BEAMON'S RUN BUFFER AND WETLAND RESTORATION SITE (BARNHILL FARM) MONITORING REPORT (2009)

Greene County, North Carolina
EEP Project No. 24

Prepared for:
North Carolina Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

Ecosystem Enhancement PROGRAM

Status of Plan: Final
Submission Date: December 2009

Monitoring Firm:

Stantec Consulting Services Inc
801 Jones Franklin Road, Suite 300
Raleigh, NC 27606

EXECUTIVE SUMMARY

The project site is located on the grounds of the Barnhill farm southeast of Wilson, NC. The site was identified for its potential as a buffer site because of its proximity to several bordering streams, including Beaman's Run and Contentnea Creek. The site was brought to the attention of the NC Wetlands Restoration Program (WRP) because it had been cited for violations by the NC Division of the Environment and Natural Resources (NCDENR) due to the stockpiling of old tires which had been found in the nearby streams.

The conservation easement is made up of two tracts: Tract A encompasses 47.53 acres along the right bank of Beamon's Run (including a 2.11 acre open pit area); Tract B encompasses 32.38 acres along the left bank of Contentnea Creek. Site investigation and design services were provided by PBS&J, Inc. The records available at this time indicated that construction and the bulk of the planting at the site occurred over the winter of 2000. Using the 2000 as-built plan, areas that did not appear to contain any of the planted species, were outside the 200' buffer limit, or exhibited a much older mature plant community were excluded from the monitoring effort. Based on the revised areas, the project consists of 16.89 acres of Neuse River riparian buffer restoration, 195 feet of streambank stabilization, and 0.34 acres of wetland restoration.

No monitoring plan was originally prepared for this site and no monitoring program began at this site when construction was completed. NCSU staff from the Biological and Agricultural Engineering Department and the Water Resources Research Institute made an initial monitoring visit on October 14, 2003. They compiled the first monitoring report submitted in March of 2004. In 2009, Stantec was contracted to implement a revised monitoring procedure and report developed based on the document "Content, Format, and Data Requirements for EEP Monitoring Reports" provided by the North Carolina Ecosystem Enhancement Program in 11/16/06.

Monitoring revealed that 6 of the 12 plots (50%) met the vegetative success criteria of 320 planted stems or greater per acre. It is difficult to discern the exact reasons for poor planted species survival in the vegetation plots and elsewhere on the site since it has been 9 years since vegetation installation. Seedlings may have been shaded out, eaten by wildlife, affected by recent droughts, or in some cases affected by mowing.

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1.0 Project Background

1.1 PROJECT OBJECTIVES

The purpose of riparian wetland and buffer restoration is to improve water quality by providing a more ecologically effective and efficient riparian buffer. The establishment and protection of a vegetated buffer along the floodplain of any stream provides a number of benefits, which include streambank stability from mature root systems, in-stream shade from the overhanging leaf canopy, organic detritus that fuels food chains, habitat and travel corridors for native wildlife species, and filtering of sediments and other potential pollutants from surface and subsurface flow (NCSRI, 2003). The natural riparian buffer along the project's section of Beamon's Run had been disturbed by past agricultural practices and portions of it had been used as a tire dump. The tires and associated debris were removed and the buffer was planted with native wetland species to restore functionality to the buffer. The primary objective of the project was to protect and improve water quality by removing and transforming pollutants with buffers and wetlands.

The goals as listed in the WRP Project Summary were to:

1. Restore agricultural land to riparian buffer to increase removal of nutrients

2. Improve wildlife habitat

1.2 PROJECT STRUCTURE

The land was acquired in a settlement of a suit brought by the state against Frank Barnhill to recover costs of cleaning up the tires he had been dumping on his land. According to the final settlement agreement, the conservation easement was conveyed to the state in lieu of money spent from the NC Scrap Tire Disposal Account "for the abatement of a nuisance tire collection site." The conservation easement is made up of two tracts: Tract A encompasses 47.53 acres along the right bank of Beamon's Run (including a 2.11 acre open pit area); Tract B encompasses 32.38 acres along the left bank of Contentnea Creek. The Wetland Restoration Program (now NCEEP) hired PBS&J to provide investigation and design services for stream enhancement, wetland restoration and Neuse River riparian buffer restoration. The as-built planset shows 24.45 acres of planting. The records available at this time indicated that construction and the bulk of the planting at the site occurred over the winter of 2000.

Using the 2000 as-built plan, areas that did not appear to contain any of the planted species, were outside the 200' buffer limit, or exhibited a much older mature plant community were excluded from the monitoring effort. The 200' buffer was taken from the normal edge of the surface water. These areas are shown on the maps in Appendix D. As per NCEEP, only the wetland area within the 200' buffer was monitored for vegetative success. The stream stabilization areas were not formally assessed; however, erosion was not observed onsite in those areas. Based on the revised areas, the project consists of 16.89 acres of Neuse River riparian buffer restoration, 195 feet of streambank stabilization, and 0.34 acres of wetland restoration.

Exhibit Table I. Project Restoration Components Beamon's Run Buffer and Wetland Restoration Site/EEP Project No. 24						
Reach ID	**Existing Feet/Acres**	**Type**	**Approach**	**Footage or Acreage**	**Stationing**	**Comment**
Riverine Wetland Restoration (ac)	0.34	R	Prepare and plant wetland areas	0.34		Cypress community near Contentnea Creek
Neuse Riparian Buffer Restoration (lf)	16.89	R	Prepare and plant buffers	16.89		Within 200' buffer along both Beamon's Run and Contentnea Creek
Streambank Stabilization (lf)	195	S	Construction and installation of brush mattresses for bank stabilization	195		In three areas along both Beamon's Run and Contentnea Creek

R = Restoration
S = Stabilization
P=Preservation

1.3 LOCATION AND SETTING

The restoration site is located approximately 7.3 miles southeast of Stantonsburg, in Greene County, North Carolina. The site is located in a rural area, adjacent to Beamon's Run Creek, which is a major tributary of Contentnea Creek, located in the Neuse River Basin.

Site directions: From Raleigh follow US 264 East toward Wilson. Take exit 49 and turn right onto NC 58 South toward Wilson/Kinston. Travel approximately 5.2 miles on NC 58. This will take you into Stantonsburg. Continue through Stantonsburg, and after traveling 4 miles past Stantonsburg, turn left at Speight's Bridge Road (NC 1225). Travel approximately 3.5 miles down NC 1225, and turn right on a farm path before you approach Beamon's Farm Rd. The farm path is behind a brick ranch style house close to NC 1225.

1.0 Project Background

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The purpose of riparian wetland and buffer restoration is to improve water quality by providing a more ecologically effective and efficient riparian buffer. The establishment and protection of a vegetated buffer along the floodplain of any stream provides a number of benefits, which include streambank stability from mature root systems, in-stream shade from the overhanging leaf canopy, organic detritus that fuels food chains, habitat and travel corridors for native wildlife species, and filtering of sediments and other potential pollutants from surface and subsurface flow (NCSRI, 2003). The natural riparian buffer along the project's section of Beamon's Run had been disturbed by past agricultural practices and portions of it had been used as a tire dump. The tires and associated debris were removed and the buffer was planted with native wetland species to restore functionality to the buffer. The primary objective of the project was to protect and improve water quality by removing and transforming pollutants with buffers and wetlands.

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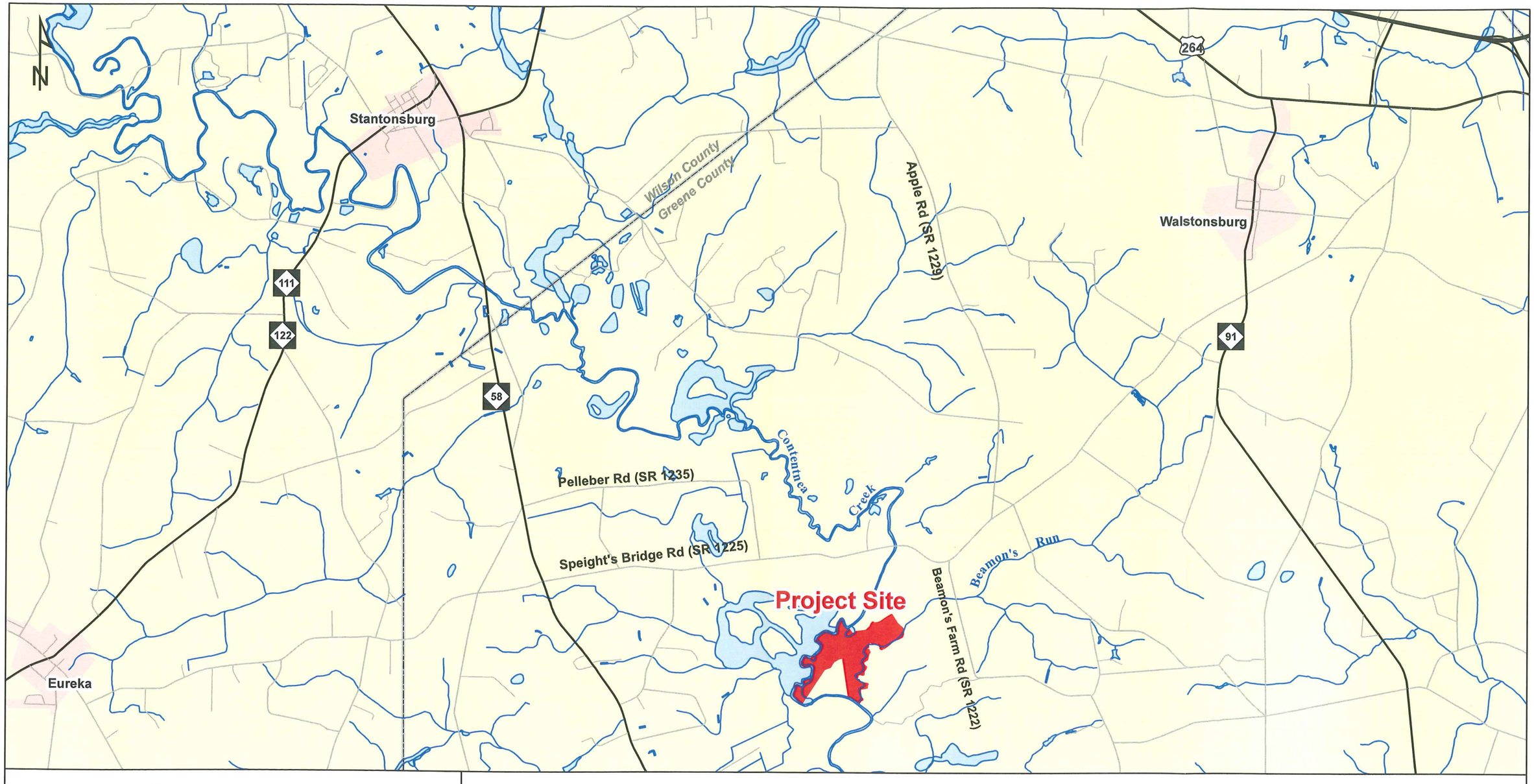

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- Roads
- Hydrography
- Municipal Boundaries
- Project Site

1 0.5 0 1 Miles

Figure 1 - Location Map

Beamon's Run Wetland and Buffer Restoration Project
EEP Project Number 24
Greene County, NC

Monitoring Report
December, 2009

1.4 PROJECT HISTORY AND BACKGROUND

Exhibit Table II. Project Activity and Reporting History Beamon's Run Buffer and Wetland Restoration Site/EEP Project No. 24			
Activity or Report	**Scheduled Completion**	**Data Collection Complete**	**Actual Completion or Delivery**
Restoration Plan	unknown	unknown	unknown
Final Design - 90%	unknown	unknown	unknown
Construction	2000	2000	2000
Temporary S&E mix applied to entire project area	2000	2000	2000
Permanent seed mix applied to entire project area	2000	2000	2000
Bare Root Seedling Installation	2000	2000	2000
Mitigation Plan / As-built (Year 0 Monitoring - baseline)	May, 2000	May, 2000	May, 2000
Final Report	unknown	unknown	unknown
Monitoring Report (NCSU)	Mar, 2004	Mar, 2004	Mar, 2004
Monitoring Report (Stantec)	Dec, 2009	Dec, 2009	Dec, 2009

Exhibit Table III. Contacts Beamon's Run Buffer and Wetland Restoration Site/EEP Project No. 24	
Designer	PBS&J 1616 East Millbrook Road Suite 310 Raleigh, NC 27609
Construction Contractor	unknown
Planting Contractor	unknown
Seeding Contractor	unknown
Seed Mix Sources	unknown
Nursery Stock Suppliers	Denton's Nursury (longleaf) 3535 NC 42 West Wilson, NC 27893
	NC Division of Forest Resources (bare roots) 762 Claridge Nursery Road Goldsboro, NC 27530
Monitoring Performers (2003)	NCSU BAE Dept & Water Quality Group Campus Box 7637 Raleigh NC 27695 (919) 515-8240
Monitoring Performers (2009)	Stantec Consulting Services, Inc. 801 Jones Franklin Road, Ste 300 Raleigh, NC 27606
Vegetation Monitoring POC	Larry Hobbs (919)851-6866 Amber Coleman (919)851-6866

Exhibit Table IV. Project Background Table Beamon's Run Buffer and Wetland Restoration Site/EEP Project No. 24	
Project County	Greene
Drainage Area	8.5 sqmi
Drainage impervious cover estimate (%)	< 1 percent
Stream Order	3rd order
Physiographic Region	Coastal Plain
Ecoregion	Southeastern Floodplains and Low Terraces
Rosgen Classification of As-built	N/A
Cowardin Classification	PFO1A - Palustrine, Forested, Broad-leaved deciduous, temp. flooded (dominant classification)
Dominant soil types	Kenansville fine sand
Riverine Wetland Restoration	
Riverine Buffer Restoration	
Reference site ID	N/A
USGS HUC for Project	03020203050010
USGS HUC for Reference	N/A
NCDWQ Subbasin for Project	03-04-07
NCDWQ Subbasin for Reference	N/A
NCDWQ Classification for Project	C SW NSW
NCDWQ Classification for Reference	N/A
Any portion of any project segment 303d listed?	No
Any portion of any project segment upstream of a 303d listed segment?	No
Reasons for 303d listing or stressor	N/A
Percent of project easement fenced	N/A

1.5 MONITORING PLAN VIEW

The monitoring plan view map is integrated within the current condition plan view map in Appendix D. The original as-built maps have been included here.

I,_____, Greene County Subdivision Administrator, certify that pursuant to the surveyor's certification, (approval)_____, or (no approval)_____ is required by the Greene County Subdivision Administrator.

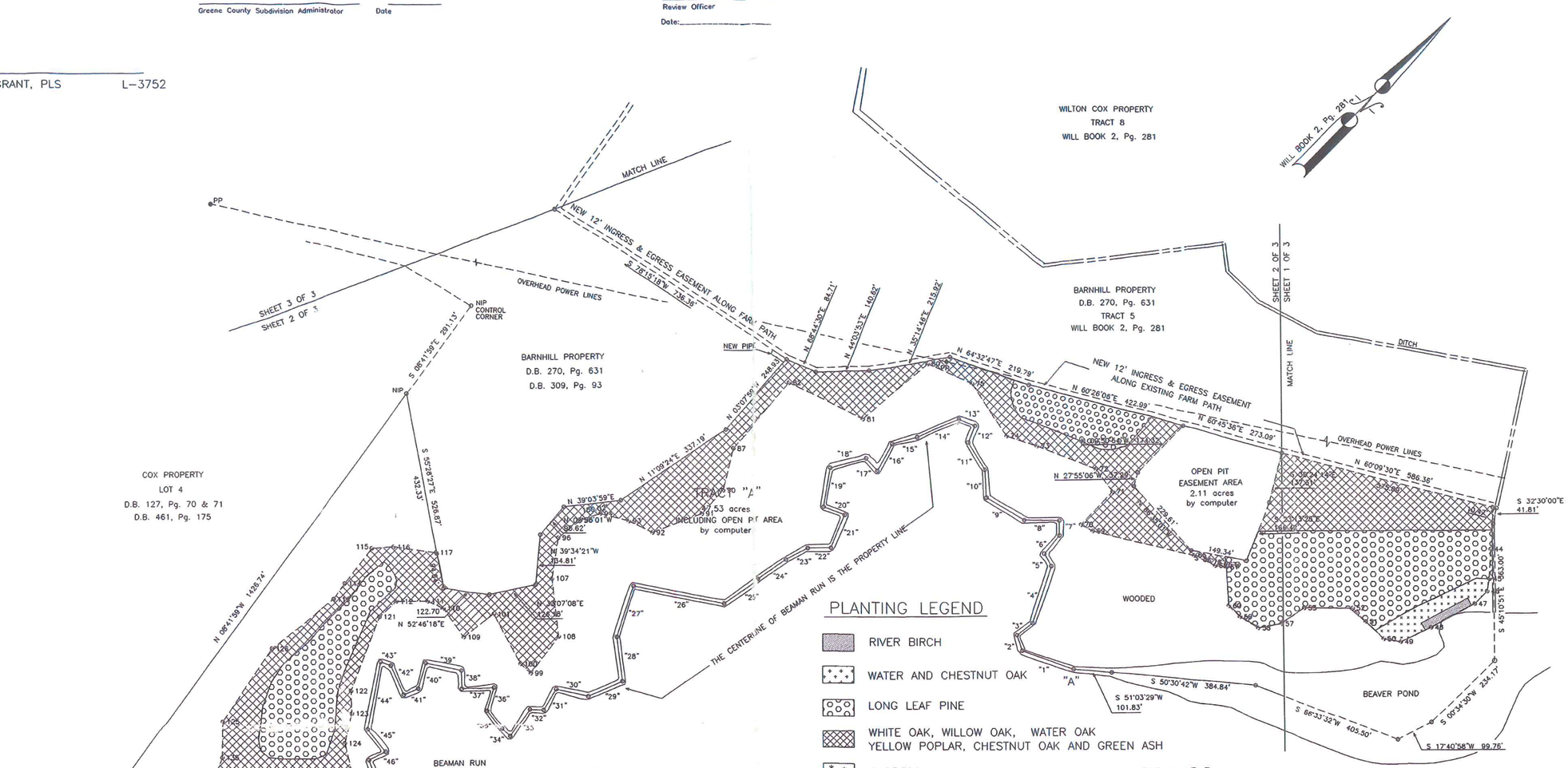
_____ _____
Greene County Subdivision Administrator Date

I,_____, Review Officer of _____ County, certify that the map or plat to which this certification is affixed meets all statutory requirements for recording.

_____
Review Officer
Date:_____

AS-BUILT PLANS

_____
JAMES D. GRANT, PLS L-3752



PLANTING LEGEND

- RIVER BIRCH
- WATER AND CHESTNUT OAK
- LONG LEAF PINE
- WHITE OAK, WILLOW OAK, WATER OAK YELLOW POPLAR, CHESTNUT OAK AND GREEN ASH
- CYPRESS
- CHESTNUT OAK

SHEET 2 OF 3
SURVEY FOR

THE STATE OF NORTH CAROLINA

(CONSERVATION EASEMENT)

A PORTION OF THE FRANK D. BARNHILL PROPERTY RECORDED IN D.B. 270, Pg. 681 & D.B. 309, Pg. 93 OF THE GREENE CO. REGISTRY.

SPEIGHTS BRIDGE TWSP. – GREENE CO., N.C.

SCALE: 1" = 200' – DATE: 05/16/00

200 100 0 200 400 600
GRAPHIC SCALE INCHES/FEET

COURSES AND DISTANCES ALONG BEAMAN RUN
"A" TO "B"
"1" THRU "59"

COURSE	BEARING	DISTANCE	COURSE	BEARING	DISTANCE
1	S 65°40'36"W	142.90'	33	S 09°50'20"E	92.58'
2	N 62°53'59"W	43.45'	34	S 89°07'25"W	29.65'
3	N 08°03'35"E	51.75'	35	N 82°17'35"W	65.85'
4	N 26°39'02"W	158.46'	36	N 28°11'47"W	63.46'
5	N 74°05'51"W	37.26'	37	S 43°08'14"W	85.34'
6	N 04°48'48"W	62.88'	38	N 46°38'15"W	48.06'
7	N 45°19'22"W	40.88'	39	S 56°40'57"W	95.18'
8	S 46°27'56"W	92.14'	40	S 27°47'51"E	70.37'
9	S 76°56'07"W	116.71'	41	S 21°30'59"W	41.29'
10	N 47°51'36"W	71.65'	42	N 59°11'45"W	83.47'
11	N 75°41'53"W	85.32'	43	S 64°50'04"W	28.60'
12	N 22°55'24"W	48.83'	44	S 33°46'28"E	184.16'
13	S 66°30'52"W	45.28'	45	S 83°10'33"E	75.49'
14	S 21°29'23"W	121.19'	46	S 17°30'40"W	49.64'
15	S 30°40'13"W	67.59'	47	S 65°23'26"E	80.25'
16	S 15°54'17"E	80.99'	48	S 70°52'33"E	149.55'
17	N 87°10'18"W	43.48'	49	S 25°20'49"E	24.59'
18	S 30°00'53"W	98.58'	50	S 85°02'23"E	171.05'
19	S 35°00'36"E	103.84'	51	S 37°54'14"W	55.74'
20	N 66°42'04"E	59.76'	52	S 00°39'59"E	102.41'
21	S 22°15'42"E	96.05'	53	S 83°09'24"W	304.19'
22	S 44°49'19"W	60.93'	54	S 01°43'27"W	163.76'
23	S 17°00'44"W	65.39'	55	S 10°41'37"E	142.63'
24	S 11°09'33"W	91.56'	56	S 18°00'29"E	118.60'
25	S 09°54'34"W	113.58'	57	S 39°36'06"E	91.08'
26	S 56°25'34"W	244.18'	58	S 71°16'39"W	85.26'
27	S 26°42'45"E	142.58'	59	S 32°58'42"W	124.42'
28	S 51°54'51"E	118.43'			
29	S 22°18'10"W	97.60'			
30	S 57°44'13"W	86.37'			
31	S 13°22'54"E	64.15'			
32	S 47°40'27"W	36.02'			

NO PERMENANT MARKERS WERE PLACED AT POINTS AS PLOTTED ALONG THE BEAMAN RUN

PLANTED ACREAGE = 19.00 acres +/-
CLEARED ACREAGE = 16.45 acres +/-
REVISED 07/21/00 TO SHOW WOODLINE

DANNY GRANT & ASSOCIATES
LAND SURVEYING SERVICES
P.O. BOX 517
SNOW HILL, N.C. 28580
(252) 747-7777

DATE: 05/16/00 DRAWN BY: JDG FB/Pg 58/2 JOB No.: 99362

AS-BUILT PLANS

I,_____, Greene County Subdivision Administrator, certify that pursuant to the surveyor's certification, (approval)_____, or (no approval)_____ is required by the Greene County Subdivision Administrator.

_____ _____
Greene County Subdivision Administrator Date

I,_____, Review Officer of _____ County, certify that the map or plat to which this certification is affixed meets all statutory requirements for recording.

_____
Review Officer

Date:_____

JAMES D. GRANT, PLS L-3752

PLANTING LEGEND

- RIVER BIRCH
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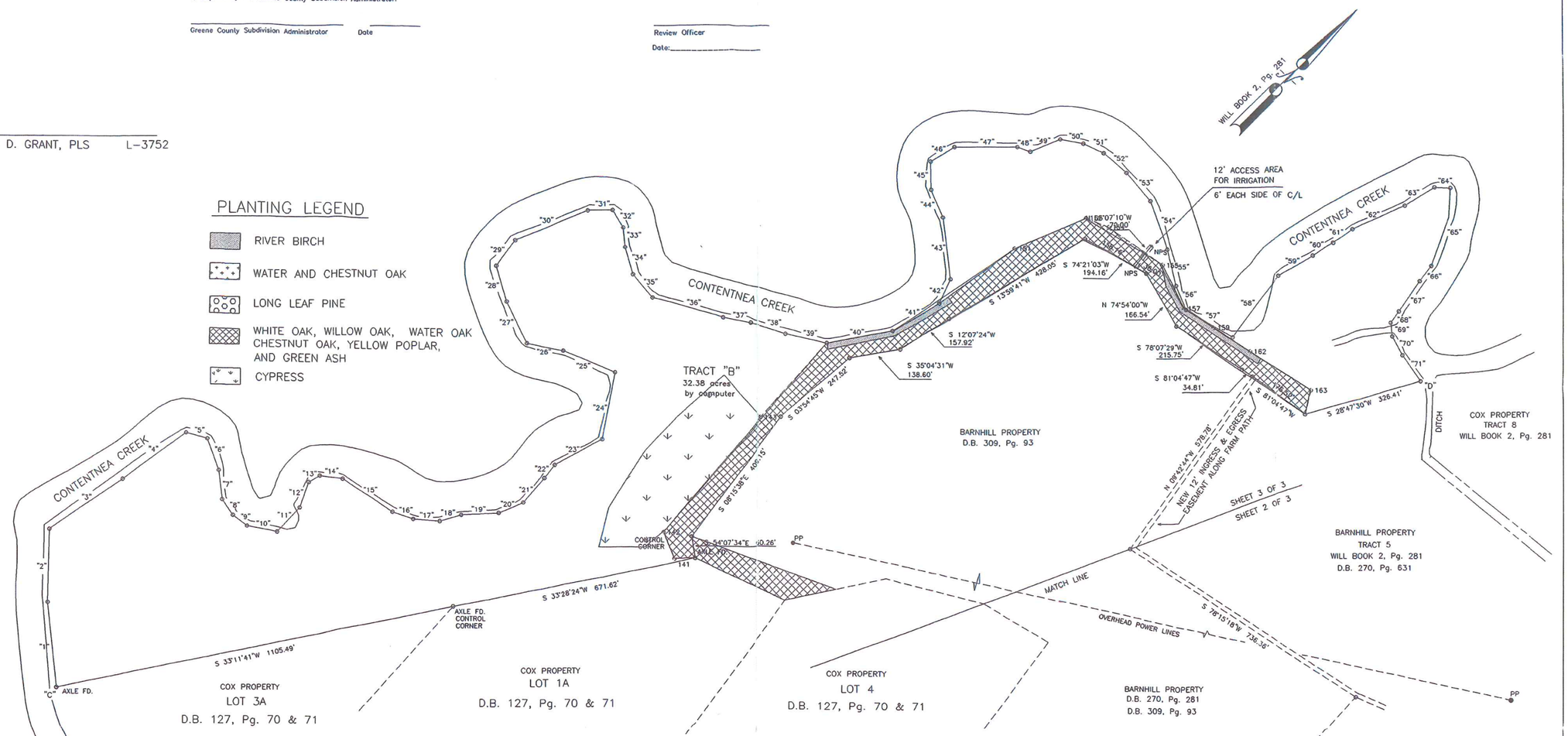

PLANTED ACREAGE = 5.45 acres +/-

CLEARED ACREAGE = 2.89 acres +/-

REVISED 07/21/00 TO SHOW WOODLINE

SHEET 3 OF 3

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SCALE: 1" = 200' – DATE: 05/16/00

200 100 0 200 400 600
GRAPHIC SCALE INCHES/FEET

COURSES AND DISTANCES ALONG THE BANK OF THE CONTENTNEA CREEK
"C" TO "D"
"1" THRU "71"

COURSE	BEARING	DISTANCE	COURSE	BEARING	DISTANCE
1	N 51°00'52"W	233.48'	37	N 55°47'32"E	75.86'
2	N 43°50'37"W	199.58'	38	N 62°51'31"E	104.20'
3	N 10°37'17"E	241.57'	39	N 57°29'55"E	114.94'
4	N 08°48'04"E	213.89'	40	N 33°57'51"E	181.24'
5	N 60°29'51"E	59.70'	41	N 13°27'46"E	148.35'
6	S 65°23'35"E	91.56'	42	N 20°40'19"W	73.49'
7	S 52°00'57"E	78.74'	43	N 51°58'36"W	169.14'
8	S 79°42'02"E	51.19'	44	N 67°49'32"W	82.88'
9	N 82°18'40"E	49.22'	45	N 46°11'52"W	75.24'
10	N 56°37'36"E	84.13'	46	N 14°04'01"E	76.00'
11	N 03°15'03"W	91.58'	47	N 44°58'18"E	168.99'
12	N 25°29'44"W	73.04'	48	N 64°50'06"E	37.04'
13	N 12°46'03"E	35.60'	49	N 22°25'43"E	88.62'
14	N 53°27'38"E	64.61'	50	N 55°23'53"E	63.40'
15	N 78°00'35"E	163.14'	51	N 69°27'52"E	61.70'
16	N 63°26'55"E	59.71'	52	N 85°46'57"E	82.52'
17	N 49°01'43"E	72.12'	53	S 86°02'46"E	100.81'
18	N 28°21'26"E	60.01'	54	S 64°33'37"E	138.59'
19	N 41°30'27"E	101.30'	55	S 58°31'47"E	102.01'
20	N 21°33'59"E	73.12'	56	S 67°42'15"E	73.14'
21	N 05°20'37"W	88.71'	57	N 74°34'33"E	147.45'
22	N 07°22'12"W	45.65'	58	N 08°01'12"W	206.66'
23	N 16°40'21"E	146.60'	59	N 13°53'39"E	108.38'
24	N 34°04'05"W	184.31'	60	N 12°20'52"E	65.72'
25	S 68°31'11"W	153.55'	61	N 10°02'53"E	64.32'
26	S 57°13'37"W	100.76'	62	N 21°13'41"E	155.17'
27	N 71°14'57"W	124.88'	63	N 13°51'54"E	94.99'
28	N 61°12'07"W	102.83'	64	N 47°43'58"E	43.05'
29	N 09°02'05"W	87.63'	65	S 31°14'26"E	216.65'
30	N 22°42'32"E	212.46'	66	S 07°34'21"E	52.13'
31	N 44°42'50"E	66.92'	67	S 10°13'44"E	99.33'
32	S 76°55'26"E	55.01'	68	S 10°01'51"E	39.30'
33	S 50°28'32"E	54.93'	69	S 51°37'15"E	37.08'
34	S 60°58'32"E	77.95'	70	S 73°20'33"E	58.86'
35	S 85°30'23"E	82.25'	71	S 79°29'02"E	85.97'
36	N 60°17'47"E	200.00'			

NO PERMANENT MARKERS WERE PLACED AT POINTS AS PLOTTED ALONG THE BANK OF CONTENTNEA CREEK

SHEET 3 OF 3

DANNY GRANT & ASSOCIATES
LAND SURVEYING SERVICES
P.O. BOX 517
SNOW HILL, N.C. 28580
(252) 747-7777

DATE: 05/16/00 | DRAWN BY: JDG | FB/Pg 58/? | FILE No: 99362

2.0 Project Condition and Monitoring Results

2.1 VEGETATION ASSESSMENT

Vegetation onsite was first visually assessed to determine the general areas of viable planted vegetation. Using the 2000 as-built plan, areas that did not appear to contain any of the planted species, were outside the 200' buffer limit, or exhibited a much older mature plant community were excluded from the monitoring effort. These areas are shown on the maps in Appendix D. The 200' buffer was taken from the normal edge of the surface water.

Twelve vegetative sample plots within the project easement were quantitatively monitored during the 2009 growing season on October 6th and 7th, 2009. The plots were randomly chosen using GIS. Species composition, density, and survival were observed during the site visit. The Carolina Vegetation Survey (CVS, 2006) methodology was utilized for vegetative monitoring. Level 2 (planted and natural stems) methodology was completed on all monitored plots. It must be noted that due to the age of the planted species, in some plots, it was difficult to distinguish planted species from volunteers. However, best professional judgment along with knowledge of project planting zones by species enabled vegetation data to be collected. The planted vegetation zones included oak mix, longleaf pine, river birch, and cypress.

The vegetative success criteria are based on the North Carolina rule 15A NCAC 2B 0242 *Neuse River Basin: Nutrient Sensitive Waters Management Strategy: Mitigation Program for Protection and Maintenance of Existing Riparian Buffers* (2000). The final vegetative success criteria will be the survival of 320 5-year old planted woody stems per acre at the end of the monitoring period. As per NCEEP, the Cypress wetland area was only monitored for vegetation within the 200' riparian buffer, and not wetland hydrology.

The 2009 stem counts within each of the twelve vegetative monitoring plots are included in Exhibit Tables A1 through A5 in Appendix A1. Photos of the vegetative monitoring plots are included in Appendix A3. Stems per acre for each of the twelve plots are reported in Table A5-A of Appendix A1.

2.1.1 Vegetation Problem Areas

Monitoring revealed that 6 of the 12 plots (50%) met the vegetative success criteria of 320 planted stems or greater per acre. The remaining 6 plots failed to meet the success criteria (plots 3, 4, 7, 9, 10 and 11A). There are a number of issues causing the failure of these plots. Vegetation Plots 4 and 9 (VP-4, VP-9) exhibited poor survival of planted longleaf likely resulting from high densities of volunteer loblolly recruitment. This may be an issue related to a lack of forest management for longleaf pines after planting. VP-7 was located in an area that appeared to have poor soil due to residual debris from the site's history of being a tire dump. It could have been attributed to early mortality of oak species after planting. It is difficult to discern the exact reasons for poor planted species survival in the vegetation plots and elsewhere on the site since it has been 9 years since vegetation installation. Seedlings may have been shaded out, eaten by wildlife, affected by recent droughts, or in some cases affected by mowing.

Exhibit Table V - Vegetative Success Criteria Attainment Beamon's Run Buffer and Wetland Restoration Site / EEP Project No. 24		
Vegetation Plot ID	**Vegetation Density Met (320 stems/acre)**	**Tract Mean**
VP-1B	Y (688)	50%
VP-2	Y (405)	
VP-3	N (202)	
VP-4	N (40)	
VP-5	Y (486)	
VP-6	Y (567)	(344 stems/acre)
VP-7	N (81)	
VP-8A	Y (567)	
VP-9	N (121)	
VP-10	N (162)	
VP-11A	N (81)	
VP-12A	Y (729)	

2.1.2 Vegetation Current Condition Plan View

Vegetative problem areas are shown on the Current Condition Plan View in Appendix D.

2.2 STREAM ASSESSMENT

As per EEP, no stream monitoring took place at the Beamon's Run Buffer and Wetland Restoration Site.

2.3 WETLAND ASSESSMENT

2.3.1 Current Condition Plan View

As per EEP, no wetland monitoring took place at the Beamon's Run Buffer and Wetland Restoration Site.

2.3.2 Wetland Criteria Attainment

No groundwater monitoring wells were installed at the site.

3.0 References

Lee, Michael T., R. K. Peet, S. D. Roberts, and T. R. Wentworth. 2006. *CVS-EEP Protocol for Recording Vegetation, Version 4.0* (http://cvs.bio.unc.edu/methods.htm)

NCEEP. 2006. *Content, Format and Data Requirements for EEP Monitoring Reports*. North Carolina Department of Environment and Natural Resources, Ecosystem Enhancement Program. Raleigh, NC. Version 1.2 November 16, 2006

NC Administrative Code: 15A NCAC 2B 0242, *Neuse River Basin: Nutrient Sensitive Waters Management Strategy: Mitigation Program for Protection and Maintenance of Existing Riparian Buffers,* Raleigh, NC. 2000.

Appendix A. Vegetation Raw Data

A.1 VEGETATION DATA TABLES

Report Prepared By	Richard Andrews
Date Prepared	10/21/2009 13:48
database name	cvs-eep-entrytool-v2.2.7.mdb
database location	V:\1713\resource\Library\Streams & Wetlands\Monitoring\cvs
computer name	ANDREWSR
file size	35663872
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT----------	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Proj, planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Proj, total stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
ALL Stems by Plot and spp	A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.
PROJECT SUMMARY----------	
Project Code	24
project Name	Beamon's Run
Description	Barnhill Farm off of HWY 58 b/w Snow Hill and Wilson in Greene County
River Basin	Neuse
length(ft)	16,350
stream-to-edge width (ft)	200
area (sq m)	68,350
Required Plots (calculated)	
Sampled Plots	12

Exhibit Table A2 - Vegetation Vigor By Species									
	Species	CommonName	4	3	2	1	0	Missing	Unknown
	Betula nigra	river birch	17						
	Fraxinus pennsylvanica	green ash	3	5	2	1			
	Pinus palustris	longleaf pine	4						
	Quercus alba	white oak	13	6	1				
	Quercus michauxii	swamp chestnut oak	1	2	3				
	Quercus nigra	water oak	6	6	11	1			
	Quercus phellos	willow oak	18	2					
TOT:	7	7	62	21	17	2			

Exhibit Table A3 - Vegetation Damage By Species					
	Species	CommonName	Count of Damage Categories	(no damage)	Beaver
	Betula nigra	river birch	0	17	
	Fraxinus pennsylvanica	green ash	0	11	
	Pinus palustris	longleaf pine	0	4	
	Quercus alba	white oak	0	20	
	Quercus michauxii	swamp chestnut oak	0	6	
	Quercus nigra	water oak	15	9	15
	Quercus phellos	willow oak	0	20	
TOT:	7	7	15	87	15

Exhibit Table A4 - Vegetation Damage By Plot

	plot	Count of Damage Categories	(no damage)	Beaver	
	024-AC/RA-0002	0	10		
	024-AC/RA-0003	0	5		
	024-AC/RA-0004	0	1		
	024-AC/RA-0005	0	12		
	024-AC/RA-0006	0	14		
	024-AC/RA-0007	0	2		
	024-AC/RA-0009	0	3		
	024-AC/RA-0010	0	4		
	024-AC/RA-01B	0	17		
	024-AC/RA-08A	0	14		
	024-AC/RA-11A	0	2		
	024-AC/RA-12A	15	3	15	
TOT:	**12**	**15**	**87**	**15**	

Exhibit Table A5-A - Planted Stems By Plot and Species

	Comment	Species	CommonName	Total Planted Stems	# plots	avg# stems	plot 024-AC/RA-0002	plot 024-AC/RA-0003	plot 024-AC/RA-0004	plot 024-AC/RA-0005	plot 024-AC/RA-0006	plot 024-AC/RA-0007	plot 024-AC/RA-0009	plot 024-AC/RA-0010	plot 024-AC/RA-01B	plot 024-AC/RA-08A	plot 024-AC/RA-11A	plot 024-AC/RA-12A
		Betula nigra	river birch	17	1	17								17				
		Fraxinus pennsylvanica	green ash	11	4	2.75	2			1	1				7			
		Pinus palustris	longleaf pine	4	2	2			1				3					
		Quercus alba	white oak	20	7	2.86		2		8	4	2		1			2	1
		Quercus michauxii	swamp chestnut oak	6	1	6					6							
		Quercus nigra	water oak	24	3	8								2		6		16
		Quercus phellos	willow oak	20	7	2.86	8	3		3	3			1		1		1
TOT:	**0**	**7**	**7**	**102**	**7**		**10**	**5**	**1**	**12**	**14**	**2**	**3**	**4**	**17**	**14**	**2**	**18**
STEMS PER ACRE							405	202	40	486	567	81	121	162	688	567	81	729

Exhibit Table A5-B - All Stems By Plot and Species

	Comment	Species	CommonName	Total Stems	# plots	avg# stems	024-AC/RA-0002	024-AC/RA-0003	024-AC/RA-0004	024-AC/RA-0005	024-AC/RA-0006	024-AC/RA-0007	024-AC/RA-0009	024-AC/RA-0010	024-AC/RA-01B	024-AC/RA-08A	024-AC/RA-11A	024-AC/RA-12A
		Acer negundo	boxelder	1	1	1											1	
		Acer rubrum	red maple	178	8	22.25	1		29	20				3	86	13	16	10
		Baccharis halimifolia	eastern baccharis	22	3	7.33					1				8		13	
		Betula nigra	river birch	52	2	26					6				46			
		Carpinus caroliniana	American hornbeam	10	2	5								1				9
		Crataegus	hawthorn	5	2	2.5	4	1										
		Fraxinus pennsylvanica	green ash	13	4	3.25	3			2	1					7		
		Ilex decidua	possumhaw	18	4	4.5		1	2	12								3
		Ilex opaca	American holly	9	6	1.5			3	1	1				2		1	1
		Ligustrum sinense	Chinese privet	3	3	1	1								1			1
		Liquidambar styraciflua	sweetgum	111	10	11.1			7	17	1	4	3	29	15	28	4	3
		Liriodendron tulipifera	tuliptree	5	2	2.5									4		1	
		Morella cerifera	wax myrtle	2	2	1									1		1	
		Nyssa	tupelo	1	1	1										1		
		Pinus palustris	longleaf pine	4	2	2			1				3					
		Pinus taeda	loblolly pine	49	8	6.12	2	2	21	5	13			2			3	1
		Prunus serotina	black cherry	1	1	1				1								
		Quercus alba	white oak	68	9	7.56	5	2		47	4	2		3		2	2	1
		Quercus michauxii	swamp chestnut oak	7	2	3.5					6		1					
		Quercus nigra	water oak	31	5	6.2	1						1	2		10		17
		Quercus phellos	willow oak	38	8	4.75	17	3		8	3			1	3	1		2
		Quercus rubra	northern red oak	47	3	15.67			1		36							10
		Salix nigra	black willow	2	2	1								1	1			
		Toxicodendron radicans	eastern poison ivy	300	2	150							50					250
TOT:	**0**	**24**	**24**	**977**	**24**		**34**	**9**	**64**	**113**	**72**	**6**	**58**	**42**	**167**	**62**	**42**	**308**
STEMS PER ACRE							1377	364	2591	4575	2915	**243**	2348	1700	6761	2510	1700	12470

EXHIBIT TABLE A6. VEGETATION PROBLEM AREAS			
Feature/Issue	**Station # / Range**	**Probable Cause**	**Photo #**
Weak numbers of planted species	VP-3, VP-7, VP-10, VP-11A	Competition from volunteers, poor soil, early morality	2
Weak numbers of planted Longleaf Pine	VP-4, VP-9	No management for Longleaf / competition from Loblolly Pine	1

A.2 VEGETATION PROBLEM AREA PHOTOS

Photo 1 – Dense loblolly pine recruitment in vicinity of Veg Plot 4 (10/7/09)

Photo 2 – Low planted species survival in vicinity of Veg Plot 7A (10/7/09)

A.3 VEGETATION MONITORING PLOT PHOTOS

Photo Station 1 - Vegetation Plot 1B (10/7/09)

Photo Station 2 - Vegetation Plot 2 (10/6/09)

Photo Station 3 - Vegetation Plot 3 (10/6/09)

Photo Station 4 - Vegetation Plot 4 (10/6/09)

Photo Station 5 - Vegetation Plot 5 (10/6/09)

Photo Station 6 - Vegetation Plot 6 (10/6/09)

Photo Station 7 - Vegetation Plot 7 (10/7/09)

Photo Station 8 - Vegetation Plot 8A (10/7/09)

Photo Station 9 - Vegetation Plot 9 (10/7/09)

Photo Station 10 – Vegetation Plot 10 (10/7/09)

Photo Station 11 – Vegetation Plot 11A (10/7/09)

Photo Station 12 – Vegetation Plot 12A (10/6/09)

Appendix B. Geomorphologic Raw Data

No stream assessment took place at the Beamon's Run Buffer and Wetland Restoration Site

Appendix C. Hydrology Data

No hydrologic monitoring took place at the Beamon's Run Buffer and Wetland Restoration Site.

Appendix D. Current Condition Plan View

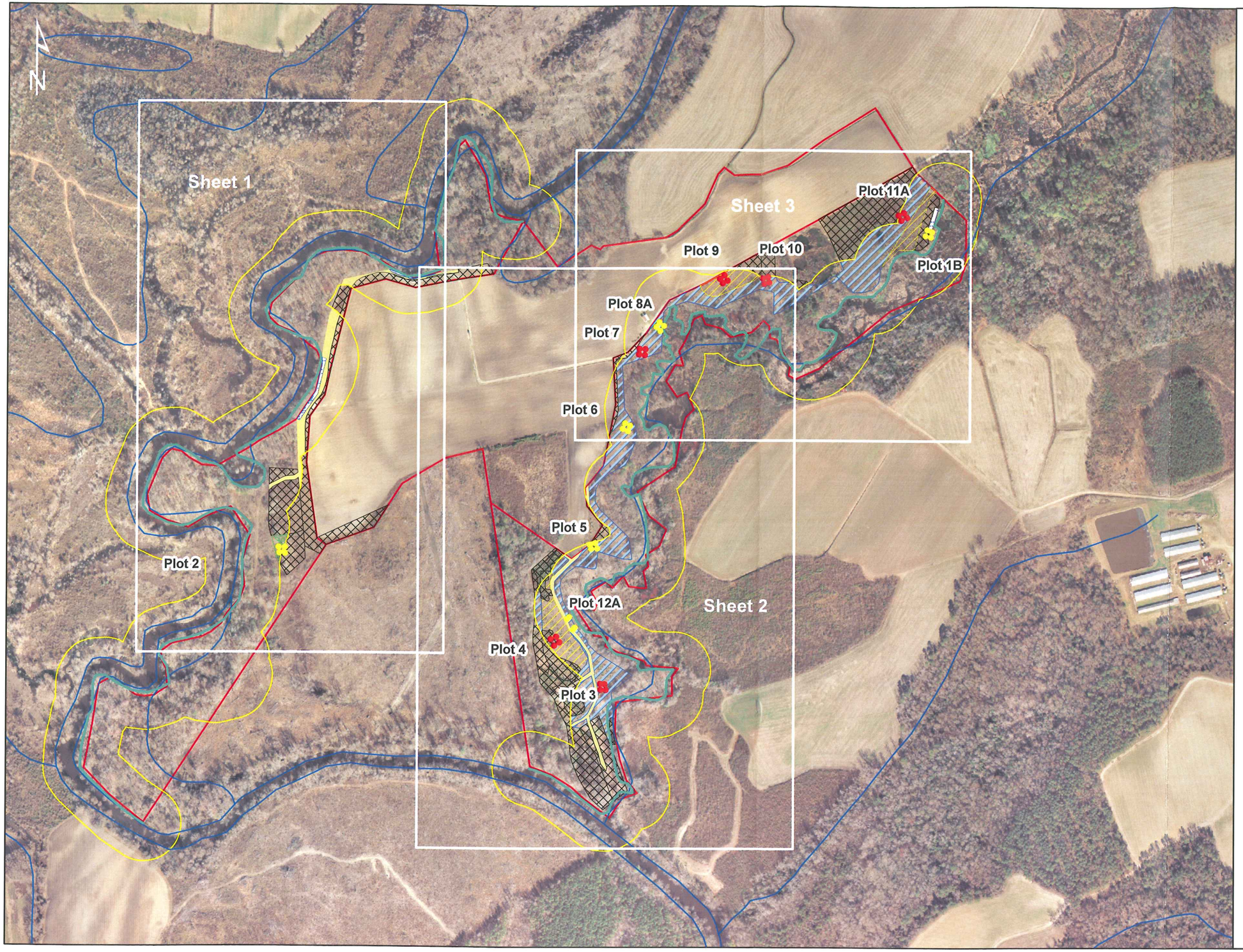

Figure 2 - Overview

Current Condition Plan View

Beamon's Run Wetland and
Buffer Restoration Project
EEP Project 24
Greene County, North Carolina

Monitoring Report
December, 2009

Stream Edge

Streams

200ft Buffer

Plantings

Excluded

Cypress

Long leaf pine

River birch

Oak Mix

Mowed

Parcel Boundaries

Veg Plot Corners

Failing <320 stems/ac

Successful >320 stems/ac

0 200 400 800
Feet

Ecosystem Enhancement Program

Stantec

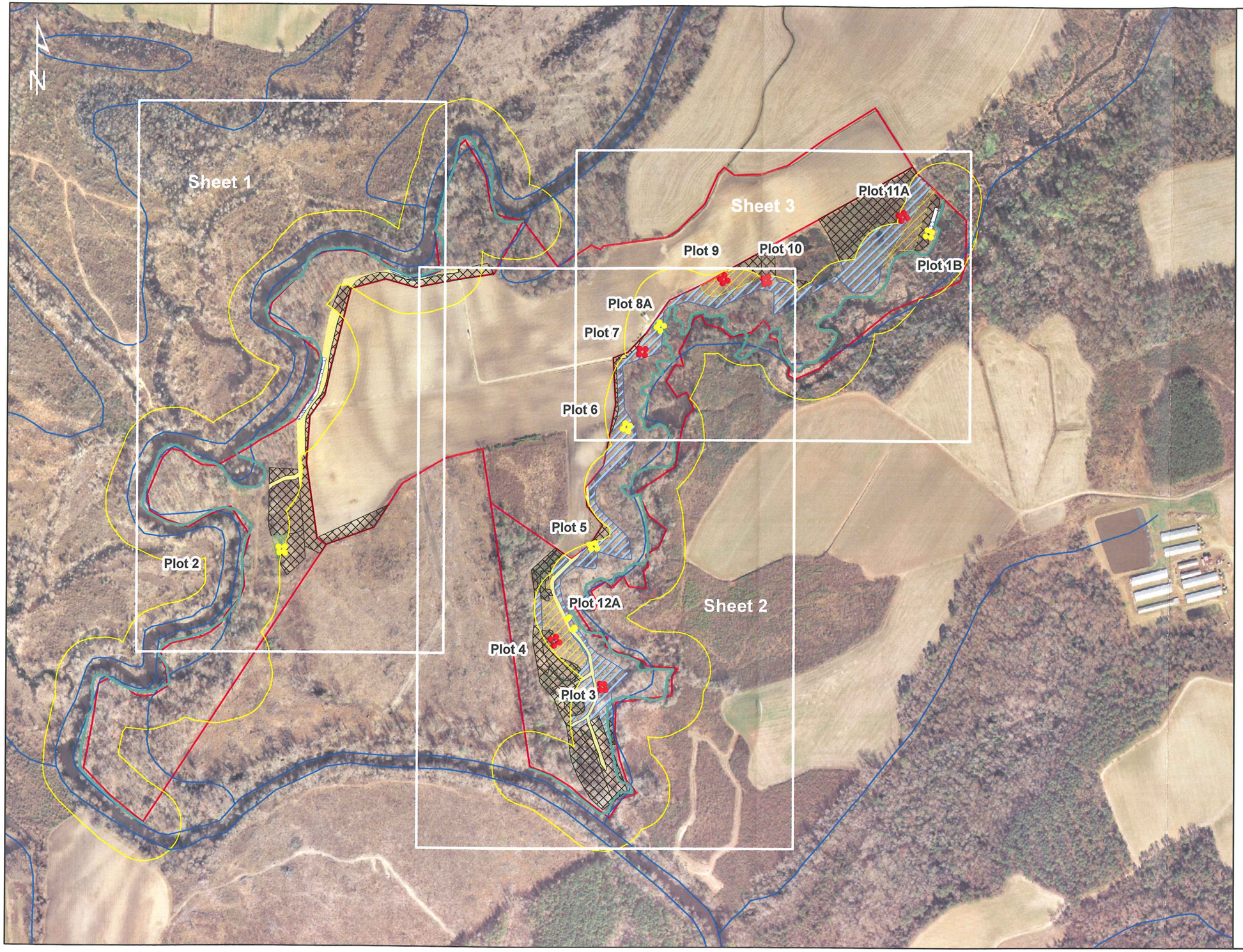

Figure 2 - Overview

Current Condition Plan View

Beamon's Run Wetland and
Buffer Restoration Project
EEP Project 24
Greene County, North Carolina

Monitoring Report
December, 2009

Stream Edge

Streams

200ft Buffer

Plantings

Excluded

Cypress

Long leaf pine

River birch

Oak Mix

Mowed

Parcel Boundaries

Veg Plot Corners

Failing <320 stems/ac

Successful >320 stems/ac

0 200 400 800
Feet

Ecosystem Enhancement Program

Stantec

Plot 2	*Lat*	*Long*
Origin	35.53992038	-77.76278982
2	35.54000623	-77.76280325
3	35.54000139	-77.76268864
4	35.53991517	-77.76268792

Figure 2 - Sheet 1

Current Condition Plan View

Beamon's Run Wetland and Buffer Restoration Project
EEP Project # 24
Greene County, North Carolina

Monitoring Report
December, 2009

- Parcel Boundaries
- Stream Edge
- 200ft Buffer

Plantings

- Excluded
- Cypress
- Long leaf pine
- River birch
- Oak Mix
- Mowed

Veg Plot Corners

- Failing <320 stems/ac
- Successful >320 stems/ac

0 75 150 300 Feet

Ecosystem Enhancement Program

Stantec

Plot 5	Lat	Long
Origin	35.540002	-77.757186
2	35.540030	-77.757093
3	35.539946	-77.757163
4	35.539950	-77.757055

Plot 12A	Lat	Long
Origin	35.538791	-77.757472
2	35.538948	-77.757575
3	35.538920	-77.757609
4	35.538766	-77.757502

Plot 4	Lat	Long
Origin	35.538581	-77.757753
2	35.538662	-77.757808
3	35.538628	-77.757907
4	35.538533	-77.757846

Plot 3	Lat	Long
Origin	35.537874	-77.757014
2	35.537870	-77.756921
3	35.537956	-77.756940
4	35.537961	-77.757019

Coordinates for Plots 6-10 shown on sheet 3

Plot 10
Plot 9
Plot 8A
Plot 7
Plot 6
Plot 5
Plot 12A
Plot 4
Plot 3

Figure 2 - Sheet 2

Current Condition Plan View

Beamon's Run Wetland and Buffer Restoration Project
EEP Project Number 24
Greene County, North Carolina

Monitoring Report
December, 2009

- Stream Edge
- 200ft Buffer

Plantings

- Excluded
- Cypress
- Long leaf pine
- River birch
- Oak Mix
- Mowed
- Planted Parcels

Veg Plot Corners

- Failing <320 stems/ac
- Successful >320 stems/ac

0 75 150 300 Feet

Ecosystem Enhancement Program

Stantec

Plot 6	Lat	Long
Origin	35.541784	-77.756530
2	35.541704	-77.756575
3	35.541668	-77.756479
4	35.541747	-77.756438
Plot 7	*Lat*	*Long*
Origin	35.542795	-77.756267
2	35.542784	-77.756161
3	35.542870	-77.756147
4	35.542877	-77.756256
Plot 8A	*Lat*	*Long*
Origin	35.543196	-77.755950
2	35.543136	-77.755883
3	35.543210	-77.755814
4	35.543262	-77.755894

Plot 9	Lat	Long
Origin	35.543828	-77.754738
2	35.543863	-77.754653
3	35.543943	-77.754707
4	35.543894	-77.754791
Plot 10	*Lat*	*Long*
Origin	35.543836	-77.753893
2	35.543916	-77.753917
3	35.543896	-77.754013
4	35.543814	-77.753983
Plot 11A	*Lat*	*Long*
Origin	35.544844	-77.751455
2	35.544811	-77.751551
3	35.544735	-77.751502
4	35.544775	-77.751400

Plot 1B	Lat	Long
Origin	35.544557	-77.750951
2	35.544589	-77.751036
3	35.544500	-77.751071
4	35.544479	-77.750975

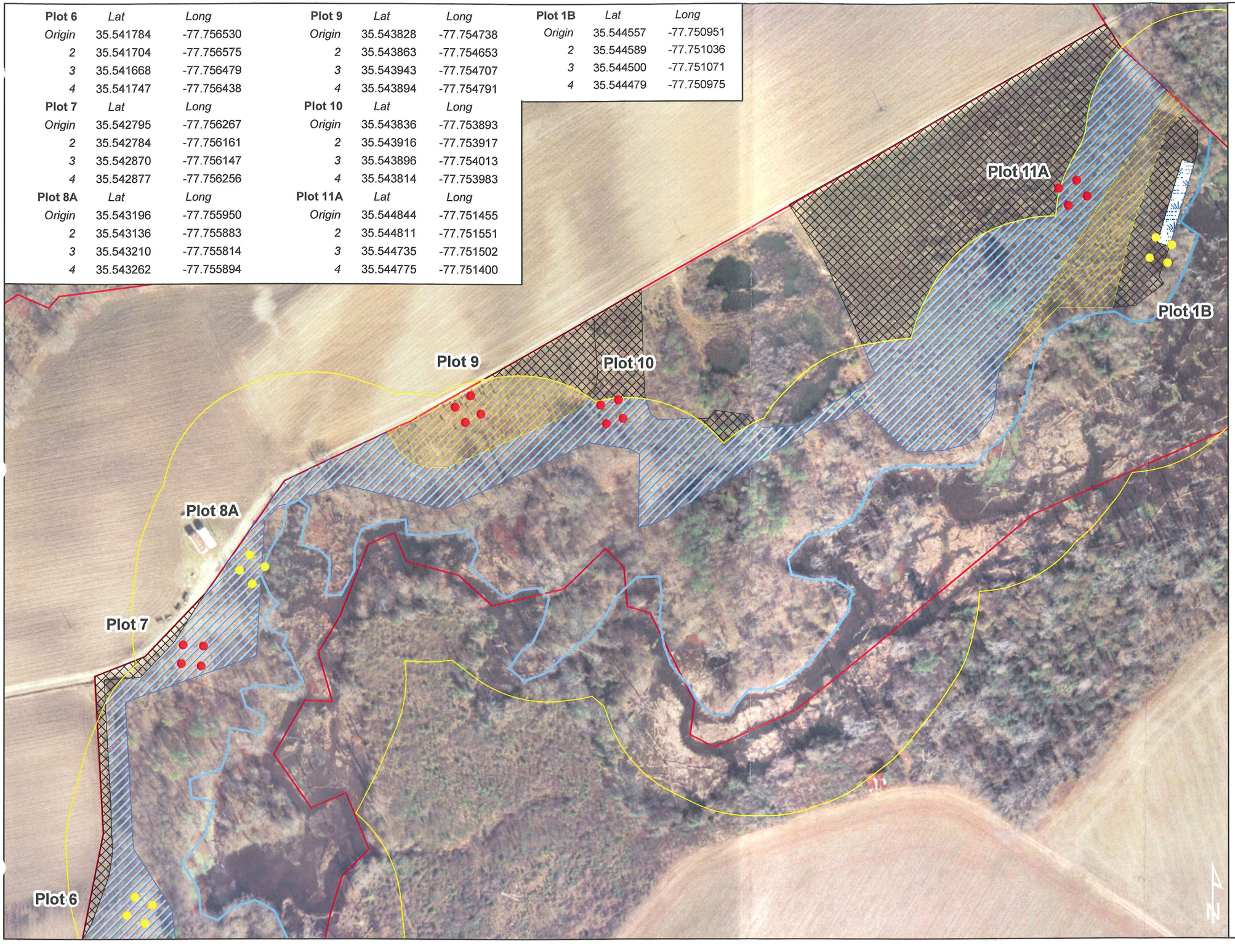

Figure 2 - Sheet 3

Current Condition Plan View

Beamon's Run Wetland and
Buffer Restoration Site
EEP Project # 24
Greene County, North Carolina

Monitoring Report
December, 2009

Stream Edge
200ft Buffer

Plantings

Excluded
Cypress
Long leaf pine
River birch
Oak Mix
Mowed
Planted parcels

Veg Plot Corners

Failing <320 stems/ac
Successful >320 stems/ac

0 65 130 260
Feet

Ecosystem Enhancement Program

Stantec