitoring Plan View



Directions to the Site:
 From Farmville take Moyer-Turnage Road east
 Pass Chinquapin Road and Site is 2 miles on left
 Point in center of Site
 Latitude: 35.5702 °N, Longitude: 77. °W



2126 Rowland Pond Drive
 Willow Spring, NC 27592
 (919) 215-1693
 (919) 341-3839 fax

SITE LOCATION
FOX RUN BUFFER RESTORATION SITE
 Pitt County, North Carolina

Dwn. by:	WGL
Kcd by:	WGL
Date:	Nov 2008
Project:	05-002.49

FIGURE
1

Legend

- Vegetation Plots
- Vegetation Plot Origin
- Conservation Easement = 46.48 ac
- Previous Access Easement Planted in 2013/2014
- Surface Water Within Easement = 2.03 ac
- Nondiffuse Flow = 0.26 ac
- Planted No Credit Areas = 0.44 ac
- 8-foot Encroachment Path = 0.14 ac (6011.06 sq. ft)

BUFFER CREDIT AREA =
43.61 acres

Note: The buffer credit area excludes planted no credit areas, surface water area within the easement, as well as an 8 foot wide road along the ditch on the west side of the easement area.



Prepared for:



Project:

**FOX RUN
RIPARIAN
BUFFER
MITIGATION
SITE**

Pitt County, NC

Title:

**MONITORING
PLAN VIEW**

Drawn by:

CLF

Date:

OCT 2014

Scale:

1:5700

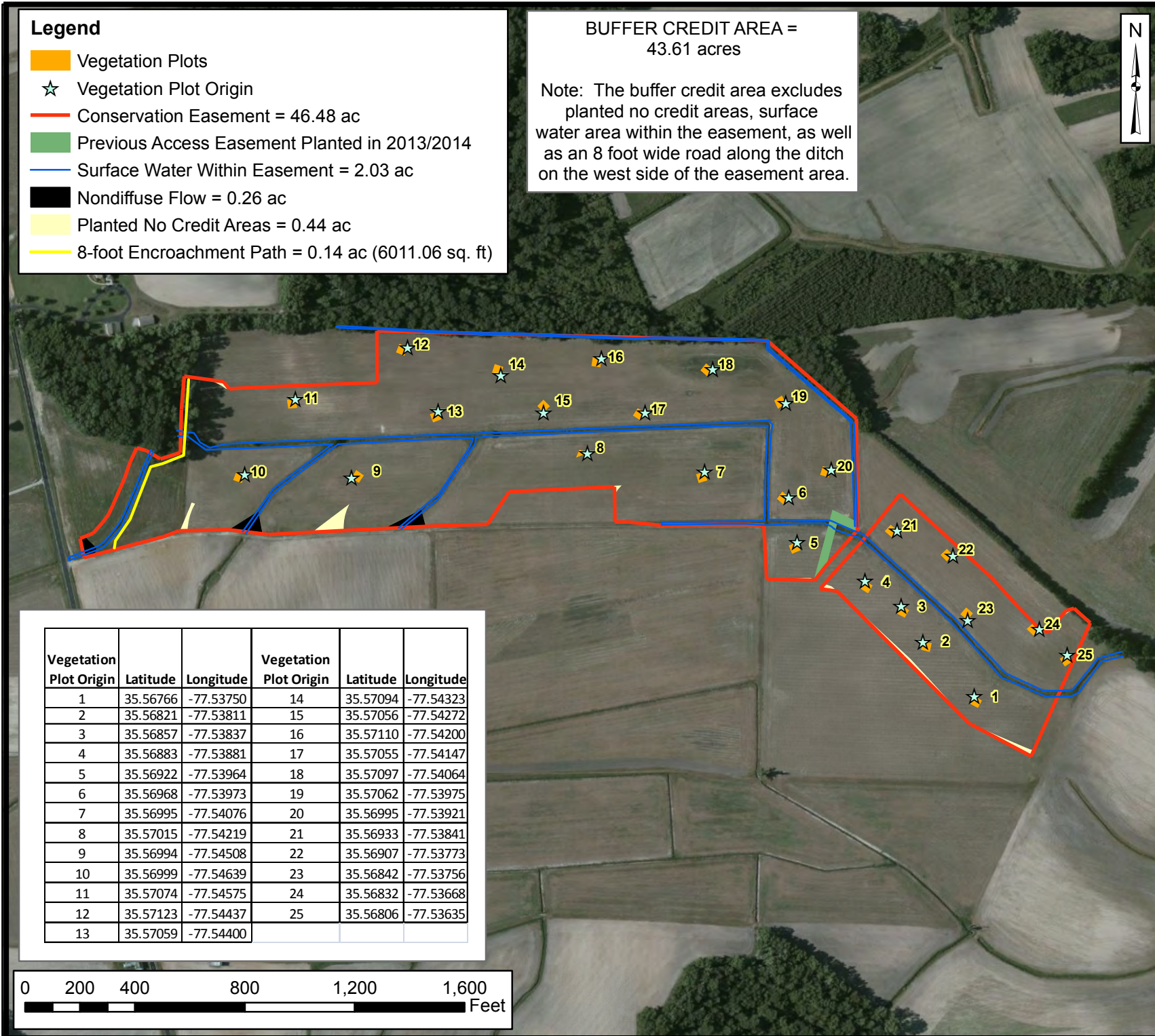
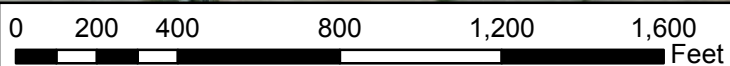
Project No.:

10-001

FIGURE

2

Vegetation Plot Origin	Latitude	Longitude	Vegetation Plot Origin	Latitude	Longitude
1	35.56766	-77.53750	14	35.57094	-77.54323
2	35.56821	-77.53811	15	35.57056	-77.54272
3	35.56857	-77.53837	16	35.57110	-77.54200
4	35.56883	-77.53881	17	35.57055	-77.54147
5	35.56922	-77.53964	18	35.57097	-77.54064
6	35.56968	-77.53973	19	35.57062	-77.53975
7	35.56995	-77.54076	20	35.56995	-77.53921
8	35.57015	-77.54219	21	35.56933	-77.53841
9	35.56994	-77.54508	22	35.56907	-77.53773
10	35.56999	-77.54639	23	35.56842	-77.53756
11	35.57074	-77.54575	24	35.56832	-77.53668
12	35.57123	-77.54437	25	35.56806	-77.53635
13	35.57059	-77.54400			



**Appendix B.
General Tables**

Table 1. Site Restoration Structures and Objectives

Table 2. Project Activity and Reporting History

Table 3. Project Contacts Table

Table 4. Project Attributes Table

Table 1. Site Restoration Structures and Objectives

Component Summation	
Restoration Level	Riparian buffer mitigation was completed by planting the entire 46.48-acre Site with native forest vegetation; credit was received for 43.61 acres of the Site. In 2014, the landowner and Restoration Systems came to an agreement that he may continue the use of an 8 foot wide road along the ditch on the west side of the easement area, resulting in a deduction of 0.14 acres of creditable area.
Riparian Buffer Restoration	
43.75-0.14= 43.61 Buffer Mitigation Units	

Table 2. Project Activity and Reporting History

Activity or Report	Data Collection Complete	Completion or Delivery
Final Restoration Plan	--	November 2010
Site Planting	--	Late winter/early spring 2010
Asbuilt Mitigation Plan	April 2010	November 2010
Year 1 Monitoring	September 2010	November 2010
Year 2 Monitoring	June 2011	June 2011
Year 3 Monitoring	June 2012	July 2012
Year 4 Monitoring	October 2013	November 2013
Year 5 Monitoring	October 2014	October 2014

Table 3. Project Contacts Table

Designer	Restoration Systems, LLC 1101 Haynes Street, Suite 211 Raleigh, North Carolina 27604 (919) 755-9490
Planting Contractor	Carolina Silvics 908 Indian Trail Road Edenton, North Carolina 27932 Dwight McKinney (252) 482-8491
Monitoring Performer	Axiom Environmental, Inc. 218 Snow Avenue Raleigh, North Carolina 27603 Grant Lewis (919) 215-1693

Table 4. Project Attribute Table

Project County	Pitt County, North Carolina
Physiographic Region	Coastal Plain
Ecoregion	Southeastern Plains
Project River Basin	Neuse
USGS 14-digit HUC	03020203070030
NCDWQ Subbasin	03-04-07
Within EEP Watershed Plan Extent?	Yes-Targeted Local Watershed
WRC Class	Warm
% of project easement fenced	0 %
Beaver activity observed during design phase	No

**Appendix C.
Vegetation Data**

**Table 5. Planted Woody Species
Vegetation Survey Data Tables
Vegetation Monitoring Plot Photographs**

Table 5. Planted Woody Vegetation

Species	Quantity
American elm (<i>Ulmus americana</i>)	7500
Black gum (<i>Nyssa sylvatica</i>)	2500
Elderberry (<i>Sambucus canadensis</i>)	2500
Loblolly pine (<i>Pinus taeda</i>)	7500
Northern red oak (<i>Quercus rubra</i>)	5000
River birch (<i>Betula nigra</i>)	2500
Sugarberry (<i>Celtis laevigata</i>)	2500
Swamp chestnut oak (<i>Quercus michauxii</i>)	7500
Sycamore (<i>Platanus occidentalis</i>)	3200
Willow oak (<i>Quercus phellos</i>)	7500
TOTAL	50,000

CVS Database Output

Living planted stems, excluding live stakes, per acre: Negative (red) numbers indicate the project failed to reach requirements in a particular year.

Project Code	Project Name	River Basin	Year 5
Fox Run	Fox Run	Neuse	623

Total stems, including planted stems of all kinds (including live stakes) and natural/volunteer stems:

Project Code	Project Name	River Basin	Year 5
Fox Run	Fox Run		2070

Vigor

vigor	Count	Percent
0	45	9.4
1	6	1.3
2	33	6.9
3	131	27.4
4	237	49.6
Missing	26	5.4

Damage

Damage	Count	Percent Of Stems
(no damage)	357	82.6
Deer	61	14.1
Unknown	6	1.4
Other/Unknown Animal	4	0.9
Insects	2	0.5
(other damage)	2	0.5

Vigor by Species

	Species	CommonName	4	3	2	1	0	Missing
	Betula nigra	river birch	12	4				
	Celtis laevigata	sugarberry	2	10				2
	Nyssa biflora	swamp tupelo		2				
	Nyssa sylvatica	blackgum	6	19	2			2
	Pinus taeda	loblolly pine	67	3				
	Quercus michauxii	swamp chestnut oak	39	29				2
	Quercus nigra	water oak						1
	Quercus phellos	willow oak	33	45	1			6
	Sambucus canadensis	Common Elderberry	2	2			1	2
	Quercus	oak	2					
	Quercus rubra	northern red oak	3	11	9	1	7	20
	Nyssa	tupelo		1				
	Platanus occidentalis	American sycamore	41	1	1			
	Ulmus americana	American elm	8	29	1			2
TOT:	14	14	215	156	14	1	8	37

Damage by Species

Species	CommonName	Count of Damage Categories	(no damage)	Deer	Insects	Other/Unknown Animal	Unknown	(other damage)
Betula nigra	river birch	2	14	1		1		
Celtis laevigata	sugarberry	6	8	6				
Nyssa	tupelo	0	1					
Nyssa biflora	swamp tupelo	2		2				
Nyssa sylvatica	blackgum	2	27	2				
Pinus taeda	loblolly pine	1	70					1
Platanus occidentalis	American sycamore	1	42					1
Quercus	oak	0	2					
Quercus michauxii	swamp chestnut oak	16	54	14		1	1	
Quercus nigra	water oak	0	1					
Quercus phellos	willow oak	19	66	17	1		1	
Quercus rubra	northern red oak	8	43	2	1	1	4	
Sambucus canadensis	Common Elderberry	0	7					
Ulmus americana	American elm	18	22	17		1		
14	14	75	357	61	2	4	6	2

Damage by Plot

plot	Count of Damage Categories	(no damage)	Deer	Insects	Other/Unknown Animal	Unknown	(other damage)	Count of Damage Categories
1	0	13						0
2	1	19		1				1
3	0	19						0
4	0	19						0
5	1	19	1					1
6	3	11			3			3
7	9	12	9					9
8	2	12	2					2
9	8	9	8					8
10	3	13	3					3
11	10	14	10					10
12	5	9	3			1	1	5
13	6	12	6					6
14	5	13	5					5
15	3	16	3					3
16	3	13	2	1				3
17	3	12	3					3
18	5	10	4				1	5
19	3	15				3		3
20	2	5			1	1		2
21	2	22	1			1		2
22	0	16						0
23	0	19						0
24	1	13	1					1
25	0	22						0
25	75	357	61	2	4	6	2	75

Plot Information

Plot	Plot Level	Year	Planted Living Stems*	Planted Living Stems* EXCLUDING Live Stakes	Dead/Missing Stems	Natural (Volunteer) Stems	Total Living Stems	Total Living Stems EXCLUDING Live Stakes	Planted Living Stems* per ACRE	Planted Living Stems* EXCLUDING Live Stakes PER ACRE	Natural (Volunteer) Stems PER ACRE	Total Living Stems PER ACRE	Total Living Stems EXCLUDING Live Stakes PER ACRE	# species
1	2	5	11	11	2	14	25	25	445	445	567	1012	1012	6
2	2	5	19	18	1	10	29	28	769	728	405	1174	1133	5
3	2	5	16	16	3	8	24	24	647	647	324	971	971	5
4	2	5	19	19	0	8	27	27	769	769	324	1093	1093	6
5	2	5	17	17	3	7	24	24	688	688	283	971	971	5
6	2	5	11	11	3	2	13	13	445	445	81	526	526	5
7	2	5	19	19	2	27	46	46	769	769	1093	1862	1862	4
8	2	5	14	14	0	49	63	63	567	567	1983	2550	2550	5
9	2	5	15	15	2	26	41	41	607	607	1052	1659	1659	5
10	2	5	14	14	2	34	48	48	567	567	1376	1942	1942	8
11	2	5	24	24	0	37	61	61	971	971	1497	2469	2469	6
12	2	5	8	8	5	142	150	150	324	324	5747	6070	6070	4
13	2	5	16	16	2	45	61	61	647	647	1821	2469	2469	4
14	2	5	17	17	1	62	79	79	688	688	2509	3197	3197	6
15	2	5	19	19	0	75	94	94	769	769	3035	3804	3804	5
16	2	5	11	11	5	80	91	91	445	445	3237	3683	3683	5
17	2	5	13	13	2	60	73	73	526	526	2428	2954	2954	4
18	2	5	15	15	0	27	42	42	607	607	1093	1700	1700	4
19	2	5	15	15	3	72	87	87	607	607	2914	3521	3521	4
20	2	5	4	4	3	0	4	4	162	162	0	162	162	3
21	2	5	23	23	1	9	32	32	931	931	364	1295	1295	7
22	2	5	13	13	3	9	22	22	526	526	364	890	890	4
23	2	5	19	19	0	8	27	27	769	769	324	1093	1093	8
24	2	5	14	14	0	3	17	17	567	567	121	688	688	6
25	2	5	20	20	2	0	20	20	809	809	0	809	809	6

*Stem count includes planted stems of *Pinus taeda* and *Sambucus canadensis*, which do not count for riparian buffer success.

Fox Run 2014 (Year 5) Total Planted Stems (No Livestakes) by Plot and Species

Type	Species	CommonName	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25		
tree	Betula nigra	river birch	1					3			3	4										4		1					
tree	Celtis laevigata	sugarberry					1						2			1	4					1				2	1		
tree	Nyssa	tupelo	1																										
tree	Nyssa biflora	swamp tupelo							2																				
tree	Nyssa sylvatica	blackgum	1		4	3	2			1		2											3	3	5	1	2		
tree	Pinus taeda	loblolly pine	2	2	4	4	2	3	4	1	3	1	3	1		1	3	4	5	4	4	1	5	1	5	3	4		
tree	Platanus occidentalis	American sycamore			1	1	1				1	1			3	4	9		2	4	4		3	4	2	3			
tree	Quercus	oak										1											1						
tree	Quercus michauxii	swamp chestnut oak	3	3	1	6		3	7	3		2	5		4	3	2	1	3	6			6		1	3	6		
tree	Quercus phellos	willow oak	3	9	6		11	1	6	7	3	2	3	1	6			4		1	5		1	5	3		2		
tree	Quercus rubra	northern red oak				1							2	2		2	1	1	3		2	2			1	2	5		
shrub	Sambucus canadensis	Common Elderberry		2								1														1			
shrub	Ulmus americana	American elm		3		4		1		2	5		9	4	3	6		1											
Totals			Stem count	11	19	16	19	17	11	19	14	15	14	24	8	16	17	19	11	13	15	15	4	23	13	19	14	20	
			Species count	6	5	5	6	5	5	4	5	5	5	8	6	4	4	6	5	5	4	4	4	3	7	4	8	6	6
			Stems per ACRE	445	769	648	769	688	445	769	567	607	567	972	324	648	688	769	445	526	607	607	162	931	526	769	567	810	
Riparian Buffer Success Criteria			Stem count	9	15	12	15	15	8	15	13	12	12	21	7	16	16	16	7	8	11	11	3	18	12	13	11	16	
			Species count	5	3	4	5	4	4	3	4	4	4	6	5	3	4	5	4	4	3	3	3	2	6	3	6	5	5
			Stems per ACRE	364	607	486	607	607	324	607	526	486	486	850	283	648	648	648	648	283	324	445	445	121	729	486	526	445	648

***Bolded** hardwood tree species are counted toward riparian buffer success criteria.

**Fox Run
Year 5 (2014)
Vegetation Monitoring Plot Photos
Taken October 2014**

Plot 1



Plot 2



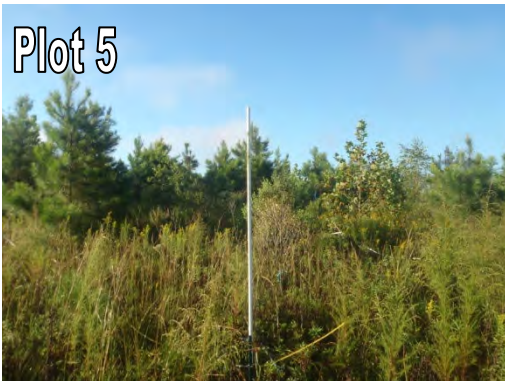
Plot 3



Plot 4



Plot 5



Plot 6



Plot 7



Plot 8



**Fox Run
Year 5 (2014)
Vegetation Monitoring Plot Photos
Taken October 2014
(continued)**



**Fox Run
Year 5 (2014)
Vegetation Monitoring Plot Photos
Taken October 2014
(continued)**



**Fox Run
Year 5 (2014)
Vegetation Monitoring Plot Photos
Taken October 2014
(continued)**



Appendix D. NCDWQ Verification

**NCDWQ On-site Determination for Applicability to the Neuse River Riparian Area Protection Rules
(15A NCAC 2B .0233) Letter
NCDWQ Preliminary Restoration Plan Approval Letter**



North Carolina Department of Environment and Natural Resources
Division of Water Quality

Beverly Eaves Perdue
Governor

Coleen H. Sullins
Director

Dee Freeman
Secretary

November 1, 2010

DWQ Project # 2010-0690 v2
Pitt County

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

Subject Property: Fox Run Riparian Buffer Mitigation Site
UT to Contentnea Creek, Neuse River Basin

**On-Site Determination for Applicability to the Neuse River Riparian Area
Protection Rules (15A NCAC 2B .0233)**

Dear Mr. Creech:

At your request I conducted an on-site determination to review drainage features located on the subject property for applicability to the Neuse Buffer Rules (15A NCAC 2B .0233). The project area is labeled as "2010-0690 v2" on the attached map initialed by me on November 1, 2010. The project is located on the east side of Moye-Turnage Road (SR)Road,

The Division of Water Quality (DWQ) has determined that the surface water circled, highlighted in blue, and labeled as "2010-0690 v2 - Fox Run" on the attached map is at least intermittent and is SUBJECT to the Neuse Buffer Rule. The portion of the surface water highlighted in red and labeled as "2010-0690 v2" on the attached map is ephemeral, and NOT SUBJECT to the Neuse Buffer Rule. These features and their associated buffers should be identified on any future plans for this property. The owner (or future owners) should notify the DWQ (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.

Landowners or affected parties that dispute a determination made by the DWQ 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

North Carolina Division of Water Quality
943 Washington Square Mall
Washington, NC 27889

Internet: www.ncwaterquality.org
Phone: 252-946-6481
FAX 252-946-9215

One
North Carolina
Naturally

Director shall be referred to the Director in writing c/o Cyndi Karoly, DWQ, 401 Oversight/Express Review Permitting Unit, 2321 Crabtree Blvd., Suite 250, Raleigh, NC 27604-2260. Individuals that dispute a determination by the DWQ or Delegated Local Authority that "exempts" a 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. DWQ 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 buffer rules and does not approve any activity within the buffers. Nor does this letter approve any activity within Waters of the United States or Waters of the State. If you have any additional questions or require additional information please call Chris Pullinger at (252) 948-3920.

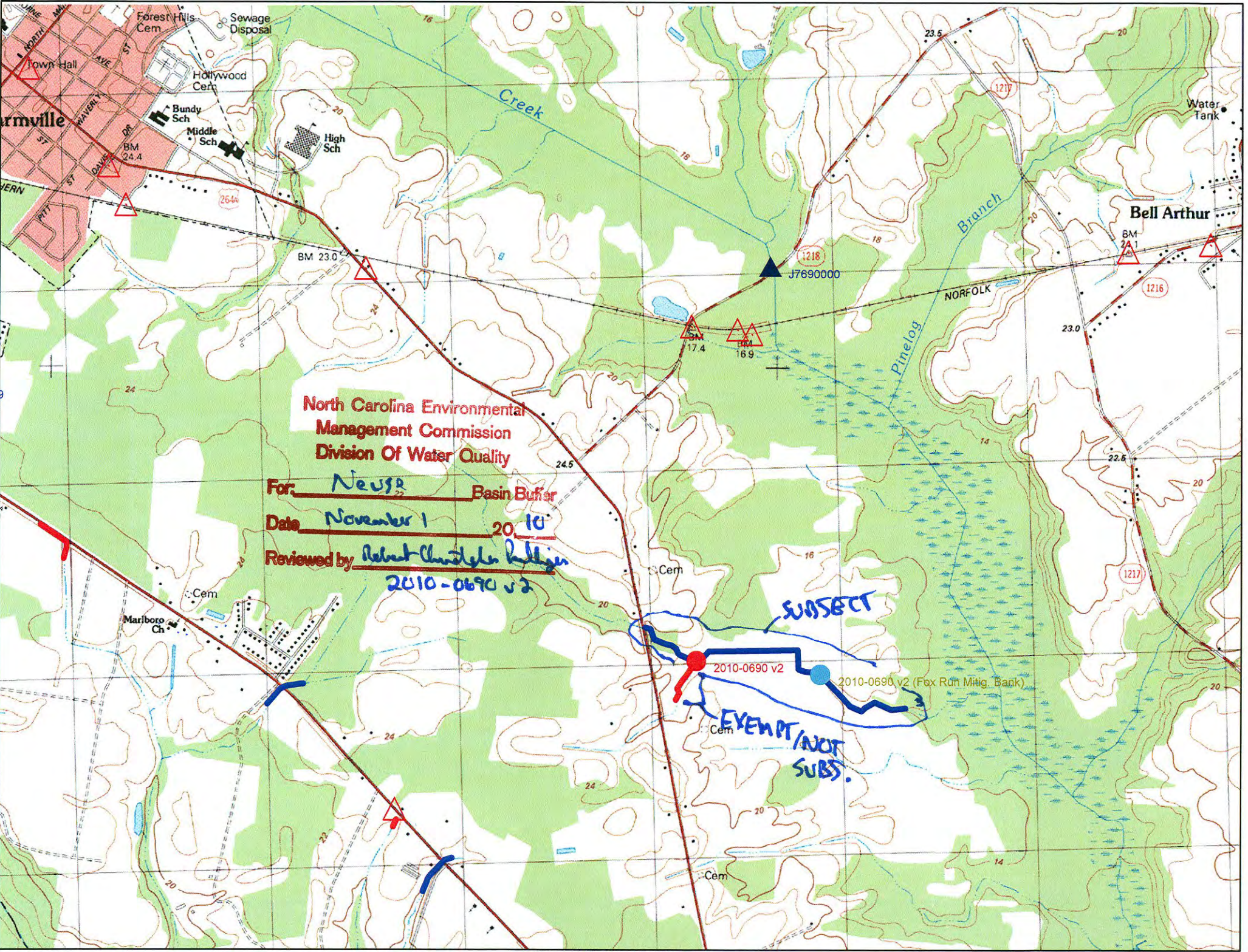
Sincerely,



Chris Pullinger
Division of Water Quality
Surface Water Protection
Washington Regional Office

Enclosures: copy of 1:24,000 scale USGS topographic map, Farmville quadrangle

cc: DWQ 401 Oversight/Express Unit
WaRO File Copy
USACE - Washington Field Office



North Carolina Environmental
Management Commission
Division Of Water Quality

For: Neuse Basin Buffer
Date: November 1, 2010
Reviewed by: Robert Christopher Holliger
2010-0690 v2

SUBJECT

EXEMPT/NOT
SUBS.

2010-0690 v2

2010-0690 v2 (Fox Run Mitig. Bank)



North Carolina Department of Environment and Natural Resources

Division of Water Quality
Coleen H. Sullins
Director

Beverly Eaves Perdue
Governor

Dee Freeman
Secretary

November 17, 2010

Pitt County
DWQ #: 10-0690

Mr. Tim Baumgartner
EEP Full Delivery Section
1652 Mail Service Center
Raleigh, NC 27604

Re: Fox Run Preliminary Restoration Approval

Dear Mr. Baumgartner:

The Division of Water Quality received a draft restoration plan for the Fox Run Riparian Buffer Mitigation Site on November 8, 2010. On October 26, 2010, Chris Pullinger conducted a site visit to the above referenced site. By copy of this correspondence, DWQ approves the concept presented in the restoration plan and that it is expected to produce 43.72 acres of nutrient offset credit for Tar-Pamlico 8-digit HUC 03020203. The As-built report will provide a more accurate credit accounting.

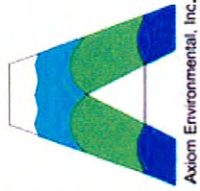
Please copy DWQ with the As-built report and yearly monitoring reports, referencing the DWQ number.

Please feel free to contact Lia Myott Gilleski at (919) 733-1786 if you have any questions regarding this correspondence.

Sincerely,

Lia M. Gilleski
for Ian McMillan, Acting Supervisor
401 Oversight/Express Review Program

Cc (w/out encl.) File Copy (Lia M. Gilleski)
Chris Pullinger – DWQ WaRO
John Huisman – DWQ Nonpoint Source Planning Unit
Cyndi Karoly – DWQ Wetlands and Stormwater Branch

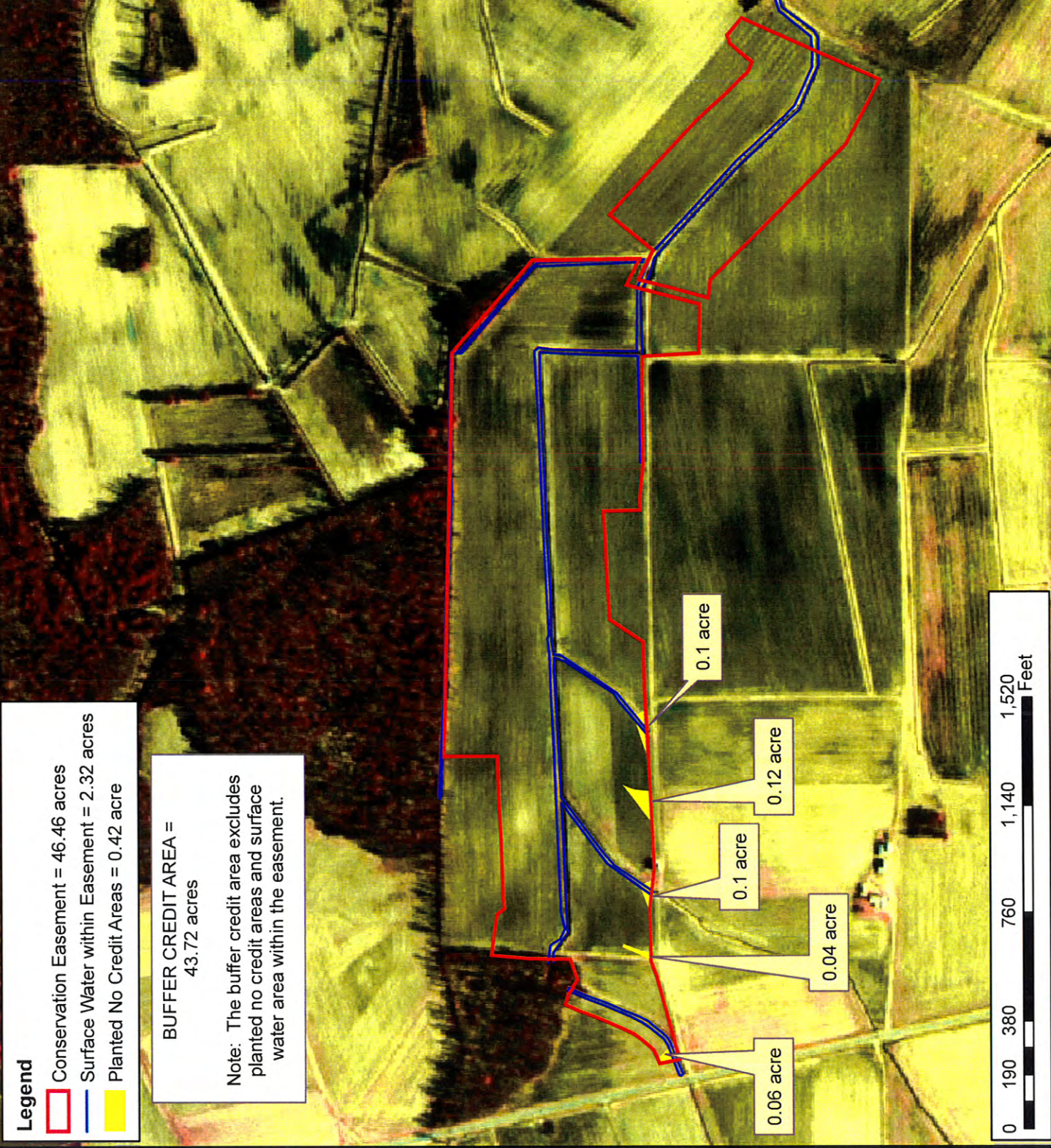


Prepared for:
 Project:
**FOX RUN
 RIPARIAN
 BUFFER
 MITIGATION
 SITE**
 Pitt County, NC

Title:
**EXISTING
 CONDITIONS**

Drawn by: CLF
 Date: NOV 2010
 Scale: 1:5700
 Project No.: 10-001

**FIGURE
 4**



Legend

- █ Conservation Easement = 46.46 acres
- █ Surface Water within Easement = 2.32 acres
- █ Planted No Credit Areas = 0.42 acre

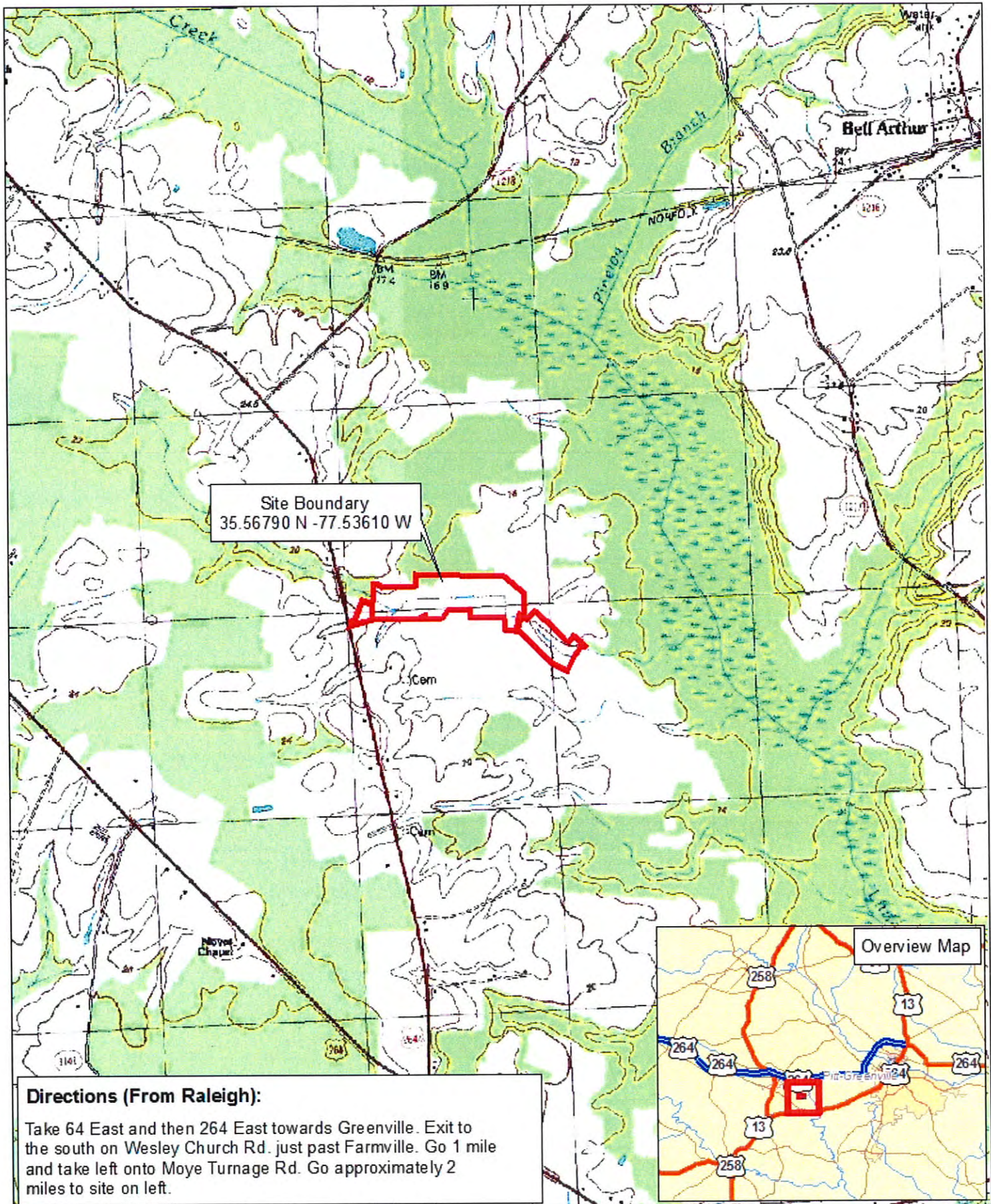
**BUFFER CREDIT AREA =
 43.72 acres**

Note: The buffer credit area excludes planted no credit areas and surface water area within the easement.



**Appendix E.
Additional Site Data**

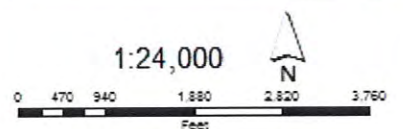
**Restoration Plan Figure 1. Site Location (USGS Topo Map)
Restoration Plan Figure 3. Soils
Preconstruction Photograph**

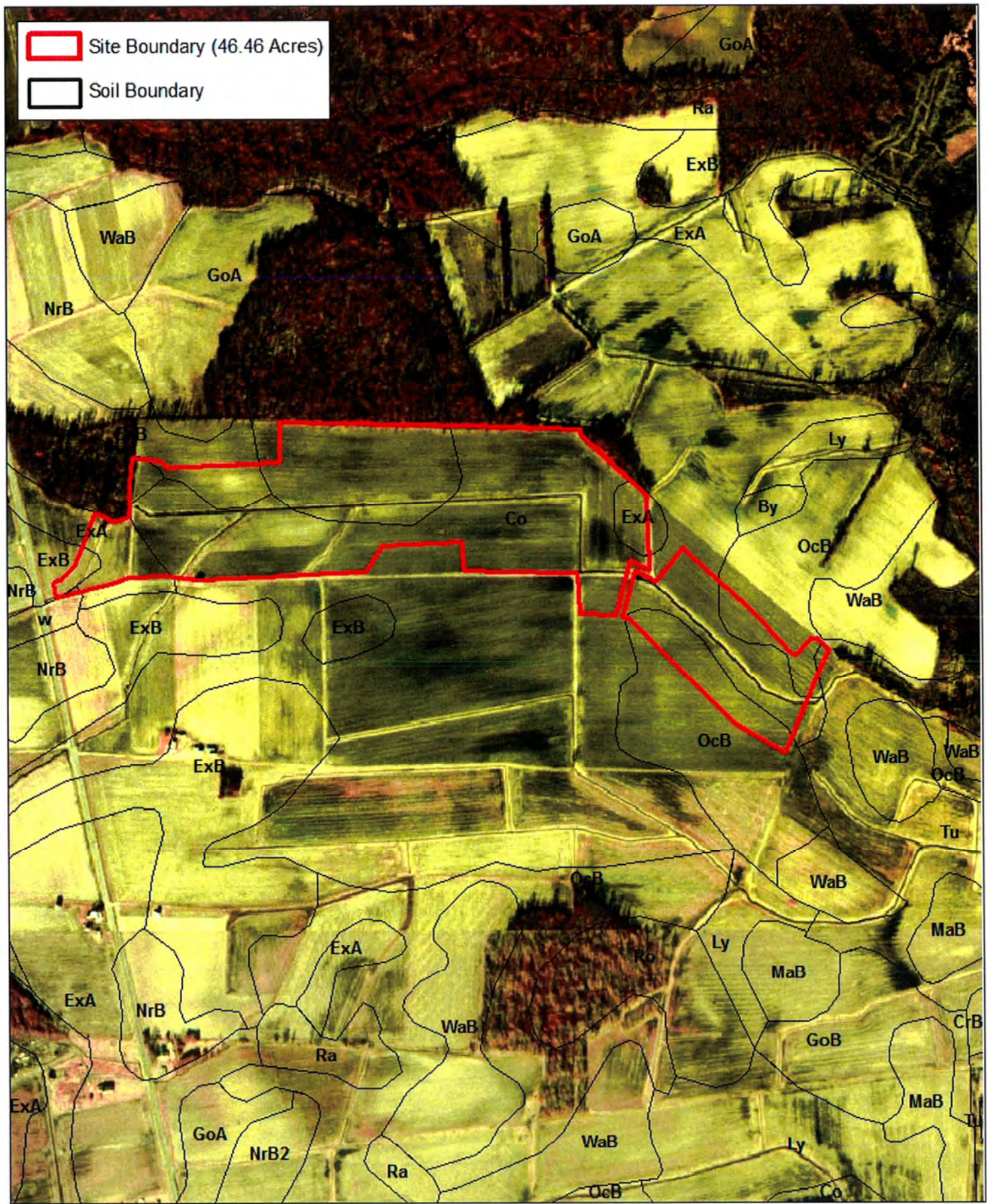


Restoration Systems, LLC
1101 Haynes St. Suite 211
Raleigh, NC 27604
tel. 919.755.9490

Figure 1:
Site
Location

**Fox Run Riparian Buffer
Mitigation Site
Pitt County, NC**





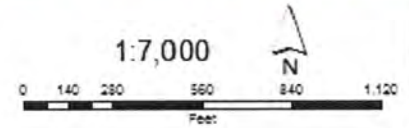
Site Boundary (46.46 Acres)
 Soil Boundary



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

Figure 3:
 Soils

**Fox Run Riparian Buffer
 Mitigation Site
 Pitt County, NC**



**Preconstruction Photograph
Fox Run
Taken October 29, 2008**

