

UT ALTAMAHAW SITE

EEP Project No. 92837

MONITORING YEAR 2 (2013) FINAL SUBMITTAL

Construction Completed February 2011

Alamance County, NC

State Construction Project No. 09-0762301



**Prepared for the
NC Department of Environment and Natural Resources
Ecosystem Enhancement Program**

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*This assessment and report are consistent with NCDENR Ecosystem Enhancement Program
Template Version 1.3 (1/15/10) for EEP Monitoring Reports.*

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1.0 EXECUTIVE SUMMARY/ PROJECT ABSTRACT

The UT Altamahaw Site is located within HUC 03030002 and sub-basin 03-06-02 of the Cape Fear River Basin in Alamance County, North Carolina (Figure 1). It includes portions of two unnamed tributaries (UTs) to Altamahaw Creek. The enhancement lengths of the main and secondary channels are 1,347 and 130 linear feet, respectively. In addition, 0.026 acres of wetlands were enhanced as part of the overall project. The UT Altamahaw Site is protected for perpetuity under a conservation easement purchased from Mr. Charles Hursey Sr., Charles Hursey II, Christopher Hursey and Carey Hursey in 2008. Project restoration components, activity and reporting history, contacts and attribute data are all provided in Appendix A.

1.1 Goals and Objectives

The Project's goals were to:

- reduce nutrient and sediment water quality stressors,
- provide for uplift in water quality functions,
- improve instream and wetland aquatic habitats, including riparian terrestrial habitats, and
- provide for greater overall instream and wetland habitat complexity and quality.

Stream enhancement, the primary project component, served as the dominant input for achieving this goal.

These goals were consistent with the Travis and Tickle Creek Local Watershed Plan (LWP). The LWP, completed in 2008, identified six goals; two of which are met by the Project. These are (1) to improve water quality through stormwater management and (2) identify and rank parcels for retrofits, stream repair, preservation and/or conservation. The Project improved the emergency spillway associated with the existing pond immediately upstream of the Project Site and the existing stream crossing to further prevent erosion into the main stream channel. It also included the design and installation of a modified level spreader to diffuse surface flows from the nearby pasture through a vegetated buffer. In addition, the Site was also one of the specific areas identified through the stakeholder process associated with the LWP.

The LWP process identified nine key watershed stressors and their corresponding management strategies. These stressors were identified via the local stakeholder groups including EEP, Piedmont Land Conservancy, Haw River Assembly, Piedmont Triad Council of Governments, Alamance and Guilford Counties, Natural Resources Conservation Service, Cities of Burlington and Graham, Towns of Elon and Gibsonville, NC Division of Water Resources, NC Wildlife Resources Commission and Resource Conservation & Development. The UT to Altamahaw Stream Enhancement Project combats six of those stressors with the following strategies:

Key Watershed Stressors

Stream bank erosion
Lack of adequate buffer
Stormwater runoff
Livestock access to streams
Nutrients
Fecal coliform

Management Strategies

Riparian buffers & livestock exclusion
Riparian buffers & livestock exclusion
Stormwater BMPs
Livestock exclusion
Agricultural BMPs, riparian buffers & stormwater BMPs
Agricultural BMPs & stormwater BMPs

The objectives were to exclude livestock in their entirety from the easement area and install plantings designed to maintain vertical stability, lateral stability and habitat, as well as re-vegetate and supplement

those areas lacking suitable vegetation along the easement area. An alternative water supply was provided and the existing crossing was improved to prevent further erosion. In addition, enhancement of the auxiliary spillway associated with the pond immediately upstream of the Site and construction of a modified level spreader to combat surface flows from the pasture were also completed as part of implementation activities. Ultimately, this supplemental planting will provide increased opportunities for the filtration of pollutants and nutrients prior to entering the stream channel as well as, the stabilization of sediment along the associated stream banks.

1.2 Vegetation Condition and Comparison to Success Criteria

Vegetation success criteria at the Site is consistent with the USACE Wilmington Regulatory District's guidance for wetland mitigation which documents the survival of a minimum of 320 planted woody stems/acre after Monitoring Year 3 (MY3). The mortality rate of 10% will be allowed after MY4 assessments (288 stems/acre) and correspondingly, MY5 assessments (260 stems/acre). Invasive, exotic species were present prior to implementation and criteria will also include the removal of all such species prior to project closeout.

Vegetation is currently being assessed using plot layouts consistent with the EEP/Carolina Vegetation Survey (CVS) Level II Vegetation Protocol. Stem count data is ascertained from five permanently placed 10-meter² vegetation plots (Figure 2). Assessments included counts of both planted and natural stems. Based on this year's monitoring effort, three of the five vegetation plots met the minimum success criteria. Stem counts ranged from approximately 121 to 404 planted stems per acre and approximately 323 to 647 total stems per acre across the Site. Prior to baseline assessments, it was discovered that cattle had accessed the easement area between the completion of implementation activities and baseline assessments. Damages were unrealized at the time; however, based on recent vegetation counts, it appears that overall seedling mortality can be attributed to this occurrence in addition to common mortality rationales such as drought, inferior specimens, etc. Several new planted stems were observed, which increased overall stem count numbers as compared with last year's reporting.

Appendices B and C depict more detailed information regarding the vegetation condition, including annual photograph comparisons.

1.3 Stream Stability/Condition and Comparison to Success Criteria

No in-channel enhancement activities were conducted as part of this project. Assessments include only annual photograph comparisons and monitoring of hydrology associated with the channel. A minimum of two bankfull events must be documented within the standard five-year monitoring period. In order for the hydrology-based monitoring to be considered complete, the two events must occur in separate monitoring years.

During June and July 2013, at least one bankfull event occurred. Evidence of this event was wrack material above the bankfull indicators along the channel and cork shavings within the crest gage present at approximately 40 inches. No other bankfull events were indicated during 2013. Annual photograph comparisons of the stream channels are depicted in Appendix B and hydrologic data associated with this year's monitoring assessment is provided in Appendix D.

1.4 Other Information

Summary information/data related to the occurrence of items such as beaver or encroachment and statistics related to performance of various project and monitoring elements can be found in the tables and figures in

the report appendices. Narrative background and supporting information formerly found in these reports can be found in the Baseline Monitoring Report (formerly Mitigation Plan) and in the Mitigation Plan (formerly the Restoration Plan) documents available on EEP's website. All raw data supporting the tables and figures in the appendices is available from EEP upon request.

Several issues were observed during the November field reconnaissance. These issues included (1) surface erosion along the existing cattle crossing, (2) mowing within the easement area, (3) lack of boundary signage and (4) erosion along the auxiliary spillway immediately outside of the Project Site.

Surface erosion at the cattle crossing is a result from repeated livestock trampling and compaction. This has ultimately resulted in surface waters bypassing the existing modified level spreader and erosion around the pipe along the downstream side of the crossing. Photographs in Appendix B depict this area of concern.

Mowing within the easement area was observed along both sides of the riparian corridor associated with the UT. Figure 3 denotes the areas that have been recently mowed. The obvious purpose of the mowing was to remove and control vegetation along the existing fence lines. It extends inward approximately four to five feet from the woven wire.

Boundary signage along the conservation easement area is limited and does not currently meet EEP guidelines.

The lower portion of the auxiliary spillway immediately adjacent to the easement area has been eroded as a result of heavy rains from the storm events in June and July. The standpipe associated with the pond upstream of the project area is approximately 12 inches in diameter. More than nine inches of rain was recorded between June 5 and July 14. Excess flows were diverted to the auxiliary spillway. These flows moved a section of rip rap downstream towards the UT revealing the geotextile underlayment. Based on visual observations, water has also eroded a portion of the soil under the geotextile fabric. Photographs of this area are depicted in Appendix B.

2.0 METHODOLOGY

This monitoring report follows methodology consistent with EEP's Procedural Guidance and Content Requirements for EEP Monitoring Reports (Version 1.3, dated 1/15/10), available at EEP's website (<http://www.nceep.net>).

Vegetation assessments were conducted using the CVS-EEP protocol (Version 4.2). As part of this protocol, vegetation is assessed using 100-meter² plots, or modules. The scientific method requires that measurements be as unbiased as possible, and that they be repeatable. Plots are designed to achieve both of these objectives; in particular, different people should be able to inventory the same plot and produce similar data (Lee et. al., 2006).

According to Lee et. al. (2006), there are many different goals in recording vegetation, and both time and resources for collecting plot data are extremely variable. To provide appropriate flexibility in project design, the CVS-EEP protocol supports five distinct types of vegetation plot records, which are referred to as levels in recognition of the increasing level of detail and complexity across the sequence. The lower levels require less detail and fewer types of information about both vegetation and environment, and thus are generally sampled with less time and effort (Lee et. al., 2006). Level 1 (Planted Stem Inventory Plots) and Level 2 (Total Woody Stem Inventory Plots) inventories were completed on all five of the vegetation plots at the Project Site.

Level 1 plots are applicable only for restoration areas with planted woody stems. The primary purpose is to determine the pattern of installation of plant material with respect to species, spacing, and density, and to monitor the survival and growth of those installed plants. Level 1 plots are one module in size (Lee et. al., 2006).

Level 2 plots also are designed specifically for restoration areas and represent a superset of information collected for Level 1 plots. In these plots planted woody stems are recorded exactly as for Level 1, but in addition all woody stems resulting from natural regeneration are recorded by size class using separate datasheets. These plots allow an accurate and rapid assessment of the overall trajectory of woody-plant restoration and regeneration on a site. Level 2 plots are one module in size (Lee et. al., 2006).

A crest gage was installed near the downstream end of the Site along the main UT. This gage will verify the on-site occurrences of bankfull events. In addition to the crest gage, observations of wrack and deposition will also serve to validate gage observations, as necessary. Documentation of the highest stage during the monitoring interval will be assessed during each Site visit and the gage will be reset. The data related to bankfull verification will be summarized in each year's report. Based on the elevation of the crest gage, any readings observed higher than 12 inches on the gage will reflect a bankfull or above bankfull event.

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>).

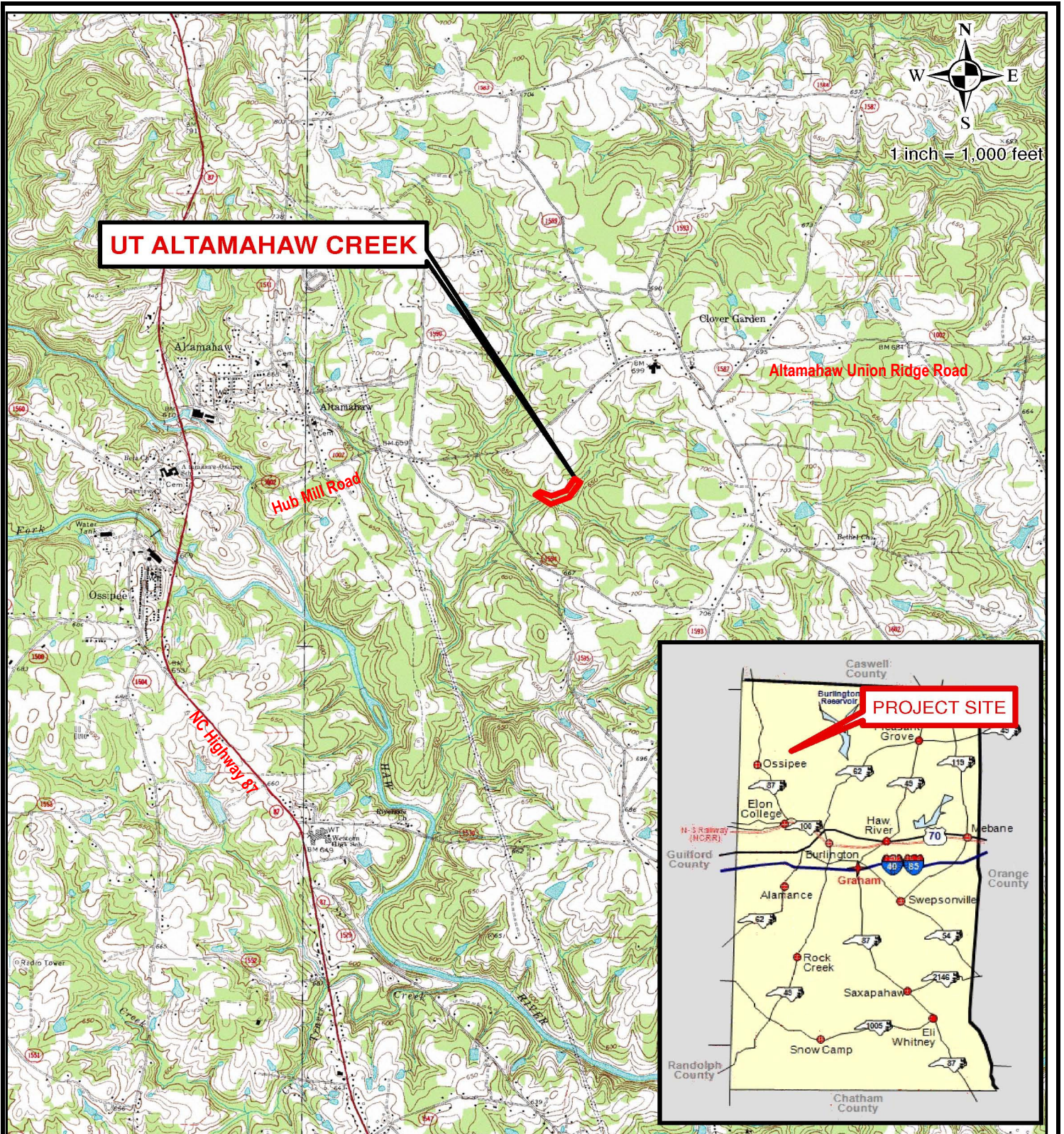
NC DENR Ecosystem Enhancement Program, 2012. UT Altamahaw Creek Baseline Monitoring Document and As-built Baseline Report. Prepared by Ecological Engineering, LLP.

NC State Climate Office, 2013. Daily Precipitation Data from Burlington/Alamance Airport (KBUY), Alamance County (www.nc-climate.ncsu.edu).

US Army Corps of Engineers, US Environmental Protection Agency, NC Wildlife Resources Commission and NC Department of Environment Division of Water Quality, 2003. Stream Mitigation Guidelines.

APPENDIX A.

Project Vicinity Map and Background Tables



DIRECTIONS FROM I-85/I-40 IN ALAMANCE COUNTY:
 Exit 140 (University Drive) – Proceed north for approximately 2.5 miles. Left onto Shallowford Church Road – Proceed approximately one mile. Left onto NC 87- Proceed approximately 2.5 miles. Right onto Hub Mill Road – Proceed approximately 0.75 miles. Right onto Altamahaw Union Ridge Road – Proceed approx. one mile. Turn right onto unnamed gravel roadway – Proceed approx. 0.25 miles. Enter site at metal gate on right.



	<p align="center">PROJECT SITE VICINITY MAP UT to Altamahaw Site - EEP Project No. 92837 Alamance County, NC November 11, 2013</p>	<p>Map Sources: USGS Ossipee/Lake Burlington NC Maps and NCDOT</p>	<p align="center">FIGURE 1</p>
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Table 1. Project Components and Mitigation Credits
UT Altamahaw/ 92837

Mitigation Credits									
	Stream		Riparian Wetland		Non-riparian wetland		Buffer	Nitrogen Nutrient Offset	Phosphorus Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals	738.5			0.013					
Project Components									
Project Component	Stationing/Location		Existing Footage/ Acreage		Approach	Restoration or Restoration Equivalent	Restoration Footage or Acreage	Mitigation Ratio	
Rip. Non-riverine	Northwest boundary		0.026 acres		E	0.013	0.013 acres	2 to 1	
UT Altamahaw Creek	Center of Project Area		1,347 linear feet		EII	673.5	673.5 lf	2 to 1	
UT to UT Altamahaw Creek	Southwest boundary		130 linear feet		EII	65	65 lf	2 to 1	
Component Summation									
Restoration Level	Stream (linear feet)	Riparian Wetland (acres)		Non-riparian Wetland (acres)	Buffer (square feet)	Upland (acres)			
		Riverine	Non-riverine						
Restoration									
Enhancement			0.026 acres						
Enhancement I									
Enhancement II	1,477 linear feet								
Creation									
Preservation									
HQ Preservation									
BMP Elements									
Element	Location		Purpose/Function		Notes				
BMP Elements									
BR = Bioretention Cell; SF = Sand Filter; SW = Stormwater Wetland; WDP = Wet Detention Pond; DDP = Dry Detention Pond; FS = Filter Strip; S = Grassed Swale; LS = Level Spreader; NI = Natural Infiltration Area; FB = Forested Buffer.									

Table 2. Project Activity and Reporting History
UT Altamahaw/ 92837

<p align="center">Elapsed Time Since Grading Complete: 2 years 7 months</p> <p align="center">Elapsed Time Since Planting Complete: 2 years 7 months</p> <p align="center">Number of Reporting Years: 2</p>		
Activity or Report	Data Collection Complete	Completion or Delivery
Mitigation Plan	May-10	May-10
Final Design - Construction Plans	June-10	June-10
Construction		February-11
Temporary S&E Mix Applied to Entire Project Area		February-11
Permanent Seed Mix Applied to Entire Project Area		February-11
Bare Root, Live Stake and Tubling Plantings Applied		February-11
Baseline Monitoring Document	January-12	February-12
Year 1 Monitoring	August-12	December-12
Year 2 Monitoring	July-13	November-13
Year 3 Monitoring		
Year 4 Monitoring		
Year 5 Monitoring		

Table 3. Project Contact Table
UT Altamahaw/ 92837

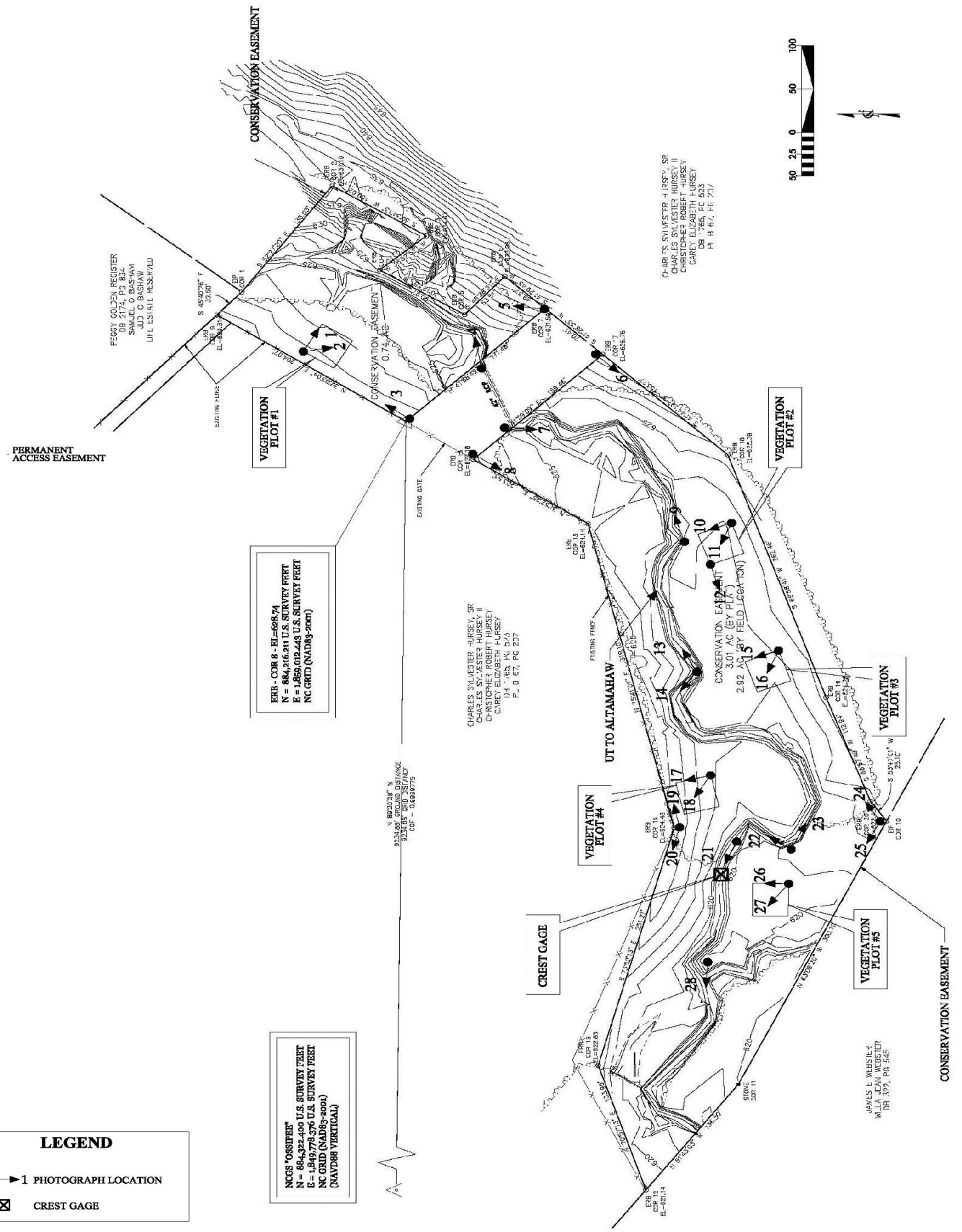
Designer Ecological Engineering, LLP Jenny S. Fleming, PE	Firm Information/ Address 1151 SE Cary Parkway, Suite 101, Cary, NC 27518 (919) 557-0929
Construction Contractor Riverworks, Inc. Bill Wright	Firm Information/ Address 8000 Regency Parkway, Suite 800, Cary, NC 27518 (919) 459-9001
Planting Contractor Riverworks, Inc. George Morris	Firm Information/ Address 8000 Regency Parkway, Suite 800, Cary, NC 27518 (919) 459-9001
Seeding Contractor Riverworks, Inc. George Morris	Firm Information/ Address 8000 Regency Parkway, Suite 800, Cary, NC 27518 (919) 459-9001
Seed Mix Sources	Green Resource (336) 855-6363
Nursery Stock Suppliers	ArborGen (843) 851-4129 Cure Nursery (919) 542-6186 Foggy Mountain Nursery (336) 384-5323 Mellow Marsh Farm (919) 742-1200 Superior Tree (850) 971-5159
Monitoring Performer Ecological Engineering, LLP Lane Sauls (stream, vegetation & wetland)	Firm Information/ Address 1151 SE Cary Parkway, Suite 101, Cary, NC 27518 (919) 557-0929

Table 4. Project Baseline Information and Attributes
UT Altamahaw/ 92837

Project Information			
Project Name		UT Altamahaw	
County		Alamance	
Project Area		3.6 acres	
Project Coordinates (latitude and longitude)		36°10'43.56" North/ 79°28'37.91" West	
Project Watershed Summary Information			
Physiographic Province		Piedmont	
River Basin		Cape Fear	
USGS Hydrologic Unit 8-digit	3030002	USGS Hydrologic Unit 14-digit	3030002030010
DWQ Subbasin		03.06.02	
Project Drainage Area		0.51 sq. mi. (334 acres)	
Project Drainage Area Percentage of Impervious Area		Less than 1%	
CGIA Land Use Classification		Agricultural Land	
Reach Summary Information			
Parameters	Reach 1		Reach 2
Length of Reach	1,347 linear feet		130 linear feet
Valley Classification	Valley Type VIII		Valley Type VIII
Drainage Area	0.51 sq. mi. (334 acres)		0.39 sq. mi. (251 acres)
NCDWQ Stream ID Score	46.75		39.25
NCDWQ Water Quality Classification	C NSW		C NSW
Morphological Description (stream type)	C/E 5		C/E 5
Evolutionary Trend	E-C-G-F-E-C		E-C-G-F-E-C
Underlying Mapped Soils	Worsham sandy loam		Worsham sandy loam
Drainage Classification	Poorly drained		Poorly drained
Soil Hydric Status	Hydric A		Hydric A
Slope	0 to 3%		0 to 3%
FEMA Classification	Zone AE - lower end		Zone AE - lower end
Native Vegetation Community	Piedmont Alluvial Forest		Piedmont Alluvial Forest
Percent Composition of Exotic Invasive Species	Less than 5%		Less than 5%
Wetland Summary Information			
Size of Wetland		0.026 acres	
Wetland Type		Seepage	
Mapped Soil Series		Worsham sandy loam	
Drainage Classification		Poorly drained	
Soil Hydric Status		Hydric A	
Source of Hydrology		Groundwater	
Hydrologic Impairment		None	
Native Vegetation Community		Piedmont Alluvial Forest	
Percent Composition of Exotic Invasive Species		Less than 5%	
Regulatory Considerations			
Waters of the United States - Section 404		Resolved	
Waters of the United States - Section 401		Resolved	
Endangered Species Act		Resolved	
Historic Preservation Act		Resolved	
Coastal Zone/Area Management Acts (CZMA/CAMA)		Not Applicable	
FEMA Floodplain Compliance		Resolved	
Essential Fisheries Habitat		Not Applicable	

APPENDIX B.

Visual Assessment Data



ERB - COR 8 - RL = 698.74
 N = 864,216.211 U.S. SURVEY FEET
 E = 1,859,022.443 U.S. SURVEY FEET
 NC GRID (NAD83-2011)

NOCS CORNER
 N = 864,216.211 U.S. SURVEY FEET
 E = 1,859,022.443 U.S. SURVEY FEET
 NC GRID (NAD83-2011)
 (NAD83 VERTICAL)

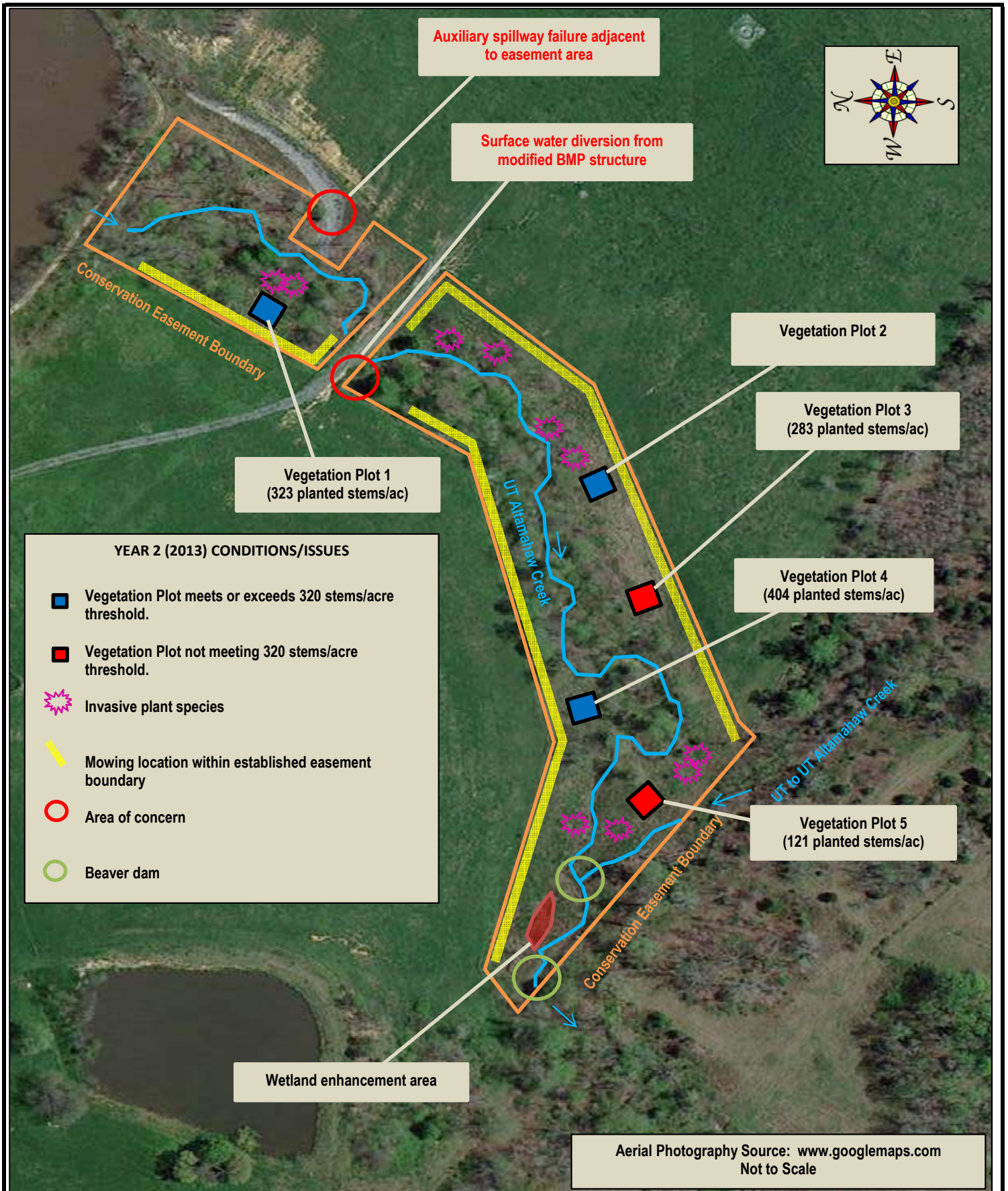
LEGEND

- → 1 PHOTOGRAPH LOCATION
- ⊗ CREST GAGE

CHARLES SYLVESTER HURSEY, SR
 CHARLES SYLVESTER HURSEY, II
 CHRISTOPHER ROBERT HURSEY
 CONSERVATION EASEMENT
 DB 7765, PG 523
 PL 8 67, PG 217

CHARLES SYLVESTER HURSEY, SR
 CHARLES SYLVESTER HURSEY, II
 CHRISTOPHER ROBERT HURSEY
 CONSERVATION EASEMENT
 DB 7765, PG 523
 PL 8 67, PG 217

JAMES E. WELLSLEY,
 WENDELL WELLSLEY
 DB 1322, PG 542



CURRENT CONDITIONS PLAN VIEW

UT to Altamahaw Site - EEP Project No. 92837
Alamance County, NC

November 11, 2013

FIGURE 3



Table 6. Vegetation Condition Assessment

UT Altamahaw EEP Project No. 92837

Planted Acreage 4.6

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbaceous material	0.1 ac	n/a	0	0	0
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY 3, 4, or 5 stem count criteria	0.1 ac	n/a	2 of 5 veg plots	<0.1 ac	2.2%
Total				2	<0.1 ac	2.2%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that area obviously small given the monitoring year	0.25 ac	n/a	0	1 ac	25%
Cumulative Total				2	1.1	27.2%

NOTES: Two of five vegetation plots did not meet the required success criteria for planted stems. A supplemental planting is proposed during November 2013 to augment existing trees within the easement area. Portions of the lower project area are covered with a dense assemblage of blackberry. Planted tree stems were difficult to impossible to locate in multiple areas. Blackberry treatment and removal is proposed in during November 2013.
















Easement Acreage 4.6

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% Planted Acreage
4. Invasive Areas of Concern	Areas or points (if too small to render as polygons at map scale)	0.1 ac	Yes	10	0.1 ac	2.1%
5. Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale)	0.1 ac	Yes	3	0.2 ac	4.3%

NOTES: Invasive plant species observed included Chinese privet and multiflora rose. These species were treated on October 24, 2013. Easement encroachment was observed in three separate areas within the existing fenced area. This encroachment consisted of mowing (4 to 5-foot wide linear row immediately adjacent to the fence. As a result the plot markers and several trees within two existing vegetation plots were destroyed. Mowing appears to have occurred during October 2013.

Photostation Comparison

UT Altamahaw Site - Monitoring Year 2 (2013)

Photo # and Location	Baseline Condition 2012	MY 1 2012	MY 2 2013
Photostation 1. Facing south east along y-axis of Vegetation Plot 1.			
Photostation 2. Facing south across Vegetation Plot 1.			
Photostation 3. Facing northeast towards Vegetation Plot 1.			
Photostation 4. Facing east (upstream) along UT Altamahaw Creek.			
Photostation 5. Facing north from east corner of existing crossing.			

**Photostation
Comparison -
Page 2**

Baseline Condition 2012

MY 1 2012

MY 2 2013

Photostation 6.
Facing southwest
from south corner of
existing crossing.



Photostation 7.
Facing south along
UT Altamahaw Creek
from existing
crossing.



Photostation 8.
Facing southwest
from corner at
existing west corner of
crossing.



Photostation 9.
Facing upstream
along UT Altamahaw
Creek north of
Vegetation Plot 2.



Photostation 10.
Facing north along x-
axis of Vegetation
Plot 2.



**Photostation
Comparison -
Page 3**

Baseline Condition 2012

MY 1 2012

MY 2 2013

Photostation 11.
Facing northwest
across Vegetation
Plot 2.



Photostation 12.
Facing west at
riparian area from
Vegetation Plot 2.



Photostation 13.
Facing upstream
along UT Altamahaw
Creek.



Photostation 14.
Facing downstream
along UT Altamahaw
Creek.



Photostation 15.
Facing north along x-
axis of Vegetation
Plot 3.



**Photostation
Comparison -
Page 4**

Baseline Condition 2012

MY 1 2012

MY 2 2013

Photostation 16.
Facing northwest
across Vegetation
Plot 3.



Photostation 17.
Facing north along x-
axis of Vegetation
Plot 4.



Photostation 18.
Facing northwest
across Vegetation
Plot 4.



Photostation 19.
Facing northwest
along easement
boundary.



Photostation 20.
Facing northeast
along easement
boundary.



**Photostation
Comparison -
Page 5**

Baseline Condition 2012

MY 1 2012

MY 2 2013

Photostation 21.
Facing downstream
along UT Altamahaw
Creek at the crest
gage.



Photostation 22.
Facing downstream
along UT Altamahaw
Creek.



Photostation 23.
Facing upstream
along UT Altamahaw
Creek.



Photostation 24.
Facing northwest
along southern
easement boundary.



Photostation 25.
Facing northwest
along southern
easement boundary.



**Photostation
Comparison -
Page 6**

Baseline Condition 2012

MY 1 2012

MY 2 2013

Photostation 26.
Facing north along x-
axis of Vegetation
Plot 5.



Photostation 27.
Facing northwest
across Vegetation
Plot 5.



Photostation 28.
Facing downstream
from confluence of
two unnamed
tributaries.



Additional Photographs

UT Altamahaw Site - Monitoring Year 2 (2013)



Photograph 29.

Facing southwest along the northern easement boundary at mowing inside of the easement fence.



Photograph 30.

Facing southwest along the southern easement boundary at mowing inside of the easement fence.



Photograph 31.

Facing northwest along the cattle crossing at mowing inside of the easement fence.



Photograph 32.

Facing southeast at erosion and bypass of the modified level spreader associated with the cattle crossing.



Photograph 33.

Facing southeast at erosion and bypass of the modified level spreader associated with the cattle crossing.



Photograph 34.

Facing northwest at erosion and bypass of the modified level spreader associated with the cattle crossing.



Photograph 35.

Existing blackberry with scattered stems of Chinese privet and multiflora rose near downstream end of the Project Area.



Photograph 36.

Impounded water along the UT associated with two beaver dams within the easement area.



Photograph 37.

Auxillary spillway erosion immediately outside of easement area.



Photograph 38.

Facing downstream along auxillary spillway at erosion.



Photograph 39.

Facing downstream along the UT at auxillary spillway sloughing into channel.

APPENDIX C.

Vegetation Plot Data

Table 7. Vegetation Plot Criteria Attainment UT Altamahaw/ 92837		
Vegetation Plot ID	Vegetation Survival Threshold Met?	T tract Mean
1	Yes	100%
2	Yes	100%
3	No	100%
4	Yes	100%
5	No	100%

Table 8. CVS Vegetation Metadata UT to Altamahaw Creek (EEP Project No. 92837)	
Report Prepared By	Lane Sauls
Date Prepared	7/31/2013 11:29
database name	cvs-EEP-entrytool-v2.3.1.mdb
database location	R:\50000 State\EEP 50512\50512-001 EEP Altamahaw Creek\MONITORING\UT Altamahaw Year 2 2013
computer name	LANE
file size	36573184
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
PROJECT SUMMARY-----	
Project Code	92837
project Name	UT ALTAMAHAW
Description	
River Basin	Cape Fear
length(ft)	1347
stream-to-edge width (ft)	50
area (sq m)	12512.77
Required Plots (calculated)	5
Sampled Plots	5

Table 9. CVS Stem Count Total and Planted Stems by Plot and Species
 EEP Project Code 92837. Project Name: UT ALTAMAHAW

Scientific Name	Common Name	Species Type	Current Plot Data (MY2 2013)												Annual Means												
			92837-LS-0001		92837-LS-0002		92837-LS-0003		92837-LS-0004		92837-LS-0005		MY2 (2013)		MY1 (2012)		MY0 (2012)										
			PnoL	SP-all	T	PnoL	SP-all	T	PnoL	SP-all	T	PnoL	SP-all	T	PnoL	SP-all	T	PnoL	SP-all	T							
Acer negundo	boxelder	Tree																									
Acer rubrum	red maple	Tree			3																						
Asimina triloba	pawpaw	Tree	1	1																							
Betula nigra	river birch	Tree																									
Carya ovala	shagbark hickory	Tree																									
Cornus florida	flowering dogwood	Tree																									
Fraxinus pennsylvanica	green ash	Tree	4	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1						
Ligustrum sinense	Chinese privet	Exotic																									
Liquidambar styraciflua	sweetgum	Tree																									
Liriodendron tulipifera	tuliptree	Tree																									
Oxydendrum arboreum	sourwood	Tree																									
Platanus occidentalis	American sycamore	Tree																									
Prunus serotina	black cherry	Tree																									
Quercus	oak	Tree																									
Quercus michauxii	swamp chestnut oak	Tree																									
Quercus pagoda	cherrybark oak	Tree	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1						
Rhus	sumac	shrub																									
Salix nigra	black willow	Tree																									
Sambucus canadensis	Common Elderberry	Shrub																									
Ulmus americana	American elm	Tree	2	2	1	1	1	3	3	3	3	1	1	1	1	1	1	1	1	1	1						
Unknown		Shrub or Tree																									
		Stem count	8	8	14	10	10	16	7	7	8	10	10	12	3	3	18	38	38	68	25	25	60	35	35	37	
		size (ares)	1																								
		size (ACRES)	0.02																								
		Species count	4	4	9	5	5	8	4	4	5	5	7	3	3	6	8	8	16	7	7	14	10	10	11	11	
		Stems per ACRE	323.7	323.7	566.6	404.7	404.7	647.5	283.3	283.3	323.7	404.7	485.6	121.4	121.4	728.4	307.6	307.6	550.4	202.3	202.3	485.6	283.3	283.3	299.5	299.5	

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%

APPENDIX D.

Hydrology Data

**Table 12. Verification of Bankfull Events
UT Altamahaw/ 92837**

Date of Data Collection	Date of Occurrence	Method	Photo # (if available)
n/a*	November 3 & 4, 2012	NC State Climate Office	None
7/31/2013	June 5-13 and June 28-July 14, 2013	NC State Climate Office, Crest Gage & Visual Assessment	None

* Based on daily rainfall data prior to installation of Crest Gage. Approximately 2.4 inches of rain was recorded over a span of two days.

Table 13. Monthly Rainfall Data Summary - UT Altamahaw Site 2013

Month	Amount (in.)	30%	70%
January	4.1038	1.05	2.45
February	3.1642	0.93	2.17
March	2.9724	1.26	2.94
April	3.3429	1.08	2.52
May	3.2845	1.11	2.59
June	6.8952	1.17	2.73
July	8.58	1.38	3.22
August	1.83	1.2	2.8
September	3.62	1.23	2.87
October	1.54	0.99	2.31
November	0	0.99	2.31
December	0	0.99	2.31

UT Altamahaw Site 30-70 Percentile Graph for Rainfall - Monitoring Year 2 (2013), Alamance County, NC

