FINAL MITIGATION PLAN

Foust Creek Mitigation Site
Alamance County, NC
DENR Contract No. 004954
EEP ID No. 95715

Cape Fear River Basin
HUC 03030002

Prepared for:

Ecosystem Enhancement PROGRAM

NC Department of Environment and Natural Resources
Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

February 4, 2014

DRAFT MITIGATION PLAN

Foust Creek Mitigation Site
Alamance County, NC
DENR Contract No. 004954
EEP ID No. 95715

Cape Fear River Basin
HUC 03030002

Prepared for:

NC Department of Environment and Natural Resources
Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

Prepared by:

Wildlands Engineering, Inc.
1430 South Mint Street, Suite 104
Charlotte, NC 28203
Phone – 704-332-7754

Shawn Wilkerson
swilkerson@wildlandseng.com

February 4, 2014

EXECUTIVE SUMMARY

Wildlands Engineering, Inc. (Wildlands) is completing a full-delivery project for the North Carolina Ecosystem Enhancement Program (EEP) to restore and enhance a total of 5,234 existing linear feet (LF) of perennial and intermittent streams and rehabilitate and re-establish 5.1 acres of wetlands in Alamance County, NC. The streams proposed for restoration and enhancement include Foust Creek, a second order perennial stream, and one unnamed first order intermittent tributary to Foust Creek (UT1). The project reaches flow off-site directly into Canes Creek, which flows into the Haw River and proceeds to the B. Everett Jordan Lake reservoir. The goal of the project is to provide stream mitigation units (SMUs) in the Cape Fear River Basin Hydrologic Unit Code (HUC) 0303002 (Cape Fear 02). Buffer restoration will also take place but is not intended for mitigation credit at this time.

The Foust Creek Mitigation Site is located within the Jordan Lake Water Supply Watershed, which has been designated a Nutrient Sensitive Water. The Site's watershed is within the Cane Creek Targeted Local Watershed (TLW) HUC 03030002050050 and was identified in the EEP's Cape Fear River Basin Restoration Priorities 2009 (RBRP) report. This RBRP plan identifies agricultural operations and degraded water quality based on "fair" and "good-fair" benthic ratings as the impairments in the Cane Creek watershed. The RBRP report also identifies the successful completion of a number of stream and wetland projects within the Cane Creek watershed. The Foust Creek Mitigation Site fully supports the Cataloging Unit (CU)-wide functional objectives stated in the 2011 Request for Proposals (RFP) to reduce and control nutrient inputs, reduce and control sediment inputs, and protect and augment Significant Natural Heritage Areas in the Cape Fear 02 River Basin.

The primary goals of the project are to improve ecologic functions and to manage nonpoint source pollution inputs to the impaired Site as described in the RBRP. The agricultural stressors and pollutants will specifically be addressed by the proposed site design. Cattle and agricultural practices will be excluded from the stream channels and riparian buffer areas, eroding banks will be stabilized, and vegetated wetlands and buffers will filter nitrogen, phosphorus, and fecal coliform pollutants from agricultural runoff.

The proposed project will provide numerous ecological benefits within the Cape Fear River Basin. While many of these benefits are limited to the Foust Creek Mitigation Site project area, others, such as pollutant removal, reduced sediment loading, and improved aquatic and terrestrial habitat have more far-reaching effects.

This mitigation plan has been written in conformance with the requirements of the following:

- Federal rule for compensatory mitigation project sites as described in the Federal Register Title 33 Navigation and Navigable Waters Volume 3 Chapter 2 Section § 332.8 paragraphs (c)(2) through (c)(14).
- NCDENR Ecosystem Enhancement Program In-Lieu Fee Instrument signed and dated July 28, 2010.

These documents govern EEP operations and procedures for the delivery of compensatory mitigation.

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1.0 Restoration Project Goals and Objectives

The Foust Creek Mitigation Site is located within the Cane Creek watershed of the Cape Fear River basin. The site consists of Foust Creek, a second order perennial stream, and one unnamed first order intermittent tributary to Foust Creek (UT1). The project reaches flow off-site directly into Canes Creek, which flows into the Haw River and proceeds to the B. Everett Jordan Lake reservoir. The site's watershed is located within Hydrologic Unit Code (HUC) 03030002050050 and was identified as a Targeted Local Watershed (TLW) in EEP's Cape Fear River Basin Restoration Priorities 2009 (RBRP) report.

The RBRP identifies agricultural operations and degraded water quality based on "fair" and "good-fair" benthic ratings as the impairments in the Cane Creek watershed and states the importance of continued restoration and preservation work in the basin to "promote good riparian conditions." The Cane Creek watershed is not rated in the 2005 DWQ Cape Fear River Basinwide Water Quality Plan. The Cape Fear 02 2011 RFP established three CU-wide Functional Improvement Objectives listed below:

- To reduce and control sediment inputs;
- To reduce and control nutrient inputs; and
- To protect and augment Significant Natural Heritage Areas.

No Significant Natural Heritage Areas are impacted by the Site; however, the Foust Creek Mitigation Site will contribute to meeting the other two CU-wide Functional Improvement Objectives described above by establishing the following project goals:

- Reduce sediment inputs by removing cattle from streams and restoring degraded and eroding stream channels;
- Return a network of streams to a stable form that is capable of supporting biological functions;
- Reduce fecal coliform, nitrogen, and phosphorus inputs through removing cattle from streams and establishing and augmenting a forested riparian corridor; and
- Protect existing high quality streams and forested buffers;

The project goals will be addressed through the following project objectives:

- On-site nutrient inputs will be decreased by removing cattle from streams, re-establishing floodplain connectivity, and filtering on-site runoff through buffer zones and wetlands. Off-site nutrient input will be absorbed on-site by filtering flood flows through restored floodplain areas and riparian wetlands, where flood flow will spread through native vegetation. Vegetation is expected to uptake excess nutrients.
- Stream bank erosion which contributes sediment load to the creeks will be greatly reduced, if not eliminated, in the project area. Eroding stream banks will be stabilized using bioengineering, natural channel design techniques, and grading to reduce bank angles and bank height. Storm flow containing grit and fine sediment will be filtered through restored floodplain areas, where flow will spread through native vegetation. Spreading flood flows will also reduce velocity and allow sediment to settle out.

Sediment transport capacity of restored reaches will be improved so that capacity balances more closely to load. Sediment load reduction will be monitored through assessing bank stability with cross section and profile surveys and visual assessment through photo documentation which serves as an accepted surrogate for direct turbidity measurements.

- Restored riffle/pool sequences will promote aeration of water and create deep water zones, helping to lower water temperature. Establishment and maintenance of riparian buffers will create long-term shading of the channel flow to minimize thermal heating. Lower water temperatures will help maintain dissolved oxygen concentrations.
- In-stream structures will be constructed to improve habitat diversity and trap detritus. Wood habitat structures will be included in the stream as part of the restoration design. Such structures may include log drops and rock structures that incorporate woody debris.
- Adjacent buffer and riparian habitats will be restored with native vegetation as part of the project. Native vegetation will provide cover and food for terrestrial creatures. Native plant species will be planted and invasive species will be treated. Eroding and unstable areas will also be stabilized with vegetation as part of this project.
- The restored land will be protected in perpetuity through a conservation easement.

2.0 Project Site Location and Selection

2.1 Directions to Project Site

The Foust Creek Mitigation Site is located in the southern portion of Alamance County, NC, as shown in Figure 1. The site is approximately fifteen miles southeast of the City of Burlington. The proposed project is located in active cattle pasturelands surrounded by woods and agriculture.

From Burlington, NC, take NC-87 south approximately 11 miles to Snow Camp Road. Turn right on Snow Camp Road and continue approximately 4 miles. The project site is located upstream and downstream of the Snow Camp Road stream crossing.

2.2 Site Selection and Project Components

The site has been selected to provide stream and wetland mitigation units (SMUs) in the Cape Fear River Basin. The site was selected based on the current degraded condition of the site's streams and wetlands and the potential for functional restoration described in Section 1.0. Credit determinations are presented in Section 9.0.

The streams proposed for restoration and enhancement include Foust Creek and one unnamed tributary to Foust Creek identified as UT1, as illustrated on Figure 2. Foust Creek includes four reaches based on drainage area, as shown in Figure 3. Reach 1 is begins at the northernmost portion of the site and continues downstream to an existing farm road crossing. Reach 2 is located from the downstream end of Reach 1 to the confluence with UT1. Reach 3A is located from the UT1 confluence to the Snow Creek Road crossing. Reach 3B is located from the Snow Creek Road crossing to the southernmost portion of the site. The wetlands proposed for

rehabilitation are located within the Foust Creek floodplain and are shown in Figure 2. Photographs of the project site are included in Appendix 1.

3.0 Site Protection Instrument

The Foust Creek Mitigation Site is located on four parcels in Alamance County, NC. Options to purchase conservation easements, to be held by the State of North Carolina, have been recorded for a total of 22.11 acres. The land required for construction, management, and stewardship of the mitigation project includes portions of the parcels listed in Table 1. A copy of the land protection instrument is included in Appendix 2. Figure 2 depicts the proposed conservation easement areas.

Table 1. Site Protection Instrument
Foust Creek Mitigation Site

Landowner	PIN	County	Site Protection Instrument	Deed Book and Page Number	Acreage to be Protected
Cheek	8788190910	Alamance	Conservation Easement	DB 2879 PN 704	2.116
	8788091418	Alamance	Conservation Easement	DB 837 PN 73	2.637
Payne	8788182993	Alamance	Conservation Easement	DB 83 PN 326	12.559
	8788175121	Alamance	Conservation Easement	DB 212 PN 237	4.798

All site protection instruments require 60-day advance notification to the Corps and the State prior to any action to void, amend, or modify the document. No such action shall take place unless approved by the State.

4.0 Baseline Information –Project Site and Watershed Summary

Table 2 presents the project information and baseline watershed information. The watershed areas were delineated on USGS 7.5-minute topographic quadrangles and are shown on Figure 3.

Table 2. Project and Watershed Information
Foust Creek Mitigation Site

Project County	Alamance County
Project Area (acres)	22.11
Project Coordinates	35°55’0.12”N, 79°24’6.84”W
Physiographic Region	Carolina Slate Belt of the Piedmont Physiographic Province
Ecoregion	Piedmont – Carolina Slate Belt
River Basin	Cape Fear
USGS HUC (8 digit, 14 digit)	03030002, 03030002050050

Table 2. (Continued)

NCDWQ Sub-basin	03-06-04			
Reaches	Foust Creek Reach 1	Foust Creek Reach 2	Foust Creek Reach 3	UT1
Drainage Area (acres)	954	1047	1259	173
Drainage Area (square miles)	1.5	1.6	2	0.3
CGIA Land Use Classification				
Developed	<1%	<1%	<1%	<1%
Forested/Scrubland	91%	81%	78%	57%
Agriculture/Managed Herb.	8%	18%	21%	42%
Open Water	<1%	<1%	<1%	<1%
Watershed Impervious Cover	<1%	<1%	<1%	<1%

4.1 Watershed Historical Land Use and Development Trends

The Foust Creek watershed is located in rural countryside approximately 15 miles southeast of Burlington, NC. Land use within the Foust Creek watershed is historically rural and dominated by agriculture and forest. A review of historical aerials from 1973, 1983, 1993, 1989, 1993, 1999, 2005, 2006, and 2008 verified that land use on the project site and in the watershed has remained relatively consistent for the past 40 years (historic aerial photos are included in Appendix 3).

There are no signs of impending land use changes or development pressure evident in the Foust Creek watershed. The Conservation Easement will prevent future development in the immediate riparian zone of the onsite streams.

4.2 Watershed Assessment

On April 10, 2013, Wildlands conducted a watershed windshield assessment to verify current land uses represented in the aerial photography and to identify potential stressors. During the watershed assessment, stream corridors were observed at road crossings throughout the watershed upstream of the project reaches. Current land use practices within the watershed were confirmed to approximately match the type, location, and extents depicted in existing aerial photography.

The land use observed is a mix of semi-mature hardwood forest, planted tree tracts, pasture, low density residential, and crop production. Few livestock grazing operations were observed in the watershed. There are several small farm ponds distributed throughout the watershed. Foust Creek is in good condition in the forested sections above the project and a reference reach was identified and surveyed in this area for use in the project (See section 8.1). The condition of Foust Creek below the project area was similar to that of the project reaches.

With the majority of the Foust Creek Watershed being forested (78-91%) it is specific local stressors including grazing, mowing, non-woody riparian buffers, and livestock access on the Site and adjacent parcels that are mostly responsible for the current degraded conditions of the onsite streams and wetlands. The watershed assessment supports the conclusion that the overall watershed hydrology and sediment regime have remained essentially the same in recent decades.

4.3 Physiography, Geology, and Soils

The project site is located in the Carolina Slate Belt region of the Piedmont Physiographic Province between the Triassic Basin to the east and Inner Piedmont to the west. The Piedmont Province is characterized by gently rolling, well-rounded hills with long low ridges, with elevations ranging from 300 to 1,500 feet above sea level. The Carolina Slate Belt consists of heated and deformed volcanic and sedimentary rocks. The area is called "Slate Belt" because of the slatey cleavage of many of the surficial rocks. The region's geology also includes coarse-grained intrusive granites. Specifically, the proposed restoration site is located in the CZfv subregion within the Carolina Slate Belt. The CZfv subregion is classified as felsic metavolcanic rock. These rock types are described as metamorphosed dacitic to rhyolitic flows and tuffs interbedded with mafic and intermediate metavolcanic rock, meta-argillite, and metamudstone.

The floodplain areas of the proposed project are mapped by the Alamance County Soil Survey. Soils in the project area floodplain are primarily mapped as Local alluvial land, Georgeville silty clay loam, and Orange silt loam. These soils are described below in Table 3. A soils map is provided in Figure 4. Soil profiles sealed by a NC registered soil scientist are included in Appendix 4 which describes the areas mapped as Local alluvial land in more detail.

Table 3. Project Soil Types and Descriptions
Foust Creek Mitigation Site

Soil Name	Description
Local alluvial land	Alluvial land soil components are found on floodplains. They are poorly-drained soils consisting of loamy alluvium derived from igneous and metamorphic rock. This soil is not flooded or ponded, but has a seasonal zone of water saturation at 6 inches.
Georgeville silty clay loam 6-10% slopes 10-15% slopes	Georgeville soils are found on uplands and hillslopes on ridges. They are well-drained with low shrink-swell potential and moderately high permeability. This soil unit is not typically flooded or ponded.
Orange silt loam, 6-10% slopes	Orange soils are typically found on interfluves and uplands. They are a deep, well-drained soil with low permeability. This soil is not typically flooded or ponded, but has a seasonal zone of water saturation at 24 inches.
Source: Alamance County Soil Survey, USDA-NRCS, http://efotg.nrcs.usda.gov	

4.4 Valley Classification

The stream valleys within the Foust Creek project area are relatively narrow floodplains with valley side slopes ranging from 5% – 15% and valley slopes ranging from 0.6% – 1.4%. It should be noted that the surrounding fluvial and morphological landforms do not fit neatly into any of the Rosgen (1996) valley type classification descriptions which best describe landforms of the Western and Central United States. However, the Foust Creek valleys most closely resemble Valley Type IV, which are steeper, moderately confined valleys with narrow valley bottoms containing the stream and an associated floodplain. While Valley Type IV is described in publication as bedrock controlled gorges and canyons, personal communication with the author has indicated that bedrock controlled confined valleys in the Mid-Atlantic and Southeast piedmont are accurately described as Valley Type IV (Rosgen, 2006 and 2007).

4.5 Surface Water Classification and Water Quality

On June 25 and 26, 2013, Wildlands investigated on-site jurisdictional waters of the U.S. using the U.S. Army Corps of Engineers (USACE) Routine On-Site Determination Method. This method is defined in the 1987 Corps of Engineers Wetlands Delineation Manual and subsequent Eastern Mountain and Piedmont Regional Supplement. Determination methods included stream classification utilizing the NCDWQ Stream Identification Form and the USACE Stream Quality Assessment Worksheet. Potential jurisdictional wetland areas as well as typical upland areas were classified using the USACE Wetland Determination Data Form.

The results of the on-site field investigation indicated that there are two jurisdictional stream channels located within the proposed project area including Foust Creek and one unnamed tributary to Foust Creek (UT1). Foust Creek was determined to be perennial within the project area while UT1 was determined to be intermittent. Nine jurisdictional wetland areas were identified within the proposed project area (Wetlands A – J) and are located within the floodplain of Foust Creek. Representatives of the USACE confirmed the aforementioned Jurisdictional Determinations during a field visit on December 16, 2013. The confirmation letter and supporting documents including a figure of assessment points and Wetland Determination Data Forms are located in Appendix 5. Site photographs are included in Appendix 1.

The North Carolina Division of Water Quality (NCDWQ) assigns best usage classifications to State Waters that reflect water quality conditions and potential resource usage. Foust Creek (DWQ Index No. 16-28-4) is the main tributary of the project and has been classified as a Water Supply – V (Class WS-V) water and a Nutrient Sensitive Water (NSW). Class WS-V waters are protected as water supplies and typically flow into other water bodies that are directly used as sources for drinking, culinary or food processing purposes. NSW classification represents water bodies that require nutrient management plans to reduce water quality impacts due to excessive nitrogen and phosphorus levels and algal populations.

5.0 Baseline Information – Reach Summary

On-site existing conditions assessments were conducted by Wildlands during the spring of 2013. The locations of the project reaches and surveyed cross sections are shown in Figure 5. Existing geomorphic survey data is included in Appendix 6. Table 4 presents the reach summary information.

Table 4. Reach Summary Information
Foust Creek Mitigation Site

	Foust Creek Reach 1	Foust Creek Reach 2	Foust Creek Reach 3	UT1
Restored Length (LF)	814	2425	1506	788
Valley Type	IV	IV	IV	IV
Valley Slope (feet/ foot)	0.006	0.010	0.008	0.014
Drainage Area (acres)	954	1047	1259	173
Drainage Area (square miles)	1.5	1.6	2.0	0.3
NCDWQ stream ID score	41.5	41.5	44	28
Perennial or Intermittent	P	P	P	I
NCDWQ Classification	WS-V	WS-V	WS-V	---
Rosgen Classification of Pre-Project Reach	C/E	C5	C/E4	E5
Simon Evolutionary Stage	III/IV	NA	III/IV	III
FEMA classification	AE	AE	AE	---

5.1 Existing Stream and Vegetation Condition

Foust Creek has been degraded by livestock access and agricultural practices. Impacts to the stream include direct access by livestock, trampling of the riparian vegetation and stream banks, channelization, eroding banks, floodplain ditching, and a lack of stabilizing riparian vegetation. The adjacent floodplain area has been cleared for pasture and is currently grazed by livestock. The riparian vegetation is either absent, limited to the streambanks, or periodically disturbed.

Foust Creek Reach 1 flows from the northernmost portion of the property and is moderately incised. Riffle and pool sequences are irregular. There are some established canopy trees along the top of bank and the floodplain area is a mix of early successional herbaceous species and

some scrub-shrub woody vegetation. The floodplain area appears to be regularly disturbed by livestock intrusion, mowing, and clearing.

Foust Creek Reaches 2 and 3A flow through cattle pasture to the crossing at Snow Camp Road. The stream is heavily impacted by livestock intrusion with severe trampling of both the bed and banks. Bedform is poorly developed and the instream habitat quality of the stream is poor. With the exception of an occasional canopy tree, the woody riparian vegetation consists of non-native shrubs and alder thickets located along the stream banks and on mid channel bars. Existing wetlands located in the floodplain are mowed and grazed.

Foust Creek Reaches 3A and 3B flow from the Snow Camp Road crossing to the southernmost boundary of the project site. The upper portion of the reach has a very low slope and poor flow conditions. The stream runs parallel to the road along a steep wooded valley wall on river right before making a sharp turn to the right. Downstream from the turn, the stream appears to have been straightened and is incised. The floodplain is in pasture and there is a large channel scar, that has formed Wetland A, on river left that is likely the location of the stream prior to channelization. There is a mix of native and non-native woody vegetation along the stream banks that appears to be regularly maintained. Instream habitat conditions throughout the reach are poor. Cattle have direct access to the stream along the length of both Reaches 3A and 3B.

UT1 runs west to east from a private road crossing to its confluence with Foust Creek. The stream is straight, narrow, and incised. Riffle and pool bedforms are largely absent and instream habitat conditions are poor. There is a narrow band of woody riparian vegetation along the top of banks composed of infrequent canopy trees and a mix of native and non-native shrubs and small trees. The streamside vegetation appears to be routinely maintained.

5.2 Stream Geomorphology

Geomorphic assessments were conducted for each project reach. Data collection included representative cross sections, longitudinal profiles, reach-wide pebble counts, and riffle pebble counts. Collected data is included in Appendix 6.

The streams exist in an unnatural condition due to livestock access and channel maintenance; therefore, reliable bankfull features were difficult to identify. Existing condition bankfull determinations were based on a combination of field observations and the drainage area – discharge relationships developed for use in the project outlined in Section 5.4. Particular emphasis was placed on the reference reach surveyed on Foust Creek in the wooded area above the project site. Existing geomorphic conditions for each reach included in the project are summarized below in Tables 5A and 5B. The reaches are mapped on Figure 5.

Foust Creek Reach 1 flows southward through a mix of successional grasses and disturbed forest. The reach starts at the northernmost conservation easement boundary and terminates several hundred feet above an existing farm road crossing. The reach drains 1.5 square miles. The reach may have been historically channelized and/or dredged. The channel has a width to depth ratio of 11.7 and a bank height ratio of 2.0. The channel classifies as a C/E stream type.

Foust Creek Reach 2 begins at the downstream end of Reach 1 and terminates at the confluence with UT1. The reach flows through active pastures and drains 1.6 square miles. The stream may

have been channelized and lacks well defined pattern. The reach has a width to depth ratio of 20.3 and a bank height ratio of 1.4. The channel slope is 0.0076 ft/ft. The d_{50} of the bed material is 1.2 mm which is in the very coarse sand substrate range. The channel classifies as a C5 stream type.

Foust Creek Reach 3A begins at the downstream end of Reach 2 and terminates at the upstream end of the Snow Camp Road crossing. The reach flows through active pastures and drains 1.9 square miles. The stream may have been channelized and lacks well defined pattern. The reach has a width to depth ratio that of 12.2 and a bank height ratio of 1.1. The channel slope is 0.0078 ft/ft. The d_{50} of the bed material is 7.6 mm which is in the medium gravel substrate range. The channel classifies as a C/E4 stream type.

Foust Creek Reach 3B begins at the downstream end of the Snow Camp Road crossing and terminates at the southernmost conservation easement boundary. The reach flows through active pastures and drains 2.0 square miles. With the exception of the first several hundred feet, the stream appears to have been relocated and channelized and is relatively straight. The reach has a width to depth ratio that of 14.6 and a bank height ratio of 1.4. The channel slope is 0.0030 ft/ft. The d_{50} of the bed material is 11 mm which is in the medium gravel substrate range. The channel classifies as a C/E4 stream type.

UT1 to Foust Creek begins approximately 70 feet to the east of an existing farm road crossing on the western side of the site and terminates at its confluence with Foust Creek. The reach flows through active pastures and drains 0.3 square miles. The stream may have been channelized and is relatively straight. The reach has a width to depth ratio that of 8.5 and a bank height ratio of 1.4. The channel slope is 0.0078 ft/ft. The d_{50} of the bed material is 0.4 mm which is in the medium sand substrate range. The channel classifies as an E5.

Table 5A. Existing Stream Conditions- Foust Creek Reach 1
Foust Creek Mitigation Site

	Notation	Units	Foust Creek Reach 1
stream type			C/E
drainage area	DA	sq mi	1.5
bankfull cross-sectional area	A_{bkf}	SF	24.9
width at bankfull	w_{bkf}	feet	17.0
mean depth at bankfull	d_{bkf}	feet	1.5
bankfull width-to-depth ratio	w_{bkf}/d_{bkf}		11.7
bank height ratio	BHR		2.0
entrenchment ratio	ER	feet/foot	2.3

Table 5B. Existing Stream Conditions- Foust Creek Reach 2, Reach 3A, Reach 3B, UT1 Foust Creek Mitigation Site

	Notation	Units	Foust Creek Reach 2		Foust Creek Reach 3A		Foust Creek Reach 3B		UT1 to Foust Creek	
			Min	Max	Min	Max	Min	Max	Min	Max
stream type			C5		C/E4		C/E4		E5	
drainage area	DA	mi^2	1.6		1.9		2		0.3	
bankfull discharge	Q	cfs	101		112		115		31	
bankfull cross-sectional area	A_{bkf}	SF	30		25.3		34.6		8.7	
average velocity during bankfull event	v_{bkf}	fps	3.4		4.5		3.3		3.6	
Cross-Section										
width at bankfull	w_{bkf}	feet	24.7		17.5		22.4		8.6	
maximum depth at bankfull	d_{max}	feet	1.8		2.5		3		1.8	
mean depth at bankfull	d_{bkf}	feet	1.2		1.4		1.5		1	
bankfull width to depth ratio	w_{bkf}/d_{bkf}		20.3		12.2		14.6		8.5	
low bank height		feet	2.4		2.7		4.2		2.4	
bank height ratio	BHR		1.4		1.1		1.4		1.4	
floodprone area width	w_{fpa}	feet	180		114.2		276.1		104.3	
entrenchment	ER		7.3		6.5		12.3		12.2	
Slope										
valley slope	S_{valley}	feet/ foot	0.006		0.01		0.008		0.014	
channel slope[1]	$S_{channel}$	feet/ foot	0.0055 / 0.0076		0.0090 / 0.0078		0.0080 / 0.003		0.0126 / 0.0078	
Profile										
riffle slope	S_{riffle}	feet/ foot	0.01	0.025	0.0151	0.0193	0.013	0.017	0.007	0.0193
riffle slope ratio	$S_{riffle}/S_{channel}$		1.32	3.29	1.94	2.47	4.33	5.67	0.9	2.47
pool slope	S_{pool}	feet/ foot	0.0005	0.0009	0.0049	0.0091	0.0001	0.0016	0.0001	0.0043
pool slope ratio	$S_{pool}l/S_{channel}$		0.07	0.12	0.63	1.17	0.03	0.53	0.01	0.55

Table 5B. (Continued)

	Notation	Units	Foust Creek Reach 2		Foust Creek Reach 3A		Foust Creek Reach 3B		UT1 to Foust Creek	
			Min	Max	Min	Max	Min	Max	Min	Max
pool-to-pool spacing	L_{p-p}	feet	212.55		49	52	68	110	29	50
pool spacing ratio	L_{p-p}/w_{bkf}		8.62		2.79	2.96	3.03	4.9	3.38	5.83
pool cross-sectional area		SF	61.8		25.4		42.9		11.4	
pool area ratio			2.1		1		1.2		1.3	
maximum pool depth		feet	4.4		2.9		4		2.6	
pool depth ratio			3.6		2		2.6		2.5	
pool width at bankfull		feet	19		16.6		18.3		7.9	
pool width ratio			0.8		0.9		0.8		0.9	
Pattern										
sinuosity	K		1.09		1.11		1.05		1.11	
belt width	w_{blt}	feet	N/A		N/A		N/A		N/A	
meander width ratio	w_{blt}/w_{bkf}		N/A		N/A		N/A		N/A	
meander length	L_m	feet	N/A		N/A		N/A		N/A	
meander length ratio	L_m/w_{bkf}		N/A		N/A		N/A		N/A	
radius of curvature	R_c	feet	N/A		N/A		N/A		N/A	
radius of curvature ratio	R_c/ w_{bkf}		N/A		N/A		N/A		N/A	
Particle Size Distribution from Reach-wide Pebble Count										
d_{50} Description			very coarse sand		fine gravel		medium gravel		medium sand	
	d_{16}	mm	0.2		0.3		0.1		0.1	
	d_{35}	mm	0.5		3.2		4.4		0.1	
	d_{50}	mm	1.2		7.6		11		0.4	
	d_{84}	mm	11		110		19		14	
	d_{95}	mm	66		160		47		24	

1. The first slope reported is the average bed slope from the top of the reach to the bottom of the reach. The second slope reported is the water surface slope from the representative longitudinal profile for each reach. The second slope is used in discharge and velocity calculations.

5.3 Channel Evolution

Foust Creek Reach 1 and most of Reach 3B are best described by late Stage III/ early Stage IV. The lack of heavy livestock pressure in Reach 1 and the maintained partially wooded buffer in Reaches 1 and 3B appear to be creating conditions favorable to channel evolution processes. Foust Creek Reaches 2 and 3A are heavily impacted by livestock intrusion and bed and bank trampling is so prevalent that channel evolution processes are not active and therefore the channel evolution model is not applicable. UT1 is best described by Stage III with some limited

evidence of early Stage IV processes. The channel evolution processes are somewhat disrupted by livestock intrusion.

None of the channels have advanced through the evolutionary process to Stage V or VI where quasi-equilibrium can be expected. Numerous years of degradation and widening, contributing substantial sediment loading to downstream waters, are expected before these channels could achieve a new stable form on their own without channel form intervention. With the exception of Reach 1 and the upper several hundred feet of Reach 3B, restoration has been selected as the appropriate treatment approach in order to establish a stable cross-section, pattern, and profile rather than stabilizing a poorly functioning channel in place. Restoration will re-connect the currently incised channels with an expansive floodplain for energy dissipation. Restoration was not selected for Reach 1 to avoid impacts to the existing woody buffer. Restoration is not practicable on the upper portion of Reach 3B because it would require raising the elevation of the Snow Camp Road crossing which would increase the flood elevations at the road for both the 50-year NCDOT design storm and the FEMA 100-year event.

5.4 Design Discharge Development

Multiple methods were used to develop bankfull discharge estimates of the project reaches. The resulting values were compared and concurrence between the estimates and best professional judgment were used to determine the specific design discharge for each project reach. The methods to estimate discharge included:

1. The published North Carolina rural Piedmont curve drainage area- discharge relationships;
2. The provisional Updated North Carolina rural Piedmont/ Mountain curve (Walker) Curve drainage area- discharge relationships;
3. Drainage area – discharge relationships from selected reference reaches; and
4. Regional flood frequency analysis

5.4.1 NC Rural Piedmont Regional Curve Predictions

Design discharges using the published NC Rural Piedmont curve were estimated based on drainage area using the regional relationships.

5.4.2 Provisional Updated NC Piedmont/Mountain Regional Curve Predictions

Design discharges using the draft updated curve for rural Piedmont and mountain stream channels were estimated based on drainage area using regional relationships (Walker, unpublished).

5.4.3 Drainage Area- Discharge Relationships from Reference Reaches

Reference reaches identified for this project include a reach of Foust Creek above the project area with stable dimension and profile and a reliable drainage area – bankfull discharge relationship. Two more sites previously surveyed for use in prior projects were used primarily for drainage area – bankfull discharge data but also provided useful dimension and profile data. The two reference sites used primarily as discharge references are an upper reach of

Dutchman's Creek with a drainage area 2.9 square miles, and UT to Richland Creek reaches 1 and 2 with a drainage area of 0.3 and 1.0 square miles respectively.

In addition, two sites previously surveyed for use in prior projects were utilized for discharge, dimension, pattern, and profile reference data. The two reference sites for discharge and geomorphic data are Spencer Creek (1.0 square miles) and UT to Cane Creek (0.3 square miles).

The drainage area – bankfull discharge data points from all the reference reaches were used to develop a reference drainage area- discharge curve to be used as one line of evidence in determining design discharge values for the Foust Creek and UT1 project reaches.

5.4.4 Regional Flood Frequency Analysis

Four USGS stream gage sites were identified within reasonable proximity of the project site for use in development of a project specific regional flood frequency analysis. Data from these gages were used to develop a regional flood frequency curve as described by Dalrymple (1960). The gages used were:

- 02065100 – Snake Creek near Brookneal, VA (drainage area 1.65 square miles);
- 02075350 – Powells Creek near Turberville, NC (drainage area 0.29 square miles);
- 002056000 – Dial Creek near Bahama, NC (drainage area 4.73 square miles); and
- 0208650112 – Flat River Tributary near Willardsville, NC (drainage area 1.14 square miles).

The regional flood frequency curve resulting from the analysis of these four gages was developed by Wildlands for use in the Byrds Creek stream mitigation project completed for EEP.

5.4.5 Design Discharge Selection

Design discharges were selected for each restoration reach with consideration for the four discharge estimation methods, the observed geology, and our experience in this portion of the North Carolina slate belt. The discharges selected are below the rural Piedmont regional curve, slightly below the reference reaches curve, slightly above the provisional updated Walker curve predictions, and between the 1.2-year and 1.5-year recurrence interval from the regional flood frequency curve. Table 6 summarizes the results of each of the discharge analyses described in this section and the final selected design discharge for each of the project reaches. Figure 6 graphically illustrates the four discharge estimation methods and the selected design discharges.

Table 6. Design Discharge Analysis Summary
Foust Creek Mitigation Site

Reach	Rural Piedmont Regional Curve (cfs)	Walker Rural Mountain and Piedmont Regional Curve (cfs)	Reference Reach Curve (cfs)	Regional Flood Frequency Analysis 1.2-yr (cfs)	Regional Flood Frequency Analysis 1.5-yr (cfs)	Selected Design Discharge (cfs)
Foust Creek Reach 2	127	82	107	71	127	100
Foust Creek Reach 3A	142	93	118	78	139	110
Foust Creek Reach 3B	145	95	120	79	142	110
UT1	35	20	34	26	46	30

6.0 Baseline Information – Wetland Summary

Table 7 presents the baseline wetland information.

Table 7. Wetland Summary Information

Wetland	A	B	C	D	E	F	G	H	J
Size of Wetland (acres)	0.46	0.52	0.46	1.39	0.08	0.27	0.1	0.03	0.01
Wetland Type (non-riparian, riparian riverine, or riparian non-riverine)	Riparian Non-Riverine	Riparian Non-Riverine	Riparian Non-Riverine	Riparian Non-Riverine	Riparian Non-Riverine	Riparian Non-Riverine	Riparian Non-Riverine	Riparian Non-Riverine	Riparian Non-Riverine
Mapped Soil Series	Local alluval land (Lc)	Georgeville (GbC3) and Local alluval land (Lc)	Georgeville (GbC3) and Local alluval land (Lc)	Local alluvial land (Lc) and Orange (ObC2)	Local alluvial land (Lc) and Orange (ObC2)	Local alluvial land (Lc)	Georgeville (GbC3)	Local alluvial land (Lc)	Local alluvial land (Lc)
Drainage Class	Poorly-drained	Well-drained, poorly-drained	Well-drained, poorly-drained	Poorly-drained, Well-drained	Poorly-drained, Well-drained	Poorly-drained	Well-drained	Poorly-drained	Poorly-drained
Hydric Soil[1]	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Source of Hydrology	Stream/ Ground-water	Stream/ Ground-water	Stream/ Ground-water	Stream/ Ground-water	Ground-water	Ground-water	Ground-water	Ground-water	Ground-water
Hydrologic Impairment	Ditched	Ditched	Ditched	Ditched	Ditched	Ditched	Ditched	N/A	N/A
Native vegetation community	Piedmont Alluvial Forest	Piedmont Alluvial Forest	Piedmont Alluvial Forest	Piedmont Alluvial Forest	Piedmont Alluvial Forest	Piedmont Alluvial Forest	Piedmont Alluvial Forest	Piedmont Alluvial Forest	Piedmont Alluvial Forest
% exotic invasive vegetation	0%	0%	0%	0%	0%	0%	0%	0%	0%

[1] Local alluvial is the only soil series with hydric inclusions in the project area.

6.1 Jurisdictional Wetlands

On June 25 and 26, 2013, Wildlands delineated jurisdictional waters of the U.S. within the project easement area. These areas were later confirmed by USACE with no adjustments. Jurisdictional areas were delineated using the USACE Routine On-Site Determination Method. This method is defined by the 1987 Corps of Engineers Wetlands Delineation Manual and subsequent Eastern Mountain and Piedmont Regional Supplement. The on-site jurisdictional determination indicated that there are ten jurisdictional wetlands located within the project easement. These wetlands (Wetland A – J) range in size from 0.01 to 1.39 acres (see Table 7) and are located within maintained agricultural fields (Figure 5). Jurisdictional calls were confirmed by the USACE on a December 16, 2013 site visit. The wetlands exhibited pockets of inundation typically less than three inches deep, saturation within the upper 12 inches of the soil profile, water stained leaves, drainage patterns, and low-chroma soils (10YR 4/2 to 2.5Y 4/2) with distinct mottles (10YR 4/6 to 2.5Y 5/6). Vegetation within the wetlands has been heavily managed, resulting in a dominant herbaceous strata layer with little to no trees. Routine On-Site Data Forms and the USACE Jurisdictional Determination Confirmation have been included in Appendix 5

Using the Dichotomous Key to General North Carolina Wetland Types, which is part of the North Carolina Wetland Assessment Method (NCWAM), Wildlands determined that the jurisdictional features historically functioned as Bottomland Hardwood Forest, prior to their conversion to agricultural fields. The North Carolina Wetland Assessment Method (NCWAM) was applied to evaluate the level of hydrologic function, water quality, and habitat condition for each wetland. The wetlands scored out as low functioning systems when compared to reference conditions due to heavy agricultural activities over the past several decades along with aggressive vegetation management. Low scoring functioning parameters include the effects of ditching and soil compaction on surface and subsurface storage, reduced aquatic and terrestrial habitat, and poor connection to adjacent natural habitats. NCWAM Wetland Rating Sheets representative of the jurisdictional wetland areas are enclosed in Appendix 5.

6.2 Hydrologic Characterization

In order to develop a wetland re-establishment and rehabilitation design for the Foust Creek Site, an analysis of the existing and proposed conditions for groundwater hydrology was necessary. DrainMod (version 6.0) was used to model existing and proposed groundwater hydrology at the site. DrainMod simulates water table depth over time and produces statistics describing long term water table characteristics and an annual water budget.

6.2.1 Groundwater Modeling

For the Foust site wetlands, two models were developed and calibrated to represent the existing and proposed conditions at two different groundwater monitoring gage locations on the site (gage 3 and gage 4). Resulting model output was used to validate and refine the proposed plan for wetland re-establishment and rehabilitation on site and to develop a water budget for the site. The modeling procedures are described below.

Data Collection

DrainMod models are built using site hydrology, soil, weather, and crop data. Prior to building the models, soil cores were taken to validate existing mapped soils across the site. Further explanation of the site soils can be found in Section 4.3 of this report. Rainfall and temperature data were obtained from nearby weather stations in Graham (Station No. 313555) and Burlington (Station No. 311239) operated by the National Oceanic and Atmospheric Administration (NOAA) National Weather Service. The data sets for these stations were obtained from the North Carolina State Climate Office for the period from January of 1953 through July of 2013. These data were used to calibrate the models and perform the long term simulations. The project site has been used as cattle pasture, so crop information is based on typical values for pasture grasses.

Existing Conditions Base Model Set up and Calibration

Models were created to represent two monitoring gage locations on the site as shown on Figure 5. The models were developed using the conventional drainage water management option with hillslope seepage to best simulate the drainage of the site. The gages were installed in December, 2012 and recorded groundwater depth twice per day with In-situ Level TROLL® 100 or 300 pressure transducers through early July 2013. This was used as the calibration period for the groundwater models.

The first step in developing the model was to prepare input files from the data described above. A soil input file obtained from N.C. State University, which has similar characteristics to the soils on the site, was used as a base soil input file for each model. The soil files were refined by adjusting certain parameters during calibration. Temperature and precipitation data from the nearby weather stations described above were used to produce weather input files for each model.

Once the necessary input files were created, the project settings were adjusted for this application and then calibration runs were conducted. To calibrate the model, parameters not measured in the field were adjusted within the limits typically encountered under similar soil and morphologic conditions until model simulation results were similar to observed gage data. Plots showing the calibration results are included in Appendix 4. Trends in the observed data are well-represented by the calibration simulations. Although hydrograph peaks between plots of observed and simulated data do not match exactly in every case, in most cases they are similar and relative changes in water table hydrology as a result of precipitation events correspond well between observed data and model results.

Proposed Conditions Model Setup

The proposed conditions models were developed based on the calibrated existing conditions models to predict whether wetland criteria would be met over a long period of recorded climate data (1953 through July 2013). Proposed plans for the site include filling drainage ditches, raising the inverts of adjacent stream channels, grading portions of the site to estimated historic elevations, planting native wetland plants, and roughening the surface soil through disking. These proposed plans were developed to increase the wetland hydrology on site. Settings for the proposed conditions model were altered to reflect these changes to the site. To account for changes to stream alignments, the ditch spacing values in the models were altered. To simulate proposed changes to stream bed profiles, the drain depths were decreased by the amount that

the channels will be raised. Changes in the vegetation on the site were simulated by altering the rooting depth of plants on the site from relatively shallow depths for grasses to deeper values for hardwood tree species. Surface storage values were increased at each gage to account for proposed surface roughening to the site. Once the proposed conditions models were developed, each model was run for a 60-year period from January 1953 through July 2013 using the weather data from the two weather stations to perform the long term simulations.

Modeling Results and Conclusions

DrainMod was used to determine the effect of proposed practices on site hydrology for wetland areas RW 6 and RW 7 (See Figure 7). The RW 6 area is similar in hydrology and site conditions to RW 1 through RW 5. RW 7 is a drier location. Each gage location was evaluated to establish how often annual wetland hydrologic criteria would be met over the 60-year simulation period. The wetland hydrologic criteria are that the water table must be within 12 inches of the ground surface for a minimum percentage of the growing season (March 24 through November 9). The modeling results show that the RW 6 gage would meet the criteria most years with a minimum percentage of 8.5% in the proposed condition. Most of this wetland area is jurisdictional and is proposed as rehabilitation. These results are expected to be similar for RW 1 through RW 5. The portions of each of these wetland areas that are currently jurisdictional and are proposed as rehabilitation will not have a hydrologic success criteria to meet. The areas that are not currently jurisdictional and are proposed as re-establishment will have a minimum success criteria of 8.5% of the growing season. The gage at RW 7 is in a non-jurisdictional location that would not regularly meet criteria according to proposed conditions modeling results. Due to these results, the non-jurisdictional area at RW7 will not be included in the Mitigation Plan. A 0.46 acre portion of RW7 has been determined to be jurisdictional and this area is therefore expected to meet criteria and is proposed as rehabilitation with no hydrologic success criteria.

6.2.2 Surface Water Modeling at Restoration Site

The only surface water modeling to support the project was done for the floodplain analysis. This is described in Section 7.4.

6.2.3 Hydrologic Budget for the Restoration Site

DrainMod computes daily water balance information and outputs summaries that describe the loss pathways for rainfall over the model simulation period. Tables 8 and 9 summarize the average annual amount of rainfall, infiltration, drainage, runoff, and evapotranspiration estimated for the two modeled locations on site. From the water balance results provided in Table 8 it can be seen that, for gage 3, evapotranspiration stays generally the same between the existing and proposed condition while infiltration and drainage increase and runoff decreases. These results indicate that more water will infiltrate the soil after construction and exit the site through subsurface drainage rather than surface runoff. Lateral seepage values are negative indicating that there is a net increase in water on the site due to seepage from the adjacent hillslope. Seepage onto the site increases for the proposed condition. The results for gage 4 (Table 9) indicate that while infiltration will increase slightly in this area (thus reducing runoff slightly) subsurface drainage will decrease by a small amount while evapotranspiration will increase. Later seepage onto the site will decrease very slightly.

Table 8. Summary Water Balance for Gage 3 for Existing and Proposed Conditions Foust Creek Mitigation Site

Hydrologic Parameter	Existing Conditions		Proposed Conditions	
	Average Annual Amount (cm of water)	Average Annual Amount (% of precip + runon)	Average Annual Amount (cm of water)	Average Annual Amount (% of precip + runon)
Precipitation	111.81	100%	111.81	100%
Runon	0	0%	0	0%
Precip + Runon	111.81	100%	111.81	100%
Infiltration	67.47	60.34%	83.73	74.89%
Evapotranspiration	93.47	83.60%	92.94	83.12%
Drainage	59.3	53.04%	85.96	76.88%
Lateral Seepage	-85.31	-76.30%	-95.17	-85.12%
Runoff	44.33	39.65%	28.07	25.11%

Table 9. Summary Water Balance for Gage 4 for Existing and Proposed Conditions Foust Creek Mitigation Site

Hydrologic Parameter	Existing Conditions		Proposed Conditions	
	Average Annual Amount (cm of water)	Average Annual Amount (% of precip + runon)	Average Annual Amount (cm of water)	Average Annual Amount (% of precip + runon)
Precipitation	111.81	100%	111.81	100%
Runon	0	0%	0	0%
Precip + Runon	111.81	100%	111.81	100%
Infiltration	104.5	93.46%	106.91	95.62%
Evapotranspiration	90.44	80.89%	93.38	83.52%
Drainage	76.55	68.46%	70.62	63.16%
Lateral Seepage	-62.94	-56.29%	-57.08	-51.05%
Runoff	7.75	6.93%	4.89	4.37%

6.3 Soil Characterization

An investigation of the existing soils within the wetland re-establishment and rehabilitation areas was performed by a licensed soil scientist (LSS) and Wildlands staff on February 9, 2012.

Soil cores were analyzed at locations across the site to provide data to refine NRCS soils mapping units and establish areas suitable for wetland re-establishment and rehabilitation. Ten soil cores were analyzed across the site by the LSS in order to characterize the wetlands mitigation areas. Soil texture, Munsell chart hue, chroma and value, and hydric soil characteristics were recorded for each core. The depth to hydric indicators was then measured as well. A map of the boring locations and the data for each core is included in Appendix 4.

In response to the December 11, 2012 IRT site walk and EEP comments, soils in the proposed wetland rehabilitation area RW7, located downstream of Snow Camp Road, were further examined to determine if wetland success could be predicted by the depth of soil horizon proposed grading would intercept. A grid of 14 soil cores was evaluated December 4, 2013. Evaluation of the soil cores and proposed design indicated grading depths would intercept the "O" or "A" horizons, which are located above the transition zone to hydric soils and saturated conditions. Locations and data for each core are included in Appendix 4. This further solidified the decision to not attempt wetland re-creation in the area.

6.3.1 Taxonomic Classification

Analysis of the soil core samples collected from the project site along with consideration of site topography indicated that soil classifications largely agreed with the mapped soil units in nearly all locations. The soil classification of the core samples are discussed below.

Local Alluvial Land

All of the wetland re-establishment and rehabilitation areas are mapped as poorly drained local alluvial land (Lc) which is listed in the North Carolina Hydric Soil list. On-site investigations by a registered soil scientist confirmed that the areas within the wetland rehabilitation zones are hydric and areas within the re-establishment zones contain relic hydric soils with matrices of Chroma 2 or lower and mottling. A soils map is provided in Figure 4 and soil boring data are included in Appendix 4.

6.3.2 Profile Description

Ten soil cores were analyzed by a licensed soil scientist and the profile descriptions and map are included in Appendix 4. Cores 1, 5, and 7 were taken from wetland re-establishment areas very near the top of the existing channel bank. Cores 2 -4, 6, and 8-10 were taken in areas that are jurisdictional and are proposed as wetland rehabilitation. The soils for all of these areas are mapped as local alluvial land. Cores 1, 5, and 7 are all loam on the upper layer with a texture of clay-loam underneath. These soils are mostly chroma 3 and 4 with mottles of chroma 2 (profile 7 has no mottles). Cores 2, 3, 6, and 8-10 are comprised by an upper layer (2 to 6 inches) of loam underlain by clay loam. Core 4 was characterized as loam to a depth of 18 inches. All of these soils include chroma 2 layers within the upper 6 inches.

6.3.3 Hydraulic Conductivity

The local alluvial land (Lc) soil unit is not described in the Alamance Soil Survey and is a general classification for poorly-drained floodplain soils. The loam/clay loam soils on this site are similar in texture to other loamy floodplain soils in the area such as the Chewacla-Wehadkee series which has moderate hydraulic conductivity.

6.4 Vegetation Community Type Descriptions and Disturbance History

The existing vegetation communities within the proposed project area are predomantly maintained pasture covered seasonally by temporary fescue grasses. Based on historical aerials, the predominant land use on this property has been maintained pasture since 1973. Due to agricultural activities and vegetation management over the past several decades, several major strata are completely absent from this area resulting in a dominant herbaceous layer with little to no canopy trees or understory growth. Dominant species in these areas include arrowleaf tearthumb (*Polygonum sagittatum*), duck potato (*Sagittaria spp.),* soft stem rush (*Juncus effusus*), shallow sedge (*Carex lurida*), spotted touch-me-not (*Impatiens capensis*), strawcolored flatsedge (*Cyperus strigosus*), Sensitive fern (*Onoclea sensibilus*)and spikerush (*Eleocharis spp.*).

7.0 Baseline Information - Regulatory Considerations

Table 10 presents the project information and baseline wetland information.

Table 10. Regulatory Considerations
Foust Creek Mitigation Site

	Applicable?	Resolved?	Supporting Documentation
Waters of the US – Section 404	Yes	Yes	Appendix 5
Waters of the US – Section 401	Yes	Yes	Appendix 5
Endangered Species Act	Yes	Yes	Appendix 7
Historic Preservation Act	Yes	Yes	Appendix 7
Coastal Zone Management Act/Coastal Area Management Act	No	N/A	N/A
FEMA Floodplain Compliance	Yes	Yes	Appendix 8
Essential Fisheries Habitat	No	N/A	N/A

7.1 401/404

As discussed in Section 4.5, the confirmed USACE Jurisdictional Determination indicated two channels, Foust Creek and UT1 to Foust Creek are jurisdictional within the project limits. Additionally there are nine jurisdictional wetland areas (Wetland A - J) located in the proposed project area (Figure 5) totaling 3.32 acres as described in Section 6.1. The project stream reaches and wetland re-establishment/rehabilitation areas will be protected under the conservation easement placed on the property.

Impacts to existing wetland areas were avoided to the extent possible during the design phase. Small areas of grading will be required on the edge of several wetlands, totaling 0.10 acres cumulative across the site. This represents impacts to 3% of the site's existing wetlands. The 0.10 acres of wetland located in the proposed stream banks will be classified as a permanent impact on the PCN application to the USACE. Overall the project proposes to re-establish 1.9 acres of former wetlands and rehabilitate 3.2 acres of existing wetlands.

7.2 Endangered and Threatened Species

7.2.1 Site Evaluation Methodology

The Endangered Species Act (ESA) of 1973, amended (16 U.S.C. 1531 et seq.), defines protection for species with the Federal Classification of Threatened (T) or Endangered (E). An "Endangered Species" is defined as "any species which is in danger of extinction throughout all or a significant portion of its range" and a "Threatened Species" is defined as "any species which is likely to become an Endangered Species within the foreseeable future throughout all or a significant portion of its range" (16 U.S.C. 1532).

Wildlands utilized the U.S. Fish and Wildlife Service (USFWS) and North Carolina Natural Heritage Program (NHP) databases in order to identify federally listed Threatened and Endangered plant and animal species for Alamance County, NC (USFWS, 2008 and NHP, 2009). There are no federal endangered or threatened species listed for Alamance County. The US Fish and Wildlife Service (USFWS) list of *Endangered Species, Threatened Species, Federal Species of Concern, and Candidate Species for Alamance County* is included in the Appendix 7.

7.3 Cultural Resources

7.3.1 Site Evaluation Methodology

The National Historic Preservation Act (NHPA) of 1966, as amended (16 U.S.C. 470), defines the policy of historic preservation to protect, restore, and reuse districts, sites, structures, and objects significant in American history, architecture, and culture. Section 106 of the NHPA mandates that federal agencies take into account the effect of an undertaking on any property that is included in, or is eligible for inclusion in, the National Register of Historic Places.

7.3.2 SHPO/THPO Concurrence

A letter was sent to the North Carolina State Historic Preservation Office (SHPO) on December 14, 2012, requesting review and comment for the potential of cultural resources potentially affected by the project. SHPO responded on January 9, 2013, and stated they were aware of no historic resources that would be affected by the project. All correspondence with SHPO is included in Appendix 7.

7.4 FEMA Floodplain Compliance and Hydrologic Trespass

Foust Creek is mapped on Panels 8788 and 8879 of the Alamance County FIRM floodplain mapping as shown on Figure 8. A detailed study has been performed by FEMA and NC Emergency Management on Foust Creek. Foust Creek is a mapped Zone AE floodplain and a floodway has been delineated. A detailed hydraulic study has been performed and base flood elevations have been defined by FEMA and NC Emergency Management. UT1 is not included in the FEMA study and mapping.

Due to the Priority 1 approach on Foust Creek within the mapped Zone AE, the proposed 100-year water surface elevations will be slightly higher than the existing 100-year water surface elevations. A Conditional Letter of Map Revision (CLOMR) with detailed hydraulic modeling will be required prior to construction. The CLOMR has been submitted to the Alamance County

Floodplain Administrator for approval. If required, a Letter of Map Revision (LOMR) will be submitted after the project is constructed in order to revise the maps to accurately reflect the project area. A Floodplain Check List is included in Appendix 8. The project will be designed to avoid adverse floodplain impacts on adjacent properties or adjacent roadways.

7.5 Utilities and Site Access

There are no known utilities or utility easements within the project area. The site is accessible from Snow Camp Road.

8.0 Reference Sites

8.1 Reference Streams

Five reference reaches were used to support the design of the project reaches (Figure 9). Reference reaches can be used as a basis for design or, more appropriately, as one source of information on which to base a stream restoration design. Section 5.4 describes how the reference reaches are used in the selection of design discharge. Dimensionless parameters of pattern, dimension, and profile dimensionless parameters from the reference reaches and from successful stream restoration designs in the North Carolina Piedmont were used to develop geomorphic design parameters for the project restoration reaches. Summaries of geomorphic parameters for the reference reaches analyzed for this project are included in Tables 11A and 11B. The project design parameters are presented in Table 13 in Section 10.1.

A section of Foust Creek upstream of the project area was surveyed as a discharge, dimension, and profile reference. Four additional reference streams were chosen because of similarities to the project streams including drainage area, valley slope and morphology, bed material, and location within or closely bordering the Carolina Slate Belt region of the Piedmont. Two reference sites were used primarily as discharge references, Dutchman's Creek gage and UT to Richland Creek, as discussed in Section 5.4. The reference streams considered when developing cross section, profile and pattern parameters for this project include Spencer Creek and UT to Cane Creek. All of the reference sites are located within the Carolina Slate Belt. The UT to Richland Creek site is located on the border of the Carolina Slate Belt and the Triassic Basin Lithologic Belt.

8.1.1 Reference Streams Channel Morphology and Classification

The Foust Creek reference site is located approximately 600 feet upstream of the northernmost conservation easement boundary on the project site. Wildlands collected three riffle and two pool cross sections and the longitudinal profile representative of the reference reach. The Foust Creek reference site classified as a C4 channel type.

Spencer Creek is located in western Montgomery County near the crossroads of Ophir, NC (Buck Engineering, 2004). This consists of two reaches (Spencer Creek Reach 1 and Reach 2) that classified as E4 stream types that flow through a mature forest.

UT to Richland Creek is located approximately 10 miles west of Carthage, NC in north-central Moore County. The stream was originally identified as a reference site for the Collins Creek Restoration plan by KCI Technologies (2007). Two reference reaches on the stream were

surveyed by Wildlands in January 2012: (1) UT to Richland Creek Reach 1 is a C4/E4 stream type with a low sinuosity and a stable riffle/run sequence; and (2) Reach 2 of UT to Richland Creek is a C4/E4 stream type with a low sinuosity.

Dutchman's Creek is located on the western edge of Montgomery County, west of Albemarle, NC. Wildlands collected three cross sections and representative longitudinal profile. The Dutchman's Creek reference site was classified as a B4c channel type.

The UT to Cane Creek reference reach is located in southern Alamance County approximately six miles from the Foust Creek site. This site, which flows through a mature forest, was classified as an E4 stream type in the Unnamed Tributary to Cane Creek Restoration Plan (URS, 2007). WEI conducted a site visit for this reference reach and surveyed an additional cross section typical of the reference reach.

Table 11A. Summary of Reference Reach Geomorphic Parameters
Foust Creek Mitigation Site

			Foust Creek Reference Site		Spencer Creek Reach 1		Spencer Creek Reach 2	
Parameter	**Notation**	**Units**	**min**	**max**	**min**	**max**	**min**	**max**
stream type			C4		E4		E4	
drainage area	DA	sq mi	1.38		0.96		0.37	
bankfull discharge	Q_{bkf}	cfs	69.4	88	97		35	
bankfull cross-sectional area	A_{bkf}	SF	23.9	24.1	17.8	19.7	6.6	8.7
average velocity during bankfull event	v_{bkf}	fps	2.9	3.7	4.9	5.4	5	5.6
Cross-Section								
width at bankfull	w_{bkf}	feet	18.5	19.4	10.7	11.2	6.3	9.3
maximum depth at bankfull	d_{max}	feet	1.8	2.1	2.1	2.6	1	1.2
mean depth at bankfull	d_{bkf}	feet	1.3	1.4	1.6	1.8	0.8	1
bankfull width to depth ratio	w_{bkf}/d_{bkf}		14.2	13.9	5.8	7.1	7.9	9.3

Table 11A. (Continued)

			Foust Creek Reference Site		Spencer Creek Reach 1		Spencer Creek Reach 2	
Parameter	**Notation**	**Units**	**min**	**max**	**min**	**max**	**min**	**max**
depth ratio	d_{max}/d_{bkf}		1.4	1.6	1.3	1.4	1.2	1.3
bank height ratio	BHR		1		1		1	
floodprone area width	w_{fpa}	feet	49	62.5	60	>114	14	125
entrenchment ratio	ER		2.6	3.4	5.5	>10.2	1.7	4.3
Slope								
valley slope	S_{valley}	ft/ft	0.0095		0.0109		0.022	0.031
channel slope	$S_{channel}$	ft/ft	0.009		0.0047		0.019	0.022
Profile								
riffle slope	S_{riffle}	ft/ft	0.015	0.035	0.013		0.0184	0.0355
riffle slope ratio	$S_{riffle}/S_{channel}$		1.7	3.9	2.8		1	2.5
pool slope	S_{pool}	ft/ft	0.0008	0.0034	0.0007	0.0009	0.0007	0.0038
pool slope ratio	$S_{pool}/S_{channel}$		0.09	0.38	0.2	0.2	0	0.2714
pool-to-pool spacing	L_{p-p}	feet	48.8	91.3	71		9	93
pool spacing ratio	L_{p-p}/w_{bkf}		2.6	4.7	6.3	6.6	1.4	6.1
pool cross-sectional area at bankfull	A_{pool}	SF	29.2	34.9	24.5		6.5	1.8
pool area ratio	A_{pool}/A_{bkf}		1.2	1.4	1.2	1.4	1	1.6
maximum pool depth at bankfull	d_{pool}	feet	2.5	2.9	3.3		1.2	16
pool depth ratio	d_{pool}/d_{bkf}		1.9	2.1	1.8	2	1.5	1.2
pool width at bankfull	w_{pool}	feet	15.3	20.5	17.5		6	15.8
pool width ratio	w_{pool}/w_{bkf}		0.8	1.1	1.6		1	0.9

Table 11A. (Continued)

			Foust Creek Reference Site		Spencer Creek Reach 1		Spencer Creek Reach 2	
Parameter	**Notation**	**Units**	**min**	**max**	**min**	**max**	**min**	**max**
Pattern								
sinuosity	K		1.05		2.3		1	1.3
belt width	w_{blt}	feet	NA		38	41	10	50
meander width ratio	w_{blt}/w_{bkf}		NA		3.4	3.6	1.6	5.4
meander length	L_m	feet	NA		46	48	53	178
meander length ratio	L_m/w_{bkf}		NA		4.1	4.4	8.4	19.1
radius of curvature	R_c	feet	NA		11	15	12	85
radius of curvature ratio	R_c/ w_{bkf}		NA		1.3	1.4	1.9	9.1

Table 11B. Summary of Reference Reach Geomorphic Parameters
Foust Creek Mitigation Site

			UT to Richland Creek Reach 1		UT to Richland Creek Reach 2		Dutchman's Creek		UT to Cane Creek	
Parameter	**Notation**	**Units**	**min**	**max**	**min**	**max**	**min**	**max**	**min**	**max**
stream type			C4/E4		C4/E4		B4c		C4/E4	
drainage area	DA	sq mi	0.28		0.97		2.9		0.29	
bankfull discharge	Q_{bkf}	cfs	29.1	32	68.9	78.6	140	165	40	
bankfull cross-sectional area	A_{bkf}	SF	7.8	8.5	16.5	17.5	34.2	36.9	8.9	12.2
average velocity during bankfull event	v_{bkf}	fps	5.2	4.1	4.2	4.5	4.2	4.5	3.8	
Cross-Section										
width at bankfull	w_{bkf}	feet	8.8	10.4	13.3	15.2	24.8	26.6	11.5	12.3
maximum depth at bankfull	d_{max}	feet	1.1	1.3	1.8	2.1	1.8	2	1.2	1.6

Table 11B. (Continued)

			UT to Richland Creek Reach 1		UT to Richland Creek Reach 2		Dutchman's Creek		UT to Cane Creek	
Parameter	**Notation**	**Units**	**min**	**max**	**min**	**max**	**min**	**max**	**min**	**max**
mean depth at bankfull	d_{bkf}	feet	0.8	0.9	1.1	1.3	1.3	1.5	0.8	1
bankfull width to depth ratio	w_{bkf}/d_{bkf}		10	12.8	10.1	13.9	17.9	19.4	12.3	14.4
depth ratio	d_{max}/d_{bkf}		1.4	1.4	1.6	1.7	1.3	1.4	1.7	
bank height ratio	BHR		1.4	2.1	1		1	1.2	---	
floodprone area width	w_{fpa}	feet	27.6	31.4	>50		47.4	49.7	31	
entrenchment ratio	ER		2.5	4	>2.5		1.9	1.9	>2.5	
Slope										
valley slope	S_{valley}	ft/ft	-		0.016		0.016		0.0262	
channel slope	$S_{channel}$	ft/ft	0.0131	0.0178	0.014		0.0093		0.015	
Profile										
riffle slope	S_{riffle}	ft/ft	0.0183	0.0355	0.0183	0.0355	---		0.0188	0.0704
riffle slope ratio	$S_{riffle}/S_{channel}$		1.3	2.5	1.3	2.5	---		1.3	4.7
pool slope	S_{pool}	ft/ft	0.0003	0.0038	0.0003	0.0038	---		0.0005	0.0108
pool slope ratio	$S_{pool}/S_{channel}$		0.0214	0.2714	0	0.3	---		0	0.72
pool-to-pool spacing	L_{p-p}	feet	33	93	33	93	---		27	73
pool spacing ratio	L_{p-p}/w_{bkf}		2.5	6.1	2.5	6.1	---		2.3	6.1
pool cross-sectional area at bankfull	A_{pool}	SF	1.8	1.8	14.7	15.8	---		11.9	
pool area ratio	A_{pool}/A_{bkf}		1.4	1.6	0.9	0.9	---		1	1.3
maximum pool depth at bankfull	d_{pool}	feet	14.7	16	1.8	1.8	---		2.6	
pool depth ratio	d_{pool}/d_{bkf}		1	1.2	1.4	1.6	---		1.7	
pool width at bankfull	w_{pool}	feet	14.7	15.8	14.7	16	---		8.5	
pool width ratio	w_{pool}/w_{bkf}		0.9	0.9	1	1.2	---		0.7	

Table 11B. (Continued)

			UT to Richland Creek Reach 1		UT to Richland Creek Reach 2		Dutchman's Creek		UT to Cane Creek	
Parameter	**Notation**	**Units**	**min**	**max**	**min**	**max**	**min**	**max**	**min**	**max**
Pattern										
sinuosity	K		1		1.1		---		1.4	
belt width	w_{blt}	feet	NA		NA		NA		102	
meander width ratio	w_{blt}/w_{bkf}		NA		NA		NA		8.3	8.9
meander length	L_m	feet	NA		NA		NA		45	81
meander length ratio	L_m/w_{bkf}		NA		NA		NA		3.9	6.6
radius of curvature	R_c	feet	NA		NA		NA		23	38
radius of curvature ratio	R_c/ w_{bkf}		NA		NA		NA		2	3.1

8.2 Reference Streams Vegetation Community Types Descriptions

Spencer Creek and Dutchman's Creek reference sites are surrounded by mature hardwood forests within the Uwharrie National Forest. Vegetation at Spencer Creek is composed of typical Piedmont bottomland forest tree species, including sweet gum (*Liquidambar styraciflua*), tulip poplar (*Liriodendron tulipifera*), red maple (*Acer rubrum*), hackberry (*Celtis occidentalis*), and American elm (*Ulmus Americana*). Common understory vegetation includes ironwood (*Carpinus caroliniana*), American holly (*Ilex opaca*), paw paw (*Asimina triloba*), and flowering dogwood (*Cornus florida*). The Dutchman's Creek site is classified as a Mesic Mixed Hardwood Forest (Schafale & Weakley, 1990). Dominant species include American beech (*Fagus grandifolia*), Northern Red Oak (*Quercus rubra*), tulip poplar, and red maple. Understory vegetation includes American holly, red maple, flowering dogwood, and rhododendron species.

According to the Collins Creek Restoration Plan (KCI, 2007) portions of the UT to Richland Creek site are classified as a Piedmont Alluvial Forest and/or Mesic Mixed Hardwood Forest (Schafale & Weakley, 1990). Representative canopy species within a Piedmont Alluvial Forest include river birch (*Betula nigra*), green ash (*Fraxinus pennsylvanica*), sycamore (*Platanus occidentalis*), sweet gum, sugarberry (*Celtis laevigata*), black walnut (*Juglans nigra*), shagbark hickory (*Carya ovate*), American elm, and tulip poplar. Species that dominant the understory are ironwood, paw paw, American holly, spicebush (*Lindera benzoin*), and painted buckeye (*Aesculus sylvatica*) (Schafale & Weakley, 1990). These mature species within these riparian vegetation communities provide a large portion of the vertical and horizontal stabilizing force for these reference reach systems.

The UT to Cane Creek site is classified as a Piedmont bottomland forest type (Schafale & Weakley, 1990). Dominant species include southern red oak (*Quercus falcata*), red maple, river

birch, tulip poplar, sweetgum, green ash, and sycamore. Common understory vegetation includes ironwood and paw paw.

Canopy species observed at the upstream reference site included sweetgum, and tulip poplar, hickory (*Carya spp.*). Understory species included ironwood, witch hazel (*Hamamelis virginiana*), spicebush, eastern red cedar (*Juniperus virginiana*), basswood (*Tilia americana*), sycamore, and river birch.

8.3 Reference Wetlands

The reference wetland identified for use in this project is located immediately adjacent to the Underwood Mitigation Site completed by WEI for EEP. This reference site is located approximately 8 miles south of the Foust Creek site. Due to its close proximity and successful use in the wetland design at the Underwood site, it offers the best opportunity to provide reference information on the appropriate natural community to use in restoring and creating wetlands on the project site. The reference wetland is primarily bottomland hardwood forest.

8.3.1 Hydrological Characterization

A groundwater monitoring gage was installed on July 29, 2010, on the reference site to document the reference wetland hydrology. However, after further analysis during the fall of 2010 it was determined that this particular location represented drier than average conditions for this wetland complex due to its proximity to a drainage feature. The gage was moved to a more appropriate reference location in March of 2011. The gage has not been installed for an adequate period to assess hydrologic conditions and determine the appropriateness of this reference location. Other reference sites are currently being evaluated and a permanent reference location will be selected prior to beginning the post-construction monitoring period. This information will be used to provide a comparison for the restored and created wetland hydrology throughout the monitoring period.

8.3.2 Soil Characterization and Taxonomic Classification

The soils on the reference site are mapped as Chewacla and Wehadkee which are listed on the NC Hydric Soils list. This floodplain area was confirmed to match the mapped soil unit which is described in more detail above.

8.3.3 Vegetation Community Type Descriptions and Disturbance History

Historical aerials reveal that the reference wetland area was vegetated in 1951 and 1993 to present. In the 1951 photograph, this area was the only vegetated zone within several hundred acres of surrounding cleared agricultural land indicating that it has generally been too wet to use as productive farm land. The existing vegetation communities are typical of a bottomland Hardwood Forest and include semi-mature canopy tree species, moderate subcanopy and shrub species, as well as an herbaceous layer. Dominant canopy species include sweetgum, red maple, sycamore, willow oak, and water oak. Typical subcanopy and shrub species include American elm, box elder, and black willow.

9.0 Determination of Credits

9.1 Stream Mitigation Credits

Mitigation credits presented in Table 12 are projections based upon site design. Upon completion of site construction the project components and credits data will be revised to be consistent with the as-built condition.

Table 12. Determination of Credits
Foust Creek Mitigation Site

Mitigation Credits									
	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorus Nutrient Offset
Type	R	RE	R-E[1]	RE[1]	R-E[1]	RE[1]	---	---	---
Totals	4818	---	1.9	2.1	---	---	---	---	---

Project Components							
Project Component or Reach ID	Stationing / Location	Existing Footage / Acreage	Approach (PI, PII, etc.)	Restoration or Restoration Equivalent	Restoration Footage or Acreage	Mitigation Ratio	Proposed Credit (SMU)
Foust Creek – Reach 1	101+86 – 110+00	814	---	Enhancement II	814	2.5:1	326
Foust Creek – Reach 2	110+00 – 114+29 115+27 – 135+23	2356	1	Restoration	2425	1:1	2425
Foust Creek – Reach 2	114+29 – 114+42	31	1	Restoration (Partial	13	2:1[2]	7
Foust Creek – Reach 3A	135+23 – 138+44	307	1/2	Restoration	321	1:1	321
Foust Creek – Reach 3B	139+44 – 141+32	187	---	Enhancement II (Partial Credit)	188	5:1[2]	38
Foust Creek – Reach 3B	141+32 – 142+74	142	---	Enhancement II	142	2.5:1	57
Foust Creek – Reach 3B	142+74 – 151+30	684	1/2	Restoration	856	1:1	856
UT1 to Foust Creek	200+94 – 208+82	713	1	Restoration	788	1:1	788
Riparian Wetland RW1	---	0.03	---	Rehabilitation	0.03	1.5:1	0.02
Riparian Wetland RW2	---	0.08	---	Rehabilitation	0.08	1.5:1	0.05
Riparian Wetland RW3	---	0.16	---	Rehabilitation	0.16	1.5:1	0.11
Riparian Wetland RW4	---	0.45	---	Rehabilitation	0.45	1.5:1	0.30
Riparian Wetland RW4	---	0.21	---	Re-establishment	0.21	1:1	0.21
Riparian Wetland RW5	---	1.46	---	Rehabilitation	1.46	1.5:1	0.97
Riparian Wetland RW5	---	1.18	---	Re-establishment	1.18	1:1	1.18
Riparian Wetland RW6	---	0.52	---	Rehabilitation	0.52	1.5:1	0.35
Riparian Wetland RW6	---	0.51	---	Re-establishment	0.51	1:1	0.51
Riparian Wetland RW7	---	0.46	---	Rehabilitation	0.46	1.5:1	0.31

Table 12. (Continued)

Component Summation						
Restoration Level	Stream (linear feet)	Riparian Wetland (acres)		Non-Riparian Wetland (acres)	Buffer (acres)	Upland (acres)
		Riverine	Non-Riv.			
Restoration	4,403	---	---	---	---	---
Enhancement I	---	---	---	---	---	---
Enhancement II	1,144	---	---	---	---	---
Re-establishment	---	1.9	---	---	---	---
Rehabilitation	---	3.2	---	---	---	---

[1] R-E = Wetland Re-establishment and RE = Wetland Rehabilitation per NCDENR July 30, 2013 Memorandum titled: Consistency between Federal and State Wetland Mitigation Requirements

[2] A portion of Foust Creek Reach 2 and Reach 3B does not have a full 50' buffer from top of bank to the proposed conservation easement boundary on the river left side. Therefore, mitigation credit is only included at a rate of half the normal crediting giving the proposed restoration or restoration equivalent type.

10.0 Credit Release Schedule

All credit releases will be based on the total credit generated as reported by the as-built survey of the mitigation site. Under no circumstances shall any mitigation project be debited until the necessary DA authorization has been received for its construction or the District Engineer (DE) has otherwise provided written approval for the project in the case where no DA authorization is required for construction of the mitigation project. The DE, in consultation with the Interagency Review Team (IRT), will determine if performance standards have been satisfied sufficiently to meet the requirements of the release schedules below. In cases where some performance standards have not been met, credits may still be released depending on the specifics of the case. Monitoring may be required to restart or be extended, depending on the extent to which the site fails to meet the specified performance standard. The release of project credits will be subject to the criteria described as follows:

Table 13A. Credit Release Schedule – Forested Wetlands Credits
Foust Creek Mitigation Site

Monitoring Year	Credit Release Activity	Interim Release	Total Released
0	Initial Allocation – see requirements below	30%	30%
1	First year monitoring report demonstrates performance standards are being met	10%	40%
2	Second year monitoring report demonstrates performance standards are being met	10%	50%
3	Third year monitoring report demonstrates performance standards are being met	10%	60%
4	Fourth year monitoring report demonstrates performance standards are being met	10%	70%
5	Fifth year monitoring report demonstrates performance standards are being met; Provided that all performance standards are met, the IRT may allow the NCEEP to discontinue hydrologic monitoring after the fifth year, but vegetation monitoring must continue for an additional two years after the fifth year for a total of seven years.	10%	80%
6	Sixth year monitoring report demonstrates performance standards are being met	10%	90%
7	Seventh year monitoring report demonstrates performance standards are being met, and project has received close-out approval	10%	100%

Table 13B. Credit Release Schedule – Stream Credits
Foust Creek Mitigation Site

Monitoring Year	Credit Release Activity	Interim Release	Total Released
0	Initial Allocation – see requirements below	30%	30%
1	First year monitoring report demonstrates performance standards are being met	10%	40%
2	Second year monitoring report demonstrates performance standards are being met	10%	50% (60%*)
3	Third year monitoring report demonstrates performance standards are being met	10%	60% (70%*)
4	Fourth year monitoring report demonstrates performance standards are being met	5%	65% (75%*)
5	Fifth year monitoring report demonstrates performance standards are being met	10%	75% (85%*)
6	Sixth year monitoring report demonstrates performance standards are being met	5%	80% (90%)
7	Seventh year monitoring report demonstrates performance standards are being met and the project has received closeout approval	10%	90% (100%)

10.1 Initial Allocation of Released Credits

The initial allocation of released credits, as specified in the mitigation plan can be released by the NCEEP without prior written approval of the DE upon satisfactory completion of the following activities:

a. Approval of the final Mitigation Plan
b. Recordation of the preservation mechanism, as well as a title opinion acceptable to the USACE covering the property
c. Completion of project construction (the initial physical and biological improvements to the mitigation site) pursuant to the mitigation plan; Per the NCEEP Instrument, construction means that a mitigation site has been constructed in its entirety, to include planting, and an as-built report has been produced. As-built reports must be sealed by an engineer prior to project closeout, if appropriate but not prior to the initial allocation of released credits.
d. Receipt of necessary DA permit authorization or written DA approval for projects where DA permit issuance is not required.

10.2 Subsequent Credit Releases

All subsequent credit releases must be approved by the DE, in consultation with the IRT, based on a determination that required performance standards have been achieved. For stream projects a reserve of 10% of a site's total stream credits shall be released after two bank-full events have occurred, in separate years, provided the channel is stable and all other performance standards are met. In the event that less than two bank-full events occur during the monitoring period, release of these reserve credits shall be at the discretion of the IRT. As projects approach milestones associated with credit release, the NCEEP will submit a request for credit release to the DE along with documentation substantiating achievement of criteria required for release to occur. This documentation will be included with the annual monitoring report.

11.0 Project Site Mitigation Plan

11.1 Design Channel Summary

The design streams will be restored to an appropriate stream type based on the surrounding landscape, climate, and natural vegetation communities but also with strong consideration to existing watershed conditions and trajectory. The project includes the following proposed stream restoration and enhancement measures, as shown in Figure 7:

- Restoration: Foust Creek Reaches 2 and 3A, approximately 850 feet of Reach 3B, and UT1
- Enhancement II - Foust Creek Reach 1 and the upper 330 feet of Foust Creek Reach 3B

All stream restoration reaches included in the design for this project will be constructed as C/E type streams according to the Rosgen classification system (Rosgen, 1996), using the morphologic design parameters shown in Table 14. The specific values for the design parameters were selected based on designer experience and judgment and were supported by morphologic data from reference reach data sets. The design width to depth ratios range from 13.3 to 15.5. A width to depth ratio in the 10 to 14 range is the delineating line between the C and E stream type. We expect that over time as vegetation is established, the channels may

narrow more toward dimensions characteristic of an E channel. This narrowing over time would not be seen as an indicator of instability in and of itself.

The design channel slopes of the restoration reaches ranged from 0.003 to 0.017 ft/ft. Restoration will be consistent with the Priority 1 approach, connecting the proposed top of bank at approximately the existing floodplain elevation. The exception is the lower portions of Foust Creek Reaches 3A and 3B and the upper portion of UT1, which is more representative of a Priority 2 approach, involving an approximately 6" – 18" excavation of the floodplain on one or both sides. The restored channels will have entrenchment ratios greater than 2.2. The sinuosity for the restored channels is proposed to be in the range of 1.12 to 1.23.

Table 14. Design Morphologic Parameters- Foust Creek Reaches 1, 2, 3A, 3B, and UT1
Foust Creek Mitigation Site

	Notation	Units	Foust Creek Reach 2			Foust Creek Reach 3A			Foust Creek 3B			UT1 to Foust Creek		
			Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max
stream type			C4			C4			C/E4			C/E4		
drainage area	DA	sq mi	1.6			1.9			2.0			0.3		
design discharge	Q	cfs	100			110			110			30		
bankfull cross-sectional area	A_{bkf}	SF	26.4			25.8			29.2			8.8		
average velocity during bankfull event	v_{bkf}	fps	3.6			4.6			4.5			3.5		
Cross-Section														
width at bankfull	w_{bkf}	ft	20			20			20			11		
maximum depth at bankfull	d_{max}	ft	2.1			2.1			2.3			1.3		
mean depth at bankfull	d_{bkf}	ft	1.3			1.3			1.5			0.8		
bankfull width to depth ratio	w_{bkf}/d_{bkf}		15.2			15.5			13.3			13.8		
low bank height		ft	2.1			2.1			2.3			1.3		
bank height ratio	BHR		1.0			1.0			1.0			1.0		
floodprone area width	w_{fpa}	ft		50	400		50	400		50	400		27.5	220
entrenchment ratio	ER			2.5	20.0		2.5	20.0		2.5	20.0		2.5	20.0
Slope														
valley slope	S_{valley}	ft/ ft	0.006			0.010			0.008			0.014		
channel slope	S_{ch}	ft/ ft	0.005	0.003	0.007	0.009	---	---	0.007	0.005	0.016	0.012	0.005	0.017
Profile														
riffle slope	S_{riffle}	ft/ ft		0.0039	0.0329		0.0117	0.0423		0.0065	0.0752		0.0065	0.0799
riffle slope ratio	S_{riffle}/S_{ch}			1.3	4.7		1.3	4.7		1.3	4.7		1.3	4.7
pool slope	S_p	ft/ ft		0.0000	0.0014		0.0000	0.0018		0.0000	0.0032		0.0000	0.0034
pool slope ratio	S_p/S_{ch}			0.0	0.2		0.0	0.2		0.0	0.2		0.0	0.2
pool-to-pool spacing	L_{p-p}	ft		50	140		50	140		50	140		28	77
pool spacing ratio	L_{p-p}/w_{bkf}			2.5	7.0		2.5	7.0		2.5	7.0		2.5	7.0

	Notation	Units	Foust Creek Reach 2			Foust Creek Reach 3A			Foust Creek 3B			UT1 to Foust Creek		
			Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max
pool cross-sectional area		SF		26	66		26	64		29	73		9	22
pool area ratio				1.0	2.5		1.0	2.5		1.0	2.5		1.0	2.5
maximum pool depth		ft		2.6	5.3		2.6	5.3		3.0	6.0		1.6	3.2
pool depth ratio				2.0	4.0		2.0	4.0		2.0	4.0		2.0	4.0
pool width at bankfull		ft	22	16.0	28.0	22	16.0	28.0	22	16.0	28.0	11	8.8	15.4
pool width ratio			1.2	0.8	1.4	1.2	0.8	1.4	1.2	0.8	1.4	1.0	0.8	1.4
Pattern														
sinuosity	K		1.18			1.12			1.23			1.15		
belt width	w_{blt}	ft		32	178		32	178		32	178		17.6	97.9
meander width ratio	w_{blt}/w_{bkf}			1.6	8.9		1.6	8.9		1.6	8.9		1.6	8.9
meander length	L_m	ft		100	280		100	280		100	280		55	154
meander length ratio	L_m/w_{bkf}			5.0	14.0		5.0	14.0		5.0	14.0		5.0	14.0
radius of curvature	R_c	ft		38	62		38	62		38	62		21	34
radius of curvature ratio	R_c/ w_{bkf}			1.9	3.1		1.9	3.1		1.9	3.1		1.9	3.1

11.2 Designed Wetland Type

The proposed stream and wetland mitigation project includes seven distinct riparian wetland mitigation areas (RW1 – RW7). These wetland areas each include a zone of rehabilitation of existing wetlands and re-establishment of lands that were prior wetlands as depicted in Figure 7. These areas will account for 5.1 acres of riparian wetlands restoration. Soil investigations for the wetland areas are described in detail in Section 6.3.

The riparian wetland re-establishment/rehabilitation zones are adjacent to the main stem of Foust Creek. The stream in this area is incised – existing bank height ratios range from 1.1 to 2.0 – which, in combination with ditching across the site, increases the drainage effect on the surrounding historic wetlands. The drainage effect from the ditches and incised stream and the lack of surface water retention in the fields has impaired wetland hydrology and function to varying degrees. The fields have been used as cattle pasture so that the soils have been compacted and the native vegetation has been removed. The bed elevation of the stream will be raised to restore the natural water table elevation and the natural over-bank flooding regime. The other drainage ditches on the site will also be filled to eliminate their drainage

effect on the wetlands. No grading will be performed in the wetland rehabilitation areas. The re-establishment areas are between the rehabilitation zones and the stream channel and include areas of top-of-bank berms or other fill and narrow stream-side zones drained by the incised stream. Some grading will be done in these re-establishment zones to remove berms and lower floodplain elevations to be more similar to those of the rehabilitation zones. Most of the grading in the re-establishment zones will be minor. All wetlands will be planted with native tree species appropriate for the bottomland hardwood type of wetland ecosystems planned for the site.

The groundwater modeling described in Section 6.2.1 indicates that the RW 6 wetland (represented by groundwater gage 3), which is hydrologically similar to RW 1 through RW 5, will meet wetland criteria most years after the project is constructed. Two other gages (gages 1 and 2) are located in RW 4 and RW 5 respectively. Each of the gages 1 through 3 has fully met criteria during the December 2012 to July 2013 period. All three of these gages are located in areas that are currently jurisdictional and will be rehabilitation zones. There is a rehabilitation zone within RW 7 (see Figure 7) that is expected to meet success criteria.

If successful, the three wetland re-establishment areas, totaling 1.9 acres, will meet the goals described in Section 1.0 above and will provide the full ecological uplift provided by restoration projects. Wetland hydrology will be restored along with cattle exclusion, planting, disking compacted soils, minor excavation to remove berming and fill, and reconnecting the stream and wetlands. Therefore, the typical mitigation ratio of 1:1 for wetland re-establishment is proposed.

The goals for the rehabilitation zones, totaling 3.2 acres, are also described in Section 1.0. The rehabilitation work will include improving wetland hydrology, planting native species, disking compacted soils, fencing out cattle, and restoring a natural stream-riverine riparian wetland connection. The wetland functions and values of these rehabilitation zones will be significantly improved through this work and the rehabilitated zones will improve water quality and habitat in the adjacent stream restoration reaches. Therefore we propose a rehabilitation ratio of 1.5:1.

11.3 Target Buffer Communities

The target communities for the restored riparian buffer zones will be based on the following:

- Reference conditions from forested areas at the reference reaches used in this project;
- Native trees with proven success in early successional restoration sites;
- Vegetation listed for these community types in Classification of the Natural Communities of North Carolina (Schafale and Weakley,1990); and
- Consultation with native tree suppliers.

Species documented at the reference reach sites are described in Section 8.1.2.

11.4 Design Justification

If livestock were removed and buffers were not managed, eventually Foust Creek and UT1 may recover to stable C or E streams. The incised reaches would stabilize at a lower position relative to the valley floor and have less frequent access to the original floodplain. During this decades-

long recovery process, the streams would continue to export sediment and nutrients and have impaired habitat conditions. However, with continued livestock access, agricultural ditching, management of buffers, and no bank / bed stabilization treatments, the streams will not stabilize and will continue to export sediment, nutrients, and pollutants to downstream receiving waters.

Based on assessments of the watershed and existing channels, the project design has been developed to address stream degradation caused primarily by livestock access and anthropogenic modifications. The existing conditions assessment of the project reaches of Foust Creek and its tributaries included in the project area indicated that the stressors listed above have resulted in degraded stream conditions as evidenced through bank erosion, straightening, direct cattle access and trampling of the stream bank and bed, incision, and over widening. In addition, the majority of the riparian buffers have been maintained in pasture. There are few canopy trees and the narrow band of woody vegetation along portions of Foust Creek and UT1 is comprised in part of non-native species. The result is reduced stream and floodplain function, low value aquatic habitat and net sediment, nutrient, and pathogen export to downstream receiving waters.

Foust Creek Reach 1 is located in a mix of early successional grasses and a sparse and regularly disturbed riparian buffer with active pasture beyond the partially wooded buffer. The stream beds generally lack riffle/pool morphology. The channel is currently in late Stage III and early Stage IV as evidenced by widening. These processes are developing slowly, in part due to the presence of larger canopy trees that promote streambank stability, and net sediment export from the reach appears low. While some functional lift could be achieved through restoration, the stream is positioned too low in the valley floor to achieve a Priority 1 and the Priority 2cut would exceed 2 – 3 feet. A Priority 2 restoration would also involve removing the existing woody vegetation in the near streamside buffer zone. An Enhancement II approach has been selected for Foust Creek Reach 1. This approach will involve excluding cattle and planting additional woody stems within the existing buffer. This approach will result in improved aquatic and terrestrial habitat.

Foust Creek Reaches 2, 3A, and 3B and UT1 to Foust Creek are located in active cattle pastures. The stream beds generally lack riffle/ pool morphology and the banks and beds have been trampled and de-stabilized by livestock encroachment. Bank height ratios vary from 1.1 to 1.4 in the areas surveyed which indicate minor to moderate incision. Reaches 2 and 3A are so severely impacted by livestock intrusion that channel evolution processes are not evident. Reach 3B and UT1 are in Stage III and IV adjustment processes and actively eroding. The streams will be restored with the exception of the upper portion of Reach 3B which is slated for an Enhancement II approach given hydraulic encroachment constraints. Functional lift will be achieved through improvements in geomorphic stability and aquatic and terrestrial habitat.

Habitat development associated with these long term evolutionary processes would be very slow. and have poor instream habitat. The project goals and objectives were developed to address the stressors and impairments described in the paragraphs above. To summarize, the key factors driving the need for this intervention are:

- Removing livestock, converting pastures and degraded floodplain wetlands to forested buffers, and re-establishing and rehabilitating floodplain wetlands supports the Cape Fear RBRP plan as it relates to promoting good riparian conditions in the Cane Creek Watershed TLW. Without intervention, poor riparian conditions will remain on the project site.
- The restoration, enhancement, buffer enhancement efforts, and re-established and rehabilitated floodplain wetlands will improve aquatic and terrestrial habitat conditions on-site. In addition, these activities will reduce sediment and pollutant export to downstream receiving waters by removing cattle and filtering on-site runoff through forested buffers and re-established and rehabilitated floodplain wetlands zones. Off-site nutrient input will be absorbed on-site by filtering flood flows through forested floodplain areas and re-established and rehabilitated floodplain wetlands, where flood flows will spread through native vegetation. All of this will help improve the "fair" and "fair-good" benthic ratings reported in the RBRP for the Cane Creek Watershed TLW.
- The intervention will provide functional improvements to the ecosystem by restoring riffle/pool sequences to promote aeration of water, lower water temperature, help maintain dissolved oxygen concentrations, and restore the aquatic, benthic, and riparian habitat. The functional lift achieved through stream restoration and enhancement and wetland re-establishment and rehabilitation builds on the previous stream and wetland projects noted in the RBRP for the Cane Creek Watershed TLW.

11.5 Sediment Competency Analysis for Proposed Restoration Channels

A sediment competency analysis was performed for the restoration reaches on the site: Foust Creek Reaches 2, 3A, and 3B and UT1 to Foust Creek. Table 15 summarizes the dimensional shear stresses and movable particle size calculations under existing conditions for the restoration reaches. The critical shear stress required to move the observed d_{100} and the movable particle size given the existing shear stress are both reported in the table.

In Foust Creek Reach 2 and 3A, existing shear stress is below the shear stress required to move the largest particle. However, the predicted particle size moved by the existing shear stress does mobilize a particle between the d_{84} and d_{95}. This indicates that, while there is a slight tendency towards aggradation, the reaches exhibit competency.

Reach 3B has a finer bed and shows a very slight degradational tendency but exhibits competency. UT1 is predicted to move a particle about twice the size of the largest particle under existing shear stress conditions and therefore is degradational. This is evident under current geomorphic conditions.

Based on the watershed assessment summarized earlier in this report, the stream channels are expected to have adequate capacity to pass the limited sediment load being received from upstream drainage.

Table 15. Existing Dimensional Shear Stress and Sediment Transport Analysis Foust Creek Mitigation Site

Parameter	Foust Creek			UT1
	Reach 2	Reach 3A	Reach 3B	
d_{84} of bulk sediment sample (mm)	22	40	11	6.6
d_{95} of bulk sediment sample (mm)	43	92	17	8.6
d_{100} of bulk sediment sample (mm)	64.7	101.0	23.7	14.4
Existing shear stress (lbs/ft^2)	0.50	0.85	0.25	0.40
Moveable particle (mm) per Shield's Curve	38.1	65.9	18.7	30.0
Shear (lbs/ft^2) stress to move d_{100}	0.84	1.28	0.32	0.20

Table 16 summarizes the dimensional shear stresses and movable particle size calculations for the restoration reaches under proposed conditions. Reach 2 and 3A have design shear stress that do not move the d_{100} but do move a particle size between the d_{84} and d_{95}. This is an indicator of sediment competency at the design discharge given that particles smaller than the d_{84} are not mobilized. In addition, the d_{50} of the designed constructed riffles will be approximately 150 mm. Therefore the riffles will be threshold structures and will not be mobilized at the design discharge. Reach 3B and UT1 has a design shear stress that moves a particle larger than the d_{100}. The use of constructed riffle with a d_{50} of approximately 150 mm for Foust Creek Reach 3B and 100 mm for UT1 will ensure that the riffle material is not mobilized at the design discharge.

Table 16. Proposed Dimensional Shear Stress and Sediment Transport Analysis Foust Creek Mitigation Site

Parameter	Foust Creek			UT1
	Reach 2	Reach 3A	Reach 3B	
d_{84} of bulk sediment sample (mm)	22	40	11	6.6
d_{95} of bulk sediment sample (mm)	43	92	17	8.6
d_{100} of bulk sediment sample (mm)	64.7	101.0	23.7	14.4
Proposed shear stress (lbs/ft^2)	0.40	0.71	0.86	0.58
Moveable particle (mm) per Shield's Curve	30.0	54.3	37.8	44.0
Shear (lbs/ft^2) stress to move d_{100}	0.84	1.28	0.32	0.20

12.0 Project Site Mitigation Plan

The stream restoration will be constructed as described in this section. Preliminary design plans are included with this mitigation plan for review.

12.1 Site Grading, Structure Installation, and Other Project Related Construction

The stream restoration elements of the project will be constructed primarily as Rosgen Priority 1 restoration with the exception of three short Priority 2 sections at the lower end of Foust Creek Reaches 3A and 3B and the upper end of UT1. Some shallow floodplain grading is required to re-establish wetlands and create a more functional floodplain surface. In general this cut is limited to 0 to 4 inches.

The stream restoration construction will result in meandering channels sized to convey the design discharge. The sinuous plan form of the channel will be built to mimic a natural Piedmont stream and allow the stream to maintain distinct pools and riffles and dissipate and collect energy through convergent and divergent flow dynamics. Generally pools will occur in the outside of the meander bends and riffles will be located in the straight sections of channel between meanders. The reconstructed channel banks will be built with stable side slopes, planted with native materials, matted, and seeded for stability. Flows above the design discharge will frequently flood the adjacent floodplain.

Scaled Schematic of Grading

The proposed grading is depicted in the preliminary design plans included with the submittal of this report.

In-Stream Structures and Other Construction Elements

In-stream structures will include constructed riffles, log sills, log vanes, log J-hooks, and boulder sills. The constructed riffles will be comprised of native gravel/cobble material harvested from the existing channel and incorporate brush, wood, large cobble, and angled logs. Quarried gravel and cobble will be substituted for the portion of total riffle material that cannot be met by harvesting native gravel/cobble material on-site. The diverse range of constructed riffle types will provide grade control, heterogeneous habitat, and a varied flow regime. Log vanes will deflect flow vectors away from banks while creating habitat diversity. Log and boulder sills will be used to allow for small grade drops across pools and provide extra grade control protection. At select outer meander bends, the channel banks will be constructed with a brush toe to reduce erosion potential and encourage pool formation.

A culvert crossing, excluded from the conservation easement, will be constructed across Foust Creek at the northernmost end of the project site to replace an existing downstream crossing to be removed. This maintains access to pasture land outside of the conservation easement to the east of Foust Creek. A culvert crossing, excluded from the conservation easement, will be added immediately downstream of the existing farm road and metal bridge crossing at the top end of Foust Creek Reach 2. This crossing will replace an existing ford crossing at the same location and will allow movement of livestock and equipment between pastures to remain outside of the conservation easement. The existing metal pipe culvert running under the existing private road at the upper end of UT1 will be replaced with a new culvert which will extend approximately 30' downstream from the current culvert invert. This will allow for the UT1 bed to be raised and support the Priority 1 approach. A permanent ford crossing will be installed downstream of this driveway culvert to allow for movement of livestock and equipment between pastures to remain outside of the conservation easement. All the crossings described above will have

fencing installed that prevents livestock from entering the streams beyond the limits of the crossing.

12.2 Natural Plant Community Restoration

As a final stage of construction, riparian stream buffers and wetlands will be planted and restored with native trees and herbaceous plants representative of the natural plant community that exists within the project watershed with an emphasis on early successional commercially available species. Selection criterion for plant communities are described in section 10.3.

Individual tree and shrub species will be planted throughout the project easement including stream banks, benches, tops of banks, and floodplains zones. These species will be planted as bare root and live stakes and will provide additional stabilization to the outsides of constructed meander bends and side slopes. Live stakes will be planted on channel banks in tangent sections and outer meander bends. Point bars will not be planted with live stakes. Low growing permanent herbaceous seed will be placed on stream banks, floodplains, and additional disturbed areas within the project easement. Areas disturbed outside the easement will be seeded with pasture grasses. Proposed plant lists are included in the preliminary plan set.

13.0 Maintenance Plan

The site shall be monitored on a regular basis and a physical inspection of the site shall be conducted a minimum of once per year throughout the post-construction monitoring period until performance standards are met. These site inspections may identify site components and features that require routine maintenance. Routine maintenance should be expected most often in the first two years following site construction and may include the following:

Table 17. Maintenance Plan
Foust Creek Mitigation Site

Component/Feature	Maintenance through project close-out
Stream	Routine channel maintenance and repair activities may include minor repairs to in-stream structures to prevent piping of flows, securing loose coir matting, and supplemental installations of live stakes and other target vegetation along the channel. Areas where storm water and floodplain flows intercept the channel may also require maintenance to prevent bank failures and head-cutting. Beaver dams that inundate the streams may need to be removed
Wetlands	Routine site walks will be conducted to identify and document potential areas of concern, such as, but not limited to areas of low stem density or poor plant vigor, invasive species, beaver activity, encroachments, and livestock access. Maintenance will follow procedures as described below under the vegetation and site boundary components.
Vegetation	Vegetation shall be maintained to ensure the health and vigor of the targeted community. Routine vegetation maintenance and repair activities may include supplemental planting, pruning, mulching, and fertilizing. Exotic invasive plant species shall be controlled by mechanical and/or chemical methods. Any vegetation control requiring herbicide application will be performed in accordance with NC Department of Agriculture (NCDA) rules and regulations.
Site boundary	Site boundaries shall be identified in the field to ensure clear distinction between the mitigation site and adjacent properties. Boundaries may be identified by fence, marker, bollard, post, tree-blazing, or other means as allowed by site conditions and/or conservation easement. Boundary markers disturbed, damaged, or destroyed will be repaired and/or replaced on an as-needed basis.
Ford and Culvert Crossings	Ford crossings within the site may be maintained only as allowed by Conservation Easement or existing easement, deed restrictions, rights of way, or corridor agreements.

14.0 Performance Standards

The stream and wetland performance criteria for the project site will follow approved performance criteria presented in the EEP Mitigation Plan Template (version 2.1, 09/01/2011), the EEP Monitoring Requirements and Performance Standards for Stream and/or Wetland Mitigation (11/7/2011), and the Stream Mitigation Guidelines issued in April 2003 by the USACE and NCDWQ. Annual monitoring and semi-annual site visits will be conducted to assess the condition of the finished project. The stream restoration and enhancement sections and the wetland re-establishment and rehabilitation sections of the project will be assigned specific performance criteria components for stream morphology, hydrology, and vegetation. Performance criteria will be evaluated throughout the seven year post-construction monitoring. If all performance criteria have been successfully met and two bankfull events have occurred

during separate years, Wildlands may propose to terminate stream and/or vegetation monitoring. An outline of the performance criteria components follows.

14.1 Streams

14.1.1 Dimension

Riffle cross-sections on the restoration reaches should be stable and should show little change in bankfull area, maximum depth ratio, and width-to-depth ratio. Per EEP guidance, bank height ratios shall not exceed 1.2 and entrenchment ratios shall be at least 2.2 for restored channels to be considered stable. All riffle cross-sections should fall within the parameters defined for channels of the appropriate Rosgen stream type. If any changes do occur, these changes will be evaluated to assess whether the stream channel is showing signs of instability. Changes in the channel that indicate a movement toward stability or enhanced habitat include a decrease in the width-to-depth ratio in meandering channels or an increase in pool depth. Remedial action would not be taken if channel changes indicate a movement toward stability.

14.1.2 Pattern and Profile

Performance standards for longitudinal profile and pattern will not be established during the seven year monitoring period unless other indicators during the annual monitoring indicate a trend toward vertical and lateral instability.

14.1.3 Substrate

Substrate materials in the restoration reaches should indicate a progression towards or the maintenance of coarser materials in the riffle features and smaller particles in the pool features.

14.1.4 Bankfull Events and Baseflow Confirmation

Two bankfull flow events must be documented on the restoration and enhancement reaches within the seven-year monitoring period. The two bankfull events must occur in separate years. Stream monitoring will continue until success criteria in the form of two bankfull events in separate years have been documented. In addition, the presence of baseflow must be documented along portions of UT1 constructed with a Priority I restoration approach. Baseflow must be present for at least some portion of the year (most likely in the winter/early spring) during years with normal rainfall conditions.

14.2 Vegetation

The final vegetative success criteria will be the survival of 210 planted stems per acre in the riparian corridor at the end of the required monitoring period (year seven). The interim measure of vegetative success for the site will be the survival of at least 320 planted stems per acre at the end of the third monitoring year and at least 260 stems per acre at the end of the fifth year of monitoring. Planted vegetation must average 10 feet in height in each plot at the end of the seventh year of monitoring. If this performance standard is met by year five and stem density is trending towards success (i.e., no less than 260 five year old stems/acre), monitoring of vegetation on the site may be terminated with written approval by the USACE in consultation with the NC Interagency Review Team. The extent of invasive species coverage will

also be monitored and controlled as necessary throughout the required monitoring period (year five or seven).

14.3 Wetlands

The final performance standard for wetland hydrology will be a free groundwater surface within 12 inches of the ground surface for 8.5 percent of the growing season for wetland RW1 – RW7, which is measured on consecutive days under typical precipitation conditions. This performance standard was determined through model simulations of post restoration conditions and comparison to reference wetland systems. A detailed discussion of the modeling approach to determining this performance standard as well as definitions and determinations of a target hydroperiod are included in section 6.2 of this report. If a particular gage does not meet the performance standard for a given monitoring year, rainfall patterns will be analyzed and the hydrograph will be compared to that of the reference wetlands to assess whether atypical weather conditions occurred during the monitoring period.

15.0 Monitoring Plan

Annual monitoring data will be reported using the EEP Monitoring Report template (version 1.4, 11/7/11). The monitoring report shall provide project data chronology that will facilitate an understanding of project status and trends, population of EEP databases for analysis, research purposes, and assist in decision making regarding close-out. The monitoring period will extend seven years beyond completion of construction or until performance criteria have been met. Project monitoring requirements are listed in more detail in Table 18. Project monitoring locations are shown on Figure 10. All surveys will be tied to grid.

15.1 Site Specific Monitoring

Using the EEP Baseline Monitoring Plan Template (version 2.0, 10/14/10), a baseline monitoring document and as-built record drawings of the project will be developed within 60 days of the planting completion and monitoring installation on the restored site. Monitoring reports will be prepared in the fall of each year of monitoring and submitted to EEP. These reports will be based on the EEP Monitoring Report Template (version 1.4, 11/7/11). The monitoring period will extend seven years beyond completion of construction or until performance criteria have been met per the criteria stated in the EEP Monitoring Requirements and Performance Standards for Stream and/or Wetland Mitigation (11/7/2011).

Table 18. Monitoring Requirements – Foust Creek Reach 1, 2 and 3, UT1, RW1-7
Foust Creek Mitigation Site

Parameter	Monitoring Feature	Quantity/ Length by Reach								Frequency	Notes
		Foust R1	Foust R2	Foust R3	UT1	RW1-7					
Dimension	Riffle Cross Sections	n/a	4	1	2	n/a				Years 1, 2, 3, 5 and 7	1
	Pool Cross Section (with Bank Erosion Pins)	n/a	3	1	2	n/a					
Pattern	Pattern	n/a	n/a	n/a	n/a	n/a				Annual	2
Profile	Longitudinal Profile	n/a	n/a	n/a	n/a	n/a				Annual	
Substrate	Reach wide (RW), Riffle (RF) 100 pebble count	n/a	1 RW, 3 RF	1 RW, 1 RF	1 RW, 1 RF	n/a				Annual	
Hydrology	Crest Gage	1			1	n/a				Annual	3
Hydrology	Groundwater Gages	n/a	n/a	n/a	n/a	7				Quarterly	
Vegetation	CVS Level 2	17								Years 1, 2, 3, 5 and 7	4
Visual Assessment		Y	Y	Y	Y	Y	Y	Y	Y	Semi-Annual	
Exotic and nuisance vegetation										Semi-Annual	5
Project Boundary										Semi-annual	6
Reference Photos	Photographs	35								Annual	7

1. Cross-sections will be permanently marked with rebar to establish location. Surveys will include points measured at all breaks in slope, including top of bank, bankfull, edge of water, and thalweg.
2. Pattern and profile will be assessed visually during bi-annual site visits.
3. Device will be inspected quarterly or semi-annually, evidence of bankfull will be documented with a photo.
4. Vegetation monitoring will follow CVS protocols.
5. Locations of exotic and nuisance vegetation will be mapped.
6. Locations of fence damage, vegetation damage, boundary encroachments, etc. will be mapped.
7. Permanent markers will be established so that the same locations and view directions on the site are monitored.

15.2 Additional Monitoring Details

15.2.1 Vegetation

Vegetation monitoring plots will be installed and evaluated within the restoration and enhancement areas to measure the survival of the planted trees. The number of monitoring quadrants required is based on the EEP monitoring guidance documents (version 1.4, 11/7/11). The size of individual quadrants will be 100 square meters for woody tree species and shrubs. Vegetation assessments will be conducted following the Carolina Vegetation Survey (CVS) Level 2 Protocol for Recording Vegetation (2006).

The initial baseline survey will be conducted within 21 days from completion of site planting and used for subsequent monitoring year comparisons. The first annual vegetation monitoring activities will commence at the end of the first growing season, during the month of September. The restoration and enhancement sites will then be evaluated each subsequent year between June 1 and September 31. Species composition, density, and survival rates will be evaluated on an annual basis by plot and for the entire site. Individual plot data will be provided and will include height, density, vigor, damage (if any), and survival. Planted woody stems will be marked annually as needed and given a coordinate, based off of a known origin, so they can be found in succeeding monitoring years. Mortality will be determined from the difference between the previous year's living planted stems and the current year's living planted stems.

15.2.2 Bankfull Events and Baseflow Confirmation

Bankfull events will be documented using a crest gage, photographs, and visual assessments such as debris lines. The crest gages will be installed within a riffle cross-section of the restored channels in surveyed riffle cross-sections. The gages will be checked at each site visit to determine if a bankfull event has occurred. Photographs will be used to document the occurrence of debris lines and sediment deposition.

Baseflow in the portions of UT1 constructed with a Priority I Restoration approach will be confirmed by installing two groundwater monitoring wells within the thalweg of the channel. One well will be located at the upper end of the Priority I reach, and one at the downstream end. The wells will be equipped with continuous-read gauges that are capable of monitoring groundwater levels. Well data will be provided annually in the monitoring reports to demonstrate intermittent aquatic function has been maintained in the restored channel.

15.2.3 Visual Assessments

Visual assessments will be performed along all stream and wetland areas on a semi-annual basis during the seven year monitoring period. Problem areas will be noted such as channel instability (i.e. lateral and/or vertical instability, in-stream structure failure/instability and/or piping, headcuts), vegetated health (i.e. low stem density, vegetation mortality, invasive species or encroachment), beaver activity, or livestock access. Areas of concern will be mapped, photographed, and accompanied by a written description in the annual report. Problem areas with be re-evaluated during each subsequent visual assessment. Should remedial actions be required, recommendations will be provided in the annual monitoring report.

15.2.4 Photo Documentation

Photographs will be taken once a year to visually document stability for seven years following construction. Permanent markers will be established and located with GPS equipment so that the same locations and view directions on the site are photographed each year. Photos will be used to monitor restoration and enhancement stream reaches as well as vegetation plots and wetland areas.

Longitudinal reference photos will be established at the tail of riffles approximately every 200 LF along the channel by taking a photo looking upstream and downstream. Cross-sectional photos will be taken of each permanent cross-section looking upstream and downstream. Reference photos will also be taken for each of the vegetation plots and within wetland areas. Representative digital photos of each permanent photo point, cross-section and vegetation plot will be taken on the same day of the stream and vegetation assessments are conducted. The photographer will make every effort to consistently maintain the same area in each photo over time.

Photographs should illustrate the site's vegetation and morphological stability on an annual basis. Cross-section photos should demonstrate no excessive erosion or degradation of the banks. Longitudinal photos should indicate the absence of persistent bars within the channel or vertical incision. Grade control structures should remain stable. Deposition of sediment on the bank side of vane arms is preferable. Maintenance of scour pools on the channel side of vane arms is expected.

16.0 Long-Term Management Plan

Upon approval for close-out by the Interagency Review Team (IRT), the site will be transferred to the NCDENR Division of Natural Resource Planning and Conservation's Stewardship Program. This party shall be responsible for periodic inspection of the site to ensure that restrictions required in the conservation easement or the deed restriction document(s) are upheld. Endowment funds required to uphold easement and deed restrictions shall be negotiated prior to site transfer to the responsible party.

The NCDENR Division of Natural Resource Planning an Conservation's Stewardship Program currently houses EEP stewardship endowments within the non-reverting, interest-bearing Conservation Lands Stewardship Endowment Account. The use of funds from the Endowment Account is governed by North Carolina General Statute GS 113A-232(d)(3). Interest gained by the endowment fund may be used only for the purpose of stewardship, monitoring, stewardship administration, and land transaction costs, if applicable. The NCDENR Stewardship Program intends to manage the account as a non-wasting endowment. Only interest generated from the endowment funds will be used to steward the compensatory mitigation sites. Interest funds not used for those purposes will be re-invested in the Endowment Account to offset losses due to inflation.

17.0 Adaptive Management Plan

Upon completion of site construction, EEP will implement the post-construction monitoring protocols previously defined in this document. Project maintenance will be performed as described previously in this document. If, during the course of annual monitoring it is

determined the site's ability to achieve site performance standards are jeopardized, EEP will notify the USACE of the need to develop a Plan of Corrective Action. The Plan of Corrective Action may be prepared using in-house technical staff or may require engineering and consulting services. Once the Corrective Action Plan is prepared and finalized EEP will:

- Notify the USACE as required by the Nationwide 27 permit general conditions.
- Revise performance standards, maintenance requirements, and monitoring requirements as necessary and/or required by the USACE.
- Obtain other permits as necessary.
- Implement the Corrective Action Plan.

Provide the USACE a Record Drawing of Corrective Actions. This document shall depict the extent and nature of the work performed.

18.0 Financial Assurances

Pursuant to Section IV H and Appendix III of the Ecosystem Enhancement Program's In-Lieu Fee Instrument dated July 28, 2010, the North Carolina Department of Environment and Natural Resources has provided the US Army Corps of Engineers Wilmington District with a formal commitment to fund projects to satisfy mitigation requirements assumed by EEP. This commitment provides financial assurance for all mitigation projects implemented by the program.

19.0 References

Buck Engineering, 2004. UT to Barnes Creek Restoration Plan: Montgomery County, NC.

Harman, Will. Personal communication, April 26, 2013.

KCI Technologies, 2007. Collins Creek Restoration Plan. Morrisville, NC

Natural Resources Conservation Service (NRCS), 2011. Web Soil Survey. http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

Natural Resources Conservation Service (NRCS), 2006. Alamance County Soil Survey. http://soils.usda.gov/survey/online_surveys/north_carolina/

North Carolina Center for Geographic Information and Analysis (NC CGIA), 2001. Landcover GIS layer. http://data.nconemap.com/geoportal/catalog/main/home.page

North Carolina Division of Water Quality (NCDWQ) Basinwide Planning Program, 2005. Cape Fear River Basinwide Water Quality Plan. http://portal.ncdenr.org/c/document_library/get_file?uuid=2eddbd59-b382-4b58-97ed-c4049bf4e8e4&groupId=38364

North Carolina Ecosystem Enhancement Program (NCEEP), 2009. Cape Fear River Basin Restoration Priorities (RBRP). http://portal.ncdenr.org/c/document_library/get_file?uuid=864e82e8-725c-415e-8ed9-c72dfcb55012&groupId=60329

Rosgen, D.L. 1996. Applied River Morphology. Pagosa Springs, CO: Wildland Hydrology Books.

Rosgen, D.L. 2006/2007. Personal Communication.

Schafale, M.P. and A.S. Weakley. 1990. Classification of the Natural Communities of North Carolina, 3rd approx. North Carolina Natural Heritage Program, Raleigh, North Carolina.

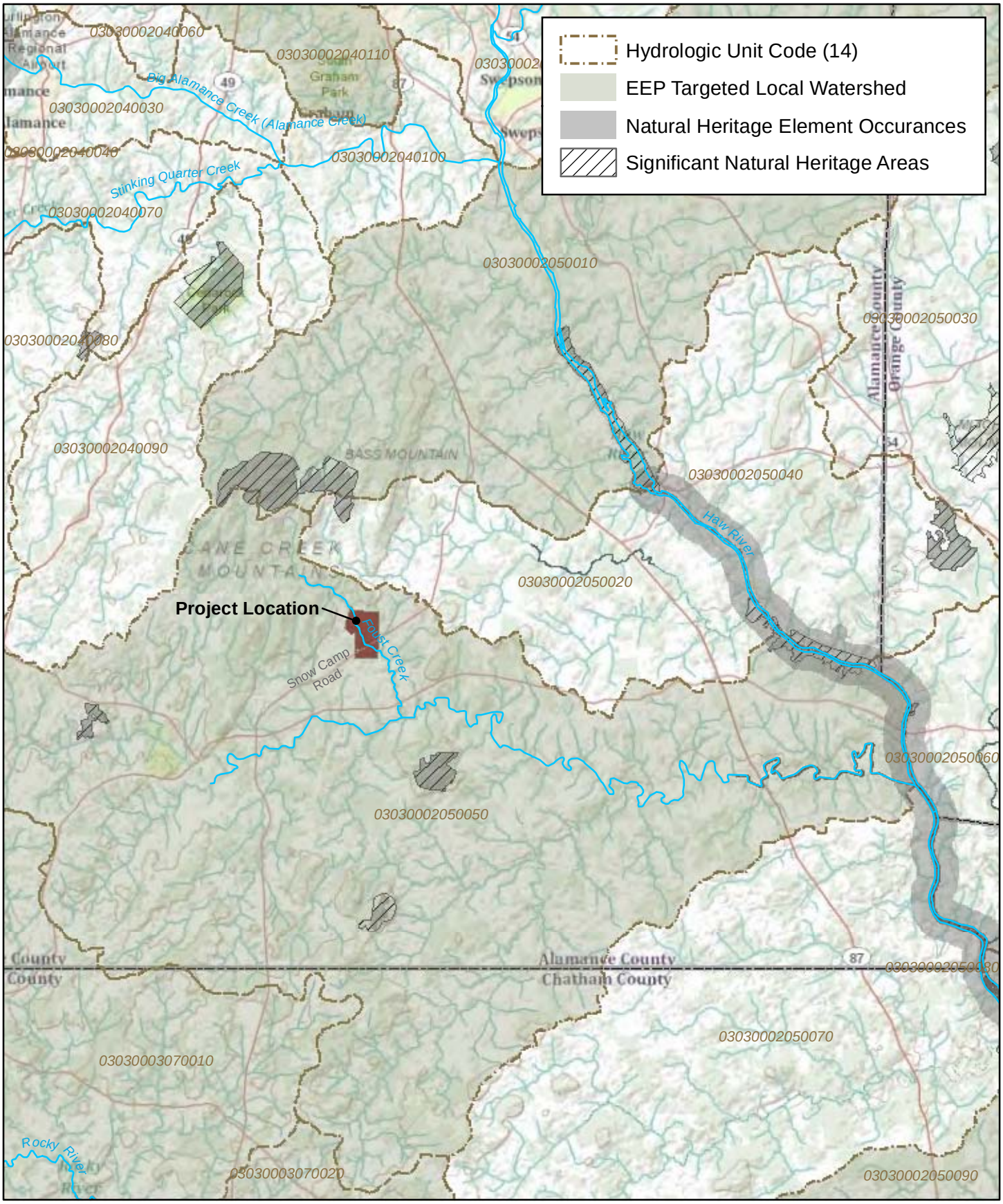
Simon, A. 1989. A model of channel response in disturbed alluvial channels. Earth Surface Processes and Landforms 14(1):11-26.

United States Fish and Wildlife Service (USFWS), 2008. Endangered Species, Threatened Species, Federal Species of Concern and Candidate Species, Alamance County, NC. http://www.fws.gov/raleigh/species/cntylist/alamance.html

URS Corporation, 2007. Unnamed Tributary to Cane Creek Restoration Plan. Morrisville, NC.

Walker, Alan, unpublished. NC Rural Mountain and Piedmont Regional Curve. Personal communication.

Walker, Alan. Personal communication, April 26, 2013.



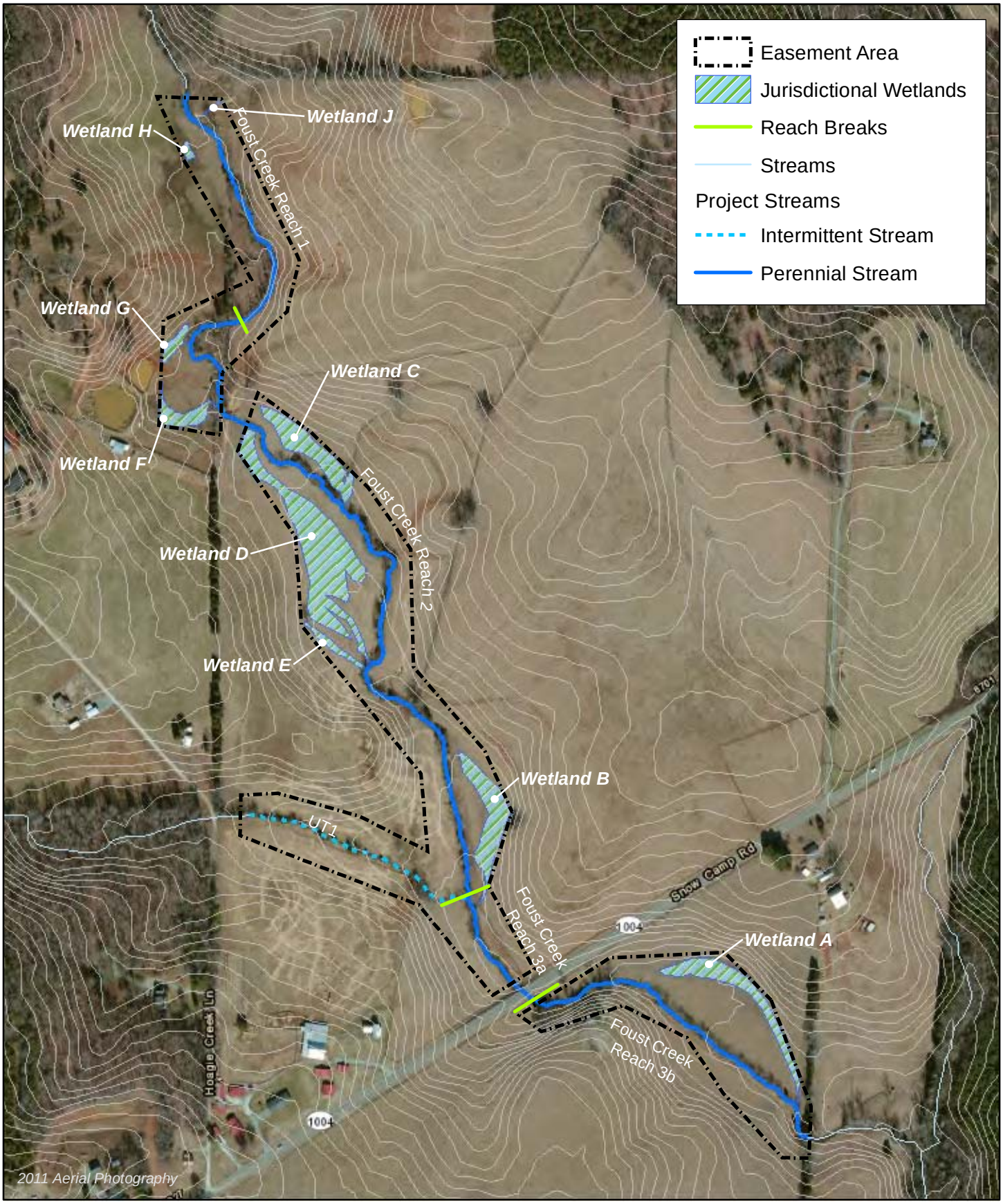
WILDLANDS ENGINEERING

0 1 2 Miles

N

Figure 1 Vicinity Map
Foust Creek Mitigation Site
Mitigation Plan
EEP #95715

Alamance County, NC



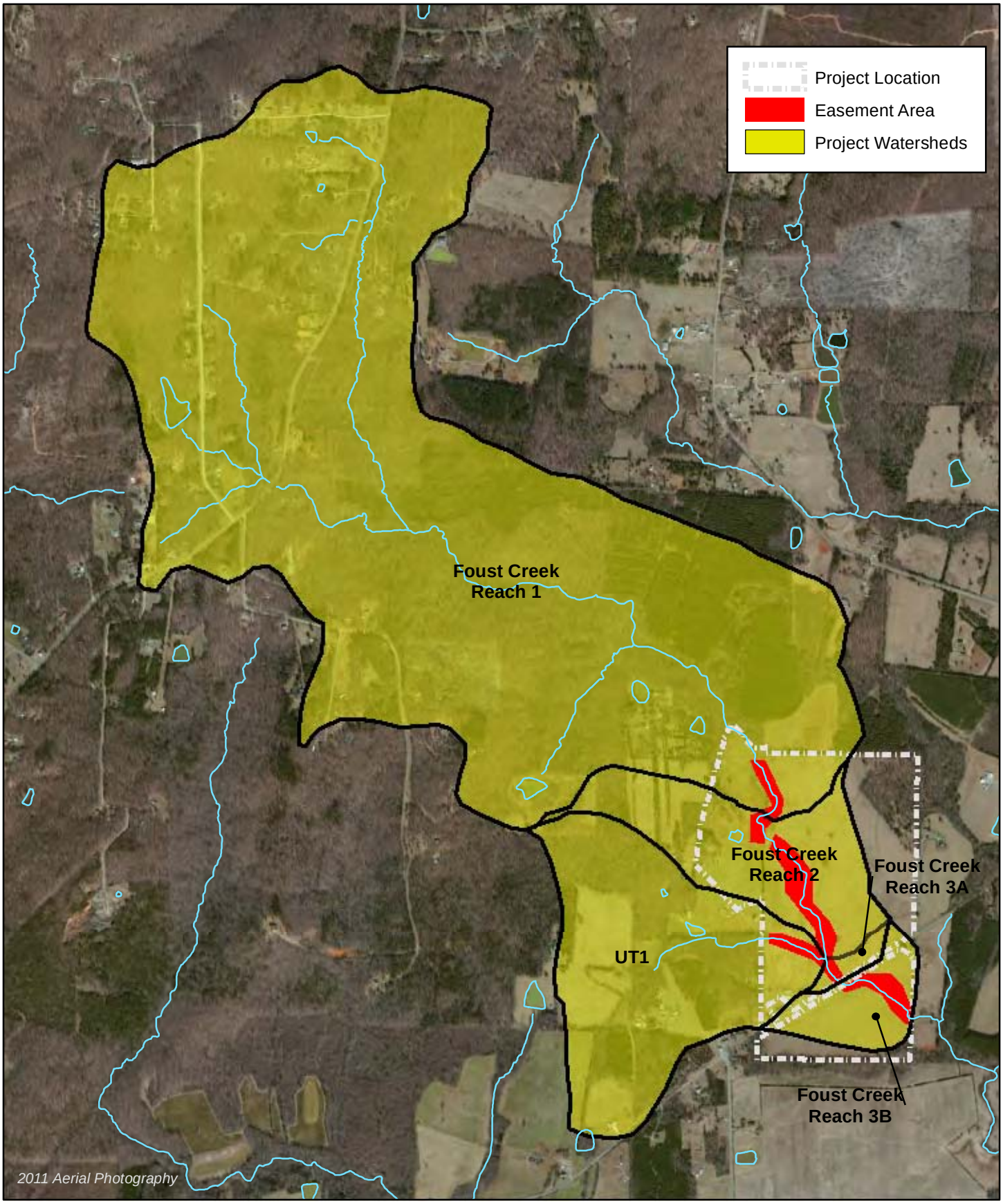
WILDLANDS ENGINEERING

0 200 400 Feet

N

Figure 2 Site Map
Foust Creek Mitigation Site
Mitigation Plan
EEP #95715

Alamance County, NC



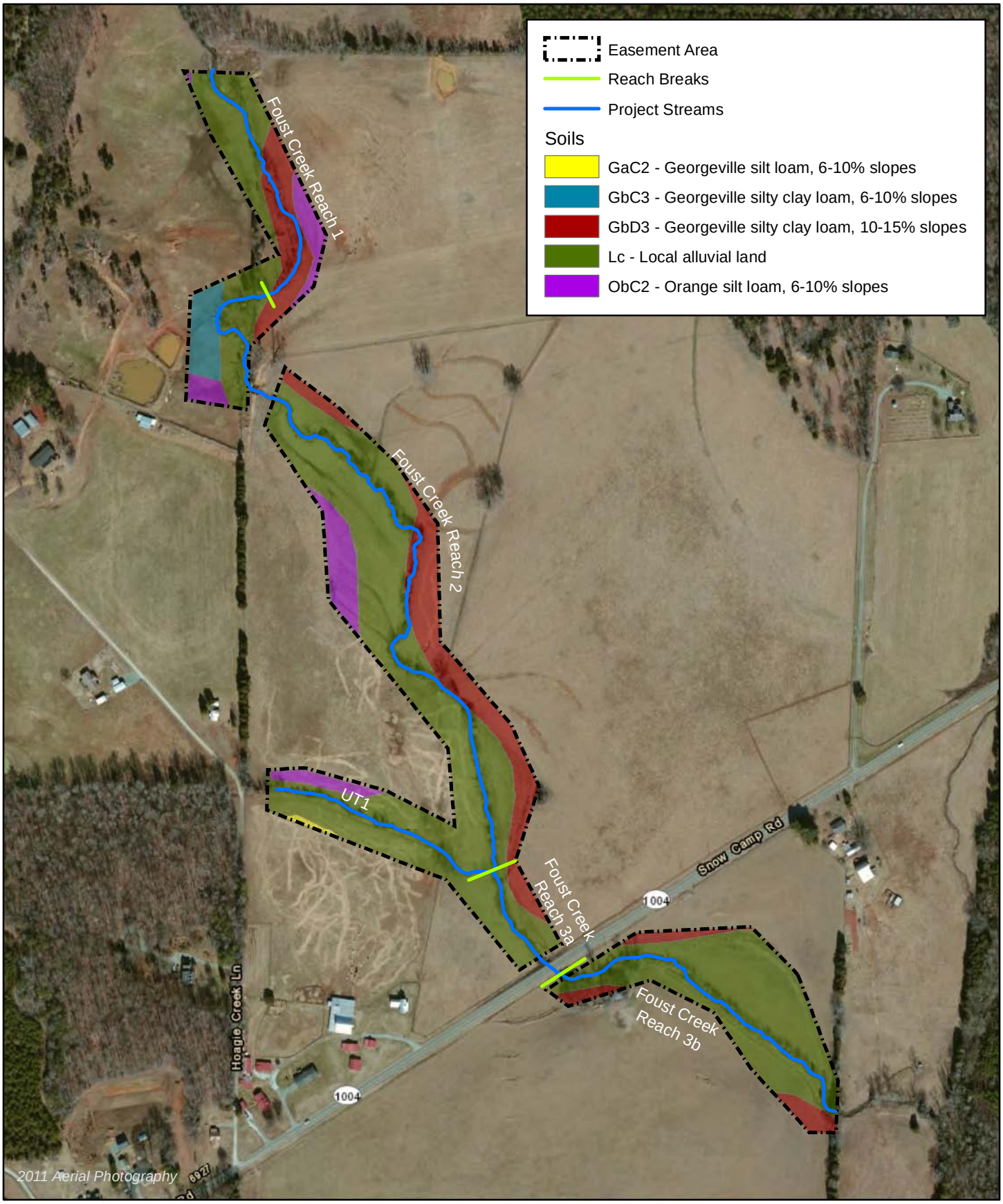
WILDLANDS ENGINEERING

0 800 1,600 Feet

N

Figure 3 Watershed Map
Foust Creek Mitigation Site
Mitigation Plan
EEP #95715

Alamance County, NC

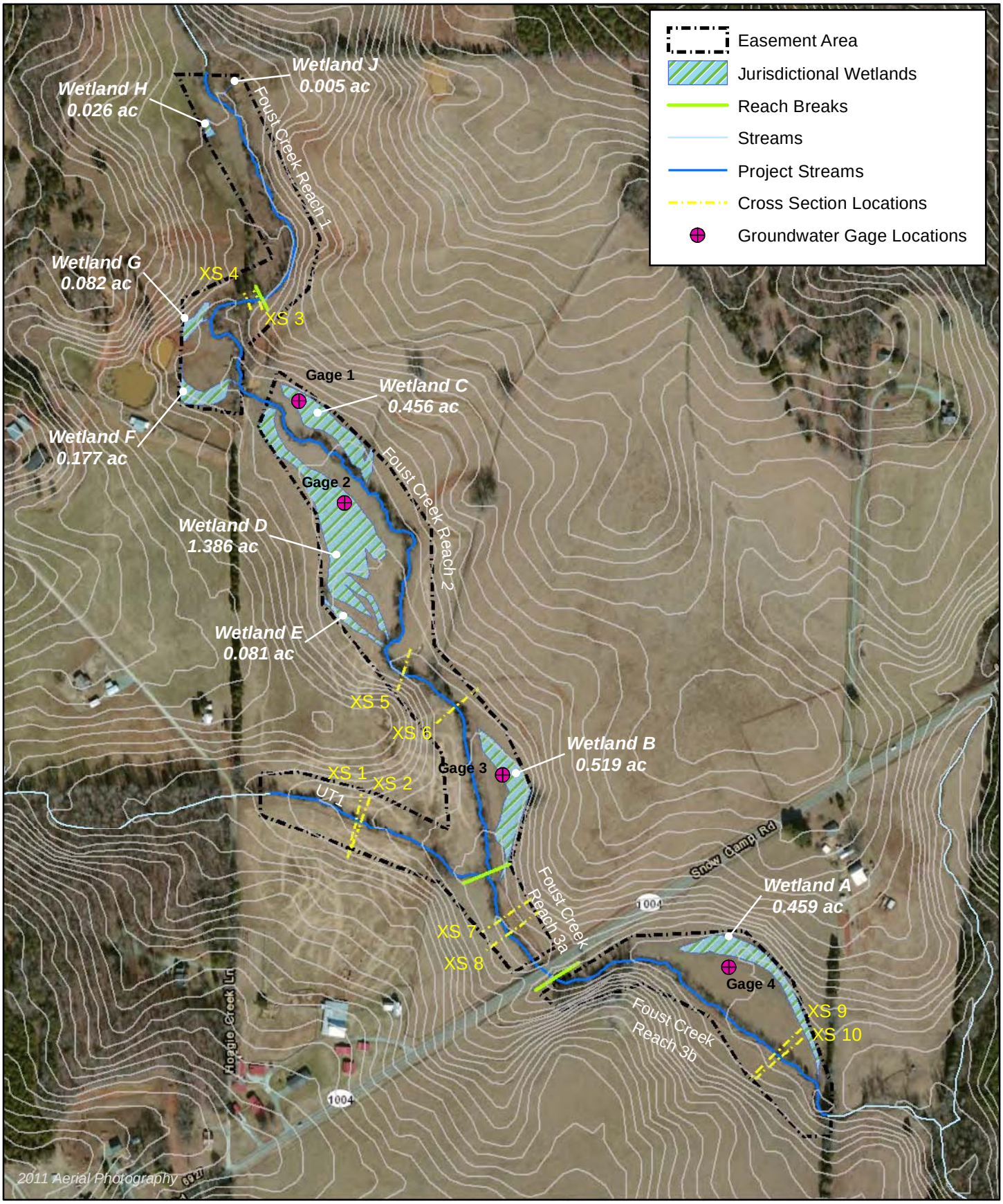


WILDLANDS ENGINEERING

0 200 400 Feet

N

Figure 4. Soils Map
Foust Creek Mitigation Site
Mitigation Plan
EEP #95715
Alamance County, NC



WILDLANDS ENGINEERING

0 200 400 Feet

N

Figure 5 Hydrologic Features Map
Foust Creek Mitigation Site
Mitigation Plan
EEP #95715

Alamance County, NC

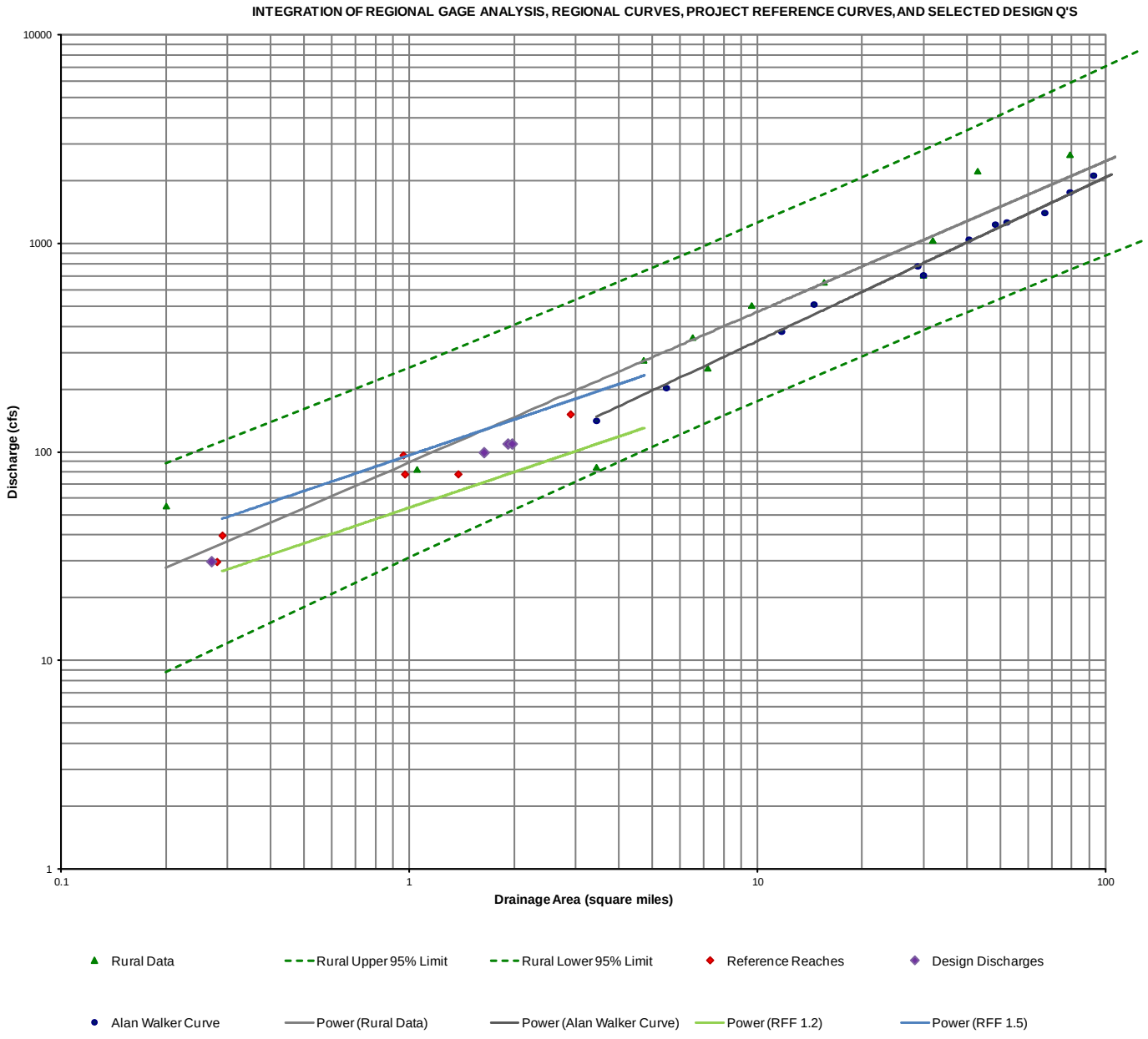
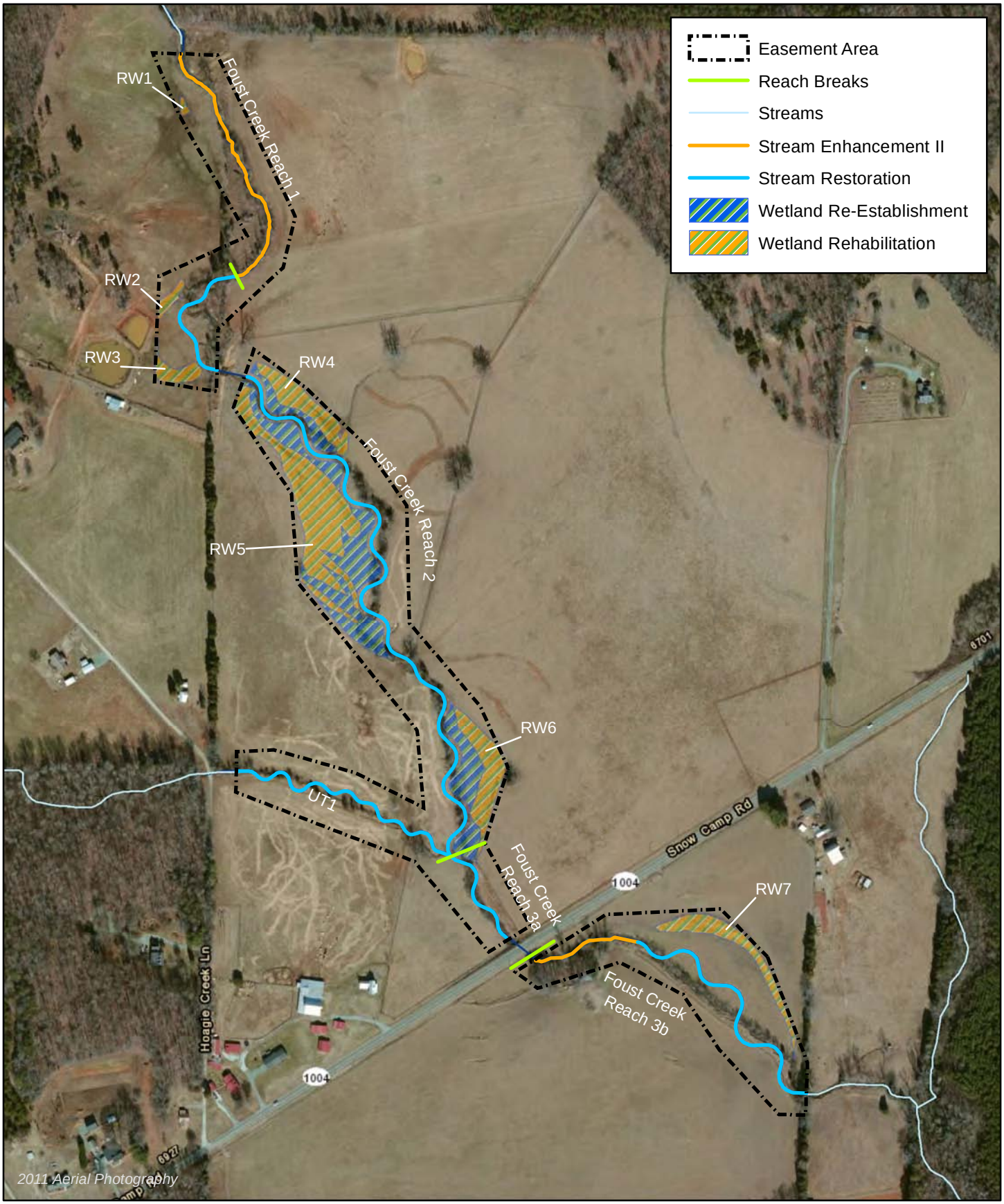


Figure 6 Design Discharge Selection
Foust Creek Mitigation Site
Mitigation Plan
EEP #95715

Alamance County, NC

WILDLANDS ENGINEERING



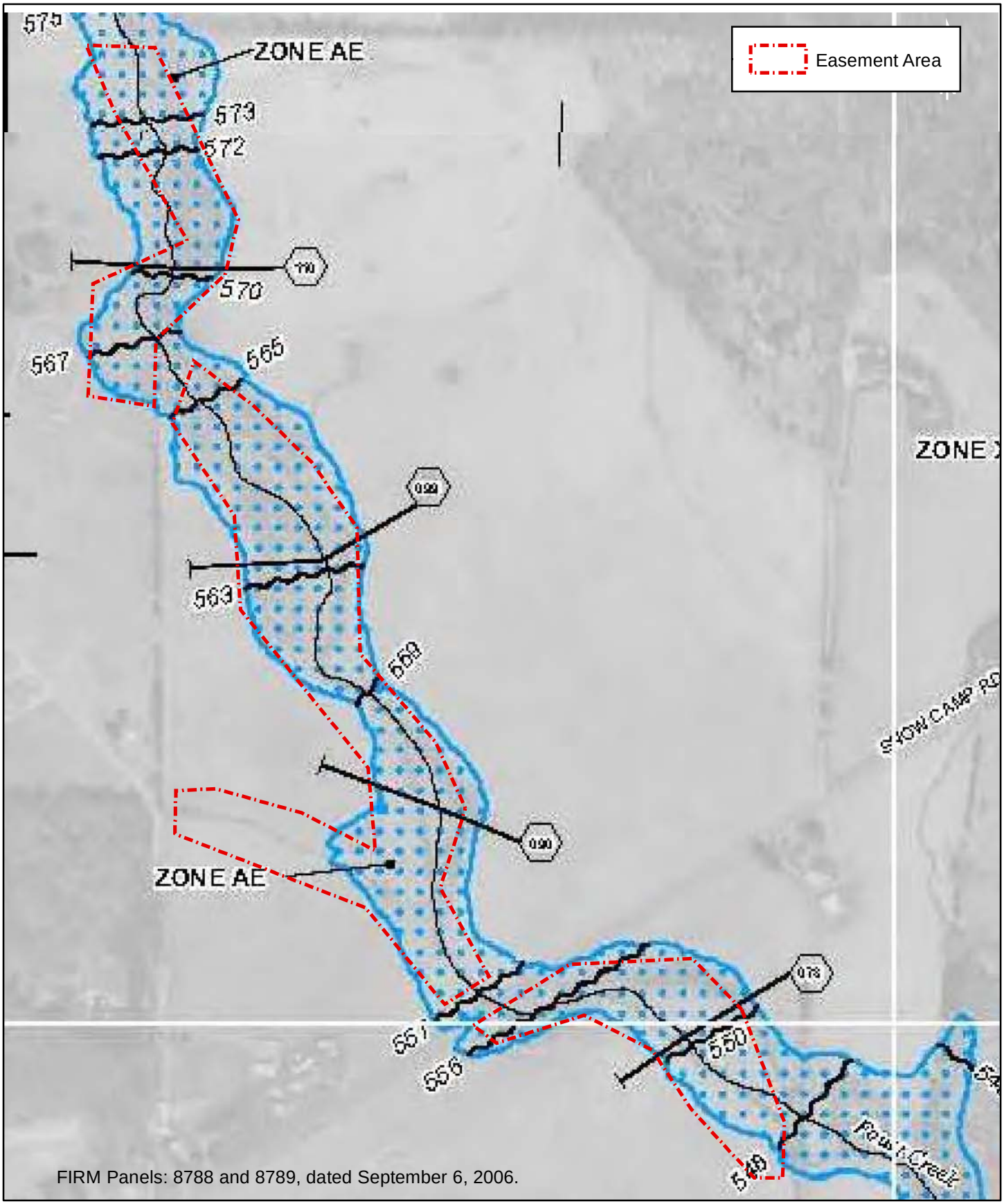
WILDLANDS ENGINEERING

0 200 400 Feet

N

Figure 7 Concept Design
Foust Creek Mitigation Site
Mitigation Plan
EEP #95715

Alamance County, NC



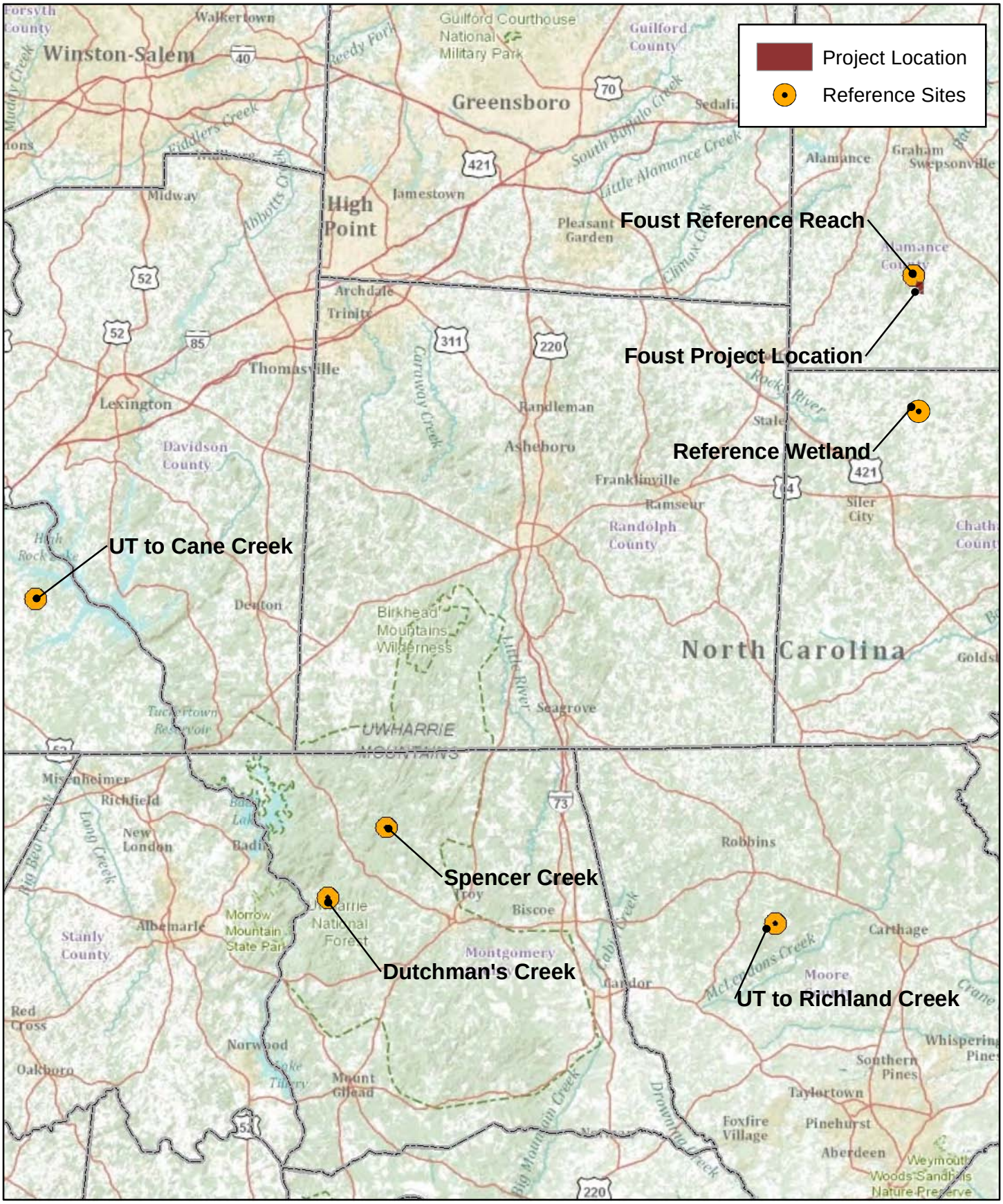
WILDLANDS ENGINEERING

0 187.5 375 Feet

N

Figure 8 FEMA Flood Map
Foust Creek Mitigation Site
Mitigation Plan
EEP #95715

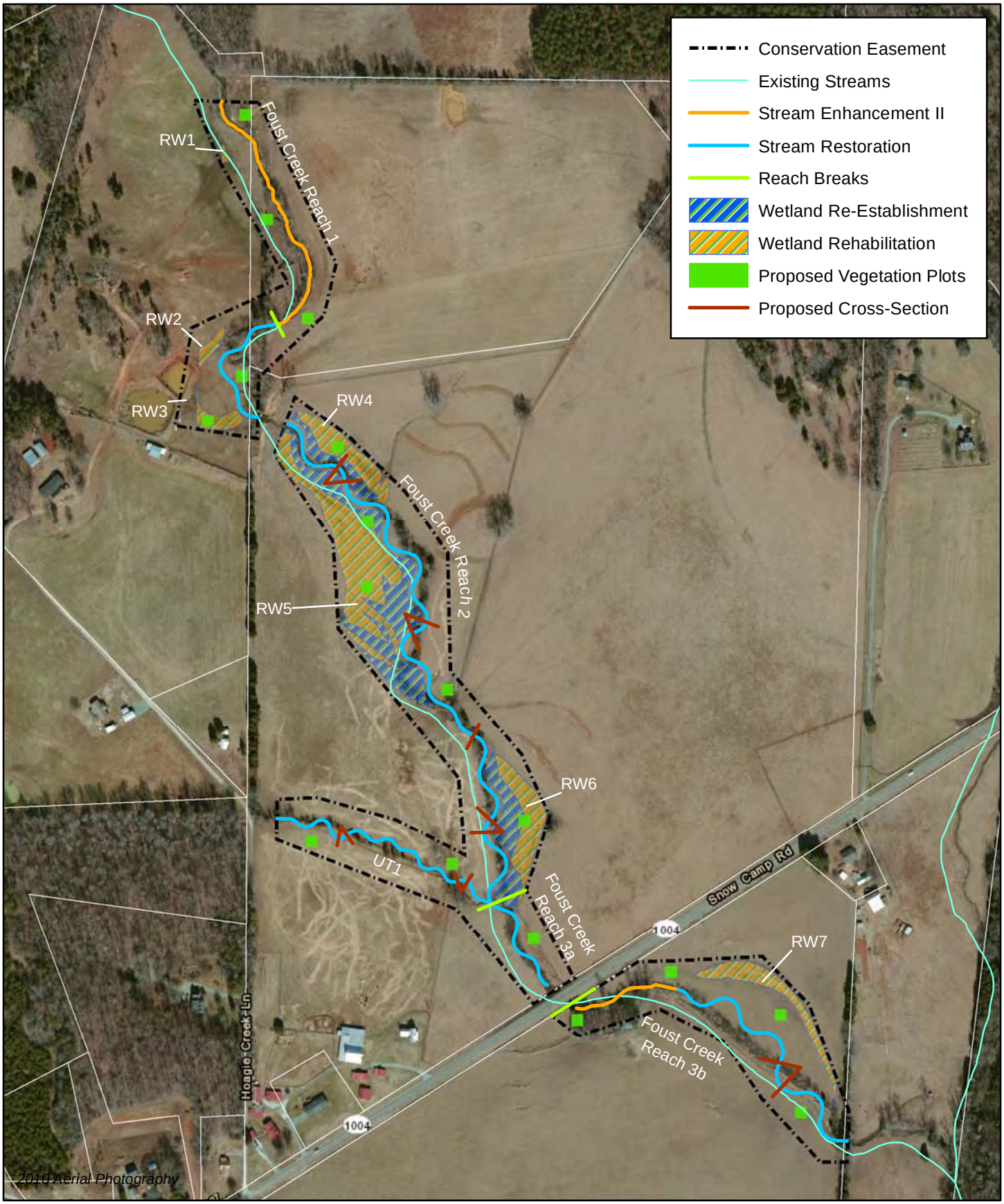
Alamance County, NC



WILDLANDS ENGINEERING

Figure 9 Reference Reach Vicinity Map
Foust Creek Mitigation Site
Mitigation Plan
EEP #95715

Alamance County, NC



WILDLANDS ENGINEERING

0 200 400 Feet

N

Figure 10 Monitoring Components Map
Foust Creek Mitigation Site
Cape Fear River Basin (03030002)

Alamance County, NC

Appendix 1 Project Site Photographs

FOUST CREEK REACH 1

FOUST CREEK REACH 2

FOUST CREEK REACH 3A

FOUST CREEK REACH 3B

UT1 TO FOUST CREEK

Appendix 2 Site Protection Instruments

Doc ID: 011618840011 Type: CRP
Recorded: 11/06/2013 at 02:34:28 PM
Fee Amt: $443.00 Page 1 of 11
Revenue Tax: $417.00
Alamance, NC
HUGH WEBSTER REGISTER OF DEEDS
BK3278 PG945-955

STATE OF NORTH CAROLINA

CONSERVATION EASEMENT PROVIDED PURSUANT TO FULL DELIVERY MITIGATION CONTRACT

Revenue Stamps # 417.00

ALAMANCE COUNTY
SPO File Number 001-K
Prepared by: Office of the Attorney General
Property Control Section
Return to: NC Department of Administration
State Property Office
1321 Mail Service Center
Raleigh, NC 27699-1321

THIS CONSERVATION EASEMENT DEED, made this 6th day of November, 2013 by Walter Steven Payne and Pamela Mae Payne, ("**Grantor**"), whose mailing address is 6857 **Hoagie Creek Lane, Snow Camp, NC**, to the State of North Carolina, ("**Grantee**"), whose mailing address is State of North Carolina, Department of Administration, State Property Office, 1321 Mail Service Center, Raleigh, NC 27699-1321. The designations of Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine, or neuter as required by context.

WITNESSETH:

WHEREAS, pursuant to the provisions of N.C. Gen. Stat. § 143-214.8 et seq., the State of North Carolina has established the Ecosystem Enhancement Program (formerly known as the Wetlands Restoration Program) within the Department of Environment and Natural Resources for the purposes of acquiring, maintaining, restoring, enhancing, creating and preserving wetland and riparian resources that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; and

WHEREAS, this Conservation Easement from Grantor to Grantee has been negotiated, arranged and provided for as a condition of a full delivery contract between Wildlands Engineering, Inc. 1430 S. Mint Street Charlotte, NC 28203 and the North Carolina Department of Environment and Natural Resources, to provide stream, wetland and/or buffer mitigation pursuant to the North Carolina Department of Environment and Natural Resources Purchase and Services Contract Number 4954.

WHEREAS, The State of North Carolina is qualified to be the Grantee of a Conservation Easement pursuant to N.C. Gen. Stat. § 121-35; and

WHEREAS, the Department of Environment and Natural Resources, the North Carolina Department of Transportation and the United States Army Corps of Engineers, Wilmington District entered into a Memorandum of Agreement, (MOA) duly executed by all parties in Greensboro, NC on July 22, 2003, which recognizes that the Ecosystem Enhancement Program is to provide for compensatory mitigation by effective protection of the land, water and natural resources of the State by restoring, enhancing and preserving ecosystem functions; and

WHEREAS, the acceptance of this instrument for and on behalf of the State of North Carolina was granted to the Department of Administration by resolution as approved by the Governor and Council of State adopted at a meeting held in the City of Raleigh, North Carolina, on the 8th day of February 2000; and

WHEREAS, the Ecosystem Enhancement Program in the Department of Environment and Natural Resources, which has been delegated the authority authorized by the Governor and Council of State to the Department of Administration, has approved acceptance of this instrument; and

WHEREAS, Grantor owns in fee simple certain real property situated, lying, and being in Newlin Township, Alamance County, North Carolina (the "**Property**"), and being more particularly described as that certain parcel of land containing approximately 92.6 acres and being conveyed to the Grantor by deed as recorded in **Deed Book 83 at Page 326 and 35.6 acres being conveyed to the Grantor by deed as recorded in Deed Book 212 at Page 237** of the Alamance County Registry, North Carolina; and

WHEREAS, Grantor is willing to grant a Conservation Easement over the herein described areas of the Property, thereby restricting and limiting the use of the included areas of the Property to the terms and conditions and purposes hereinafter set forth, and Grantee is willing to accept such Conservation Easement. This Conservation Easement shall be for the protection and benefit of Foust Creek.

NOW, THEREFORE, in consideration of the mutual covenants, terms, conditions, and restrictions hereinafter set forth, Grantor unconditionally and irrevocably hereby grants and conveys unto Grantee, its successors and assigns, forever and in perpetuity, a Conservation Easement along with a general Right of Access.

The Easement Area consists of the following:

Easement Areas 4 and 5 containing a total of 17.357 **acres** as shown on the plats of survey entitled "Final Plat, Conservation Easement for the State of North Carolina Ecosystem Enhancement Program, Project Name: Foust Stream Mitigation Site, SPO File No.001-K & 001-L, EEP Site No. 95715, Property of David Gene Cheek and Walter Steven Payne," dated July 25, 2013 by David S. Turner, PLS Number L-4551 and recorded in the Alamance County, North Carolina Register of Deeds at **Plat Book 76 Pages 59-62.**

See attached "**Exhibit A**", Legal Description of area of the Property hereinafter referred to as the "Easement Area"

The purposes of this Conservation Easement are to maintain, restore, enhance, construct, create and preserve wetland and/or riparian resources in the Easement Area that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; to maintain permanently the Easement Area in its natural condition, consistent with these purposes; and to prevent any use of the Easement Area that will significantly impair or interfere with these purposes. To achieve these purposes, the following conditions and restrictions are set forth:

I. DURATION OF EASEMENT

Pursuant to law, including the above referenced statutes, this Conservation Easement and Right of Access shall be perpetual and it shall run with, and be a continuing restriction upon the use of, the Property, and it shall be enforceable by the Grantee against the Grantor and against Grantor's heirs, successors and assigns, personal representatives, agents, lessees, and licensees.

II. GRANTOR RESERVED USES AND RESTRICTED ACTIVITES

The Easement Area shall be restricted from any development or usage that would impair or interfere with the purposes of this Conservation Easement. Unless expressly reserved as a compatible use herein, any activity in, or use of, the Easement Area by the Grantor is prohibited as inconsistent with the purposes of this Conservation Easement. Any rights not expressly reserved hereunder by the Grantor have been acquired by the Grantee. Any rights not expressly reserved hereunder by the Grantor, including the rights to all mitigation credits, including, but not limited to, stream, wetland, and riparian buffer mitigation units, derived from each site within the area of the Conservation Easement, are conveyed to and belong to the Grantee. Without limiting the generality of the foregoing, the following specific uses are prohibited, restricted, or reserved as indicated:

A. Recreational Uses. Grantor expressly reserves the right to undeveloped recreational uses, including hiking, bird watching, hunting and fishing, and access to the Easement Area for the purposes thereof.

B. Motorized Vehicle Use. Motorized vehicle use in the Easement Area is prohibited.

C. Educational Uses. The Grantor reserves the right to engage in and permit others to engage in educational uses in the Easement Area not inconsistent with this Conservation Easement, and the right of access to the Easement Area for such purposes including organized educational activities such as site visits and observations. Educational uses of the property shall not alter vegetation, hydrology or topography of the site.

D. Vegetative Cutting. Except as related to the removal of non-native plants, diseased or damaged trees, or vegetation that destabilizes or renders unsafe the Easement Area to persons or

natural habitat, all cutting, removal, mowing, harming, or destruction of any trees and vegetation in the Easement Area is prohibited.

E. Industrial, Residential and Commercial Uses. All industrial, residential and commercial uses are prohibited in the Easement Area.

F. Agricultural Use. All agricultural uses are prohibited within the Easement Area including any use for cropland, waste lagoons, or pastureland.

G. New Construction. There shall be no building, facility, mobile home, antenna, utility pole, tower, or other structure constructed or placed in the Easement Area.

H. Roads and Trails. There shall be no construction of roads, trails, walkways, or paving in the Easement Area.

I. Signs. No signs shall be permitted in the Easement Area except interpretive signs describing restoration activities and the conservation values of the Easement Area, signs identifying the owner of the Property and the holder of the Conservation Easement, signs giving directions, or signs prescribing rules and regulations for the use of the Easement Area.

J. Dumping or Storing. Dumping or storage of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances, machinery, or any other material in the Easement Area is prohibited.

K. Grading, Mineral Use, Excavation, Dredging. There shall be no grading, filling, excavation, dredging, mining, drilling; removal of topsoil, sand, gravel, rock, peat, minerals, or other materials.

L. Water Quality and Drainage Patterns. There shall be no diking, draining, dredging, channeling, filling, leveling, pumping, impounding or diverting, causing, allowing or permitting the diversion of surface or underground water in the Easement Area. No altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns is allowed. All removal of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides in the Easement Area is prohibited. In the event of an emergency interruption or shortage of all other water sources, water from within the Easement Area may temporarily be used for good cause shown as needed for the survival of livestock and agricultural production on the Property.

M. Subdivision and Conveyance. Grantor voluntarily agrees that no subdivision, partitioning, or dividing of the underlying Property owned by the Grantor in fee simple ("fee") that is subject to this Easement is allowed. Unless agreed to by the Grantee in writing, any future conveyance of the underlying fee and the rights conveyed herein shall be as a single block of property. Any future transfer of the fee simple shall be subject to this Conservation Easement. Any transfer of the fee is subject to the Grantee's right of unlimited and repeated ingress and egress over and across the Property to the Easement Area for the purposes set forth herein.

N. Development Rights. All development rights are permanently removed from the Easement Area and are non-transferrable.

O. **Disturbance of Natural Features**. Any change, disturbance, alteration or impairment of the natural features of the Easement Area or any intentional introduction of non-native plants, trees and/or animal species by Grantor is prohibited.

The Grantor may request permission to vary from the above restrictions for good cause shown, provided that any such request is not inconsistent with the purposes of this Conservation Easement, and the Grantor obtains advance written approval from the N.C. Ecosystem Enhancement Program, whose mailing address is 1652 Mail Services Center, Raleigh, NC 27699-1652.

III. GRANTEE RESERVED USES

A. **Right of Access, Construction, and Inspection.** The Grantee, its employees and agents, successors and assigns, receive a perpetual Right of Access to the Easement Area over the Property at reasonable times to undertake any activities to restore, construct, manage, maintain, enhance, and monitor the stream, wetland and any other riparian resources in the Easement Area, in accordance with restoration activities or a long-term management plan. Unless otherwise specifically set forth in this Conservation Easement, the rights granted herein do not include or establish for the public any access rights.

B. **Restoration Activities.** These activities include planting of trees, shrubs and herbaceous vegetation, installation of monitoring wells, utilization of heavy equipment to grade, fill, and prepare the soil, modification of the hydrology of the site, and installation of natural and manmade materials as needed to direct in-stream, above ground, and subterraneous water flow.

C. **Signs.** The Grantee, its employees and agents, successors or assigns, shall be permitted to place signs and witness posts on the Property to include any or all of the following: describe the project, prohibited activities within the Conservation Easement, or identify the project boundaries and the holder of the Conservation Easement.

D. **Fences.** The Grantee, its employees and agents, successors or assigns, shall be permitted to place fencing on the Property to restrict livestock access. Although the Grantee is not responsible for fence maintenance, the Grantee reserves the right to repair the fence, at its sole discretion.

IV. ENFORCEMENT AND REMEDIES

A. **Enforcement.** To accomplish the purposes of this Conservation Easement, Grantee is allowed to prevent any activity within the Easement Area that is inconsistent with the purposes of this Easement and to require the restoration of such areas or features in the Easement Area that may have been damaged by such unauthorized activity or use. Upon any breach of the terms of this Conservation Easement by Grantor, the Grantee shall, except as provided below, notify the Grantor-in writing of such breach and the Grantor shall have ninety (90) days after receipt of such notice to correct the damage caused by such breach. If the breach and damage remains uncured after ninety (90) days, the Grantee may enforce this Conservation Easement by bringing

appropriate legal proceedings including an action to recover damages, as well as injunctive and other relief. The Grantee shall also have the power and authority, consistent with its statutory authority: (a) to prevent any impairment of the Easement Area by acts which may be unlawful or in violation of this Conservation Easement; (b) to otherwise preserve or protect its interest in the Property; or (c) to seek damages from any appropriate person or entity. Notwithstanding the foregoing, the Grantee reserves the immediate right, without notice, to obtain a temporary restraining order, injunctive or other appropriate relief, if the breach is or would irreversibly or otherwise materially impair the benefits to be derived from this Conservation Easement, and the Grantor and Grantee acknowledge that the damage would be irreparable and remedies at law inadequate. The rights and remedies of the Grantee provided hereunder shall be in addition to, and not in lieu of, all other rights and remedies available to Grantee in connection with this Conservation Easement.

B. Inspection. The Grantee, its employees and agents, successors and assigns, have the right, with reasonable notice, to enter the Easement Area over the Property at reasonable times for the purpose of inspection to determine whether the Grantor is complying with the terms, conditions and restrictions of this Conservation Easement.

C. Acts Beyond Grantor's Control. Nothing contained in this Conservation Easement shall be construed to entitle Grantee to bring any action against Grantor for any injury or change in the Easement Area caused by third parties, resulting from causes beyond the Grantor's control, including, without limitation, fire, flood, storm, and earth movement, or from any prudent action taken in good faith by the Grantor under emergency conditions to prevent, abate, or mitigate significant injury to life, or damage to the Property resulting from such causes.

D. Costs of Enforcement. Beyond regular and typical monitoring expenses, any costs incurred by Grantee in enforcing the terms of this Conservation Easement against Grantor, including, without limitation, any costs of restoration necessitated by Grantor's acts or omissions in violation of the terms of this Conservation Easement, shall be borne by Grantor.

E. No Waiver. Enforcement of this Easement shall be at the discretion of the Grantee and any forbearance, delay or omission by Grantee to exercise its rights hereunder in the event of any breach of any term set forth herein shall not be construed to be a waiver by Grantee.

V. MISCELLANEOUS

A. This instrument sets forth the entire agreement of the parties with respect to the Conservation Easement and supersedes all prior discussions, negotiations, understandings or agreements relating to the Conservation Easement. If any provision is found to be invalid, the remainder of the provisions of the Conservation Easement, and the application of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

B. Grantor is responsible for any real estate taxes, assessments, fees, or charges levied upon the Property. Grantee shall not be responsible for any costs or liability of any kind related to the ownership, operation, insurance, upkeep, or maintenance of the Property, except as expressly provided herein. Upkeep of any constructed bridges, fences, or other amenities on the Property are the sole responsibility of the Grantor. Nothing herein shall relieve the Grantor of the

obligation to comply with federal, state or local laws, regulations and permits that may apply to the exercise of the Reserved Rights.

C. Any notices shall be sent by registered or certified mail, return receipt requested to the parties at their addresses shown herein or to other addresses as either party establishes in writing upon notification to the other.

D. Grantor shall notify Grantee in writing of the name and address and any party to whom the Property or any part thereof is to be transferred at or prior to the time said transfer is made. Grantor further agrees that any subsequent lease, deed, or other legal instrument by which any interest in the Property is conveyed subject to the Conservation Easement herein created.

E. The Grantor and Grantee agree that the terms of this Conservation Easement shall survive any merger of the fee and easement interests in the Property or any portion thereof.

F. This Conservation Easement and Right of Access may be amended, but only in writing signed by all parties hereto, or their successors or assigns, if such amendment does not affect the qualification of this Conservation Easement or the status of the Grantee under any applicable laws, and is consistent with the purposes of the Conservation Easement. The owner of the Property shall notify the U.S. Army Corps of Engineers in writing sixty (60) days prior to the initiation of any transfer of all or any part of the Property. Such notification shall be addressed to: Justin McCorkle, General Counsel, US Army Corps of Engineers, 69 Darlington Avenue, Wilmington, NC 28403

G. The parties recognize and agree that the benefits of this Conservation Easement are in gross and assignable provided, however, that the Grantee hereby covenants and agrees, that in the event it transfers or assigns this Conservation Easement, the organization receiving the interest will be a qualified holder under N.C. Gen. Stat. § 121-34 et seq. and § 170(h) of the Internal Revenue Code, and the Grantee further covenants and agrees that the terms of the transfer or assignment will be such that the transferee or assignee will be required to continue in perpetuity the conservation purposes described in this document.

VI. QUIET ENJOYMENT

Grantor reserves all remaining rights accruing from ownership of the Property, including the right to engage in or permit or invite others to engage in only those uses of the Easement Area that are expressly reserved herein, not prohibited or restricted herein, and are not inconsistent with the purposes of this Conservation Easement. Without limiting the generality of the foregoing, the Grantor expressly reserves to the Grantor, and the Grantor's invitees and licensees, the right of access to the Easement Area, and the right of quiet enjoyment of the Easement Area

TO HAVE AND TO HOLD, the said rights and easements perpetually unto the State of North Carolina for the aforesaid purposes.

AND Grantor covenants that Grantor is seized of said premises in fee and has the right to convey the permanent Conservation Easement herein granted; that the same is free from

encumbrances and that Grantor will warrant and defend title to the same against the claims of all persons whomsoever.

IN TESTIMONY WHEREOF, the Grantor has hereunto set his hand and seal, the day and year first above written.

Walter Steven Payne (SEAL)

Walter Steven Payne

Pamela Mae Payne (SEAL)

Pamela Mae Payne

NORTH CAROLINA
COUNTY OF Alamance

I, R. Nelson Richardson, a Notary Public in and for the County and State aforesaid, do hereby certify that Walter Steven Payne, Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 6th day of November, 2013.

R. Nelson Richardson

Notary Public

R. Nelson Richardson
Notary Public
Alamance County
North Carolina
My Commission Expires 3/3/14

R. Nelson [illegible]
Notary
Alaman[illegible]
North
My Commissio[illegible]

My commission expires:

3/3/14

NORTH CAROLINA
COUNTY OF Alamance

I, R. Nelson Richardson, a Notary Public in and for the County and State aforesaid, do hereby certify that Pamela Mae Payne, Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 6th day of November, 2013.

R. Nelson Richardson
Notary Public

My commission expires:

3/3/14

R. Nelson Richardson
Notary Public
Alamance County
North Carolina
My Commission Expires 3/3/14

Exhibit A

Descriptions for conservation easement for the State of North Carolina Ecosystem Enhancement Program on the properties of Walter Steven Payne located in Newlin Township, Alamance County, North Carolina. (All references to the Alamance County Register of Deeds.)

PIN: 8788182993 (Alamance Co. Parcel ID: 103678)

Easement Area 4
Beginning at a point within the property of Walter Steven Payne (now or formerly, see Deed Book 83, Page 326, & Estate File 07E1055), said point being located S 71°25'34" W a distance of 400.31' from a GPS Site Control Point (rebar with cap) with NCGS Grid Coordinates [NAD83(2011)] N=787,747.26, E=1,881,790.11;
thence, from the point of Beginning, continuing through the Payne property, S 57°34'04" W a distance of 148.02' to a point;
thence N 39°18'44" W a distance of 352.06' to a point;
thence N 68°46'41" W a distance of 576.94' to a point;
thence N 01°08'59" E a distance of 121.33' to a point;
thence N 86°54'14" E a distance of 111.74' to a point;
thence S 74°20'57" E a distance of 253.31' to a point;
thence S 62°50'42" E a distance of 232.88' to a point;
thence N 04°52'20" W a distance of 234.10' to a point;
thence N 38°52'43" W a distance of 573.45' to a point;
thence N 03°55'48" W a distance of 266.77' to a point;
thence N 33°49'36" W a distance of 312.88' to a point;
thence N 19°22'13" E a distance of 184.90' to a point;
thence S 53°20'19" E a distance of 201.59' to a point;
thence S 45°58'32" E a distance of 235.09' to a point;
thence S 34°37'40" E a distance of 226.98' to a point;
thence S 01°21'23" E a distance of 354.32' to a point;
thence S 40°24'37" E a distance of 328.96' to a point;
thence S 24°16'17" E a distance of 204.02' to a point;
thence S 17°35'06" W a distance of 235.28' to a point;
thence S 28°52'37" E a distance of 284.62' to the point of Beginning;
containing 12.559 acres, more or less, and shown as Easement Area 4 on a plat by Turner Land Surveying, PLLC of Raleigh, NC, titled "Conservation Easement for the State of North Carolina, Ecosystem Enhancement Program, Foust Stream Mitigation Site" and dated July 25, 2013 and recorded in **Plat Book 76 Pages 59-62** of the Alamance County Register of Deeds.

PIN: 8788175121 (Alamance Co. Parcel ID: 103677)

Easement Area 5

Beginning at a point within the property of Walter Steven Payne (now or formerly, see Deed Book 212, Page 237, & Estate File 07E1055), said point being located S 58°13'55" W a distance of 177.96' from a GPS Site Control Point (rebar with cap) with NCGS Grid Coordinates [NAD83(2011)] N=787,747.26, E=1,881,790.11;
thence, from the point of Beginning, continuing through the Payne property, N 87°17'59" E a distance of 345.29' to a point;
thence S 44°18'52" E a distance of 200.65' to a point;
thence S 20°41'54" E a distance of 341.50' to a point in the Payne property line, being the common line with David Gene Herring (now or formerly, see Deed Book 2659, Page 611);
thence, with the common line of David Gene Herring, S 02°07'19" W a distance of 156.66' to a point;
thence, leaving said line, continuing through the Payne property, N 89°20'06" W a distance of 80.42' to a point;
thence N 42°28'39" W a distance of 263.18' to a point;
thence N 33°25'50" W a distance of 200.01' to a point;
thence N 62°59'54" W a distance of 214.63' to a point;
thence S 72°21'12" W a distance of 259.26' to a point;
thence N 53°04'16" W a distance of 82.24' to a point;
thence N 57°34'04" E a distance of 322.73' to the point of Beginning;
containing 4.798 acres, more or less, and shown as Easement Area 5 on a plat by Turner Land Surveying, PLLC of Raleigh, NC, titled "Conservation Easement for the State of North Carolina, Ecosystem Enhancement Program, Foust Stream Mitigation Site" and dated July 25, 2013 and recorded in **Plat Book 76 Pages 59-62**of the Alamance County Register of Deeds.

Doc ID: 011618830010 Type: CRP
Recorded: 11/06/2013 at 02:32:00 PM
Fee Amt: $136.00 Page 1 of 10
Revenue Tax: $110.00
Alamance, NC
HUGH WEBSTER REGISTER OF DEEDS
BK 3278 PG 935-944

STATE OF NORTH CAROLINA

Revenue Stamps #110.-

ALAMANCE COUNTY

CONSERVATION EASEMENT PROVIDED PURSUANT TO FULL DELIVERY MITIGATION CONTRACT

SPO File Number 001-L
Prepared by: Office of the Attorney General
Property Control Section
Return to: NC Department of Administration
State Property Office
1321 Mail Service Center
Raleigh, NC 27699-1321

THIS CONSERVATION EASEMENT DEED, made this 1st day of November, 2013 by David G. Cheek, ("**Grantor**"), whose mailing address is 6000 **Hoagie Creek Lane, Snow Camp, NC**, to the State of North Carolina, ("**Grantee**"), whose mailing address is State of North Carolina, Department of Administration, State Property Office, 1321 Mail Service Center, Raleigh, NC 27699-1321. The designations of Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine, or neuter as required by context.

WITNESSETH:

WHEREAS, pursuant to the provisions of N.C. Gen. Stat. § 143-214.8 et seq., the State of North Carolina has established the Ecosystem Enhancement Program (formerly known as the Wetlands Restoration Program) within the Department of Environment and Natural Resources for the purposes of acquiring, maintaining, restoring, enhancing, creating and preserving wetland and riparian resources that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; and

WHEREAS, this Conservation Easement from Grantor to Grantee has been negotiated, arranged and provided for as a condition of a full delivery contract between Wildlands Engineering, Inc. 1430 S. Mint Street Charlotte, NC 28203 and the North Carolina Department of Environment and Natural Resources, to provide stream, wetland and/or buffer mitigation pursuant to the North Carolina Department of Environment and Natural Resources Purchase and Services Contract Number 4954.

WHEREAS, The State of North Carolina is qualified to be the Grantee of a Conservation Easement pursuant to N.C. Gen. Stat. § 121-35; and

WHEREAS, the Department of Environment and Natural Resources, the North Carolina Department of Transportation and the United States Army Corps of Engineers, Wilmington District entered into a Memorandum of Agreement, (MOA) duly executed by all parties in Greensboro, NC on July 22, 2003, which recognizes that the Ecosystem Enhancement Program is to provide for compensatory mitigation by effective protection of the land, water and natural resources of the State by restoring, enhancing and preserving ecosystem functions; and

WHEREAS, the acceptance of this instrument for and on behalf of the State of North Carolina was granted to the Department of Administration by resolution as approved by the Governor and Council of State adopted at a meeting held in the City of Raleigh, North Carolina, on the 8th day of February 2000; and

WHEREAS, the Ecosystem Enhancement Program in the Department of Environment and Natural Resources, which has been delegated the authority authorized by the Governor and Council of State to the Department of Administration, has approved acceptance of this instrument; and

WHEREAS, Grantor owns in fee simple certain real property situated, lying, and being in Newlin Township, Alamance County, North Carolina (the "**Property**"), and being more particularly described as that certain parcel of land containing approximately 22 acres and being conveyed to the Grantor by deed as recorded in **Deed Book 2879 at Page 704 and approximately 29 acres and being conveyed to the Grantor by deed as recorded in Deed Book 837 at Page 73** of the Alamance County Registry, North Carolina; and

WHEREAS, Grantor is willing to grant a Conservation Easement over the herein described areas of the Property, thereby restricting and limiting the use of the included areas of the Property to the terms and conditions and purposes hereinafter set forth, and Grantee is willing to accept such Conservation Easement. This Conservation Easement shall be for the protection and benefit of Foust Creek.

NOW, THEREFORE, in consideration of the mutual covenants, terms, conditions, and restrictions hereinafter set forth, Grantor unconditionally and irrevocably hereby grants and conveys unto Grantee, its successors and assigns, forever and in perpetuity, a Conservation Easement along with a general Right of Access.

The Easement Area consists of the following:

Easement Areas 1, 2 and 3 containing a total of 4.753 **acres** as shown on the plats of survey entitled "Final Plat, Conservation Easement for the State of North Carolina Ecosystem Enhancement Program, Project Name: Foust Stream Mitigation Site, SPO File No.001-K & 001-L, EEP Site No. 95715, Property of David Gene Cheek and Walter Steven Payne," dated July 25, 2013 by David S. Turner, PLS Number L-4551 and recorded in the Alamance County, North Carolina Register of Deeds at **Plat Book 76 Pages 59-62.**

See attached "**Exhibit A**", Legal Description of area of the Property hereinafter referred to as the "Easement Area"

The purposes of this Conservation Easement are to maintain, restore, enhance, construct, create and preserve wetland and/or riparian resources in the Easement Area that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; to maintain permanently the Easement Area in its natural condition, consistent with these purposes; and to prevent any use of the Easement Area that will significantly impair or interfere with these purposes. To achieve these purposes, the following conditions and restrictions are set forth:

I. DURATION OF EASEMENT

Pursuant to law, including the above referenced statutes, this Conservation Easement and Right of Access shall be perpetual and it shall run with, and be a continuing restriction upon the use of, the Property, and it shall be enforceable by the Grantee against the Grantor and against Grantor's heirs, successors and assigns, personal representatives, agents, lessees, and licensees.

II. GRANTOR RESERVED USES AND RESTRICTED ACTIVITES

The Easement Area shall be restricted from any development or usage that would impair or interfere with the purposes of this Conservation Easement. Unless expressly reserved as a compatible use herein, any activity in, or use of, the Easement Area by the Grantor is prohibited as inconsistent with the purposes of this Conservation Easement. Any rights not expressly reserved hereunder by the Grantor have been acquired by the Grantee. Any rights not expressly reserved hereunder by the Grantor, including the rights to all mitigation credits, including, but not limited to, stream, wetland, and riparian buffer mitigation units, derived from each site within the area of the Conservation Easement, are conveyed to and belong to the Grantee. Without limiting the generality of the foregoing, the following specific uses are prohibited, restricted, or reserved as indicated:

A. Recreational Uses. Grantor expressly reserves the right to undeveloped recreational uses, including hiking, bird watching, hunting and fishing, and access to the Easement Area for the purposes thereof.

B. Motorized Vehicle Use. Motorized vehicle use in the Easement Area is prohibited.

C. Educational Uses. The Grantor reserves the right to engage in and permit others to engage in educational uses in the Easement Area not inconsistent with this Conservation Easement, and the right of access to the Easement Area for such purposes including organized educational activities such as site visits and observations. Educational uses of the property shall not alter vegetation, hydrology or topography of the site.

D. Vegetative Cutting. Except as related to the removal of non-native plants, diseased or damaged trees, or vegetation that destabilizes or renders unsafe the Easement Area to persons or natural habitat, all cutting, removal, mowing, harming, or destruction of any trees and vegetation in the Easement Area is prohibited.

E. Industrial, Residential and Commercial Uses. All industrial, residential and commercial uses are prohibited in the Easement Area.

F. Agricultural Use. All agricultural uses are prohibited within the Easement Area including any use for cropland, waste lagoons, or pastureland.

G. New Construction. There shall be no building, facility, mobile home, antenna, utility pole, tower, or other structure constructed or placed in the Easement Area.

H. Roads and Trails. There shall be no construction of roads, trails, walkways, or paving in the Easement Area.

I. Signs. No signs shall be permitted in the Easement Area except interpretive signs describing restoration activities and the conservation values of the Easement Area, signs identifying the owner of the Property and the holder of the Conservation Easement, signs giving directions, or signs prescribing rules and regulations for the use of the Easement Area.

J. Dumping or Storing. Dumping or storage of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances, machinery, or any other material in the Easement Area is prohibited.

K. Grading, Mineral Use, Excavation, Dredging. There shall be no grading, filling, excavation, dredging, mining, drilling; removal of topsoil, sand, gravel, rock, peat, minerals, or other materials.

L. Water Quality and Drainage Patterns. There shall be no diking, draining, dredging, channeling, filling, leveling, pumping, impounding or diverting, causing, allowing or permitting the diversion of surface or underground water in the Easement Area. No altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns is allowed. All removal of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides in the Easement Area is prohibited. In the event of an emergency interruption or shortage of all other water sources, water from within the Easement Area may temporarily be used for good cause shown as needed for the survival of livestock and agricultural production on the Property.

M. Subdivision and Conveyance. Grantor voluntarily agrees that no subdivision, partitioning, or dividing of the underlying Property owned by the Grantor in fee simple ("fee") that is subject to this Easement is allowed. Unless agreed to by the Grantee in writing, any future conveyance of the underlying fee and the rights conveyed herein shall be as a single block of property. Any future transfer of the fee simple shall be subject to this Conservation Easement. Any transfer of the fee is subject to the Grantee's right of unlimited and repeated ingress and egress over and across the Property to the Easement Area for the purposes set forth herein.

N. Development Rights. All development rights are permanently removed from the Easement Area and are non-transferrable.

O. Disturbance of Natural Features. Any change, disturbance, alteration or impairment of the natural features of the Easement Area or any intentional introduction of non-native plants, trees and/or animal species by Grantor is prohibited.

The Grantor may request permission to vary from the above restrictions for good cause shown, provided that any such request is not inconsistent with the purposes of this Conservation Easement, and the Grantor obtains advance written approval from the N.C. Ecosystem Enhancement Program, whose mailing address is 1652 Mail Services Center, Raleigh, NC 27699-1652.

III. GRANTEE RESERVED USES

A. Right of Access, Construction, and Inspection. The Grantee, its employees and agents, successors and assigns, receive a perpetual Right of Access to the Easement Area over the Property at reasonable times to undertake any activities to restore, construct, manage, maintain, enhance, and monitor the stream, wetland and any other riparian resources in the Easement Area, in accordance with restoration activities or a long-term management plan. Unless otherwise specifically set forth in this Conservation Easement, the rights granted herein do not include or establish for the public any access rights.

B. Restoration Activities. These activities include planting of trees, shrubs and herbaceous vegetation, installation of monitoring wells, utilization of heavy equipment to grade, fill, and prepare the soil, modification of the hydrology of the site, and installation of natural and manmade materials as needed to direct in-stream, above ground, and subterraneous water flow.

C. Signs. The Grantee, its employees and agents, successors or assigns, shall be permitted to place signs and witness posts on the Property to include any or all of the following: describe the project, prohibited activities within the Conservation Easement, or identify the project boundaries and the holder of the Conservation Easement.

D. Fences. The Grantee, its employees and agents, successors or assigns, shall be permitted to place fencing on the Property to restrict livestock access. Although the Grantee is not responsible for fence maintenance, the Grantee reserves the right to repair the fence, at its sole discretion.

IV. ENFORCEMENT AND REMEDIES

A. Enforcement. To accomplish the purposes of this Conservation Easement, Grantee is allowed to prevent any activity within the Easement Area that is inconsistent with the purposes of this Easement and to require the restoration of such areas or features in the Easement Area that may have been damaged by such unauthorized activity or use. Upon any breach of the terms of this Conservation Easement by Grantor, the Grantee shall, except as provided below, notify the Grantor-in writing of such breach and the Grantor shall have ninety (90) days after receipt of such notice to correct the damage caused by such breach. If the breach and damage remains uncured after ninety (90) days, the Grantee may enforce this Conservation Easement by bringing appropriate legal proceedings including an action to recover damages, as well as injunctive and

other relief. The Grantee shall also have the power and authority, consistent with its statutory authority: (a) to prevent any impairment of the Easement Area by acts which may be unlawful or in violation of this Conservation Easement; (b) to otherwise preserve or protect its interest in the Property; or (c) to seek damages from any appropriate person or entity. Notwithstanding the foregoing, the Grantee reserves the immediate right, without notice, to obtain a temporary restraining order, injunctive or other appropriate relief, if the breach is or would irreversibly or otherwise materially impair the benefits to be derived from this Conservation Easement, and the Grantor and Grantee acknowledge that the damage would be irreparable and remedies at law inadequate. The rights and remedies of the Grantee provided hereunder shall be in addition to, and not in lieu of, all other rights and remedies available to Grantee in connection with this Conservation Easement.

B. Inspection. The Grantee, its employees and agents, successors and assigns, have the right, with reasonable notice, to enter the Easement Area over the Property at reasonable times for the purpose of inspection to determine whether the Grantor is complying with the terms, conditions and restrictions of this Conservation Easement.

C. Acts Beyond Grantor's Control. Nothing contained in this Conservation Easement shall be construed to entitle Grantee to bring any action against Grantor for any injury or change in the Easement Area caused by third parties, resulting from causes beyond the Grantor's control, including, without limitation, fire, flood, storm, and earth movement, or from any prudent action taken in good faith by the Grantor under emergency conditions to prevent, abate, or mitigate significant injury to life, or damage to the Property resulting from such causes.

D. Costs of Enforcement. Beyond regular and typical monitoring expenses, any costs incurred by Grantee in enforcing the terms of this Conservation Easement against Grantor, including, without limitation, any costs of restoration necessitated by Grantor's acts or omissions in violation of the terms of this Conservation Easement, shall be borne by Grantor.

E. No Waiver. Enforcement of this Easement shall be at the discretion of the Grantee and any forbearance, delay or omission by Grantee to exercise its rights hereunder in the event of any breach of any term set forth herein shall not be construed to be a waiver by Grantee.

V. MISCELLANEOUS

A. This instrument sets forth the entire agreement of the parties with respect to the Conservation Easement and supersedes all prior discussions, negotiations, understandings or agreements relating to the Conservation Easement. If any provision is found to be invalid, the remainder of the provisions of the Conservation Easement, and the application of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

B. Grantor is responsible for any real estate taxes, assessments, fees, or charges levied upon the Property. Grantee shall not be responsible for any costs or liability of any kind related to the ownership, operation, insurance, upkeep, or maintenance of the Property, except as expressly provided herein. Upkeep of any constructed bridges, fences, or other amenities on the Property are the sole responsibility of the Grantor. Nothing herein shall relieve the Grantor of the

obligation to comply with federal, state or local laws, regulations and permits that may apply to the exercise of the Reserved Rights.

C. Any notices shall be sent by registered or certified mail, return receipt requested to the parties at their addresses shown herein or to other addresses as either party establishes in writing upon notification to the other.

D. Grantor shall notify Grantee in writing of the name and address and any party to whom the Property or any part thereof is to be transferred at or prior to the time said transfer is made. Grantor further agrees that any subsequent lease, deed, or other legal instrument by which any interest in the Property is conveyed subject to the Conservation Easement herein created.

E. The Grantor and Grantee agree that the terms of this Conservation Easement shall survive any merger of the fee and easement interests in the Property or any portion thereof.

F. This Conservation Easement and Right of Access may be amended, but only in writing signed by all parties hereto, or their successors or assigns, if such amendment does not affect the qualification of this Conservation Easement or the status of the Grantee under any applicable laws, and is consistent with the purposes of the Conservation Easement. The owner of the Property shall notify the U.S. Army Corps of Engineers in writing sixty (60) days prior to the initiation of any transfer of all or any part of the Property. Such notification shall be addressed to: Justin McCorkle, General Counsel, US Army Corps of Engineers, 69 Darlington Avenue, Wilmington, NC 28403

G. The parties recognize and agree that the benefits of this Conservation Easement are in gross and assignable provided, however, that the Grantee hereby covenants and agrees, that in the event it transfers or assigns this Conservation Easement, the organization receiving the interest will be a qualified holder under N.C. Gen. Stat. § 121-34 et seq. and § 170(h) of the Internal Revenue Code, and the Grantee further covenants and agrees that the terms of the transfer or assignment will be such that the transferee or assignee will be required to continue in perpetuity the conservation purposes described in this document.

VI. QUIET ENJOYMENT

Grantor reserves all remaining rights accruing from ownership of the Property, including the right to engage in or permit or invite others to engage in only those uses of the Easement Area that are expressly reserved herein, not prohibited or restricted herein, and are not inconsistent with the purposes of this Conservation Easement. Without limiting the generality of the foregoing, the Grantor expressly reserves to the Grantor, and the Grantor's invitees and licensees, the right of access to the Easement Area, and the right of quiet enjoyment of the Easement Area

TO HAVE AND TO HOLD, the said rights and easements perpetually unto the State of North Carolina for the aforesaid purposes.

AND Grantor covenants that Grantor is seized of said premises in fee and has the right to convey the permanent Conservation Easement herein granted; that the same is free from

encumbrances and that Grantor will warrant and defend title to the same against the claims of all persons whomsoever.

IN TESTIMONY WHEREOF, the Grantor has hereunto set his hand and seal, the day and year first above written.

David G. Cheek (SEAL)

David G. Cheek

NORTH CAROLINA
COUNTY OF Alamance

I, R. Nelson Richardson, a Notary Public in and for the County and State aforesaid, do hereby certify that David G. Cheek, Single, Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the 6th day of November, ~~2011~~. 2013.

R. Nelson Richardson
Notary Public

R. Nelson Richardson
Notary Public
Alamance County
North Carolina
My Commission Expires 3/3/14

My commission expires:

3/3/14

Exhibit A

Description for conservation easement for the State of North Carolina Ecosystem Enhancement Program on the properties of David Gene Cheek located in Newlin Township, Alamance County, North Carolina. (All references to the Alamance County Register of Deeds.)

PIN: 8788091418 (Alamance Co. Parcel ID: 103675)

Easement Area 1

Beginning at a point in the line of David Gene Cheek (now or formerly, see Deed Book 837, Page 73), said point being located N 27°57'58" W a distance of 2,772.76' from a GPS Site Control Point (rebar with cap) with NCGS Grid Coordinates [NAD83(2011)] N=787,747.26, E=1,881,790.11;
thence, from the point of Beginning, with the Cheek property line, S 01°23'05" W a distance of 362.48' to a point;
thence, leaving said line, continuing through the Cheek property, N 29°30'32" W a distance of 254.48' to a point;
thence N 23°01'35" W a distance of 207.59' to a point;
thence S 87°56'18" E a distance of 194.57' to a point;
thence S 25°48'01" E a distance of 47.93' to the point of Beginning;
containing 1.064 acres, more or less, and shown as Easement Area 1 on a plat by Turner Land Surveying, PLLC of Raleigh, NC, titled "Conservation Easement for the State of North Carolina, Ecosystem Enhancement Program, Foust Stream Mitigation Site" and dated July 25, 2013 and recorded in **Plat Book 76 Pages 59-62**of the Alamance County Register of Deeds.

Easement Area 2

Beginning at a point in the line of David Gene Cheek (now or formerly, see Deed Book 837, Page 73), said point being located N 41°48'22" W a distance of 1,985.71' from a GPS Site Control Point (rebar with cap) with NCGS Grid Coordinates [NAD83(2011)] N=787,747.26, E=1,881,790.11;
thence, from the point of Beginning, leaving said line, continuing through the Cheek property, N 80°59'16" W a distance of 188.45' to a point;
thence N 02°30'32" E a distance of 317.03' to a point;
thence N 65°19'01" E a distance of 201.01' to a point in the Cheek property line;
thence, with the line, S 01°23'05" W a distance of 242.70' to a point, passing an existing iron pipe 140.66' on said line, said point also being the common corner with Walter Steven Payne (now or formerly, see Deed Book 83, Page 326, & Estate File 07E1055);
thence, with the common line of Walter Steven Payne S 01°23'05" W a distance of 187.61' to the point of Beginning;
containing 1.573 acres, more or less, and shown as Easement Area 2 on a plat by Turner Land Surveying, PLLC of Raleigh, NC, titled "Conservation Easement for the State of North Carolina, Ecosystem Enhancement Program, Foust Stream Mitigation Site" and dated July 25, 2013 and recorded in **Plat Book 76 Pages 59-62**of the Alamance County Register of Deeds.

PIN: 8788190910 (Alamance Co. Parcel ID: 170419)

Easement Area 3

Beginning at a point in the line of David Gene Cheek (now or formerly, see Deed Book 2879, Page 704), said point being located N 27°57'58" W a distance of 2,772.76' from a GPS Site Control Point (rebar with cap) with NCGS Grid Coordinates [NAD83(2011)] N=787,747.26, E=1,881,790.11;
thence, from the point of Beginning, leaving said line, continuing through the Cheek property, S 25°48'01" E a distance of 490.86' to a point;
thence S 13°25'49" W a distance of 159.12' to a point;
thence S 46°39'33" W a distance of 268.90' to a point being the common corner with Walter Steven Payne (now or formerly, see Deed Book 83, Page 326, & Estate File 07E1055);
thence, with the Cheek property line, N 01°23'05" E a distance of 242.70' to a point, passing an existing iron pipe 102.04' on said line;
thence, leaving said property line, continuing through the Cheek property, N 65°19'01" E a distance of 90.85' to a point;
thence N 29°30'32" W a distance of 158.94' to a point in the Cheek property line;
thence, with the property line, N 01°23'05" E a distance of 362.48' to the point of Beginning;
containing 2.116 acres, more or less, and shown as Easement Area 3 on a plat by Turner Land Surveying, PLLC of Raleigh, NC, titled "Conservation Easement for the State of North Carolina, Ecosystem Enhancement Program, Foust Stream Mitigation Site" and dated July 25, 2013 and recorded in **Plat Book 76 Pages 59-62**of the Alamance County Register of Deeds.

Appendix 3 Historic Aerial Photographs


FOUST CREEK
SNOW CAMP ROAD
INQUIRY #: 3478916.4
YEAR: 1973
= 500'
N


FOUST CREEK
SNOW CAMP ROAD
INQUIRY #: 3478916.4
YEAR: 1983
= 500'
N


FOUST CREEK
SNOW CAMP ROAD
INQUIRY #: 3478916.4
YEAR: 1993
= 500'
N


FOUST CREEK
SNOW CAMP ROAD
INQUIRY #: 3478916.4
YEAR: 1999
= 750'
N


FOUST CREEK
SNOW CAMP ROAD
INQUIRY #: 3478916.4
YEAR: 2005
= 500'
N


FOUST CREEK
SNOW CAMP ROAD
INQUIRY #: 3478916.4
YEAR: 2006
= 500'
N


FOUST CREEK
SNOW CAMP ROAD
INQUIRY #: 3478916.4
YEAR: 2008
= 500'
N

Appendix 4 Soil Borings / DrainMod Calibration Results

Soils Descriptions performed by **Mike Ortosky** (NC Licensed Soil Scientist # 1075)

Foust Creek (Payne) Site - 2/9/12

Profile #1

Depth	Color (Munsell)	Mottles	Texture	Notes
0-6	10 YR 5/3		Loam	
6-18	7.5 YR 4/6	C2D 5 YR 4/3	Clay Loam	
18-24	10 YR 4/6	C2D 10 YR 7/1	Clay Loam	
				Non-Hydric

Profile #2

Depth	Color (Munsell)	Mottles	Texture	Notes
0-2	10 YR 4/2		Loam	
2-16	10 YR 5/2	C2D 7.5 YR 4/4	Clay Loam	
16-24	10 YR 5/4	C2D 10YR 7/1 & C2D 7.5YR 5/4	Clay Loam	
				Hydric

Profile #3

Depth	Color (Munsell)	Mottles	Texture	Notes
0-6	10 YR 2/2	M2D 10YR 3/2	Loam	
6-12	10 YR 5/2	M2D 7.5YR 5/4	Clay Loam	
12-18	10YR 6/2 & 5/6		Clay Loam	
				Hydric

Profile #4

Depth	Color (Munsell)	Mottles	Texture	Notes
0-3	10 YR 4/2	C2D 5YR 4/4	Loam	
3-18	10 YR 6/2	C2D 5YR 5/4	Loam	
				Hydric

Profile #5

Depth	Color (Munsell)	Mottles	Texture	Notes
0-4	7.5 YR 4/3		Loam	
4-14	7.5 YR 5/4	C2F 7.5YR 6/2	Clay Loam	
14-18	7.5 YR 5/3	C2F 7.5YR 6/2	Clay Loam	Non-Hydric

Profile #6

Depth	Color (Munsell)	Mottles	Texture	Notes
0-5	10 YR 4/2		Loam	
5-18	10 YR 5/2	C2D 7.5YR 5/4	Clay Loam	
				Hydric

Profile #7

Depth	Color (Munsell)	Mottles	Texture	Notes
0-3	7.5 YR 4/3		Loam	
3-18	7.5 YR 5/4		Clay Loam	
				Non-Hydric

Profile #8

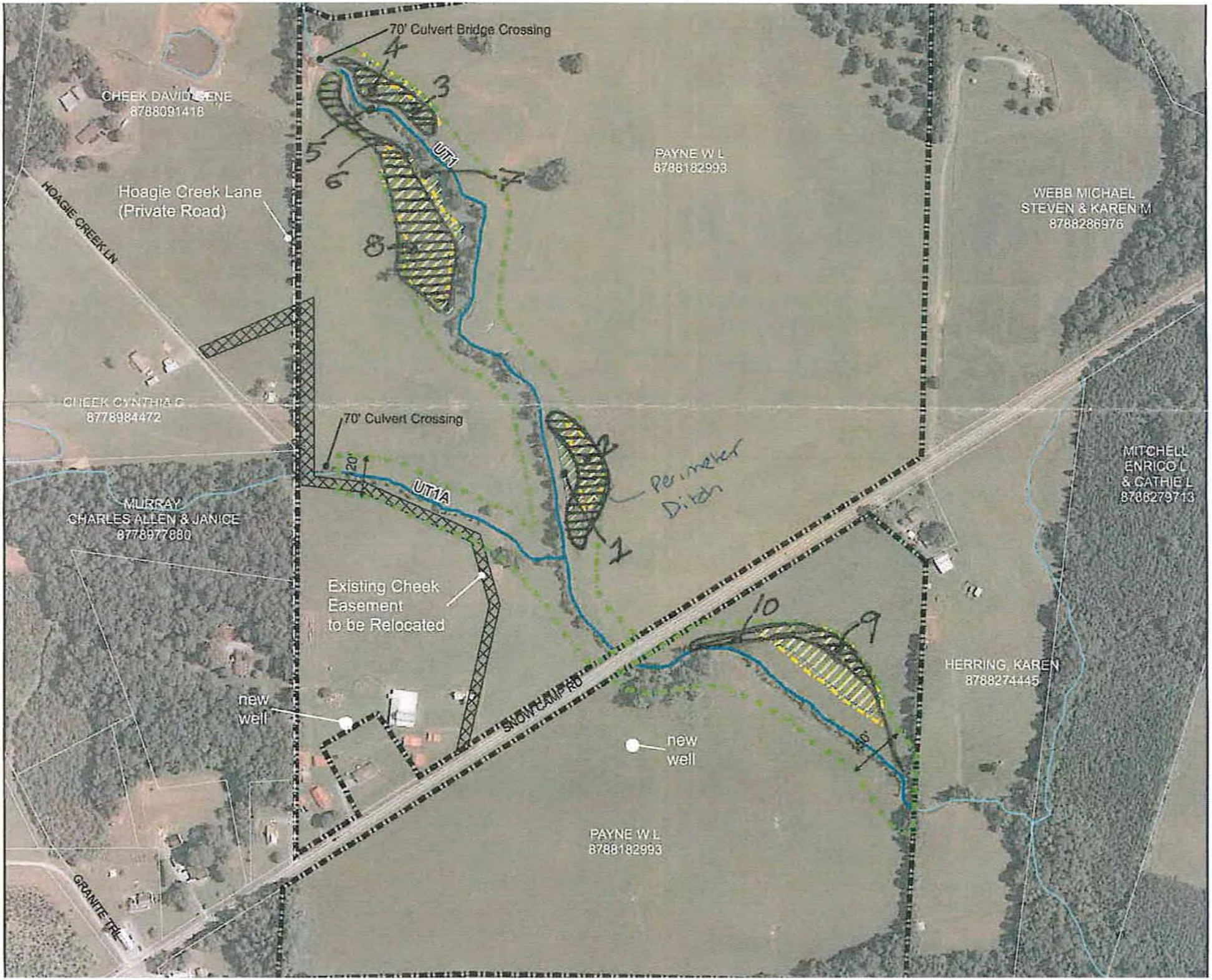
Depth	Color (Munsell)	Mottles	Texture	Notes
0-4	10 YR 4/2	C2D 10YR 3/4	Loam	
4-14	10 YR 5/2	C2D 7.5 3/4	Loam	
14-20	10 YR 5/3	C2D 10YR 6/1 & C2D 7.5YR 4/4	Clay Loam	Hydric

Profile #9

Depth	Color (Munsell)	Mottles	Texture	Notes
0-4	10 YR 4/3		Loam	
4-14	10 YR 5/2	C2D 7.5YR 3/4	Clay Loam	
14-18	10 YR 5/2 & 5/1	C2D 7.5YR 5/4	Clay Loam	Hydric

Profile #10

Depth	Color (Munsell)	Mottles	Texture	Notes
0-4	10 YR 4/3		Loam	
4-12	10 YR 5/2		Clay Loam	
12-20	10 YR 5/2	C2D 7.5YR 5/4	Clay Loam	Hydric


70' Culvert Bridge Crossing
CHEEK DAVID GENE
8788091418
PAYNE W L
8788182993
WEBB MICHAEL
STEVEN & KAREN M
8788286976
Hoagie Creek Lane
(Private Road)
HOAGIE CREEK LN
UT1
CHEEK CYNTHIA C
8778984472
70' Culvert Crossing
20'
UT1A
Perimeter
Ditch
MITCHELL
ENRICO L
& CATHIE L
8788279713
MURRAY
CHARLES ALLEN & JANICE
8778977880
Existing Cheek
Easement
to be Relocated
HERRING, KAREN
8788274445
new
well
SNOW CAMP RD
new
well
PAYNE W L
8788182993
GRANITE TRL

Foust Creek Mitigation Site - Additional Soils Borings

DP1 (Wetland A)

Depth	Color	Mottles	Texture
0-4	2.5Y 4/1	2.5Y 5/6	silty loam
4-12	2.5Y 5/3	10YR 4/6	clay loam

DP2 (Upland)

Depth	Color	Mottles	Texture
0-2	5Y 4/2	10YR 3/6	clay loam
2-12	2.5Y 5/3	10YR 3/6	loam

DP3 (Wetland B)

Depth	Color	Mottles	Texture
0-6	2.5Y 4/1	10YR 4/6	clay
6-12	10YR 4/2	10YR 4/6	clay loam

DP4 (Upland)

Depth	Color	Mottles	Texture
0-2	10YR 5/3	10YR 4/6	loam
2-12	2.5Y 5/3	10YR 4/6	clay loam

DP5 (Upland)

Depth	Color	Mottles	Texture
0-2	10YR 4/4	-	loam
2-12	10YR 5/3	7.5YR 3/4	clay loam

DP6 (Wetland C)

Depth	Color	Mottles	Texture
0-6	10YR 5/1	10YR 3/6	clay loam
6-12	2.5Y 6/2	10YR 3/6	clay loam

DP7 (Wetland D)

Depth	Color	Mottles	Texture
0-4	5Y 4/1	10YR 3/6	clay loam
4-7	5Y 4/2	10YR 3/6	clay loam
7-12	5Y 5/3	10YR 4/6	clay loam

DP8 (Upland)

Depth	Color	Mottles	Texture
0-2	2.5YR 4/3	-	loam
2-12	2.5YR 4/4	10YR 4/3	loam

DP9 (Wetland F)

Depth	Color	Mottles	Texture
0-3	2.5Y 4/2	-	silt
3-6	2.5Y 5/2	10YR 3/6	silt loam
6-12	2.5Y 52/	10YR 3/7	silt loam

DP10 (Upland)

Depth	Color	Mottles	Texture
0-3	10YR 3/4	-	loam
3-12	2.5Y 5/4	10YR 4/6	loam

DP11 (Wetland H)

Depth	Color	Mottles	Texture
0-3	10YR 5/1	10YR 3/6	clay loam
3-12	2.5Y 5/2	10YR 3/6	clay loam

DP12 (Upland)

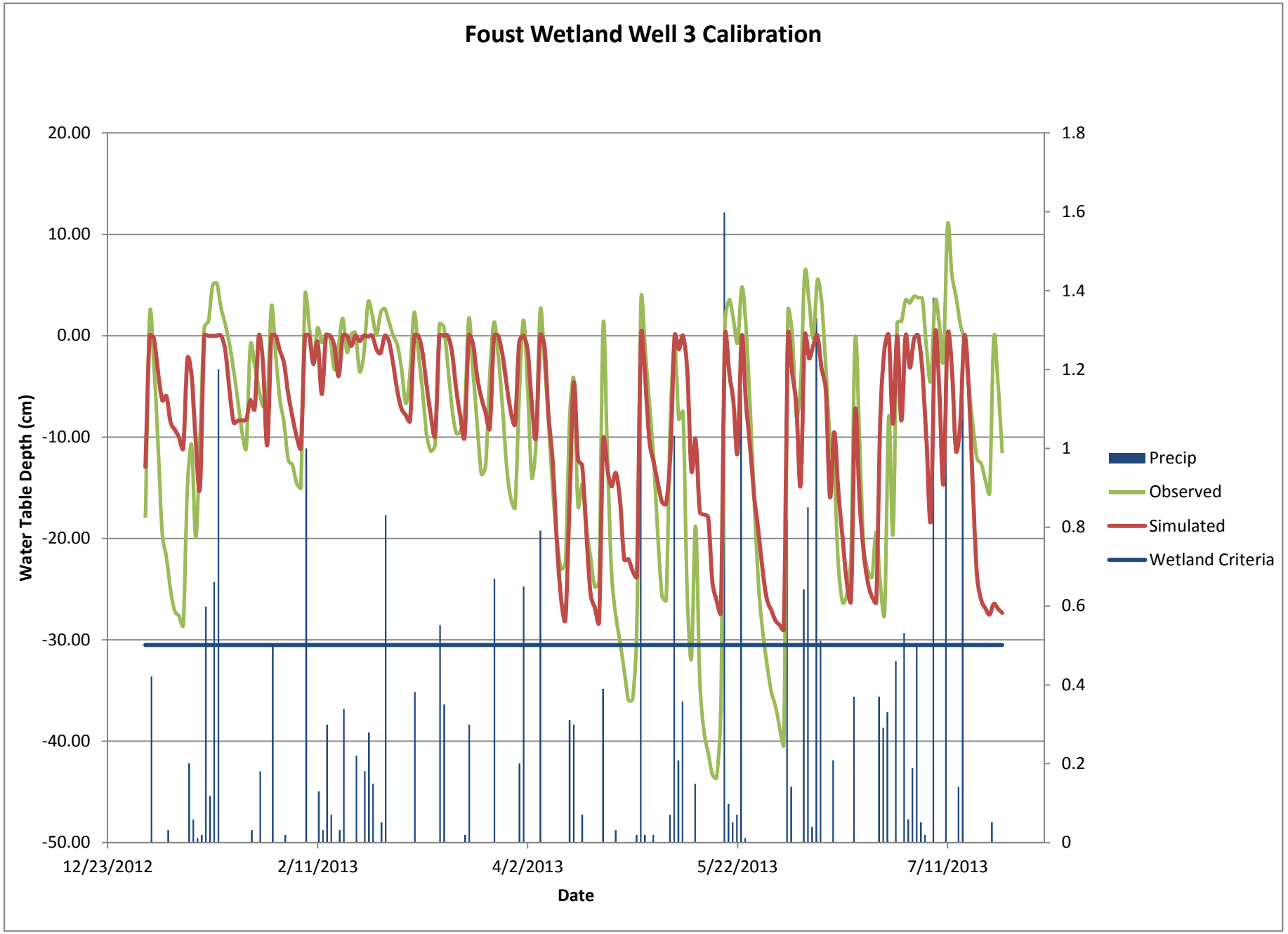
Depth	Color	Mottles	Texture
0-2	2.5Y 4/4	-	loam
2-12	2.5Y 6/4	-	loam

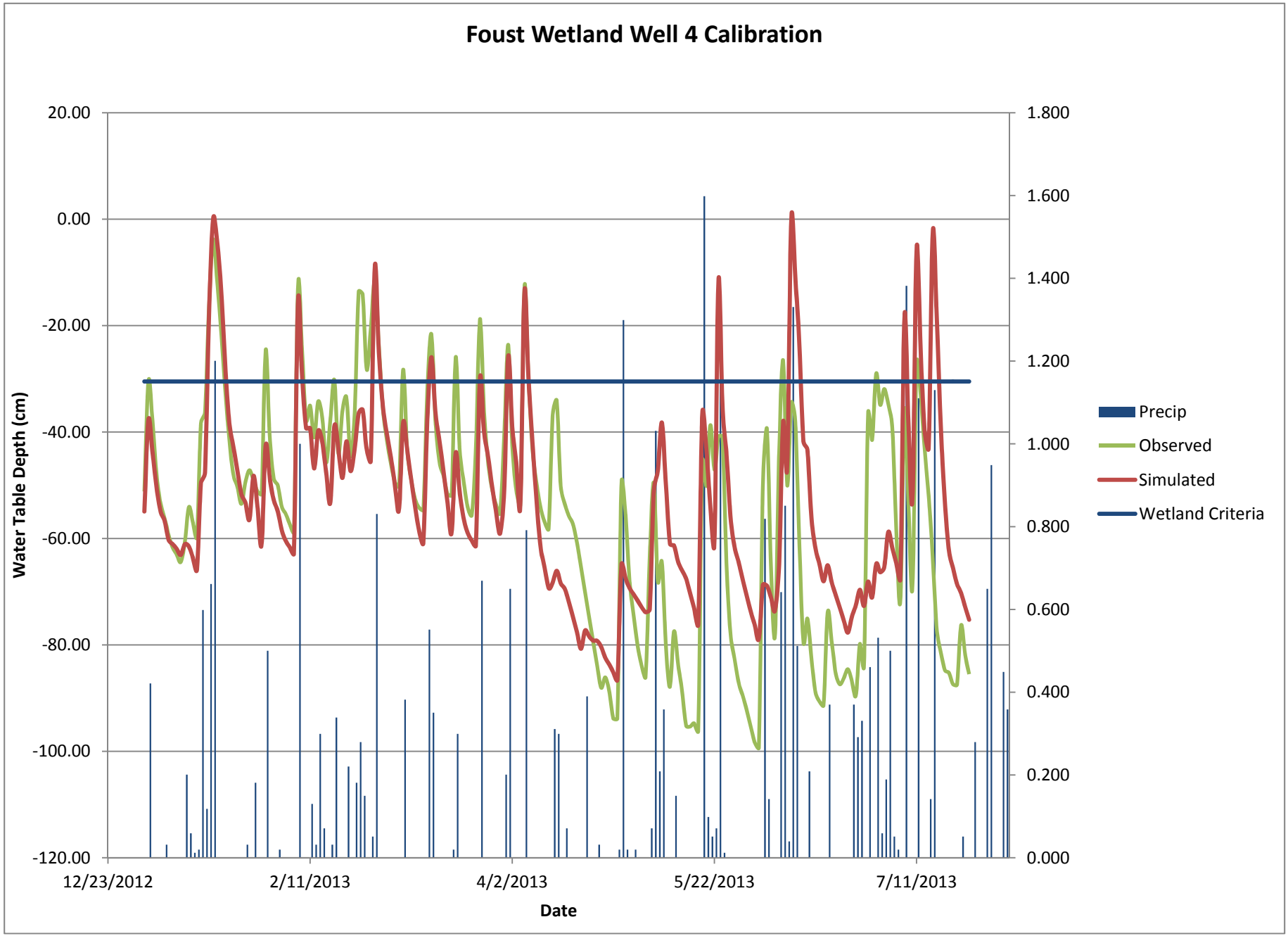
DP13 (Wetland I)

Depth	Color	Mottles	Texture
0-5	10YR 4/1	-	silt loam
5-12	2.5Y 6/3	10YR 4/6	clay loam

DP14 (Upland)

Depth	Color	Mottles	Texture
0-4	10YR 5/4	-	loam
4-12	10YR 5/4	7.5YR 5/6	loam


Foust Wetland Well 3 Calibration
20.00
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
Water Table Depth (cm)
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
12/23/2012
2/11/2013
4/2/2013
5/22/2013
7/11/2013
Date
Precip
Observed
Simulated
Wetland Criteria


Foust Wetland Well 4 Calibration
Water Table Depth (cm)
20.00
0.00
-20.00
-40.00
-60.00
-80.00
-100.00
-120.00
1.800
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
12/23/2012
2/11/2013
4/2/2013
5/22/2013
7/11/2013
Date
Precip
Observed
Simulated
Wetland Criteria

Project` Foust Creek Mitigation Site
Location Wetland Re-establishment Area adjacent to RW-7
Date 12/4/2013
Observers JH, AA

Profile #1

Depth	Matrix Color	Mottling %	Mottling Color	minerals	texture
0-2"	10YR 5/3			black and Mn	loam
2-18"	10YR5/6	10	10YR 5/2	black and Mn	loam
18-29"	5YR 6/2	40	10YR 5/6	black and Mn	loam
29-48"	10YR 5/1	20	10YR 3/1	black and Mn	silt loam
		10	10YR 5/6		

Approx. Existing surface elev 548.466
Approx proposed surface elev 548
Associated Depth 5.59 inches

Water Table at 25"

Profile #2

Depth	Matrix Color	Mottling %	Mottling Color	minerals	texture
0-2"	10YR 5/3				loam
2-18"	10YR5/6	10	10YR 5/2	black and Mn	loam
18-48"	5YR 6/2	40	10YR 5/6		sandy loam

Approx. Existing surface elev 548.5
Approx proposed surface elev 548.4
Associated Depth 1.2 inches

Water Table at 36"

Profile #3

Depth	Matrix Color	Mottling %	Mottling Color	minerals	texture
0-4"	2.5Y 5/1	10	10YR 5/6		loam
4-34"	2.5Y 6/2	30	10YR 5/6	black and Mn	loam
34-48"	2.5Y 6/2	30	10YR 5/6		sandy loam

Approx. Existing surface elev 548.23
Approx proposed surface elev 548.23
Associated Depth 0 inches

Profile #4

Depth	Matrix Color	Mottling %	Mottling Color	minerals	texture
0-2"	10YR 5/3				loam
2-20"	10YR 5/6			black and Mn	loam
20-36"	5YR 6/2	40	10 YR 5/6	black and Mn	loam
36-48"	5YR 6/2	40	10 YR 5/6	black and Mn	sandy loam
48" +	10YR 5/1	40	10 YR 5/6	black and Mn	sandy loam

Approx. Existing surface elev 548.694
Approx proposed surface elev in stream

Profile #5

Depth	Matrix Color	Mottling %	Mottling Color	minerals	texture
0-2"	10YR 5/3				loam
2-14"	10YR 5/6	40	10YR 5/2	black and Mn	loam
14-28"	10YR 5/6		10YR 5/2	black and Mn	sandy loam
28-36"	10YR 5/6		10YR 5/2	black and Mn	sandy loam
36"	Layer of Ash from file				
36" +	10YR 5/6		10YR 5/2	black and Mn	sandy loam

Approx. Existing surface elev 548.761
Approx proposed surface elev 548.6
Associated Depth 1.93 inches

Water Table at 28"

Profile #6

Depth	Matrix Color	Mottling %	Mottling Color	minerals	texture
0-2"	10YR 5/3				loam
2-17"	10YR 5/6	10	10YR 5/2	black and Mn	loam
17-30"	5YR 6/2	40	10YR 5/6	black and Mn	loam
30-48"	2.5Y 7/2	20	10YR 3/1	black and Mn	loam
		10	10YR 5/6		

Approx. Existing surface elev 547.525
Approx proposed surface elev in stream

Profile #7

Depth	Matrix Color	Mottling %	Mottling Color	minerals	texture
0-4"	10YR 5/3				loam
2-14"	10YR 5/6	10	10YR 5/2	black and Mn	loam
14-24"	10YR 5/6	40	10YR 5/2	black and Mn	sandy loam
24-48"	10YR 5/2	40	10YR 5/6	black and Mn	loam

Approx. Existing surface elev 547.846
Approx proposed surface elev 547.36
Associated Depth 5.83 inches

Profile #8

Depth	Matrix Color	Mottling %	Mottling Color	minerals	texture
0-4"	2.5Y 5/1	10	10YR 5/6		loam
4-34"	2.5Y 6/2	30	10YR 5/6	black and Mn	loam
34-48"	2.5Y 6/2	30	10YR 5/6	black and Mn	sandy loam

Approx. Existing surface elev 547.548
Approx proposed surface elev 547.25
Associated Depth 3.58 inches

Water Table at 34"

Profile #9

Depth	Matrix Color	Mottling %	Mottling Color	minerals	texture
0-12"	10YR 5/1	10	10YR 5/6		loam

Approx. Existing surface elev 546.943
Approx proposed surface elev 549.943
Associated Depth 0

Standing Water at Surface

Project` Foust Creek Mitigation Site
Location Wetland Re-establishment Area adjacent to RW-7
Date 12/4/2013
Observers JH, AA

Profile #10

Depth	Matrix Color	Mottling %	Mottling Color	minerals	texture
0-12"	10YR 5/1	10	10YR 5/6		loam

Approx. Existing surface elev 546.34
Approx proposed surface elev 546.34
Associated Depth 0

Standing Water at Surface

Profile #11

Depth	Matrix Color	Mottling %	Mottling Color	minerals	texture
0-4"	2.5Y 5/1	10	10YR 5/6		loam
4-34"	2.5Y 6/2	30	10YR 5/6	black and Mn	loam
34-48"	2.5Y 6/2	30	10YR 5/6	black and Mn	sandy loam

Approx. Existing surface elev 547.079
Approx proposed surface elev 546.8
Associated Depth 3.35 inches

Water Table at 34"

Profile #12

Depth	Matrix Color	Mottling %	Mottling Color	minerals	texture
0-2"	10YR 5/3	10	10YR 5/2		loam
2-18"	10YR 5/6	10	10YR 5/2	black and Mn	loam
18-22"	10YR 5/6	10	10YR 5/2		silt loam
22-30"+	10YR 5/6	20	10YR 5/1		silt loam
		10	10YR 5/6		

Approx. Existing surface elev 547.491
Approx proposed surface elev 546.82
Associated Depth 8.05 inches

Water Table at 22"

Profile #13

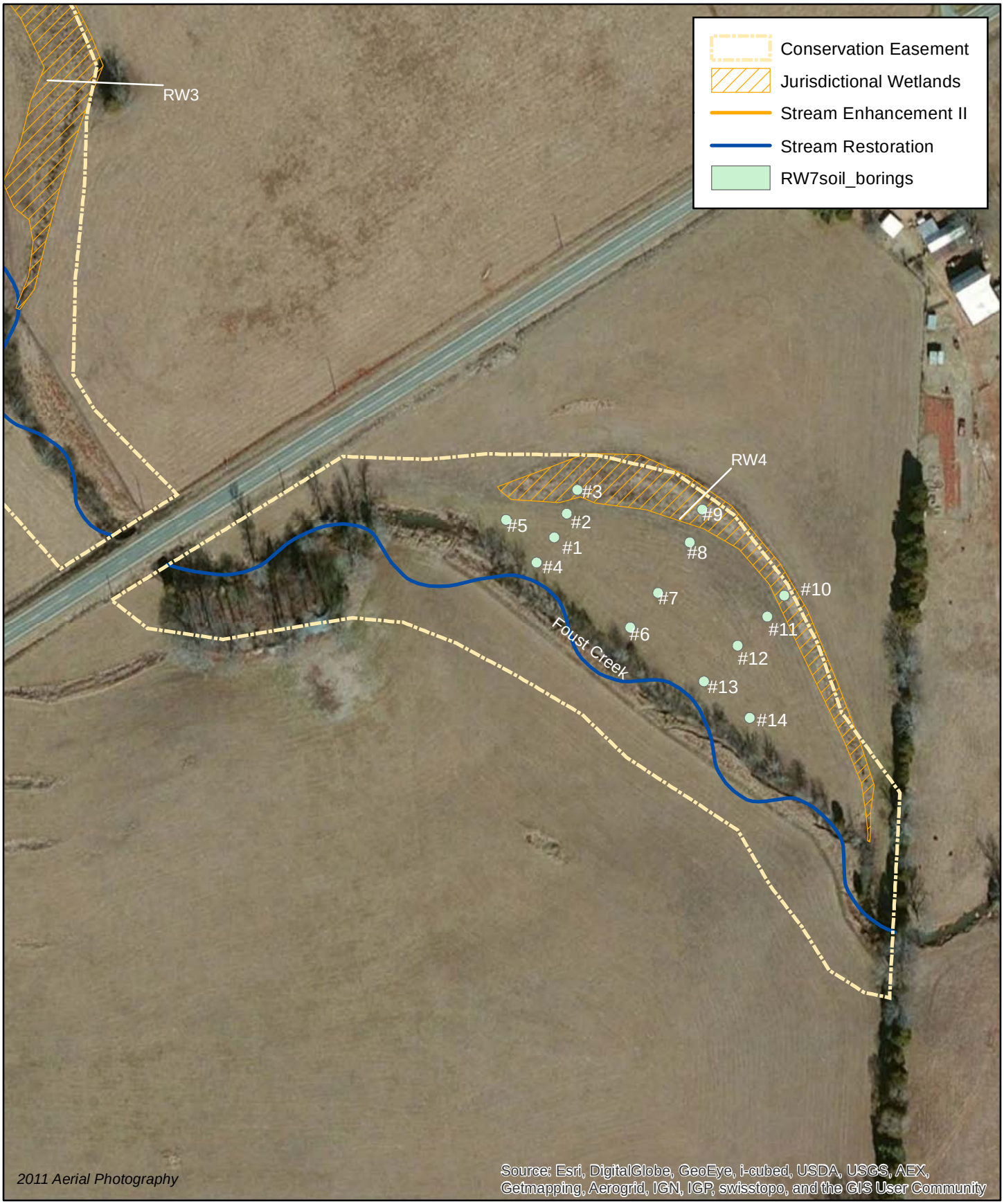
Depth	Matrix Color	Mottling %	Mottling Color	minerals	texture
0-2"	10YR 5/3				loam
2-12"	10YR 5/6	10	10YR 5/2	black and Mn	loam
12-40"	10YR 5/2	10	10YR 5/6	black and Mn	silt loam
		10	10YR 3/1		

Approx. Existing surface elev 547.251
Approx proposed surface elev 546.82
Associated Depth 5.17 inches

Profile #14

Depth	Matrix Color	Mottling %	Mottling Color	minerals	texture
0-2"	10YR 5/3				loam
2-14"	10YR 5/6	10	10YR 5/2	black and Mn	loam
14-36"	10YR 4/3	30	10YR 5/2	black and Mn	silt loam
		10	10YR 5/6		

Approx. Existing surface elev 546.946
Approx proposed surface elev 546.55
Associated Depth 4.75 inches



WILDLANDS ENGINEERING

0 100 200 Feet

N

Foust Creek Mitigation Site
Cape Fear River Basin (03030002)

Alamance County, NC

Appendix 5 Jurisdctional Determination Information

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action Id. SAW-2012-01908 County: Alamance U.S.G.S. Quad: NC-SNOW CAMP

NOTIFICATION OF JURISDICTIONAL DETERMINATION

Property Owner: Wildlands Engineering, Inc.
Ian Eckardt
Address: 1430 South Mint Street
Suite 104
Charlotte, NC, 27203
Telephone Number: 704-332-7754

Size (acres) 22.1
Nearest Waterway Marys Creek
USGS HUC 3030002

Nearest Town Graham
River Basin Haw. North Carolina.
Coordinates Latitude: 35.9160724370081
Longitude: -79.4018802293965

Location description: The property is located along the corridor of Foust Creek, north-west, and south-east of Snow Camp Road, Alamance County, NC

Indicate Which of the Following Apply:

A. Preliminary Determination

_ Based on preliminary information, there may be wetlands on the above described property. We strongly suggest you have this property inspected to determine the extent of Department of the Army (DA) jurisdiction. To be considered final, a jurisdictional determination must be verified by the Corps. This preliminary determination is not an appealable action under the Regulatory Program Administrative Appeal Process (Reference 33 CFR Part 331). If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also, you may provide new information for further consideration by the Corps to reevaluate the JD.

B. Approved Determination

_ There are Navigable Waters of the United States within the above described property subject to the permit requirements of Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

X There are waters of the U.S. including wetlands on the above described property subject to the permit requirements of Section 404 of the Clean Water Act (CWA)(33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ We strongly suggest you have the wetlands on your property delineated. Due to the size of your property and/or our present workload, the Corps may not be able to accomplish this wetland delineation in a timely manner. For a more timely delineation, you may wish to obtain a consultant. To be considered final, any delineation must be verified by the Corps.

X The waters of the U.S. including wetlands on your property have been delineated and the delineation has been verified by the Corps. We strongly suggest you have this delineation surveyed. Upon completion, this survey should be reviewed and verified by the Corps. Once verified, this survey will provide an accurate depiction of all areas subject to CWA jurisdiction on your property which, provided there is no change in the law or our published regulations, may be relied upon for a period not to exceed five years.

_ The waters of the U.S. including wetlands have been delineated and surveyed and are accurately depicted on the plat signed by the Corps Regulatory Official identified below on _____. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ There are no waters of the U.S., to include wetlands, present on the above described project area which are subject to the permit requirements of Section 404 of the Clean Water Act (33 USC 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ The property is located in one of the 20 Coastal Counties subject to regulation under the Coastal Area Management Act (CAMA). You should contact the Division of Coastal Management in Morehead City, NC, at (252) 808-2808 to determine their requirements.

Placement of dredged or fill material within waters of the US and/or wetlands without a Department of the Army permit may constitute a violation of Section 301 of the Clean Water Act (33 USC § 1311). If you have any questions regarding this determination and/or the Corps regulatory program, please contact **Thomas Brown** at **919-554-4884 x22 or Thomas.L.Brown@usace.army.mil.**

C. Basis For Determination: 1987 Manual, Eastern Mountain and Piedmont Supplement.

D. Remarks:

E. Attention USDA Program Participants

This delineation/determination has been conducted to identify the limits of Corps' Clean Water Act jurisdiction for the particular site identified in this request. The delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA Program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

F. Appeals Information (This information applies only to approved jurisdictional determinations as indicated in B. above)

This correspondence constitutes an approved jurisdictional determination for the above described site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and request for appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the following address:

US Army Corps of Engineers
South Atlantic Division
Attn: Jason Steele, Review Officer
60 Forsyth Street SW, Room 10M15
Atlanta, Georgia 30303-8801

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by **3/28/2014**.

It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this correspondence.

Corps Regulatory Official: _____

Date: **January 27, 2014** Expiration Date: **January 27, 2019**

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete the attached customer Satisfaction Survey or visit http://per2.nwp.usace.army.mil/survey.html to complete the survey online.

Copy furnished:

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL		
Applicant: **Wildlands Engineering, Inc.** **Ian Eckardt**	File Number: **SAW-2012-01908**	Date: **January 27, 2014**

Attached is:	See Section below
☐ INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
☐ PROFFERED PERMIT (Standard Permit or Letter of permission)	B
☐ PERMIT DENIAL	C
☒ APPROVED JURISDICTIONAL DETERMINATION	D
☐ PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/inet/functions/cw/cecwo/reg or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the district engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact: **District Engineer, Wilmington Regulatory Division,** **Attn: Thomas Brown** **Raleigh Regualtory Field Office** **3331 Heritage Trade Dr, Suite 105** **Wake Forest, NC 27587**	If you only have questions regarding the appeal process you may also contact: Mr. Jason Steele, Administrative Appeal Review Officer CESAD-PDO U.S. Army Corps of Engineers, South Atlantic Division 60 Forsyth Street, Room 10M15 Atlanta, Georgia 30303-8801 Phone: (404) 562-5137

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

_____ Signature of appellant or agent.	Date:	Telephone number:

For appeals on Initial Proffered Permits send this form to:

District Engineer, Wilmington Regulatory Division, Attn: Thomas Brown, 69 Darlington Avenue, Wilmington, North Carolina 28403

For Permit denials, Proffered Permits and approved Jurisdictional Determinations send this form to:

Division Engineer, Commander, U.S. Army Engineer Division, South Atlantic, Attn: Mr. Jason Steele, Administrative Appeal Officer, CESAD-PDO, 60 Forsyth Street, Room 10M15, Atlanta, Georgia 30303-8801 Phone: (404) 562-5137

NC DWQ Stream Identification Form Version 4.11

Date: 2/9/12	Project/Site: Foust Creek	Latitude: 35.914464°N
Evaluator: MLJ	County: Alamance	Longitude: 79.402531°W
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 28	Stream Determination (circle one) Ephemeral (Intermittent) Perennial	Other SCPI - UT1 *e.g. Quad Name:*

A. Geomorphology (Subtotal = 13)	Absent	Weak	Moderate	Strong
1[a]. Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	(1)	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	(1)	2	3
4. Particle size of stream substrate	0	(1)	2	3
5. Active/relict floodplain	0	1	(2)	3
6. Depositional bars or benches	0	(1)	2	3
7. Recent alluvial deposits	0	(1)	2	3
8. Headcuts	0	(1)	2	3
9. Grade control	0	0.5	(1)	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	No = (0)		Yes = 3	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 7.5)				
12. Presence of Baseflow	0	1	(2)	3
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	(1.5)	1	0.5	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = (3)	

C. Biology (Subtotal = 7.5)				
18. Fibrous roots in streambed	(3)	2	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macrobenthos (note diversity and abundance)	(0)	1	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	0	(0.5)	1	1.5
25. Algae	0	0.5	(1)	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

NC DWQ Stream Identification Form Version 4.11

Date: 2/9/12	Project/Site: Foust Creek	Latitude: 35.914596°N
Evaluator: MLJ	County: Alamance	Longitude: 79.401302°W
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 41.5	Stream Determination (circle one) Ephemeral Intermittent (Perennial)	Other SCP2- Foust Creek *e.g. Quad Name:*

A. Geomorphology (Subtotal = 22)	Absent	Weak	Moderate	Strong
1[a]. Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	1	2	(3)
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	(2)	3
4. Particle size of stream substrate	0	1	(2)	3
5. Active/relict floodplain	0	1	2	(3)
6. Depositional bars or benches	0	(1)	2	3
7. Recent alluvial deposits	0	1	(2)	3
8. Headcuts	0	(1)	2	3
9. Grade control	0	0.5	(1)	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	No = 0		Yes = (3)	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 9.5)				
12. Presence of Baseflow	0	1	2	(3)
13. Iron oxidizing bacteria	0	(1)	2	3
14. Leaf litter	(1.5)	1	0.5	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = (3)	

C. Biology (Subtotal = 10)				
18. Fibrous roots in streambed	(3)	2	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macrobenthos (note diversity and abundance)	0	(1)	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	0	(0.5)	1	1.5
23. Crayfish	0	(0.5)	1	1.5
24. Amphibians	0	0.5	(1)	1.5
25. Algae	0	0.5	(1)	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

NC DWQ Stream Identification Form Version 4.11

Date: 2/9/12	Project/Site: Foust Creek	Latitude: 35.91288°N
Evaluator: MLJ	County: Alamance	Longitude: 79.39886°W
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 44	Stream Determination (circle one) Ephemeral Intermittent (Perennial)	Other SCP3 - Foust Creek *e.g. Quad Name:*

A. Geomorphology (Subtotal = 24.5)	Absent	Weak	Moderate	Strong
1[a]. Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	1	(2)	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	(2)	3
4. Particle size of stream substrate	0	1	(2)	3
5. Active/relict floodplain	0	1	2	(3)
6. Depositional bars or benches	0	1	2	(3)
7. Recent alluvial deposits	0	1	(2)	3
8. Headcuts	0	1	(2)	3
9. Grade control	0	0.5	(1)	1.5
10. Natural valley	0	0.5	1	(1.5)
11. Second or greater order channel	No = 0		Yes = (3)	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 10.5)				
12. Presence of Baseflow	0	1	2	(3)
13. Iron oxidizing bacteria	0	(1)	2	3
14. Leaf litter	(1.5)	1	0.5	0
15. Sediment on plants or debris	0	0.5	(1)	1.5
16. Organic debris lines or piles	0	0.5	(1)	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = (3)	

C. Biology (Subtotal = 9)				
18. Fibrous roots in streambed	(3)	2	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macrobenthos (note diversity and abundance)	0	(1)	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	0	(0.5)	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	0	(0.5)	1	1.5
25. Algae	0	0.5	(1)	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

OFFICE USE ONLY: USACE AID#_____ DWQ #_____

SCP 1 – UT1 to Foust Creek

STREAM QUALITY ASSESSMENT WORKSHEET

1. Applicant's Name: Wildlands Engineering, Inc
2. Evaluator's Name: Ian Eckardt
3. Date of Evaluation: 6/25/2013
4. Time of Evaluation: 10:30 AM
5. Name of Stream: UT1 to Foust Creek
6. River Basin: Cape Fear 03030002
7. Approximate Drainage Area: 173 Acres
8. Stream Order: First
9. Length of Reach Evaluated: 200 lf
10. County: Alamance
11. Location of reach under evaluation (include nearby roads and landmarks): From Graham, NC, travel south on NC 87/Main Street for 8 miles. Turn right onto Snow Camp Road and continue for 4 miles to Foust Creek Mitigation Site. UT1 is located approximately 350 linear feet north of the Snow Camp Road crossing over Foust Creek.
12. Site Coordinates (if known): N 35.913215°, W 79.400600°
13. Proposed Channel Work (if any): restoration
14. Recent Weather Conditions: No rainfall in previous 48 hours.
15. Site conditions at time of visit: partly sunny, 90°
16. Identify any special waterway classifications known: ___Section 10 ___Tidal Waters ___Essential Fisheries Habitat ___Trout Waters ___Outstanding Resource Waters _X_ Nutrient Sensitive Waters ___Water Supply Watershed _X_ (I-IV)
17. Is there a pond or lake located upstream of the evaluation point? YES (NO) If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES (NO) 19. Does channel appear on USDA Soil Survey? YES (NO)
20. Estimated Watershed Land Use: ___% Residential ___% Commercial ___% Industrial 50 % Agricultural 50 % Forested ___% Cleared / Logged ___% Other (_____)
21. Bankfull Width: 8-10' 22. Bank Height (from bed to top of bank): 2-3'
23. Channel slope down center of stream: _X_ Flat (0 to 2%) ___Gentle (2 to 4%) ___Moderate (4 to 10%) ___Steep (>10%)
24. Channel Sinuosity: _X_ Straight ___Occasional Bends ___Frequent Meander ___Very Sinuous ___Braided Channel

Instructions for completion of worksheet (located on page 2): Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 26 **Comments:**

Evaluator's Signature Ian Eckardt **Date** 6/25/13

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers in order to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
PHYSICAL	1	**Presence of flow / persistent pools in stream** (no flow or saturation = 0; strong flow = max points)	0 – 5	0 – 4	0 – 5	3
	2	**Evidence of past human alteration** (extensive alteration = 0; no alteration = max points)	0 – 6	0 – 5	0 – 5	0
	3	**Riparian zone** (no buffer = 0; contiguous, wide buffer = max points)	0 – 6	0 – 4	0 – 5	0
	4	**Evidence of nutrient or chemical discharges** (extensive discharges = 0; no discharges = max points)	0 – 5	0 – 4	0 – 4	2
	5	**Groundwater discharge** (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0 – 4	0 – 4	0
	6	**Presence of adjacent floodplain** (no floodplain = 0; extensive floodplain = max points)	0 – 4	0 – 4	0 – 2	2
	7	**Entrenchment / floodplain access** (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0 – 4	0 – 2	1
	8	**Presence of adjacent wetlands** (no wetlands = 0; large adjacent wetlands = max points)	0 – 6	0 – 4	0 – 2	0
	9	**Channel sinuosity** (extensive channelization = 0; natural meander = max points)	0 – 5	0 – 4	0 – 3	0
	10	**Sediment input** (extensive deposition= 0; little or no sediment = max points)	0 – 5	0 – 4	0 – 4	3
	11	**Size & diversity of channel bed substrate** (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0 – 4	0 – 5	1
STABILITY	12	**Evidence of channel incision or widening** (deeply incised = 0; stable bed & banks = max points)	0 – 5	0 – 4	0 – 5	1
	13	**Presence of major bank failures** (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0 – 5	0 – 5	3
	14	**Root depth and density on banks** (no visible roots = 0; dense roots throughout = max points)	0 – 3	0 – 4	0 – 5	2
	15	**Impact by agriculture or livestock production** (substantial impact =0; no evidence = max points)	0 – 5	0 – 4	0 – 5	0
HABITAT	16	**Presence of riffle-pool/ripple-pool complexes** (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0 – 5	0 – 6	1
	17	**Habitat complexity** (little or no habitat = 0; frequent, varied habitats = max points)	0 – 6	0 – 6	0 – 6	2
	18	**Canopy coverage over streambed** (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0 – 5	0 – 5	1
	19	**Substrate embeddedness** (deeply embedded = 0; loose structure = max)	NA*	0 – 4	0 – 4	2
BIOLOGY	20	**Presence of stream invertebrates** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 5	0 – 5	0
	21	**Presence of amphibians** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	1
	22	**Presence of fish** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	0
	23	**Evidence of wildlife use** (no evidence = 0; abundant evidence = max points)	0 – 6	0 – 5	0 – 5	1
Total Points Possible			100	100	100	
TOTAL SCORE (also enter on first page)						26

* These characteristics are not assessed in coastal streams.

OFFICE USE ONLY: USACE AID#_____ DWQ #_____

SCP 2 – Foust Creek above UT1

STREAM QUALITY ASSESSMENT WORKSHEET

1. Applicant's Name: Wildlands Engineering, Inc
2. Evaluator's Name: Ian Eckardt
3. Date of Evaluation: 6/25/2013
4. Time of Evaluation: 5:30 PM
5. Name of Stream: Foust Creek
6. River Basin: Cape Fear 03030002
7. Approximate Drainage Area: 1,000 Acres
8. Stream Order: First
9. Length of Reach Evaluated: 200 lf
10. County: Alamance
11. Location of reach under evaluation (include nearby roads and landmarks): From Graham, NC, travel south on NC 87/Main Street for 8 miles. Turn right onto Snow Camp Road and continue for 4 miles to Foust Creek Mitigation Site.
12. Site Coordinates (if known): N 35.914596°, W 79.401302°
13. Proposed Channel Work (if any): enhancement/restoration
14. Recent Weather Conditions: No rainfall in previous 48 hours.
15. Site conditions at time of visit: partly sunny, 90°
16. Identify any special waterway classifications known: ___Section 10 ___Tidal Waters ___Essential Fisheries Habitat ___Trout Waters ___Outstanding Resource Waters _X_ Nutrient Sensitive Waters _X_ Water Supply Watershed ____(I-IV)
17. Is there a pond or lake located upstream of the evaluation point? YES (NO) If yes, estimate the water surface area:_
18. Does channel appear on USGS quad map? (YES) NO 19. Does channel appear on USDA Soil Survey? (YES) NO
20. Estimated Watershed Land Use: ___% Residential ___% Commercial ___% Industrial 20 % Agricultural 80 % Forested ___% Cleared / Logged ___% Other (_____)
21. Bankfull Width: 15-25' 22. Bank Height (from bed to top of bank): 3-4'
23. Channel slope down center of stream: _X_ Flat (0 to 2%) ___Gentle (2 to 4%) ___Moderate (4 to 10%) ___Steep (>10%)
24. Channel Sinuosity: ____Straight ___Occasional Bends _X_ Frequent Meander ___Very Sinuous ___Braided Channel

Instructions for completion of worksheet (located on page 2): Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 49 **Comments:**_____

Evaluator's Signature Ian Eckardt **Date** 6/25/13

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers in order to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
PHYSICAL	1	**Presence of flow / persistent pools in stream** (no flow or saturation = 0; strong flow = max points)	0 – 5	0 – 4	0 – 5	4
	2	**Evidence of past human alteration** (extensive alteration = 0; no alteration = max points)	0 – 6	0 – 5	0 – 5	3
	3	**Riparian zone** (no buffer = 0; contiguous, wide buffer = max points)	0 – 6	0 – 4	0 – 5	1
	4	**Evidence of nutrient or chemical discharges** (extensive discharges = 0; no discharges = max points)	0 – 5	0 – 4	0 – 4	2
	5	**Groundwater discharge** (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0 – 4	0 – 4	3
	6	**Presence of adjacent floodplain** (no floodplain = 0; extensive floodplain = max points)	0 – 4	0 – 4	0 – 2	3
	7	**Entrenchment / floodplain access** (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0 – 4	0 – 2	3
	8	**Presence of adjacent wetlands** (no wetlands = 0; large adjacent wetlands = max points)	0 – 6	0 – 4	0 – 2	2
	9	**Channel sinuosity** (extensive channelization = 0; natural meander = max points)	0 – 5	0 – 4	0 – 3	2
	10	**Sediment input** (extensive deposition= 0; little or no sediment = max points)	0 – 5	0 – 4	0 – 4	2
	11	**Size & diversity of channel bed substrate** (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0 – 4	0 – 5	2
STABILITY	12	**Evidence of channel incision or widening** (deeply incised = 0; stable bed & banks = max points)	0 – 5	0 – 4	0 – 5	1
	13	**Presence of major bank failures** (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0 – 5	0 – 5	2
	14	**Root depth and density on banks** (no visible roots = 0; dense roots throughout = max points)	0 – 3	0 – 4	0 – 5	2
	15	**Impact by agriculture or livestock production** (substantial impact =0; no evidence = max points)	0 – 5	0 – 4	0 – 5	0
HABITAT	16	**Presence of riffle-pool/ripple-pool complexes** (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0 – 5	0 – 6	3
	17	**Habitat complexity** (little or no habitat = 0; frequent, varied habitats = max points)	0 – 6	0 – 6	0 – 6	3
	18	**Canopy coverage over streambed** (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0 – 5	0 – 5	3
	19	**Substrate embeddedness** (deeply embedded = 0; loose structure = max)	NA*	0 – 4	0 – 4	2
BIOLOGY	20	**Presence of stream invertebrates** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 5	0 – 5	1
	21	**Presence of amphibians** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	3
	22	**Presence of fish** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	1
	23	**Evidence of wildlife use** (no evidence = 0; abundant evidence = max points)	0 – 6	0 – 5	0 – 5	1
Total Points Possible			100	100	100	
TOTAL SCORE (also enter on first page)						49

* These characteristics are not assessed in coastal streams.

OFFICE USE ONLY: USACE AID#_____ DWQ #_____

SCP 3 – Foust Creek (Downstream of Snow Camp Rd.)

STREAM QUALITY ASSESSMENT WORKSHEET

1. Applicant's Name: Wildlands Engineering, Inc
2. Evaluator's Name: Ian Eckardt
3. Date of Evaluation: 6/25/2013
4. Time of Evaluation: 4:30 PM
5. Name of Stream: Foust Creek
6. River Basin: Cape Fear 03030002
7. Approximate Drainage Area: 1,259 Acres
8. Stream Order: First
9. Length of Reach Evaluated: 200 lf
10. County: Alamance
11. Location of reach under evaluation (include nearby roads and landmarks): From Graham, NC, travel south on NC 87/Main Street for 8 miles. Turn right onto Snow Camp Road and continue for 4 miles to Foust Creek Mitigation Site.
12. Site Coordinates (if known): N 35.91288°, W 79.398861°
13. Proposed Channel Work (if any): enhancement/restoration
14. Recent Weather Conditions: No rainfall in previous 48 hours.
15. Site conditions at time of visit: partly sunny, 90°
16. Identify any special waterway classifications known: ___Section 10 ___Tidal Waters ___Essential Fisheries Habitat ___Trout Waters ___Outstanding Resource Waters _X_ Nutrient Sensitive Waters _X_ Water Supply Watershed ____(I-IV)
17. Is there a pond or lake located upstream of the evaluation point? YES (NO) If yes, estimate the water surface area:_
18. Does channel appear on USGS quad map? (YES) NO 19. Does channel appear on USDA Soil Survey? (YES) NO
20. Estimated Watershed Land Use: ___% Residential ___% Commercial ___% Industrial 20 % Agricultural 80 % Forested ___% Cleared / Logged ___% Other (_____)
21. Bankfull Width: 15-25' 22. Bank Height (from bed to top of bank): 2-4'
23. Channel slope down center of stream: _X_ Flat (0 to 2%) ___Gentle (2 to 4%) ___Moderate (4 to 10%) ___Steep (>10%)
24. Channel Sinuosity: ____Straight _X_ Occasional Bends ___Frequent Meander ___Very Sinuous ___Braided Channel

Instructions for completion of worksheet (located on page 2): Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 45 **Comments:**_____

Evaluator's Signature Ian Eckardt **Date** 6/25/13

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers in order to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
PHYSICAL	1	**Presence of flow / persistent pools in stream** (no flow or saturation = 0; strong flow = max points)	0 – 5	0 – 4	0 – 5	4
	2	**Evidence of past human alteration** (extensive alteration = 0; no alteration = max points)	0 – 6	0 – 5	0 – 5	3
	3	**Riparian zone** (no buffer = 0; contiguous, wide buffer = max points)	0 – 6	0 – 4	0 – 5	1
	4	**Evidence of nutrient or chemical discharges** (extensive discharges = 0; no discharges = max points)	0 – 5	0 – 4	0 – 4	4
	5	**Groundwater discharge** (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0 – 4	0 – 4	1
	6	**Presence of adjacent floodplain** (no floodplain = 0; extensive floodplain = max points)	0 – 4	0 – 4	0 – 2	3
	7	**Entrenchment / floodplain access** (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0 – 4	0 – 2	1
	8	**Presence of adjacent wetlands** (no wetlands = 0; large adjacent wetlands = max points)	0 – 6	0 – 4	0 – 2	1
	9	**Channel sinuosity** (extensive channelization = 0; natural meander = max points)	0 – 5	0 – 4	0 – 3	1
	10	**Sediment input** (extensive deposition= 0; little or no sediment = max points)	0 – 5	0 – 4	0 – 4	2
	11	**Size & diversity of channel bed substrate** (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0 – 4	0 – 5	2
STABILITY	12	**Evidence of channel incision or widening** (deeply incised = 0; stable bed & banks = max points)	0 – 5	0 – 4	0 – 5	1
	13	**Presence of major bank failures** (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0 – 5	0 – 5	2
	14	**Root depth and density on banks** (no visible roots = 0; dense roots throughout = max points)	0 – 3	0 – 4	0 – 5	2
	15	**Impact by agriculture or livestock production** (substantial impact =0; no evidence = max points)	0 – 5	0 – 4	0 – 5	0
HABITAT	16	**Presence of riffle-pool/ripple-pool complexes** (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0 – 5	0 – 6	3
	17	**Habitat complexity** (little or no habitat = 0; frequent, varied habitats = max points)	0 – 6	0 – 6	0 – 6	3
	18	**Canopy coverage over streambed** (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0 – 5	0 – 5	4
	19	**Substrate embeddedness** (deeply embedded = 0; loose structure = max)	NA*	0 – 4	0 – 4	2
BIOLOGY	20	**Presence of stream invertebrates** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 5	0 – 5	1
	21	**Presence of amphibians** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	2
	22	**Presence of fish** (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	1
	23	**Evidence of wildlife use** (no evidence = 0; abundant evidence = max points)	0 – 6	0 – 5	0 – 5	1
Total Points Possible			100	100	100	
TOTAL SCORE (also enter on first page)						45

* These characteristics are not assessed in coastal streams.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Foust Creek Mitigation Site City/County: Alamance Sampling Date: 6/25/13

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland A - DP1

Investigator(s): Ian Eckardt Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): MLRA 136 Lat: N 35.913382 Long: W 79.398511 Datum:

Soil Map Unit Name: Local alluvial land (Lc) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Sampling point located at the toe of slope in the back of the left floodplain of Foust Creek. The vegetation has been routinely managed at the sampling location. Ditching efforts adjacent to the sampling location have likely impacted hydrology. The area has recently above average rainfall for the month of June compared to the historic average.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ✓ Algal Mat or Crust (B4)
- ✓ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 3
Water Table Present?	Yes ✓	No ____	Depth (inches): <12
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): <12

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Wetland A - DP1

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Juncus effusus	30	Yes	FACW
2. Cyperus strigosus	30	Yes	FACW
3. Impatiens capensis	20	Yes	FACW
4. Polygonum sagittatum	20	Yes	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

Feature is located in a maintained farm field. Routine maintenance has removed tree strata.

SOIL

Sampling Point: Wetland A - DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	2.5Y 4/1	80	2.5Y 5/6	20	C	PL	silty loam	
4-12	2.5Y 5/3	50	10YR 4/6	50	C	PL	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Foust Creek Mitigation Site City/County: Alamance Sampling Date: 6/25/13

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland - DP2

Investigator(s): Ian Eckardt Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): MLRA 136 Lat: N 353913244 Long: W 79.398575 Datum:

Soil Map Unit Name: Local alluvial land (Lc) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

Sampling point located in the left floodplain of Foust Creek. The vegetation has been routinely managed at the sampling location. The site has received above average rainfall for the month of June compared to historic average.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ____ Depth (inches): -

Water Table Present? Yes ____ No ____ Depth (inches): -

Saturation Present? (includes capillary fringe) Yes ____ No ____ Depth (inches): -

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Upland - DP2

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca spp.	100	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

Feature is located in a maintained farm field. Routine maintenance has removed tree strata.

SOIL

Sampling Point: Upland - DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	5Y 4/3	85	10YR 3/6	15	C	PL	clay loam	
2-12	2.5Y 5/3	65	10YR 3/6	35	C	PL	loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Foust Creek Mitigation Site City/County: Alamance Sampling Date: 6/25/13

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland B - DP3

Investigator(s): Ian Eckardt Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): MLRA 136 Lat: N 35.914736 Long: W 79.400928 Datum:

Soil Map Unit Name: Georgeville silty clay loam (GbC3) and local alluvial land NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Sampling point located at the toe of slope in the back of the left floodplain of Foust Creek. The vegetation has been routinely managed at the sampling location. Ditching efforts adjacent to the sampling location have likely impacted hydrology. The site has received above average rainfall for the month of June compared to historic average.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ✓ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 2
Water Table Present?	Yes ✓	No ____	Depth (inches): 10
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): <12

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Wetland B - DP3

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. Fraxinus pennsylvanica	2	No	FACW
2. Cornus amomum	2	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	4 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Juncus effusus	35	Yes	FACW
2. Carex lurida	30	Yes	OBL
3. Onoclea sensibilus	10	No	FACW
4. Polygonum sagittatum	10	No	OBL
5. Sagittaria spp.	5	No	OBL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

Feature is located in a maintained farm field. Routine maintenance has removed tree strata.

SOIL

Sampling Point: Wetland B - DP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	2.5Y 4/1	98	10YR 4/6	2	C	PL	clay	
6-12	10YR 4/2	60	10YR 4/6	40	C	PL	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Foust Creek Mitigation Site City/County: Alamance Sampling Date: 6/25/13

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland - DP4

Investigator(s): Ian Eckardt Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): MLRA 136 Lat: N 35.914700 Long: W 79.401095 Datum:

Soil Map Unit Name: Local alluvial land (Lc) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

Sampling point located adjacent Wetland B. The vegetation has been routinely managed at the sampling location. The site has received above average rainfall for the month of June 2013 compared to historic average.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): -
Water Table Present?	Yes ____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Upland - DP4

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca spp.	90	Yes	FAC
2. Juncus effusus	5	No	FACW
3. Onoclea sensibilis	5	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

Feature is located in a maintained farm field. Routine maintenance has removed tree strata.

SOIL

Sampling Point: Upland - DP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 5/3	90	10YR 4/6	10	C	PL	loam	
2-12	2.5Y 5/3	85	10YR 4/6	15	C	PL	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Foust Creek Mitigation Site City/County: Alamance Sampling Date: 6/25/13

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland - DP5

Investigator(s): Ian Eckardt Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): MLRA 136 Lat: N 35.917807 Long: W 79.403163 Datum:

Soil Map Unit Name: Local alluvial land (Lc) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

Sampling point located adjacent Wetland C. The vegetation has been routinely managed at the sampling location. The area has received above average rainfall for the month of June (2013) compared to the historic average.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): -
Water Table Present?	Yes ____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): -

Wetland Hydrology Present? **Yes** ____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Upland - DP5

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca spp.	70	Yes	FAC
2. Eupatorium capillifolium	30	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	70	x 3 =	210
FACU species	30	x 4 =	120
UPL species		x 5 =	
Column Totals:	100 (A)		(B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ✓

Remarks: (Include photo numbers here or on a separate sheet.)

Feature is located in a maintained farm field. Routine maintenance has removed tree strata.

SOIL

Sampling Point: Upland - DP5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 4/4	100					loam	
2-12	10YR 5/3	90	7.5YR 3/4	10	C	PL	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Foust Creek Mitigation Site City/County: Alamance Sampling Date: 6/25/13

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland C - DP6

Investigator(s): Ian Eckardt Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): MLRA 136 Lat: N 35.917690 Long: W 79.402771 Datum:

Soil Map Unit Name: Georgeville silty clay loam (GbC3) and local alluvial land NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** **Yes ✓** **No ____**
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Sampling point located at the toe of slope in the back of the left floodplain of Foust Creek. The vegetation has been routinely managed at the sampling location. The area has received above average rainfall for June 2013 compared to the historic average.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ✓ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): -

Water Table Present? Yes ____ No ✓ Depth (inches): -

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): W/i 4" of surface

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Wetland C - DP6

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Juncus effusus	70	Yes	FACW
2. Polygonum sagittatum	20	Yes	OBL
3. Sagittaria spp.	5	No	OBL
4. Carex lurida	5	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

Feature is located in a maintained farm field. Routine maintenance has removed tree strata.

SOIL

Sampling Point: Wetland C - DP6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 5/1	85	10YR 3/6	15	C	PL	clay loam	
6-12	2.5Y 6/2	75	10YR 3/6	25	C	PL	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Foust Creek Mitigation Site City/County: Alamance Sampling Date: 6/25/13

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland D - DP7

Investigator(s): Ian Eckardt Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): MLRA 136 Lat: N 35.916647 Long: W 79.402270 Datum:

Soil Map Unit Name: Local alluvial land (Lc) and Orange silt loam (ObC2) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Sampling point located in the right floodplain of Foust Creek. The vegetation has been routinely managed at the sampling location. Ditching efforts adjacent to the sampling location have likely impacted hydrology. The site has received above average rainfall for June 2013 compared to historic average.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ✓ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 2
Water Table Present?	Yes ____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): < 12

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Wetland D - DP7

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Juncus effusus	50	Yes	FACW
2. Polygonum sagittatum	20	Yes	OBL
3. Carex lurida	20	Yes	OBL
4. Eleocharis spp.	10	No	FACW-OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

Feature is located in a maintained farm field. Routine maintenance has removed tree strata.

SOIL

Sampling Point: Wetland D - DP7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	5Y 4/1	90	10YR 3/6	10	C	PL	clay loam	
4-7	5Y 4/1	70	10YR 3/6	30	C	PL	clay loam	
7-12	5Y 5/3	70	10YR 4/6	30	C	PL	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Foust Creek Mitigation Site City/County: Alamance Sampling Date: 6/25/13

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland - DP8

Investigator(s): Ian Eckardt Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): MLRA 136 Lat: N 35.916843 Long: W 79.403025 Datum:

Soil Map Unit Name: Orange silt loam (ObC2) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

Sampling point located adjacent Wetland D. The vegetation has been routinely managed at the sampling location. The site has received above average rainfall for June 2013 compared to historic average.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): -
Water Table Present?	Yes ____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): -

Wetland Hydrology Present? **Yes** ____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Upland - DP8

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca spp.	80	Yes	FAC
2. Trifolium repens	20	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	80	x 3 =	240
FACU species	20	x 4 =	80
UPL species		x 5 =	
Column Totals:	100 (A)		320 (B)

Prevalence Index = B/A = 3.2

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

Feature is located in a maintained farm field. Routine maintenance has removed tree strata.

SOIL

Sampling Point: Upland - DP8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	2.5YR 4/3	100					loam	
2-12	2.5YR 4/3	60	10YR 4/3	40	C	PL	loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Foust Creek Mitigation Site City/County: Alamance Sampling Date: 6/26/13

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland F - DP9

Investigator(s): Ian Eckardt Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): MLRA 136 Lat: N 35.918004 Long: W 79.403994 Datum:

Soil Map Unit Name: Georgeville silt loam (GaC3), Local alluvial land (Lc), Orange silt loam (ObC2) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** **Yes ✓** **No ____**
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Sampling point located in the right floodplain of Foust Creek. The vegetation has been routinely managed at the sampling location. The site has received above average rainfall for June 2013 compared to historic average.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ✓ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 2
Water Table Present?	Yes ____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): < 12

Wetland Hydrology Present? **Yes ✓** **No ____**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Frogs observed at sampling location.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Wetland F - DP9

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Eleocharis spp.	60	Yes	FACW-OBL
2. Juncus effusus	30	Yes	FACW
3. Polygonum spp.	5	No	FAC-OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

Feature is located in a maintained farm field. Routine maintenance has removed tree strata.

SOIL

Sampling Point: Wetland F - DP9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	2.5Y 4/2	100					silt	
3-6	2.5Y 5/2	80	10YR 3/6	20	C	PL	silt loam	
6-12	2.5Y 5/2	65	10YR 3/6	35	C	PL	silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Foust Creek Mitigation Site City/County: Alamance Sampling Date: 6/25/13

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland - DP10

Investigator(s): Ian Eckardt Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): MLRA 136 Lat: N 35.918186 Long: W 79.404044 Datum:

Soil Map Unit Name: Local alluvial land (Lc) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

Sampling point located adjacent Wetland F. The vegetation has been routinely managed at the sampling location. The site has received above average rainfall for June 2013 compared to historic average.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): -
Water Table Present?	Yes ____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Upland - DP10

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca spp.	85	Yes	FAC
2. Eupatorium capillifoium	15	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

Feature is located in a maintained farm field. Routine maintenance has removed tree strata.

SOIL

Sampling Point: Upland - DP10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/4	100					loam	
3-12	2.5Y 5/4	85	10YR 4/6	15	C	PL	loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Foust Creek Mitigation Site City/County: Alamance Sampling Date: 6/26/13

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland H - DP11

Investigator(s): Ian Eckardt Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): MLRA 136 Lat: N 35.920148 Long: W 79.404019 Datum:

Soil Map Unit Name: Local alluvial land (Lc) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Sampling point located within a small depression in the right floodplain of Foust Creek. The vegetation has been routinely managed at the sampling location. The area has received above average rainfall for June 2013 compared to historic average.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): -
Water Table Present?	Yes ____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Wetland H - DP11

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Eleocharis spp.	90	Yes	FACW-OBL
2. Juncus effusus	10	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

Feature is located in a maintained farm field. Routine maintenance has removed tree strata.

SOIL

Sampling Point: Wetland H - DP11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 5/1	80	10YR 3/6	20	C	PL	clay loam	
3-12	2.5Y 5/2	65	10YR 3/6	20	C	PL	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Foust Creek Mitigation Site City/County: Alamance Sampling Date: 6/25/13

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland - DP12

Investigator(s): Ian Eckardt Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): MLRA 136 Lat: N 35.920230 Long: W 79.403912 Datum: _____

Soil Map Unit Name: Local alluvial land (Lc) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located adjacent Wetland H. The vegetation has been routinely managed at the sampling location. The site has received above average rainfall for June 2013 compared to historic averages.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: Upland - DP12

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca spp.	100	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

Feature is located in a maintained farm field. Routine maintenance has removed tree strata.

SOIL

Sampling Point: Upland - DP12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-2	2.5Y 4/4	100					loam	
2-12	2.5Y 6/4	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

NC WAM WETLAND ASSESSMENT FORM
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name Foust Creek - Wetland A | **Date** 6/25/2013

Wetland Type Bottomland Hardwood Forest | **Assessor Name/Organization** Ian Eckardt

Level III Ecoregion Piedmont | **Nearest Named Water Body** Foust Creek

River Basin Cape Fear | **USGS 8-Digit Catalogue Unit** 03030002

☐ Yes ☒ No **Precipitation within 48 hrs?** | **Latitude/Longitude (deci-degrees)** 35.913382/-79.398511

Evidence of stressors affecting the assessment area (may not be within the assessment area)
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? ☒ Yes ☐ No

Regulatory Considerations (select all that apply to the assessment area)

☐ Anadromous fish
☐ Federally protected species or State endangered or threatened species
☐ NCDWQ riparian buffer rule in effect
☐ Abuts a Primary Nursery Area (PNA)
☐ Publicly owned property
☐ N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
☐ Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
☐ Designated NCNHP reference community
☐ Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

☐ Blackwater
☒ Brownwater
☐ Tidal (if tidal, check one of the following boxes) ☐ Lunar ☐ Wind ☐ Both

Is the assessment area on a coastal island? ☐ Yes ☒ No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? ☐ Yes ☒ No

Does the assessment area experience overbank flooding during normal rainfall conditions? ☐ Yes ☒ No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

GS	VS	
☒ A	☐ A	Not severely altered
☐ B	☒ B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
☐ A	☐ A	Water storage capacity and duration are not altered.
☒ B	☒ B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
☐ C	☐ C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)
Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

	AA	WT	
3a.	☐ A	☐ A	Majority of wetland with depressions able to pond water > 1 foot deep
	☐ B	☐ B	Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
	☐ C	☐ C	Majority of wetland with depressions able to pond water 3 to 6 inches deep
	☒ D	☒ D	Depressions able to pond water < 3 inches deep

3b. ☐ A Evidence that maximum depth of inundation is greater than 2 feet
☐ B Evidence that maximum depth of inundation is between 1 and 2 feet
☒ C Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- ☐ A Sandy soil
- ☒ B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ☐ C Loamy or clayey soils not exhibiting redoximorphic features
- ☐ D Loamy or clayey gleyed soil
- ☐ E Histosol or histic epipedon

4b.
- ☒ A Soil ribbon < 1 inch
- ☐ B Soil ribbon ≥ 1 inch

4c.
- ☒ A No peat or muck presence
- ☐ B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

Surf	Sub	
☒ A	☒ A	Little or no evidence of pollutants or discharges entering the assessment area
☐ B	☐ B	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
☐ C	☐ C	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)

6. Land Use – opportunity metric

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

WS	5M	2M	
☐ A	☐ A	☐ A	≥ 10% impervious surfaces
☑ B	☑ B	☑ B	< 10% impervious surfaces
☐ C	☐ C	☐ C	Confined animal operations (or other local, concentrated source of pollutants)
☐ D	☐ D	☐ D	≥ 20% coverage of pasture
☐ E	☐ E	☐ E	≥ 20% coverage of agricultural land (regularly plowed land)
☐ F	☐ F	☐ F	≥ 20% coverage of maintained grass/herb
☐ G	☐ G	☐ G	≥ 20% coverage of clear-cut land
☐ H	☐ H	☐ H	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric

7a. Is assessment area within 50 feet of a tributary or other open water?

☒ Yes ☐ No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
- ☐ A ≥ 50 feet
- ☐ B From 30 to < 50 feet
- ☐ C From 15 to < 30 feet
- ☐ D From 5 to < 15 feet
- ☒ E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

☐ ≤ 15-feet wide ☒ > 15-feet wide ☐ Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

☐ Yes ☒ No

7e. Is tributary or other open water sheltered or exposed?
- ☒ Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- ☐ Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)

Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

WT	WC	
☐ A	☐ A	≥ 100 feet
☐ B	☐ B	From 80 to < 100 feet
☐ C	☐ C	From 50 to < 80 feet
☐ D	☐ D	From 40 to < 50 feet
☒ E	☒ E	From 30 to < 40 feet
☐ F	☐ F	From 15 to < 30 feet
☐ G	☐ G	From 5 to < 15 feet
☐ H	☐ H	< 5 feet

9. Inundation Duration – assessment area condition metric

Answer for assessment area dominant landform.

- ☐ A Evidence of short-duration inundation (< 7 consecutive days)
- ☐ B Evidence of saturation, without evidence of inundation
- ☉ C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric

Consider recent deposition only (no plant growth since deposition).

- ☉ A Sediment deposition is not excessive, but at approximately natural levels.
- ☐ B Sediment deposition is excessive, but not overwhelming the wetland.
- ☐ C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

WT	WC	FW (if applicable)	
☐ A	☐ A	☐ A	≥ 500 acres
☐ B	☐ B	☐ B	From 100 to < 500 acres
☐ C	☐ C	☐ C	From 50 to < 100 acres
☐ D	☐ D	☐ D	From 25 to < 50 acres
☐ E	☐ E	☐ E	From 10 to < 25 acres
☐ F	☐ F	☐ F	From 5 to < 10 acres
☐ G	☐ G	☐ G	From 1 to < 5 acres
☐ H	☐ H	☐ H	From 0.5 to < 1 acre
☉ I	☉ I	☐ I	From 0.1 to < 0.5 acre
☐ J	☐ J	☐ J	From 0.01 to < 0.1 acre
☐ K	☐ K	☉ K	< 0.01 acre or assessment area is clear-cut

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- ☐ A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- ☐ B Pocosin is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. **Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment.** This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

Well	Loosely	
☐ A	☐ A	≥ 500 acres
☐ B	☐ B	From 100 to < 500 acres
☐ C	☐ C	From 50 to < 100 acres
☐ D	☐ D	From 10 to < 50 acres
☐ E	☐ E	< 10 acres
☉ F	☉ F	Wetland type has a poor or no connection to other natural habitats

13b. **Evaluate for marshes only**.

☐ Yes ☐ No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- ☐ A No artificial edge within 150 feet in all directions
- ☐ B No artificial edge within 150 feet in four (4) to seven (7) directions
- ☉ C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- ☐ A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- ☐ B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- ☉ C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- ☐ A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- ☐ B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- ☐ C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

☒ Yes ☐ No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

☐ A ≥ 25% coverage of vegetation
☐ B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

		AA	WT	
Canopy	A	☐	☐	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	B	☐	☐	Canopy present, but opened more than natural gaps
	C	☒	☒	Canopy sparse or absent
Mid-Story	A	☐	☐	Dense mid-story/sapling layer
	B	☐	☐	Moderate density mid-story/sapling layer
	C	☒	☒	Mid-story/sapling layer sparse or absent
Shrub	A	☐	☐	Dense shrub layer
	B	☐	☐	Moderate density shrub layer
	C	☒	☒	Shrub layer sparse or absent
Herb	A	☒	☒	Dense herb layer
	B	☐	☐	Moderate density herb layer
	C	☐	☐	Herb layer sparse or absent

18. Snags – wetland type condition metric

☐ A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
☒ B Not A

19. Diameter Class Distribution – wetland type condition metric

☐ A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
☐ B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
☒ C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric

Include both natural debris and man-placed natural debris.

☐ A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
☒ B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

☐ A ☐ B ☐ C ☐ D

22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

☐ A Overbank and overland flow are not severely altered in the assessment area.
☒ B Overbank flow is severely altered in the assessment area.
☐ C Overland flow is severely altered in the assessment area.
☐ D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name	Foust Creek - Wetland A	Date	6/25/2013
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	Ian Eckardt

Notes on Field Assessment Form (Y/N)	NO
Presence of regulatory considerations (Y/N)	NO
Wetland is intensively managed (Y/N)	YES
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N)	YES
Assessment area is substantially altered by beaver (Y/N)	NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N)	NO
Assessment area is on a coastal island (Y/N)	NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	**LOW**
	Sub-Surface Storage and Retention	Condition	**MEDIUM**
Water Quality	Pathogen Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Particulate Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Soluble Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Physical Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Habitat	Physical Structure	Condition	**LOW**
	Landscape Patch Structure	Condition	**LOW**
	Vegetation Composition	Condition	**LOW**

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	**LOW**
Water Quality	Condition	**LOW**
	Condition/Opportunity	**LOW**
	Opportunity Presence? (Y/N)	**NO**
Habitat	Conditon	**LOW**

Overall Wetland Rating **LOW**

NC WAM WETLAND ASSESSMENT FORM
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name Foust Creek - Wetland B | **Date** 6/25/2013

Wetland Type Bottomland Hardwood Forest | **Assessor Name/Organization** Ian Eckardt

Level III Ecoregion Piedmont | **Nearest Named Water Body** Foust Creek

River Basin Cape Fear | **USGS 8-Digit Catalogue Unit** 03030002

☐ Yes ☒ No **Precipitation within 48 hrs?** | **Latitude/Longitude (deci-degrees)** 35.914736/-79.400928

Evidence of stressors affecting the assessment area (may not be within the assessment area)
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? ☒ Yes ☐ No

Regulatory Considerations (select all that apply to the assessment area)

☐ Anadromous fish
☐ Federally protected species or State endangered or threatened species
☐ NCDWQ riparian buffer rule in effect
☐ Abuts a Primary Nursery Area (PNA)
☐ Publicly owned property
☐ N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
☐ Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
☐ Designated NCNHP reference community
☐ Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

☐ Blackwater
☒ Brownwater
☐ Tidal (if tidal, check one of the following boxes) ☐ Lunar ☐ Wind ☐ Both

Is the assessment area on a coastal island? ☐ Yes ☒ No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? ☐ Yes ☒ No

Does the assessment area experience overbank flooding during normal rainfall conditions? ☐ Yes ☒ No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

GS	VS	
☒ A	☐ A	Not severely altered
☐ B	☒ B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
☐ A	☐ A	Water storage capacity and duration are not altered.
☒ B	☒ B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
☐ C	☐ C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)
Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

	AA	WT	
3a.	☐ A	☐ A	Majority of wetland with depressions able to pond water > 1 foot deep
	☐ B	☐ B	Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
	☐ C	☐ C	Majority of wetland with depressions able to pond water 3 to 6 inches deep
	☒ D	☒ D	Depressions able to pond water < 3 inches deep

3b. ☐ A Evidence that maximum depth of inundation is greater than 2 feet
☐ B Evidence that maximum depth of inundation is between 1 and 2 feet
☒ C Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- ☐ A Sandy soil
- ☒ B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ☐ C Loamy or clayey soils not exhibiting redoximorphic features
- ☐ D Loamy or clayey gleyed soil
- ☐ E Histosol or histic epipedon

4b.
- ☒ A Soil ribbon < 1 inch
- ☐ B Soil ribbon ≥ 1 inch

4c.
- ☒ A No peat or muck presence
- ☐ B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

Surf	Sub	
☐ A	☒ A	Little or no evidence of pollutants or discharges entering the assessment area
☒ B	☐ B	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
☐ C	☐ C	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)

6. Land Use – opportunity metric

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

WS	5M	2M	
☐ A	☐ A	☐ A	≥ 10% impervious surfaces
☑ B	☑ B	☑ B	< 10% impervious surfaces
☐ C	☐ C	☐ C	Confined animal operations (or other local, concentrated source of pollutants)
☐ D	☐ D	☐ D	≥ 20% coverage of pasture
☐ E	☐ E	☐ E	≥ 20% coverage of agricultural land (regularly plowed land)
☐ F	☐ F	☐ F	≥ 20% coverage of maintained grass/herb
☐ G	☐ G	☐ G	≥ 20% coverage of clear-cut land
☐ H	☐ H	☐ H	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric

7a. Is assessment area within 50 feet of a tributary or other open water?

☒ Yes ☐ No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
- ☐ A ≥ 50 feet
- ☐ B From 30 to < 50 feet
- ☐ C From 15 to < 30 feet
- ☐ D From 5 to < 15 feet
- ☒ E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

☐ ≤ 15-feet wide ☒ > 15-feet wide ☐ Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

☐ Yes ☒ No

7e. Is tributary or other open water sheltered or exposed?
- ☒ Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- ☐ Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)

Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

WT	WC	
☐ A	☐ A	≥ 100 feet
☐ B	☐ B	From 80 to < 100 feet
☒ C	☒ C	From 50 to < 80 feet
☐ D	☐ D	From 40 to < 50 feet
☐ E	☐ E	From 30 to < 40 feet
☐ F	☐ F	From 15 to < 30 feet
☐ G	☐ G	From 5 to < 15 feet
☐ H	☐ H	< 5 feet

9. Inundation Duration – assessment area condition metric

Answer for assessment area dominant landform.

- ☐ A Evidence of short-duration inundation (< 7 consecutive days)
- ☐ B Evidence of saturation, without evidence of inundation
- ☉ C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric

Consider recent deposition only (no plant growth since deposition).

- ☉ A Sediment deposition is not excessive, but at approximately natural levels.
- ☐ B Sediment deposition is excessive, but not overwhelming the wetland.
- ☐ C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

WT	WC	FW (if applicable)	
☐ A	☐ A	☐ A	≥ 500 acres
☐ B	☐ B	☐ B	From 100 to < 500 acres
☐ C	☐ C	☐ C	From 50 to < 100 acres
☐ D	☐ D	☐ D	From 25 to < 50 acres
☐ E	☐ E	☐ E	From 10 to < 25 acres
☐ F	☐ F	☐ F	From 5 to < 10 acres
☐ G	☐ G	☐ G	From 1 to < 5 acres
☉ H	☉ H	☐ H	From 0.5 to < 1 acre
☐ I	☐ I	☐ I	From 0.1 to < 0.5 acre
☐ J	☐ J	☐ J	From 0.01 to < 0.1 acre
☐ K	☐ K	☉ K	< 0.01 acre or assessment area is clear-cut

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- ☐ A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- ☐ B Pocosin is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. **Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment.** This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

Well	Loosely	
☐ A	☐ A	≥ 500 acres
☐ B	☐ B	From 100 to < 500 acres
☐ C	☐ C	From 50 to < 100 acres
☐ D	☐ D	From 10 to < 50 acres
☐ E	☐ E	< 10 acres
☉ F	☉ F	Wetland type has a poor or no connection to other natural habitats

13b. **Evaluate for marshes only**.

☐ Yes ☐ No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- ☐ A No artificial edge within 150 feet in all directions
- ☐ B No artificial edge within 150 feet in four (4) to seven (7) directions
- ☉ C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- ☐ A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- ☐ B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- ☉ C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- ☐ A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- ☐ B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- ☐ C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

☒ Yes ☐ No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

☐ A ≥ 25% coverage of vegetation
☐ B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

		AA	WT	
Canopy	A	☐	☐	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	B	☐	☐	Canopy present, but opened more than natural gaps
	C	☒	☒	Canopy sparse or absent
Mid-Story	A	☐	☐	Dense mid-story/sapling layer
	B	☐	☐	Moderate density mid-story/sapling layer
	C	☒	☒	Mid-story/sapling layer sparse or absent
Shrub	A	☐	☐	Dense shrub layer
	B	☐	☐	Moderate density shrub layer
	C	☒	☒	Shrub layer sparse or absent
Herb	A	☒	☒	Dense herb layer
	B	☐	☐	Moderate density herb layer
	C	☐	☐	Herb layer sparse or absent

18. Snags – wetland type condition metric

☐ A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
☒ B Not A

19. Diameter Class Distribution – wetland type condition metric

☐ A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
☐ B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
☒ C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric

Include both natural debris and man-placed natural debris.

☐ A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
☒ B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

☐ A ☐ B ☐ C ☐ D

22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

☐ A Overbank and overland flow are not severely altered in the assessment area.
☒ B Overbank flow is severely altered in the assessment area.
☐ C Overland flow is severely altered in the assessment area.
☐ D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name	Foust Creek - Wetland B	Date	6/25/2013
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	Ian Eckardt

Notes on Field Assessment Form (Y/N)	NO
Presence of regulatory considerations (Y/N)	NO
Wetland is intensively managed (Y/N)	YES
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N)	YES
Assessment area is substantially altered by beaver (Y/N)	NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N)	NO
Assessment area is on a coastal island (Y/N)	NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	**LOW**
	Sub-Surface Storage and Retention	Condition	**MEDIUM**
Water Quality	Pathogen Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Particulate Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Soluble Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Physical Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Habitat	Physical Structure	Condition	**LOW**
	Landscape Patch Structure	Condition	**LOW**
	Vegetation Composition	Condition	**LOW**

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	**LOW**
Water Quality	Condition	**LOW**
	Condition/Opportunity	**LOW**
	Opportunity Presence? (Y/N)	**NO**
Habitat	Conditon	**LOW**

Overall Wetland Rating **LOW**

NC WAM WETLAND ASSESSMENT FORM
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name Foust Creek - Wetland C | **Date** 6/25/2013

Wetland Type Bottomland Hardwood Forest | **Assessor Name/Organization** Ian Eckardt

Level III Ecoregion Piedmont | **Nearest Named Water Body** Foust Creek

River Basin Cape Fear | **USGS 8-Digit Catalogue Unit** 03030002

☐ Yes ☒ No **Precipitation within 48 hrs?** | **Latitude/Longitude (deci-degrees)** 35.917690/-79.402771

Evidence of stressors affecting the assessment area (may not be within the assessment area)
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? ☒ Yes ☐ No

Regulatory Considerations (select all that apply to the assessment area)

☐ Anadromous fish
☐ Federally protected species or State endangered or threatened species
☐ NCDWQ riparian buffer rule in effect
☐ Abuts a Primary Nursery Area (PNA)
☐ Publicly owned property
☐ N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
☐ Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
☐ Designated NCNHP reference community
☐ Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

☐ Blackwater
☒ Brownwater
☐ Tidal (if tidal, check one of the following boxes) ☐ Lunar ☐ Wind ☐ Both

Is the assessment area on a coastal island? ☐ Yes ☒ No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? ☐ Yes ☒ No

Does the assessment area experience overbank flooding during normal rainfall conditions? ☐ Yes ☒ No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

GS	VS	
☒ A	☐ A	Not severely altered
☐ B	☒ B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
☐ A	☐ A	Water storage capacity and duration are not altered.
☒ B	☒ B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
☐ C	☐ C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)
Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

	AA	WT	
3a.	☐ A	☐ A	Majority of wetland with depressions able to pond water > 1 foot deep
	☐ B	☐ B	Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
	☐ C	☐ C	Majority of wetland with depressions able to pond water 3 to 6 inches deep
	☒ D	☒ D	Depressions able to pond water < 3 inches deep

3b. ☐ A Evidence that maximum depth of inundation is greater than 2 feet
☐ B Evidence that maximum depth of inundation is between 1 and 2 feet
☒ C Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- ☐ A Sandy soil
- ☒ B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ☐ C Loamy or clayey soils not exhibiting redoximorphic features
- ☐ D Loamy or clayey gleyed soil
- ☐ E Histosol or histic epipedon

4b.
- ☒ A Soil ribbon < 1 inch
- ☐ B Soil ribbon ≥ 1 inch

4c.
- ☒ A No peat or muck presence
- ☐ B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

Surf	Sub	
☐ A	☒ A	Little or no evidence of pollutants or discharges entering the assessment area
☒ B	☐ B	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
☐ C	☐ C	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)

6. Land Use – opportunity metric

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

WS	5M	2M	
☐ A	☐ A	☐ A	≥ 10% impervious surfaces
☑ B	☑ B	☑ B	< 10% impervious surfaces
☐ C	☐ C	☐ C	Confined animal operations (or other local, concentrated source of pollutants)
☐ D	☐ D	☐ D	≥ 20% coverage of pasture
☐ E	☐ E	☐ E	≥ 20% coverage of agricultural land (regularly plowed land)
☐ F	☐ F	☐ F	≥ 20% coverage of maintained grass/herb
☐ G	☐ G	☐ G	≥ 20% coverage of clear-cut land
☐ H	☐ H	☐ H	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric

7a. Is assessment area within 50 feet of a tributary or other open water?

☒ Yes ☐ No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
- ☐ A ≥ 50 feet
- ☐ B From 30 to < 50 feet
- ☒ C From 15 to < 30 feet
- ☐ D From 5 to < 15 feet
- ☐ E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

☐ ≤ 15-feet wide ☒ > 15-feet wide ☐ Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

☐ Yes ☒ No

7e. Is tributary or other open water sheltered or exposed?
- ☒ Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- ☐ Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)

Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

WT	WC	
☐ A	☐ A	≥ 100 feet
☐ B	☐ B	From 80 to < 100 feet
☐ C	☐ C	From 50 to < 80 feet
☒ D	☒ D	From 40 to < 50 feet
☐ E	☐ E	From 30 to < 40 feet
☐ F	☐ F	From 15 to < 30 feet
☐ G	☐ G	From 5 to < 15 feet
☐ H	☐ H	< 5 feet

9. Inundation Duration – assessment area condition metric

Answer for assessment area dominant landform.

- ☐ A Evidence of short-duration inundation (< 7 consecutive days)
- ☐ B Evidence of saturation, without evidence of inundation
- ☉ C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric

Consider recent deposition only (no plant growth since deposition).

- ☉ A Sediment deposition is not excessive, but at approximately natural levels.
- ☐ B Sediment deposition is excessive, but not overwhelming the wetland.
- ☐ C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

WT	WC	FW (if applicable)	
☐ A	☐ A	☐ A	≥ 500 acres
☐ B	☐ B	☐ B	From 100 to < 500 acres
☐ C	☐ C	☐ C	From 50 to < 100 acres
☐ D	☐ D	☐ D	From 25 to < 50 acres
☐ E	☐ E	☐ E	From 10 to < 25 acres
☐ F	☐ F	☐ F	From 5 to < 10 acres
☐ G	☐ G	☐ G	From 1 to < 5 acres
☉ H	☉ H	☐ H	From 0.5 to < 1 acre
☐ I	☐ I	☐ I	From 0.1 to < 0.5 acre
☐ J	☐ J	☐ J	From 0.01 to < 0.1 acre
☐ K	☐ K	☉ K	< 0.01 acre or assessment area is clear-cut

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- ☐ A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- ☐ B Pocosin is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. **Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment.** This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

Well	Loosely	
☐ A	☐ A	≥ 500 acres
☐ B	☐ B	From 100 to < 500 acres
☐ C	☐ C	From 50 to < 100 acres
☐ D	☐ D	From 10 to < 50 acres
☐ E	☐ E	< 10 acres
☉ F	☉ F	Wetland type has a poor or no connection to other natural habitats

13b. **Evaluate for marshes only**.

☐ Yes ☐ No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- ☐ A No artificial edge within 150 feet in all directions
- ☐ B No artificial edge within 150 feet in four (4) to seven (7) directions
- ☉ C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- ☐ A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- ☐ B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- ☉ C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- ☐ A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- ☐ B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- ☐ C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

☒ Yes ☐ No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

☐ A ≥ 25% coverage of vegetation
☐ B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

		AA	WT	
Canopy	A	☐	☐	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	B	☐	☐	Canopy present, but opened more than natural gaps
	C	☒	☒	Canopy sparse or absent
Mid-Story	A	☐	☐	Dense mid-story/sapling layer
	B	☐	☐	Moderate density mid-story/sapling layer
	C	☒	☒	Mid-story/sapling layer sparse or absent
Shrub	A	☐	☐	Dense shrub layer
	B	☐	☐	Moderate density shrub layer
	C	☒	☒	Shrub layer sparse or absent
Herb	A	☒	☒	Dense herb layer
	B	☐	☐	Moderate density herb layer
	C	☐	☐	Herb layer sparse or absent

18. Snags – wetland type condition metric

☐ A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
☒ B Not A

19. Diameter Class Distribution – wetland type condition metric

☐ A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
☐ B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
☒ C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric

Include both natural debris and man-placed natural debris.

☐ A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
☒ B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

☐ A ☐ B ☐ C ☐ D

22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

☐ A Overbank and overland flow are not severely altered in the assessment area.
☒ B Overbank flow is severely altered in the assessment area.
☐ C Overland flow is severely altered in the assessment area.
☐ D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name	Foust Creek - Wetland C	Date	6/25/2013
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	Ian Eckardt

Notes on Field Assessment Form (Y/N)	NO
Presence of regulatory considerations (Y/N)	NO
Wetland is intensively managed (Y/N)	YES
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N)	YES
Assessment area is substantially altered by beaver (Y/N)	NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N)	NO
Assessment area is on a coastal island (Y/N)	NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	**LOW**
	Sub-Surface Storage and Retention	Condition	**MEDIUM**
Water Quality	Pathogen Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Particulate Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Soluble Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Physical Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Habitat	Physical Structure	Condition	**LOW**
	Landscape Patch Structure	Condition	**LOW**
	Vegetation Composition	Condition	**LOW**

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	**LOW**
Water Quality	Condition	**LOW**
	Condition/Opportunity	**LOW**
	Opportunity Presence? (Y/N)	**NO**
Habitat	Conditon	**LOW**

Overall Wetland Rating **LOW**

NC WAM WETLAND ASSESSMENT FORM
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name Foust Creek - Wetland D | **Date** 6/26/2013

Wetland Type Bottomland Hardwood Forest | **Assessor Name/Organization** Ian Eckardt

Level III Ecoregion Piedmont | **Nearest Named Water Body** Foust Creek

River Basin Cape Fear | **USGS 8-Digit Catalogue Unit** 03030002

☐ Yes ☒ No **Precipitation within 48 hrs?** | **Latitude/Longitude (deci-degrees)** 35.916647/-79.402270

Evidence of stressors affecting the assessment area (may not be within the assessment area)
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? ☒ Yes ☐ No

Regulatory Considerations (select all that apply to the assessment area)

☐ Anadromous fish
☐ Federally protected species or State endangered or threatened species
☐ NCDWQ riparian buffer rule in effect
☐ Abuts a Primary Nursery Area (PNA)
☐ Publicly owned property
☐ N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
☐ Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
☐ Designated NCNHP reference community
☐ Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

☐ Blackwater
☒ Brownwater
☐ Tidal (if tidal, check one of the following boxes) ☐ Lunar ☐ Wind ☐ Both

Is the assessment area on a coastal island? ☐ Yes ☒ No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? ☐ Yes ☒ No

Does the assessment area experience overbank flooding during normal rainfall conditions? ☐ Yes ☒ No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

GS	VS	
☒ A	☐ A	Not severely altered
☐ B	☒ B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
☐ A	☐ A	Water storage capacity and duration are not altered.
☒ B	☒ B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
☐ C	☐ C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)
Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

	AA	WT	
3a.	☐ A	☐ A	Majority of wetland with depressions able to pond water > 1 foot deep
	☐ B	☐ B	Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
	☐ C	☐ C	Majority of wetland with depressions able to pond water 3 to 6 inches deep
	☒ D	☒ D	Depressions able to pond water < 3 inches deep

3b. ☐ A Evidence that maximum depth of inundation is greater than 2 feet
☐ B Evidence that maximum depth of inundation is between 1 and 2 feet
☒ C Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- ☐ A Sandy soil
- ☒ B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ☐ C Loamy or clayey soils not exhibiting redoximorphic features
- ☐ D Loamy or clayey gleyed soil
- ☐ E Histosol or histic epipedon

4b.
- ☒ A Soil ribbon < 1 inch
- ☐ B Soil ribbon ≥ 1 inch

4c.
- ☒ A No peat or muck presence
- ☐ B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

Surf	Sub	
☐ A	☒ A	Little or no evidence of pollutants or discharges entering the assessment area
☒ B	☐ B	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
☐ C	☐ C	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)

6. Land Use – opportunity metric

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

WS	5M	2M	
☐ A	☐ A	☐ A	≥ 10% impervious surfaces
☑ B	☑ B	☑ B	< 10% impervious surfaces
☐ C	☐ C	☐ C	Confined animal operations (or other local, concentrated source of pollutants)
☐ D	☐ D	☐ D	≥ 20% coverage of pasture
☐ E	☐ E	☐ E	≥ 20% coverage of agricultural land (regularly plowed land)
☐ F	☐ F	☐ F	≥ 20% coverage of maintained grass/herb
☐ G	☐ G	☐ G	≥ 20% coverage of clear-cut land
☐ H	☐ H	☐ H	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric

7a. Is assessment area within 50 feet of a tributary or other open water?

☒ Yes ☐ No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
- ☐ A ≥ 50 feet
- ☐ B From 30 to < 50 feet
- ☐ C From 15 to < 30 feet
- ☐ D From 5 to < 15 feet
- ☒ E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

☐ ≤ 15-feet wide ☒ > 15-feet wide ☐ Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

☐ Yes ☒ No

7e. Is tributary or other open water sheltered or exposed?
- ☒ Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- ☐ Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)

Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

WT	WC	
☐ A	☐ A	≥ 100 feet
☐ B	☐ B	From 80 to < 100 feet
☐ C	☐ C	From 50 to < 80 feet
☒ D	☒ D	From 40 to < 50 feet
☐ E	☐ E	From 30 to < 40 feet
☐ F	☐ F	From 15 to < 30 feet
☐ G	☐ G	From 5 to < 15 feet
☐ H	☐ H	< 5 feet

9. Inundation Duration – assessment area condition metric

Answer for assessment area dominant landform.

- ☐ A Evidence of short-duration inundation (< 7 consecutive days)
- ☐ B Evidence of saturation, without evidence of inundation
- ☉ C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric

Consider recent deposition only (no plant growth since deposition).

- ☉ A Sediment deposition is not excessive, but at approximately natural levels.
- ☐ B Sediment deposition is excessive, but not overwhelming the wetland.
- ☐ C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

WT	WC	FW (if applicable)	
☐ A	☐ A	☐ A	≥ 500 acres
☐ B	☐ B	☐ B	From 100 to < 500 acres
☐ C	☐ C	☐ C	From 50 to < 100 acres
☐ D	☐ D	☐ D	From 25 to < 50 acres
☐ E	☐ E	☐ E	From 10 to < 25 acres
☐ F	☐ F	☐ F	From 5 to < 10 acres
☉ G	☉ G	☐ G	From 1 to < 5 acres
☐ H	☐ H	☐ H	From 0.5 to < 1 acre
☐ I	☐ I	☐ I	From 0.1 to < 0.5 acre
☐ J	☐ J	☐ J	From 0.01 to < 0.1 acre
☐ K	☐ K	☉ K	< 0.01 acre or assessment area is clear-cut

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- ☐ A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- ☐ B Pocosin is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. **Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment.** This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

Well	Loosely	
☐ A	☐ A	≥ 500 acres
☐ B	☐ B	From 100 to < 500 acres
☐ C	☐ C	From 50 to < 100 acres
☐ D	☐ D	From 10 to < 50 acres
☐ E	☐ E	< 10 acres
☉ F	☉ F	Wetland type has a poor or no connection to other natural habitats

13b. **Evaluate for marshes only**.

☐ Yes ☐ No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- ☐ A No artificial edge within 150 feet in all directions
- ☐ B No artificial edge within 150 feet in four (4) to seven (7) directions
- ☉ C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- ☐ A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- ☐ B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- ☉ C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- ☐ A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- ☐ B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- ☐ C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

☒ Yes ☐ No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

☐ A ≥ 25% coverage of vegetation
☐ B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

		AA	WT	
Canopy	A	☐	☐	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	B	☐	☐	Canopy present, but opened more than natural gaps
	C	☒	☒	Canopy sparse or absent
Mid-Story	A	☐	☐	Dense mid-story/sapling layer
	B	☐	☐	Moderate density mid-story/sapling layer
	C	☒	☒	Mid-story/sapling layer sparse or absent
Shrub	A	☐	☐	Dense shrub layer
	B	☐	☐	Moderate density shrub layer
	C	☒	☒	Shrub layer sparse or absent
Herb	A	☒	☒	Dense herb layer
	B	☐	☐	Moderate density herb layer
	C	☐	☐	Herb layer sparse or absent

18. Snags – wetland type condition metric

☐ A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
☒ B Not A

19. Diameter Class Distribution – wetland type condition metric

☐ A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
☐ B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
☒ C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric

Include both natural debris and man-placed natural debris.

☐ A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
☒ B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

☐ A ☐ B ☐ C ☐ D

22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

☐ A Overbank and overland flow are not severely altered in the assessment area.
☒ B Overbank flow is severely altered in the assessment area.
☐ C Overland flow is severely altered in the assessment area.
☐ D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name	Foust Creek - Wetland D	Date	6/26/2013
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	Ian Eckardt

Notes on Field Assessment Form (Y/N)	NO
Presence of regulatory considerations (Y/N)	NO
Wetland is intensively managed (Y/N)	YES
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N)	YES
Assessment area is substantially altered by beaver (Y/N)	NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N)	NO
Assessment area is on a coastal island (Y/N)	NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	**LOW**
	Sub-Surface Storage and Retention	Condition	**MEDIUM**
Water Quality	Pathogen Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Particulate Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Soluble Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Physical Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Habitat	Physical Structure	Condition	**LOW**
	Landscape Patch Structure	Condition	**LOW**
	Vegetation Composition	Condition	**LOW**

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	**LOW**
Water Quality	Condition	**LOW**
	Condition/Opportunity	**LOW**
	Opportunity Presence? (Y/N)	**NO**
Habitat	Conditon	**LOW**

Overall Wetland Rating **LOW**

NC WAM WETLAND ASSESSMENT FORM
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name Foust Creek - Wetland E | **Date** 6/26/2013

Wetland Type Bottomland Hardwood Forest | **Assessor Name/Organization** Ian Eckardt

Level III Ecoregion Piedmont | **Nearest Named Water Body** Foust Creek

River Basin Cape Fear | **USGS 8-Digit Catalogue Unit** 03030002

☐ Yes ☒ No **Precipitation within 48 hrs?** | **Latitude/Longitude (deci-degrees)** 35.916077/-79.402501

Evidence of stressors affecting the assessment area (may not be within the assessment area)
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? ☒ Yes ☐ No

Regulatory Considerations (select all that apply to the assessment area)

☐ Anadromous fish
☐ Federally protected species or State endangered or threatened species
☐ NCDWQ riparian buffer rule in effect
☐ Abuts a Primary Nursery Area (PNA)
☐ Publicly owned property
☐ N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
☐ Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
☐ Designated NCNHP reference community
☐ Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

☐ Blackwater
☒ Brownwater
☐ Tidal (if tidal, check one of the following boxes) ☐ Lunar ☐ Wind ☐ Both

Is the assessment area on a coastal island? ☐ Yes ☒ No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? ☐ Yes ☒ No

Does the assessment area experience overbank flooding during normal rainfall conditions? ☐ Yes ☒ No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

GS	VS	
☒ A	☐ A	Not severely altered
☐ B	☒ B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
☐ A	☐ A	Water storage capacity and duration are not altered.
☒ B	☒ B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
☐ C	☐ C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)
Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

	AA	WT	
3a.	☐ A	☐ A	Majority of wetland with depressions able to pond water > 1 foot deep
	☐ B	☐ B	Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
	☒ C	☒ C	Majority of wetland with depressions able to pond water 3 to 6 inches deep
	☐ D	☐ D	Depressions able to pond water < 3 inches deep

3b. ☐ A Evidence that maximum depth of inundation is greater than 2 feet
☐ B Evidence that maximum depth of inundation is between 1 and 2 feet
☒ C Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- ☐ A Sandy soil
- ☒ B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ☐ C Loamy or clayey soils not exhibiting redoximorphic features
- ☐ D Loamy or clayey gleyed soil
- ☐ E Histosol or histic epipedon

4b.
- ☒ A Soil ribbon < 1 inch
- ☐ B Soil ribbon ≥ 1 inch

4c.
- ☒ A No peat or muck presence
- ☐ B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

Surf	Sub	
☐ A	☒ A	Little or no evidence of pollutants or discharges entering the assessment area
☒ B	☐ B	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
☐ C	☐ C	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)

6. Land Use – opportunity metric

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

WS	5M	2M	
☐ A	☐ A	☐ A	≥ 10% impervious surfaces
☑ B	☑ B	☑ B	< 10% impervious surfaces
☐ C	☐ C	☐ C	Confined animal operations (or other local, concentrated source of pollutants)
☐ D	☐ D	☐ D	≥ 20% coverage of pasture
☐ E	☐ E	☐ E	≥ 20% coverage of agricultural land (regularly plowed land)
☐ F	☐ F	☐ F	≥ 20% coverage of maintained grass/herb
☐ G	☐ G	☐ G	≥ 20% coverage of clear-cut land
☐ H	☐ H	☐ H	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric

7a. Is assessment area within 50 feet of a tributary or other open water?

☒ Yes ☐ No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
- ☐ A ≥ 50 feet
- ☐ B From 30 to < 50 feet
- ☐ C From 15 to < 30 feet
- ☐ D From 5 to < 15 feet
- ☒ E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

☐ ≤ 15-feet wide ☒ > 15-feet wide ☐ Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

☐ Yes ☒ No

7e. Is tributary or other open water sheltered or exposed?
- ☒ Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- ☐ Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)

Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

WT	WC	
☐ A	☐ A	≥ 100 feet
☒ B	☒ B	From 80 to < 100 feet
☐ C	☐ C	From 50 to < 80 feet
☐ D	☐ D	From 40 to < 50 feet
☐ E	☐ E	From 30 to < 40 feet
☐ F	☐ F	From 15 to < 30 feet
☐ G	☐ G	From 5 to < 15 feet
☐ H	☐ H	< 5 feet

9. Inundation Duration – assessment area condition metric

Answer for assessment area dominant landform.

- ☐ A Evidence of short-duration inundation (< 7 consecutive days)
- ☐ B Evidence of saturation, without evidence of inundation
- ☉ C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric

Consider recent deposition only (no plant growth since deposition).

- ☉ A Sediment deposition is not excessive, but at approximately natural levels.
- ☐ B Sediment deposition is excessive, but not overwhelming the wetland.
- ☐ C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

WT	WC	FW (if applicable)	
☐ A	☐ A	☐ A	≥ 500 acres
☐ B	☐ B	☐ B	From 100 to < 500 acres
☐ C	☐ C	☐ C	From 50 to < 100 acres
☐ D	☐ D	☐ D	From 25 to < 50 acres
☐ E	☐ E	☐ E	From 10 to < 25 acres
☐ F	☐ F	☐ F	From 5 to < 10 acres
☐ G	☐ G	☐ G	From 1 to < 5 acres
☐ H	☐ H	☐ H	From 0.5 to < 1 acre
☐ I	☐ I	☐ I	From 0.1 to < 0.5 acre
☉ J	☉ J	☐ J	From 0.01 to < 0.1 acre
☐ K	☐ K	☉ K	< 0.01 acre or assessment area is clear-cut

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- ☐ A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- ☐ B Pocosin is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. **Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment.** This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

Well	Loosely	
☐ A	☐ A	≥ 500 acres
☐ B	☐ B	From 100 to < 500 acres
☐ C	☐ C	From 50 to < 100 acres
☐ D	☐ D	From 10 to < 50 acres
☐ E	☐ E	< 10 acres
☉ F	☉ F	Wetland type has a poor or no connection to other natural habitats

13b. **Evaluate for marshes only**.

☐ Yes ☐ No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- ☐ A No artificial edge within 150 feet in all directions
- ☐ B No artificial edge within 150 feet in four (4) to seven (7) directions
- ☉ C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- ☐ A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- ☐ B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- ☉ C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- ☐ A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- ☐ B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- ☐ C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

☒ Yes ☐ No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

☐ A ≥ 25% coverage of vegetation
☐ B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

		AA	WT	
Canopy	A	☐	☐	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	B	☐	☐	Canopy present, but opened more than natural gaps
	C	☒	☒	Canopy sparse or absent
Mid-Story	A	☐	☐	Dense mid-story/sapling layer
	B	☐	☐	Moderate density mid-story/sapling layer
	C	☒	☒	Mid-story/sapling layer sparse or absent
Shrub	A	☐	☐	Dense shrub layer
	B	☐	☐	Moderate density shrub layer
	C	☒	☒	Shrub layer sparse or absent
Herb	A	☒	☒	Dense herb layer
	B	☐	☐	Moderate density herb layer
	C	☐	☐	Herb layer sparse or absent

18. Snags – wetland type condition metric

☐ A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
☒ B Not A

19. Diameter Class Distribution – wetland type condition metric

☐ A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
☐ B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
☒ C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric

Include both natural debris and man-placed natural debris.

☐ A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
☒ B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

☐ A ☐ B ☐ C ☐ D

22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

☐ A Overbank and overland flow are not severely altered in the assessment area.
☒ B Overbank flow is severely altered in the assessment area.
☐ C Overland flow is severely altered in the assessment area.
☐ D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name	Foust Creek - Wetland E	Date	6/26/2013
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	Ian Eckardt

Notes on Field Assessment Form (Y/N)	NO
Presence of regulatory considerations (Y/N)	NO
Wetland is intensively managed (Y/N)	YES
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N)	YES
Assessment area is substantially altered by beaver (Y/N)	NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N)	NO
Assessment area is on a coastal island (Y/N)	NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	**LOW**
	Sub-Surface Storage and Retention	Condition	**MEDIUM**
Water Quality	Pathogen Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Particulate Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Soluble Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Physical Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Habitat	Physical Structure	Condition	**LOW**
	Landscape Patch Structure	Condition	**LOW**
	Vegetation Composition	Condition	**LOW**

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	**LOW**
Water Quality	Condition	**LOW**
	Condition/Opportunity	**LOW**
	Opportunity Presence? (Y/N)	**NO**
Habitat	Conditon	**LOW**

Overall Wetland Rating **LOW**

NC WAM WETLAND ASSESSMENT FORM
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name Foust Creek - Wetland F | **Date** 6/26/2013

Wetland Type Bottomland Hardwood Forest | **Assessor Name/Organization** Ian Eckardt

Level III Ecoregion Piedmont | **Nearest Named Water Body** Foust Creek

River Basin Cape Fear | **USGS 8-Digit Catalogue Unit** 03030002

☐ Yes ☒ No **Precipitation within 48 hrs?** | **Latitude/Longitude (deci-degrees)** 35.918004/-79.403994

Evidence of stressors affecting the assessment area (may not be within the assessment area)
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? ☒ Yes ☐ No

Regulatory Considerations (select all that apply to the assessment area)

☐ Anadromous fish
☐ Federally protected species or State endangered or threatened species
☐ NCDWQ riparian buffer rule in effect
☐ Abuts a Primary Nursery Area (PNA)
☐ Publicly owned property
☐ N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
☐ Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
☐ Designated NCNHP reference community
☐ Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

☐ Blackwater
☒ Brownwater
☐ Tidal (if tidal, check one of the following boxes) ☐ Lunar ☐ Wind ☐ Both

Is the assessment area on a coastal island? ☐ Yes ☒ No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? ☐ Yes ☒ No

Does the assessment area experience overbank flooding during normal rainfall conditions? ☐ Yes ☒ No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

GS	VS	
☒ A	☐ A	Not severely altered
☐ B	☒ B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
☒ A	☒ A	Water storage capacity and duration are not altered.
☐ B	☐ B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
☐ C	☐ C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)
Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

	AA	WT	
3a.	☐ A	☐ A	Majority of wetland with depressions able to pond water > 1 foot deep
	☐ B	☐ B	Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
	☐ C	☐ C	Majority of wetland with depressions able to pond water 3 to 6 inches deep
	☒ D	☒ D	Depressions able to pond water < 3 inches deep

3b. ☐ A Evidence that maximum depth of inundation is greater than 2 feet
☐ B Evidence that maximum depth of inundation is between 1 and 2 feet
☒ C Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- ☐ A Sandy soil
- ☒ B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ☐ C Loamy or clayey soils not exhibiting redoximorphic features
- ☐ D Loamy or clayey gleyed soil
- ☐ E Histosol or histic epipedon

4b.
- ☒ A Soil ribbon < 1 inch
- ☐ B Soil ribbon ≥ 1 inch

4c.
- ☒ A No peat or muck presence
- ☐ B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

Surf	Sub	
☐ A	☒ A	Little or no evidence of pollutants or discharges entering the assessment area
☒ B	☐ B	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
☐ C	☐ C	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)

6. Land Use – opportunity metric

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

WS	5M	2M	
☐ A	☐ A	☐ A	≥ 10% impervious surfaces
☑ B	☑ B	☑ B	< 10% impervious surfaces
☐ C	☐ C	☐ C	Confined animal operations (or other local, concentrated source of pollutants)
☐ D	☐ D	☐ D	≥ 20% coverage of pasture
☐ E	☐ E	☐ E	≥ 20% coverage of agricultural land (regularly plowed land)
☐ F	☐ F	☐ F	≥ 20% coverage of maintained grass/herb
☐ G	☐ G	☐ G	≥ 20% coverage of clear-cut land
☐ H	☐ H	☐ H	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric

7a. Is assessment area within 50 feet of a tributary or other open water?

☒ Yes ☐ No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
- ☒ A ≥ 50 feet
- ☐ B From 30 to < 50 feet
- ☐ C From 15 to < 30 feet
- ☐ D From 5 to < 15 feet
- ☐ E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

☐ ≤ 15-feet wide ☒ > 15-feet wide ☐ Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

☐ Yes ☒ No

7e. Is tributary or other open water sheltered or exposed?
- ☒ Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- ☐ Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)

Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

WT	WC	
☐ A	☐ A	≥ 100 feet
☐ B	☐ B	From 80 to < 100 feet
☒ C	☒ C	From 50 to < 80 feet
☐ D	☐ D	From 40 to < 50 feet
☐ E	☐ E	From 30 to < 40 feet
☐ F	☐ F	From 15 to < 30 feet
☐ G	☐ G	From 5 to < 15 feet
☐ H	☐ H	< 5 feet

9. Inundation Duration – assessment area condition metric

Answer for assessment area dominant landform.

- [x] A Evidence of short-duration inundation (< 7 consecutive days)
- [ ] B Evidence of saturation, without evidence of inundation
- [ ] C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric

Consider recent deposition only (no plant growth since deposition).

- [x] A Sediment deposition is not excessive, but at approximately natural levels.
- [ ] B Sediment deposition is excessive, but not overwhelming the wetland.
- [ ] C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

WT	WC	FW (if applicable)	
[ ] A	[ ] A	[ ] A	≥ 500 acres
[ ] B	[ ] B	[ ] B	From 100 to < 500 acres
[ ] C	[ ] C	[ ] C	From 50 to < 100 acres
[ ] D	[ ] D	[ ] D	From 25 to < 50 acres
[ ] E	[ ] E	[ ] E	From 10 to < 25 acres
[ ] F	[ ] F	[ ] F	From 5 to < 10 acres
[ ] G	[ ] G	[ ] G	From 1 to < 5 acres
[ ] H	[ ] H	[ ] H	From 0.5 to < 1 acre
[x] I	[x] I	[ ] I	From 0.1 to < 0.5 acre
[ ] J	[ ] J	[ ] J	From 0.01 to < 0.1 acre
[ ] K	[ ] K	[x] K	< 0.01 acre or assessment area is clear-cut

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- [ ] A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- [ ] B Pocosin is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. **Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment.** This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

Well	Loosely	
[ ] A	[ ] A	≥ 500 acres
[ ] B	[ ] B	From 100 to < 500 acres
[ ] C	[ ] C	From 50 to < 100 acres
[ ] D	[ ] D	From 10 to < 50 acres
[ ] E	[ ] E	< 10 acres
[x] F	[x] F	Wetland type has a poor or no connection to other natural habitats

13b. **Evaluate for marshes only**.

[ ] Yes [ ] No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- [ ] A No artificial edge within 150 feet in all directions
- [ ] B No artificial edge within 150 feet in four (4) to seven (7) directions
- [x] C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- [ ] A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- [ ] B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- [x] C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- [ ] A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- [ ] B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- [ ] C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

☒ Yes ☐ No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

☐ A ≥ 25% coverage of vegetation
☐ B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

		AA	WT	
Canopy	A	☐	☐	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	B	☐	☐	Canopy present, but opened more than natural gaps
	C	☒	☒	Canopy sparse or absent
Mid-Story	A	☐	☐	Dense mid-story/sapling layer
	B	☐	☐	Moderate density mid-story/sapling layer
	C	☒	☒	Mid-story/sapling layer sparse or absent
Shrub	A	☐	☐	Dense shrub layer
	B	☐	☐	Moderate density shrub layer
	C	☒	☒	Shrub layer sparse or absent
Herb	A	☒	☒	Dense herb layer
	B	☐	☐	Moderate density herb layer
	C	☐	☐	Herb layer sparse or absent

18. Snags – wetland type condition metric

☐ A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
☒ B Not A

19. Diameter Class Distribution – wetland type condition metric

☐ A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
☐ B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
☒ C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric

Include both natural debris and man-placed natural debris.

☐ A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
☒ B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

☐ A ☐ B ☐ C ☐ D

22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

☐ A Overbank and overland flow are not severely altered in the assessment area.
☒ B Overbank flow is severely altered in the assessment area.
☐ C Overland flow is severely altered in the assessment area.
☐ D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name	Foust Creek - Wetland F	Date	6/26/2013
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	Ian Eckardt

Notes on Field Assessment Form (Y/N)	NO
Presence of regulatory considerations (Y/N)	NO
Wetland is intensively managed (Y/N)	YES
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N)	YES
Assessment area is substantially altered by beaver (Y/N)	NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N)	NO
Assessment area is on a coastal island (Y/N)	NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	**LOW**
	Sub-Surface Storage and Retention	Condition	**MEDIUM**
Water Quality	Pathogen Change	Condition	**MEDIUM**
		Condition/Opportunity	**MEDIUM**
		Opportunity Presence? (Y/N)	**NO**
	Particulate Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Soluble Change	Condition	**MEDIUM**
		Condition/Opportunity	**MEDIUM**
		Opportunity Presence? (Y/N)	**NO**
	Physical Change	Condition	**MEDIUM**
		Condition/Opportunity	**MEDIUM**
		Opportunity Presence? (Y/N)	**NO**
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Habitat	Physical Structure	Condition	**LOW**
	Landscape Patch Structure	Condition	**LOW**
	Vegetation Composition	Condition	**LOW**

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	**LOW**
Water Quality	Condition	**MEDIUM**
	Condition/Opportunity	**MEDIUM**
	Opportunity Presence? (Y/N)	**NO**
Habitat	Conditon	**LOW**

Overall Wetland Rating **LOW**

NC WAM WETLAND ASSESSMENT FORM
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name Foust Creek - Wetland G | **Date** 6/26/2013

Wetland Type Bottomland Hardwood Forest | **Assessor Name/Organization** Ian Eckardt

Level III Ecoregion Piedmont | **Nearest Named Water Body** Foust Creek

River Basin Cape Fear | **USGS 8-Digit Catalogue Unit** 03030002

☐ Yes ☒ No **Precipitation within 48 hrs?** | **Latitude/Longitude (deci-degrees)** 35.918549/-79.404197

Evidence of stressors affecting the assessment area (may not be within the assessment area)
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? ☒ Yes ☐ No

Regulatory Considerations (select all that apply to the assessment area)

☐ Anadromous fish
☐ Federally protected species or State endangered or threatened species
☐ NCDWQ riparian buffer rule in effect
☐ Abuts a Primary Nursery Area (PNA)
☐ Publicly owned property
☐ N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
☐ Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
☐ Designated NCNHP reference community
☐ Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

☐ Blackwater
☒ Brownwater
☐ Tidal (if tidal, check one of the following boxes) ☐ Lunar ☐ Wind ☐ Both

Is the assessment area on a coastal island? ☐ Yes ☒ No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? ☐ Yes ☒ No

Does the assessment area experience overbank flooding during normal rainfall conditions? ☐ Yes ☒ No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

GS	VS	
☒ A	☐ A	Not severely altered
☐ B	☒ B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
☒ A	☒ A	Water storage capacity and duration are not altered.
☐ B	☐ B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
☐ C	☐ C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)
Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

	AA	WT	
3a.	☐ A	☐ A	Majority of wetland with depressions able to pond water > 1 foot deep
	☐ B	☐ B	Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
	☐ C	☐ C	Majority of wetland with depressions able to pond water 3 to 6 inches deep
	☒ D	☒ D	Depressions able to pond water < 3 inches deep

3b. ☐ A Evidence that maximum depth of inundation is greater than 2 feet
☐ B Evidence that maximum depth of inundation is between 1 and 2 feet
☒ C Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- ☐ A Sandy soil
- ☒ B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ☐ C Loamy or clayey soils not exhibiting redoximorphic features
- ☐ D Loamy or clayey gleyed soil
- ☐ E Histosol or histic epipedon

4b.
- ☒ A Soil ribbon < 1 inch
- ☐ B Soil ribbon ≥ 1 inch

4c.
- ☒ A No peat or muck presence
- ☐ B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

Surf	Sub	
☐ A	☒ A	Little or no evidence of pollutants or discharges entering the assessment area
☒ B	☐ B	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
☐ C	☐ C	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)

6. Land Use – opportunity metric

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

WS	5M	2M	
☐ A	☐ A	☐ A	≥ 10% impervious surfaces
☑ B	☑ B	☑ B	< 10% impervious surfaces
☐ C	☐ C	☐ C	Confined animal operations (or other local, concentrated source of pollutants)
☐ D	☐ D	☐ D	≥ 20% coverage of pasture
☐ E	☐ E	☐ E	≥ 20% coverage of agricultural land (regularly plowed land)
☐ F	☐ F	☐ F	≥ 20% coverage of maintained grass/herb
☐ G	☐ G	☐ G	≥ 20% coverage of clear-cut land
☐ H	☐ H	☐ H	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric

7a. Is assessment area within 50 feet of a tributary or other open water?

☒ Yes ☐ No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
- ☒ A ≥ 50 feet
- ☐ B From 30 to < 50 feet
- ☐ C From 15 to < 30 feet
- ☐ D From 5 to < 15 feet
- ☐ E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

☐ ≤ 15-feet wide ☒ > 15-feet wide ☐ Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

☐ Yes ☒ No

7e. Is tributary or other open water sheltered or exposed?
- ☒ Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- ☐ Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)

Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

WT	WC	
☐ A	☐ A	≥ 100 feet
☐ B	☐ B	From 80 to < 100 feet
☐ C	☐ C	From 50 to < 80 feet
☐ D	☐ D	From 40 to < 50 feet
☒ E	☒ E	From 30 to < 40 feet
☐ F	☐ F	From 15 to < 30 feet
☐ G	☐ G	From 5 to < 15 feet
☐ H	☐ H	< 5 feet

9. Inundation Duration – assessment area condition metric

Answer for assessment area dominant landform.

- [x] A Evidence of short-duration inundation (< 7 consecutive days)
- [ ] B Evidence of saturation, without evidence of inundation
- [ ] C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric

Consider recent deposition only (no plant growth since deposition).

- [x] A Sediment deposition is not excessive, but at approximately natural levels.
- [ ] B Sediment deposition is excessive, but not overwhelming the wetland.
- [ ] C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

WT	WC	FW (if applicable)	
[ ] A	[ ] A	[ ] A	≥ 500 acres
[ ] B	[ ] B	[ ] B	From 100 to < 500 acres
[ ] C	[ ] C	[ ] C	From 50 to < 100 acres
[ ] D	[ ] D	[ ] D	From 25 to < 50 acres
[ ] E	[ ] E	[ ] E	From 10 to < 25 acres
[ ] F	[ ] F	[ ] F	From 5 to < 10 acres
[ ] G	[ ] G	[ ] G	From 1 to < 5 acres
[ ] H	[ ] H	[ ] H	From 0.5 to < 1 acre
[x] I	[x] I	[ ] I	From 0.1 to < 0.5 acre
[ ] J	[ ] J	[ ] J	From 0.01 to < 0.1 acre
[ ] K	[ ] K	[x] K	< 0.01 acre or assessment area is clear-cut

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- [ ] A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- [ ] B Pocosin is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. **Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment.** This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

Well	Loosely	
[ ] A	[ ] A	≥ 500 acres
[ ] B	[ ] B	From 100 to < 500 acres
[ ] C	[ ] C	From 50 to < 100 acres
[ ] D	[ ] D	From 10 to < 50 acres
[ ] E	[ ] E	< 10 acres
[x] F	[x] F	Wetland type has a poor or no connection to other natural habitats

13b. **Evaluate for marshes only**.

[ ] Yes [ ] No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- [ ] A No artificial edge within 150 feet in all directions
- [ ] B No artificial edge within 150 feet in four (4) to seven (7) directions
- [x] C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- [ ] A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- [ ] B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- [x] C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- [ ] A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- [ ] B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- [ ] C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

☒ Yes ☐ No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

☐ A ≥ 25% coverage of vegetation
☐ B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

		AA	WT	
Canopy	A	☐	☐	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	B	☐	☐	Canopy present, but opened more than natural gaps
	C	☒	☒	Canopy sparse or absent
Mid-Story	A	☐	☐	Dense mid-story/sapling layer
	B	☐	☐	Moderate density mid-story/sapling layer
	C	☒	☒	Mid-story/sapling layer sparse or absent
Shrub	A	☐	☐	Dense shrub layer
	B	☐	☐	Moderate density shrub layer
	C	☒	☒	Shrub layer sparse or absent
Herb	A	☒	☒	Dense herb layer
	B	☐	☐	Moderate density herb layer
	C	☐	☐	Herb layer sparse or absent

18. Snags – wetland type condition metric

☐ A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
☒ B Not A

19. Diameter Class Distribution – wetland type condition metric

☐ A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
☐ B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
☒ C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric

Include both natural debris and man-placed natural debris.

☐ A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
☒ B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

☐ A ☐ B ☐ C ☐ D

22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

☐ A Overbank and overland flow are not severely altered in the assessment area.
☒ B Overbank flow is severely altered in the assessment area.
☐ C Overland flow is severely altered in the assessment area.
☐ D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name	Foust Creek - Wetland G	Date	6/26/2013
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	Ian Eckardt

Notes on Field Assessment Form (Y/N)	NO
Presence of regulatory considerations (Y/N)	NO
Wetland is intensively managed (Y/N)	YES
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N)	YES
Assessment area is substantially altered by beaver (Y/N)	NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N)	NO
Assessment area is on a coastal island (Y/N)	NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	**LOW**
	Sub-Surface Storage and Retention	Condition	**MEDIUM**
Water Quality	Pathogen Change	Condition	**MEDIUM**
		Condition/Opportunity	**MEDIUM**
		Opportunity Presence? (Y/N)	**NO**
	Particulate Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Soluble Change	Condition	**MEDIUM**
		Condition/Opportunity	**MEDIUM**
		Opportunity Presence? (Y/N)	**NO**
	Physical Change	Condition	**MEDIUM**
		Condition/Opportunity	**MEDIUM**
		Opportunity Presence? (Y/N)	**NO**
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Habitat	Physical Structure	Condition	**LOW**
	Landscape Patch Structure	Condition	**LOW**
	Vegetation Composition	Condition	**LOW**

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	**LOW**
Water Quality	Condition	**MEDIUM**
	Condition/Opportunity	**MEDIUM**
	Opportunity Presence? (Y/N)	**NO**
Habitat	Conditon	**LOW**

Overall Wetland Rating **LOW**

NC WAM WETLAND ASSESSMENT FORM
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name Foust Creek - Wetland H | **Date** 6/26/2013

Wetland Type Bottomland Hardwood Forest | **Assessor Name/Organization** Ian Eckardt

Level III Ecoregion Piedmont | **Nearest Named Water Body** Foust Creek

River Basin Cape Fear | **USGS 8-Digit Catalogue Unit** 03030002

☐ Yes ☒ No **Precipitation within 48 hrs?** | **Latitude/Longitude (deci-degrees)** 35.920148/-79.404019

Evidence of stressors affecting the assessment area (may not be within the assessment area)
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? ☒ Yes ☐ No

Regulatory Considerations (select all that apply to the assessment area)

☐ Anadromous fish
☐ Federally protected species or State endangered or threatened species
☐ NCDWQ riparian buffer rule in effect
☐ Abuts a Primary Nursery Area (PNA)
☐ Publicly owned property
☐ N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
☐ Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
☐ Designated NCNHP reference community
☐ Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

☐ Blackwater
☒ Brownwater
☐ Tidal (if tidal, check one of the following boxes) ☐ Lunar ☐ Wind ☐ Both

Is the assessment area on a coastal island? ☐ Yes ☒ No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? ☐ Yes ☒ No

Does the assessment area experience overbank flooding during normal rainfall conditions? ☐ Yes ☒ No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

GS	VS	
☒ A	☐ A	Not severely altered
☐ B	☒ B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
☒ A	☒ A	Water storage capacity and duration are not altered.
☐ B	☐ B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
☐ C	☐ C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)
Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

	AA	WT	
3a.	☐ A	☐ A	Majority of wetland with depressions able to pond water > 1 foot deep
	☐ B	☐ B	Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
	☐ C	☐ C	Majority of wetland with depressions able to pond water 3 to 6 inches deep
	☒ D	☒ D	Depressions able to pond water < 3 inches deep

3b. ☐ A Evidence that maximum depth of inundation is greater than 2 feet
☐ B Evidence that maximum depth of inundation is between 1 and 2 feet
☒ C Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- ☐ A Sandy soil
- ☒ B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ☐ C Loamy or clayey soils not exhibiting redoximorphic features
- ☐ D Loamy or clayey gleyed soil
- ☐ E Histosol or histic epipedon

4b.
- ☒ A Soil ribbon < 1 inch
- ☐ B Soil ribbon ≥ 1 inch

4c.
- ☒ A No peat or muck presence
- ☐ B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

Surf	Sub	
☐ A	☒ A	Little or no evidence of pollutants or discharges entering the assessment area
☒ B	☐ B	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
☐ C	☐ C	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)

6. Land Use – opportunity metric

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

WS	5M	2M	
☐ A	☐ A	☐ A	≥ 10% impervious surfaces
☑ B	☑ B	☑ B	< 10% impervious surfaces
☐ C	☐ C	☐ C	Confined animal operations (or other local, concentrated source of pollutants)
☐ D	☐ D	☐ D	≥ 20% coverage of pasture
☐ E	☐ E	☐ E	≥ 20% coverage of agricultural land (regularly plowed land)
☐ F	☐ F	☐ F	≥ 20% coverage of maintained grass/herb
☐ G	☐ G	☐ G	≥ 20% coverage of clear-cut land
☐ H	☐ H	☐ H	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric

7a. Is assessment area within 50 feet of a tributary or other open water?

☒ Yes ☐ No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
- ☐ A ≥ 50 feet
- ☐ B From 30 to < 50 feet
- ☐ C From 15 to < 30 feet
- ☒ D From 5 to < 15 feet
- ☐ E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

☐ ≤ 15-feet wide ☒ > 15-feet wide ☐ Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

☐ Yes ☒ No

7e. Is tributary or other open water sheltered or exposed?
- ☒ Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- ☐ Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)

Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

WT	WC	
☐ A	☐ A	≥ 100 feet
☐ B	☐ B	From 80 to < 100 feet
☐ C	☐ C	From 50 to < 80 feet
☐ D	☐ D	From 40 to < 50 feet
☐ E	☐ E	From 30 to < 40 feet
☐ F	☐ F	From 15 to < 30 feet
☒ G	☒ G	From 5 to < 15 feet
☐ H	☐ H	< 5 feet

9. Inundation Duration – assessment area condition metric

Answer for assessment area dominant landform.

- [x] A Evidence of short-duration inundation (< 7 consecutive days)
- [ ] B Evidence of saturation, without evidence of inundation
- [ ] C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric

Consider recent deposition only (no plant growth since deposition).

- [x] A Sediment deposition is not excessive, but at approximately natural levels.
- [ ] B Sediment deposition is excessive, but not overwhelming the wetland.
- [ ] C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

WT	WC	FW (if applicable)	
[ ] A	[ ] A	[ ] A	≥ 500 acres
[ ] B	[ ] B	[ ] B	From 100 to < 500 acres
[ ] C	[ ] C	[ ] C	From 50 to < 100 acres
[ ] D	[ ] D	[ ] D	From 25 to < 50 acres
[ ] E	[ ] E	[ ] E	From 10 to < 25 acres
[ ] F	[ ] F	[ ] F	From 5 to < 10 acres
[ ] G	[ ] G	[ ] G	From 1 to < 5 acres
[ ] H	[ ] H	[ ] H	From 0.5 to < 1 acre
[ ] I	[ ] I	[ ] I	From 0.1 to < 0.5 acre
[x] J	[x] J	[ ] J	From 0.01 to < 0.1 acre
[ ] K	[ ] K	[x] K	< 0.01 acre or assessment area is clear-cut

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- [ ] A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- [ ] B Pocosin is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. **Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment.** This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

Well	Loosely	
[ ] A	[ ] A	≥ 500 acres
[ ] B	[ ] B	From 100 to < 500 acres
[ ] C	[ ] C	From 50 to < 100 acres
[ ] D	[ ] D	From 10 to < 50 acres
[ ] E	[ ] E	< 10 acres
[x] F	[x] F	Wetland type has a poor or no connection to other natural habitats

13b. **Evaluate for marshes only**.

[ ] Yes [ ] No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- [ ] A No artificial edge within 150 feet in all directions
- [ ] B No artificial edge within 150 feet in four (4) to seven (7) directions
- [x] C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- [ ] A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- [ ] B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- [x] C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- [ ] A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- [ ] B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- [ ] C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

☒ Yes ☐ No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

☐ A ≥ 25% coverage of vegetation
☐ B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

		AA	WT	
Canopy	A	☐	☐	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	B	☐	☐	Canopy present, but opened more than natural gaps
	C	☒	☒	Canopy sparse or absent
Mid-Story	A	☐	☐	Dense mid-story/sapling layer
	B	☐	☐	Moderate density mid-story/sapling layer
	C	☒	☒	Mid-story/sapling layer sparse or absent
Shrub	A	☐	☐	Dense shrub layer
	B	☐	☐	Moderate density shrub layer
	C	☒	☒	Shrub layer sparse or absent
Herb	A	☒	☒	Dense herb layer
	B	☐	☐	Moderate density herb layer
	C	☐	☐	Herb layer sparse or absent

18. Snags – wetland type condition metric

☐ A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
☒ B Not A

19. Diameter Class Distribution – wetland type condition metric

☐ A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
☐ B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
☒ C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric

Include both natural debris and man-placed natural debris.

☐ A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
☒ B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

☐ A ☐ B ☐ C ☐ D

22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

☐ A Overbank and overland flow are not severely altered in the assessment area.
☒ B Overbank flow is severely altered in the assessment area.
☐ C Overland flow is severely altered in the assessment area.
☐ D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name	Foust Creek - Wetland H	Date	6/26/2013
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	Ian Eckardt

Notes on Field Assessment Form (Y/N)	NO
Presence of regulatory considerations (Y/N)	NO
Wetland is intensively managed (Y/N)	YES
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N)	YES
Assessment area is substantially altered by beaver (Y/N)	NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N)	NO
Assessment area is on a coastal island (Y/N)	NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	**LOW**
	Sub-Surface Storage and Retention	Condition	**MEDIUM**
Water Quality	Pathogen Change	Condition	**MEDIUM**
		Condition/Opportunity	**MEDIUM**
		Opportunity Presence? (Y/N)	**NO**
	Particulate Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Soluble Change	Condition	**MEDIUM**
		Condition/Opportunity	**MEDIUM**
		Opportunity Presence? (Y/N)	**NO**
	Physical Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Habitat	Physical Structure	Condition	**LOW**
	Landscape Patch Structure	Condition	**LOW**
	Vegetation Composition	Condition	**LOW**

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	**LOW**
Water Quality	Condition	**LOW**
	Condition/Opportunity	**LOW**
	Opportunity Presence? (Y/N)	**NO**
Habitat	Conditon	**LOW**

Overall Wetland Rating **LOW**

NC WAM WETLAND ASSESSMENT FORM
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name Foust Creek - Wetland J | **Date** 6/26/2013

Wetland Type Bottomland Hardwood Forest | **Assessor Name/Organization** Ian Eckardt

Level III Ecoregion Piedmont | **Nearest Named Water Body** Foust Creek

River Basin Cape Fear | **USGS 8-Digit Catalogue Unit** 03030002

☐ Yes ☒ No **Precipitation within 48 hrs?** | **Latitude/Longitude (deci-degrees)** 35.920497/-79.403848

Evidence of stressors affecting the assessment area (may not be within the assessment area)
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? ☒ Yes ☐ No

Regulatory Considerations (select all that apply to the assessment area)

☐ Anadromous fish
☐ Federally protected species or State endangered or threatened species
☐ NCDWQ riparian buffer rule in effect
☐ Abuts a Primary Nursery Area (PNA)
☐ Publicly owned property
☐ N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
☐ Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
☐ Designated NCNHP reference community
☐ Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

☐ Blackwater
☒ Brownwater
☐ Tidal (if tidal, check one of the following boxes) ☐ Lunar ☐ Wind ☐ Both

Is the assessment area on a coastal island? ☐ Yes ☒ No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? ☐ Yes ☒ No

Does the assessment area experience overbank flooding during normal rainfall conditions? ☐ Yes ☒ No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

GS	VS	
☒ A	☐ A	Not severely altered
☐ B	☒ B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
☐ A	☒ A	Water storage capacity and duration are not altered.
☒ B	☐ B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
☐ C	☐ C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)
Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

	AA	WT	
3a.	☐ A	☐ A	Majority of wetland with depressions able to pond water > 1 foot deep
	☐ B	☐ B	Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
	☐ C	☐ C	Majority of wetland with depressions able to pond water 3 to 6 inches deep
	☒ D	☒ D	Depressions able to pond water < 3 inches deep

3b. ☐ A Evidence that maximum depth of inundation is greater than 2 feet
☐ B Evidence that maximum depth of inundation is between 1 and 2 feet
☒ C Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- ☐ A Sandy soil
- ☒ B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ☐ C Loamy or clayey soils not exhibiting redoximorphic features
- ☐ D Loamy or clayey gleyed soil
- ☐ E Histosol or histic epipedon

4b.
- ☒ A Soil ribbon < 1 inch
- ☐ B Soil ribbon ≥ 1 inch

4c.
- ☒ A No peat or muck presence
- ☐ B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

Surf	Sub	
☐ A	☒ A	Little or no evidence of pollutants or discharges entering the assessment area
☒ B	☐ B	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
☐ C	☐ C	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)

6. Land Use – opportunity metric

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

WS	5M	2M	
☐ A	☐ A	☐ A	≥ 10% impervious surfaces
☑ B	☑ B	☑ B	< 10% impervious surfaces
☐ C	☐ C	☐ C	Confined animal operations (or other local, concentrated source of pollutants)
☐ D	☐ D	☐ D	≥ 20% coverage of pasture
☐ E	☐ E	☐ E	≥ 20% coverage of agricultural land (regularly plowed land)
☐ F	☐ F	☐ F	≥ 20% coverage of maintained grass/herb
☐ G	☐ G	☐ G	≥ 20% coverage of clear-cut land
☐ H	☐ H	☐ H	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric

7a. Is assessment area within 50 feet of a tributary or other open water?

☒ Yes ☐ No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
- ☒ A ≥ 50 feet
- ☐ B From 30 to < 50 feet
- ☐ C From 15 to < 30 feet
- ☐ D From 5 to < 15 feet
- ☐ E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

☐ ≤ 15-feet wide ☒ > 15-feet wide ☐ Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

☒ Yes ☐ No

7e. Is tributary or other open water sheltered or exposed?
- ☒ Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- ☐ Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)

Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

WT	WC	
☐ A	☐ A	≥ 100 feet
☐ B	☐ B	From 80 to < 100 feet
☒ C	☒ C	From 50 to < 80 feet
☐ D	☐ D	From 40 to < 50 feet
☐ E	☐ E	From 30 to < 40 feet
☐ F	☐ F	From 15 to < 30 feet
☐ G	☐ G	From 5 to < 15 feet
☐ H	☐ H	< 5 feet

9. Inundation Duration – assessment area condition metric

Answer for assessment area dominant landform.

- [x] A Evidence of short-duration inundation (< 7 consecutive days)
- [ ] B Evidence of saturation, without evidence of inundation
- [ ] C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric

Consider recent deposition only (no plant growth since deposition).

- [x] A Sediment deposition is not excessive, but at approximately natural levels.
- [ ] B Sediment deposition is excessive, but not overwhelming the wetland.
- [ ] C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

WT	WC	FW (if applicable)	
[ ] A	[ ] A	[ ] A	≥ 500 acres
[ ] B	[ ] B	[ ] B	From 100 to < 500 acres
[ ] C	[ ] C	[ ] C	From 50 to < 100 acres
[ ] D	[ ] D	[ ] D	From 25 to < 50 acres
[ ] E	[ ] E	[ ] E	From 10 to < 25 acres
[ ] F	[ ] F	[ ] F	From 5 to < 10 acres
[ ] G	[ ] G	[ ] G	From 1 to < 5 acres
[ ] H	[ ] H	[ ] H	From 0.5 to < 1 acre
[ ] I	[ ] I	[ ] I	From 0.1 to < 0.5 acre
[ ] J	[ ] J	[ ] J	From 0.01 to < 0.1 acre
[x] K	[x] K	[x] K	< 0.01 acre or assessment area is clear-cut

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- [ ] A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- [ ] B Pocosin is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. **Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment.** This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

Well	Loosely	
[ ] A	[ ] A	≥ 500 acres
[ ] B	[ ] B	From 100 to < 500 acres
[ ] C	[ ] C	From 50 to < 100 acres
[ ] D	[ ] D	From 10 to < 50 acres
[ ] E	[ ] E	< 10 acres
[x] F	[x] F	Wetland type has a poor or no connection to other natural habitats

13b. **Evaluate for marshes only**.

- [ ] Yes [ ] No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- [ ] A No artificial edge within 150 feet in all directions
- [ ] B No artificial edge within 150 feet in four (4) to seven (7) directions
- [x] C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- [ ] A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- [ ] B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- [x] C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- [ ] A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- [ ] B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- [ ] C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

☒ Yes ☐ No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

☐ A ≥ 25% coverage of vegetation
☐ B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

		AA	WT	
Canopy	A	☐	☐	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	B	☐	☐	Canopy present, but opened more than natural gaps
	C	☒	☒	Canopy sparse or absent
Mid-Story	A	☐	☐	Dense mid-story/sapling layer
	B	☐	☐	Moderate density mid-story/sapling layer
	C	☒	☒	Mid-story/sapling layer sparse or absent
Shrub	A	☐	☐	Dense shrub layer
	B	☐	☐	Moderate density shrub layer
	C	☒	☒	Shrub layer sparse or absent
Herb	A	☒	☒	Dense herb layer
	B	☐	☐	Moderate density herb layer
	C	☐	☐	Herb layer sparse or absent

18. Snags – wetland type condition metric

☐ A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
☒ B Not A

19. Diameter Class Distribution – wetland type condition metric

☐ A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
☐ B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
☒ C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric

Include both natural debris and man-placed natural debris.

☐ A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
☒ B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

☐ A ☐ B ☐ C ☐ D

22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

☐ A Overbank and overland flow are not severely altered in the assessment area.
☒ B Overbank flow is severely altered in the assessment area.
☐ C Overland flow is severely altered in the assessment area.
☐ D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name	Foust Creek - Wetland J	Date	6/26/2013
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	Ian Eckardt

Notes on Field Assessment Form (Y/N)	NO
Presence of regulatory considerations (Y/N)	NO
Wetland is intensively managed (Y/N)	YES
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N)	YES
Assessment area is substantially altered by beaver (Y/N)	NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N)	NO
Assessment area is on a coastal island (Y/N)	NO

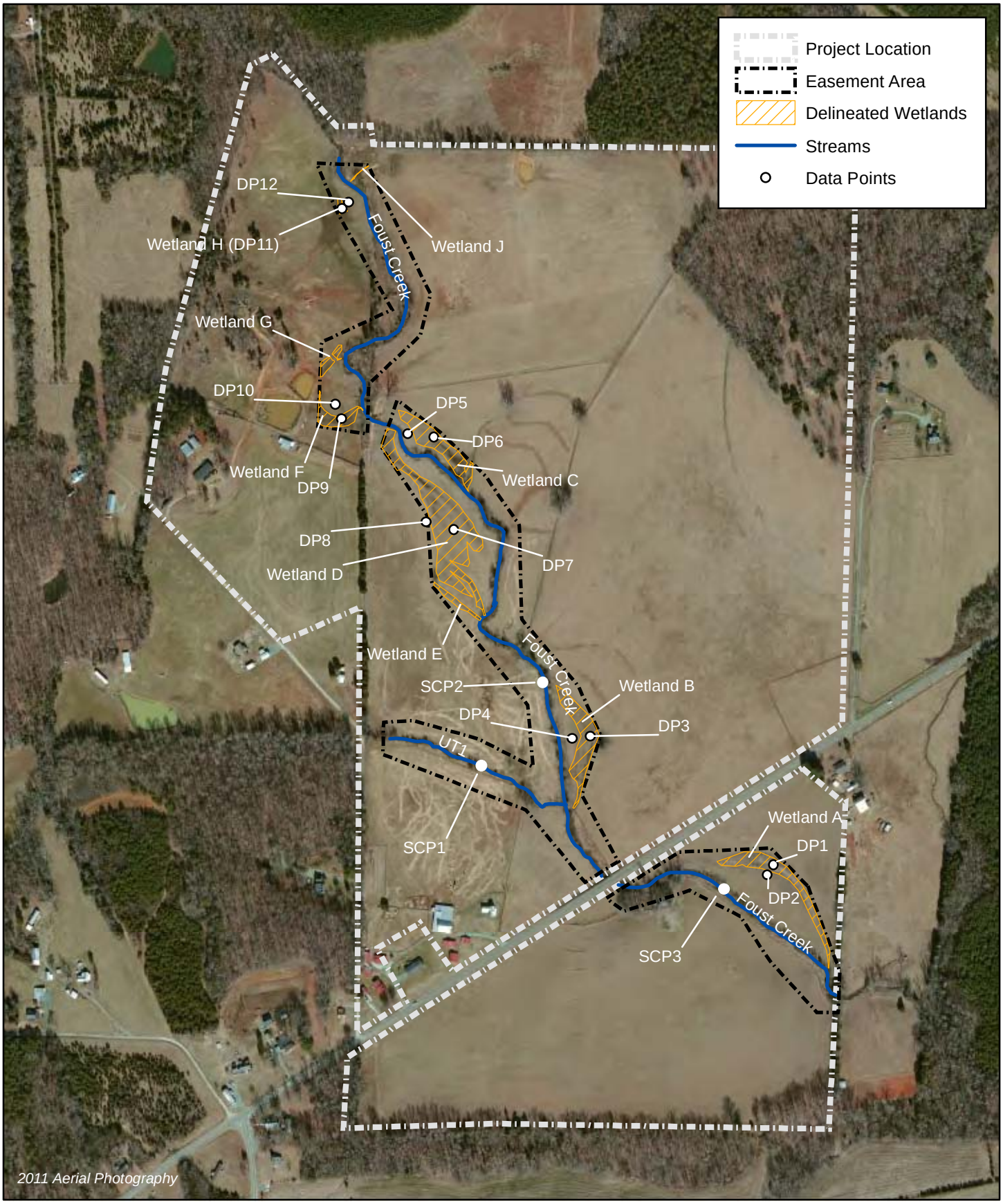
Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	**LOW**
	Sub-Surface Storage and Retention	Condition	**MEDIUM**
Water Quality	Pathogen Change	Condition	**MEDIUM**
		Condition/Opportunity	**MEDIUM**
		Opportunity Presence? (Y/N)	**NO**
	Particulate Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence? (Y/N)	**NO**
	Soluble Change	Condition	**MEDIUM**
		Condition/Opportunity	**MEDIUM**
		Opportunity Presence? (Y/N)	**NO**
	Physical Change	Condition	**MEDIUM**
		Condition/Opportunity	**MEDIUM**
		Opportunity Presence? (Y/N)	**NO**
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Habitat	Physical Structure	Condition	**LOW**
	Landscape Patch Structure	Condition	**LOW**
	Vegetation Composition	Condition	**LOW**

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	**LOW**
Water Quality	Condition	**MEDIUM**
	Condition/Opportunity	**MEDIUM**
	Opportunity Presence? (Y/N)	**NO**
Habitat	Conditon	**LOW**

Overall Wetland Rating **LOW**



WILDLANDS ENGINEERING

0 250 500 Feet

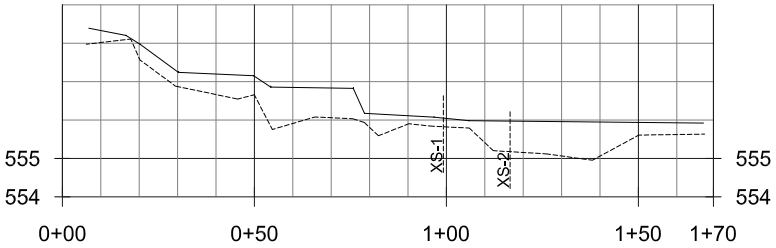
N

Wetland Data Form Location Map
Foust Creek Mitigation Site
Mitigation Plan
EEP #95715

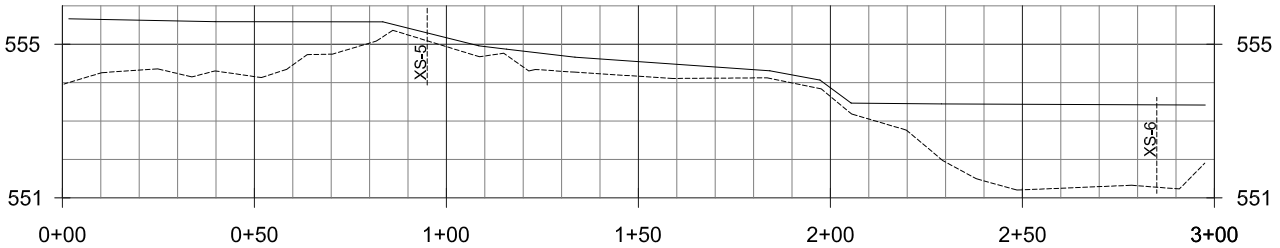
Alamance County, NC

Appendix 6 Existing Morphologic Survey Data

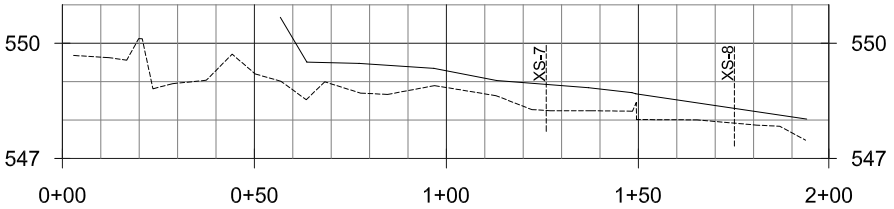
PROFILE: UT 1 TO FOUST CREEK



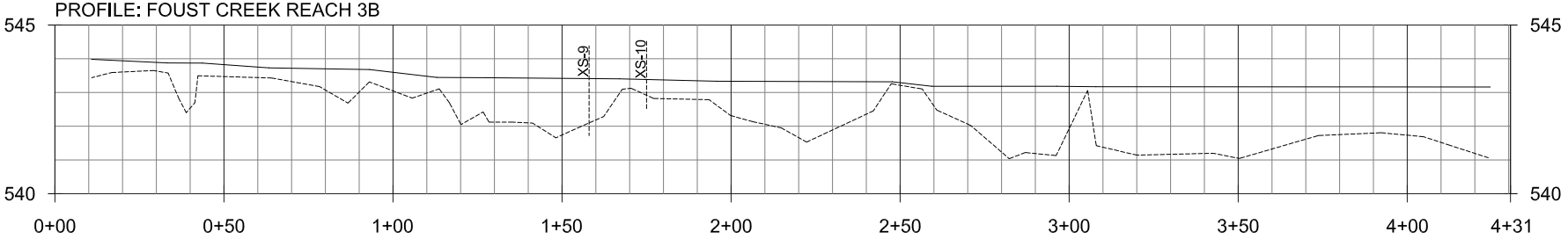
PROFILE: FOUST CREEK REACH 2



PROFILE: FOUST CREEK REACH 3A



PROFILE: FOUST CREEK REACH 3B



---------- EXISTING STREAM BED PROFILE

——— EXISTING WATER SURFACE PROFILE

UT1 REACHWIDE PEBBLE COUNT FOR CLASSIFICATION

Feature Percent of Reach

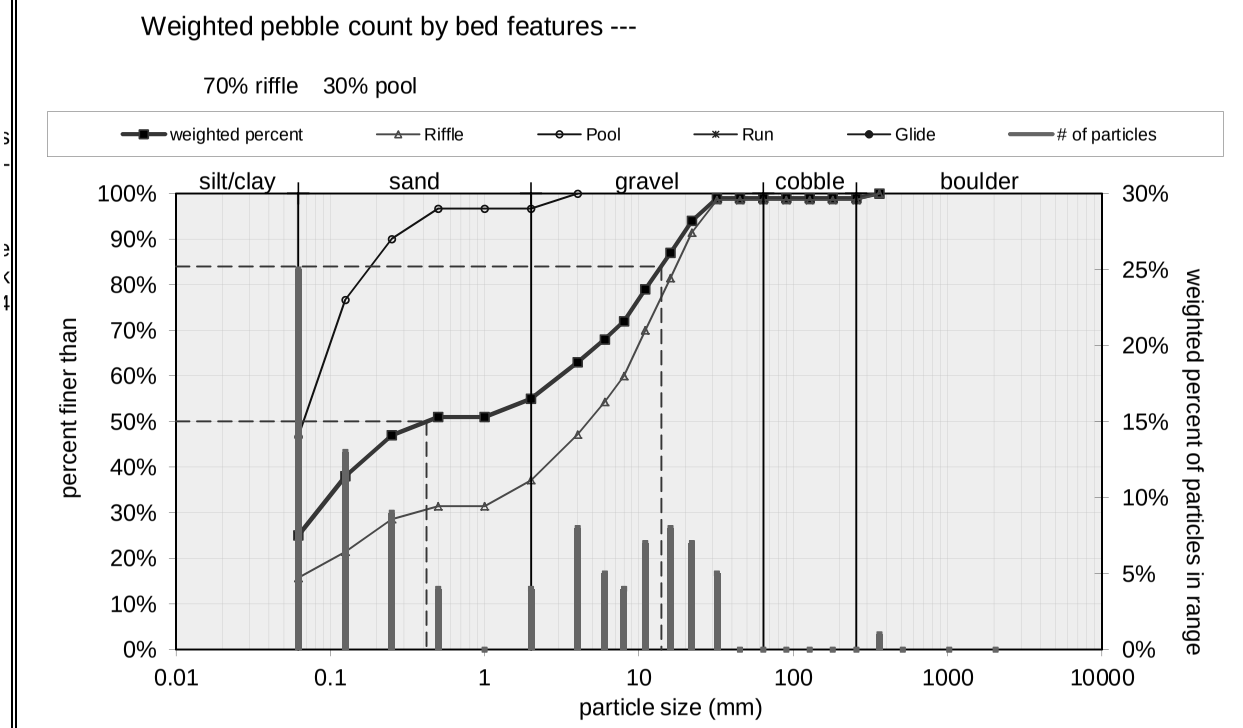
Riffle, Pool, Run, Glide

Riffle	**70**	%	Run		%
Pool	**30**	%	Glide		%

Weighted pebble count by bed features

Material	Size Range (mm)		weighted
silt/clay	0	- 0.062	25.0
very fine sand	0.062	- 0.125	13.0
fine sand	0.125	- 0.25	9.0
medium sand	0.25	- 0.5	4.0
coarse sand	0.5	- 1	0.0
very coarse sand	1	- 2	4.0
very fine gravel	2	- 4	8.0
fine gravel	4	- 6	5.0
fine gravel	6	- 8	4.0
medium gravel	8	- 11	7.0
medium gravel	11	- 16	8.0
coarse gravel	16	- 22	7.0
coarse gravel	22	- 32	5.0
very coarse gravel	32	- 45	0.0
very coarse gravel	45	- 64	0.0
small cobble	64	- 90	0.0
medium cobble	90	- 128	0.0
large cobble	128	- 180	0.0
very large cobble	180	- 256	0.0
small boulder	256	- 362	1.0
small boulder	362	- 512	0.0
medium boulder	512	- 1024	0.0
large boulder	1024	- 2048	0.0
very large boulder	2048	- 4096	0.0
total particle weighted count:			100
bedrock ----------			0.0
clay hardpan ----------			0.0
detritus/wood ----------			0.0
artificial ----------			0.0
total weighted count:			100.0

Note:

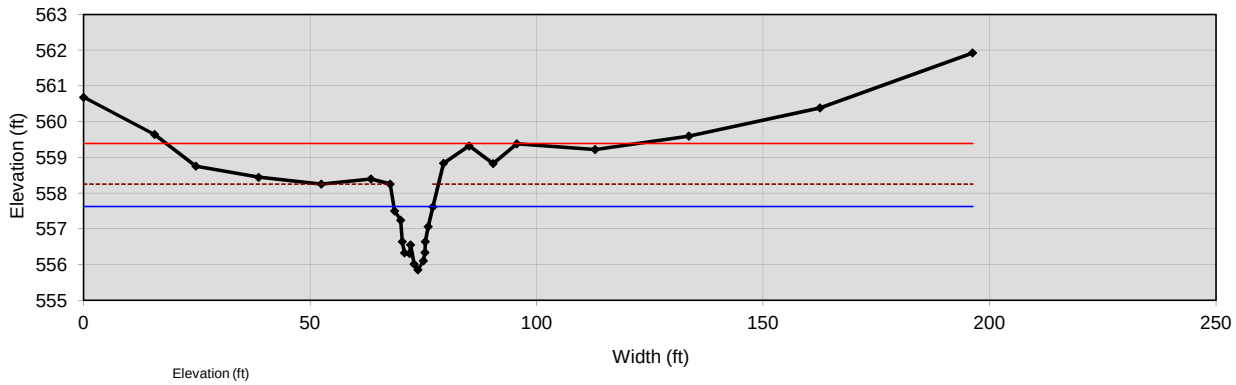


Size (mm)	
D16	0.062
D35	0.11
D50	0.42
D65	4.7
D84	14
D95	24

Size Distribution	
mean	0.9
dispersion	20.1
skewness	0.23

Type	
silt/clay	25%
sand	30%
gravel	44%
cobble	0%
boulder	1%

Cross Section 1 UT1 RIFFLE



Elevation (ft)

Bankfull Dimensions		Flood Dimensions		Materials	
8.7	x-section area (ft.sq.)	104.3	W flood prone area (ft)	6.6	D50 Riffle (mm)
8.6	width (ft)	12.2	entrenchment ratio	13	D84 Riffle (mm)
1.0	mean depth (ft)	2.4	low bank height (ft)	21	threshold grain size (mm):
1.8	max depth (ft)	1.4	low bank height ratio		
10.0	wetted parimeter (ft)				
0.9	hyd radi (ft)				
8.5	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
3.7	velocity (ft/s)	0.033	Manning's roughness	0.78	channel slope (%)
31.9	discharge rate (cfs)	0.13	D'Arcy-Weisbach fric.	0.42	shear stress (lb/sq.ft.)
0.70	Froude number	11.0	resistance factor u/u*	0.47	shear velocity (ft/s)
		23.7	relative roughness	1.81	unit strm power (lb/ft/s)

Cross Section

reference ID: 1
longitudinal station: 1+00 ---
alignment: straight line
feature:

Bankfull Stage

elevation: 557.62 ---

Low Bank Height

elevation: 558.25

Flood Prone Area

width fpa: 104.3

Channel Slope

percent slope: 0.78 ---

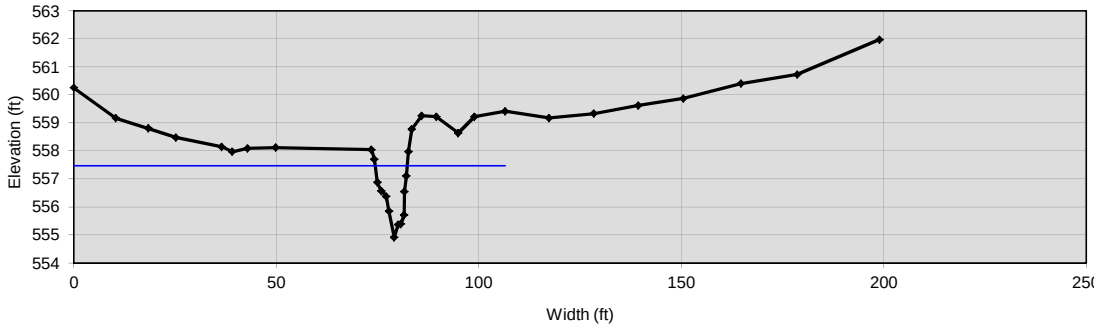
Flow Resistance

Manning's "n": 0.0325 0.023
D'Arcy - Weisbach "f": 0.07

Note:

easting (ft)	northing (ft)	Distance (ft)	Elevation (ft)	Omit Rkf	Notes
		0	560.684		
		15.66	559.642		
		24.78	558.75		
		38.6	558.444		
		52.47	558.25		
		63.41	558.394		
		67.68	558.255		
		68.67	557.501		
		69.97	557.24		
		70.37	556.639		
		70.85	556.326		
		71.97	556.308		
		72.19	556.547		
		72.97	556.009		
		73.81	555.848		
		75.02	556.103		
		75.39	556.333		
		75.43	556.638		
		76.03	557.061		
		77.09	557.62		
		79.48	558.83		
		85.13	559.322		
		90.39	558.824		
		95.62	559.383		
		112.97	559.219		
		133.67	559.593		
		162.58	560.384		
		196.32	561.924		

Cross Section 2 UT1 POOL



Bankfull Dimensions		Flood Dimensions		Materials	
11.4	x-section area (ft.sq.)	---	W flood prone area (ft)	6.6	D50 Riffle (mm)
7.9	width (ft)	---	entrenchment ratio	13	D84 Riffle (mm)
1.4	mean depth (ft)	---	low bank height (ft)	---	threshold grain size (mm):
2.6	max depth (ft)	---	low bank height ratio		
10.1	wetted parimeter (ft)				
1.1	hyd radi (ft)				
5.5	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
---	velocity (ft/s)	0.023	Manning's roughness	---	channel slope (%)
---	discharge rate (cfs)	0.06	D'Arcy-Weisbach fric.	---	shear stress (lb/sq.ft.)
---	Froude number	11.7	resistance factor u/u*	---	shear velocity (ft/s)
		33.7	relative roughness	---	unit strm power (lb/ft/s)

Cross Section

reference ID: 2
longitudinal station: 1+17 ---
alignment feature: straight line

Bankfull Stage

elevation: 557.47 ---

Low Bank Height

elevation:

Flood Prone Area

width fpa: ---

Channel Slope

percent slope: ---

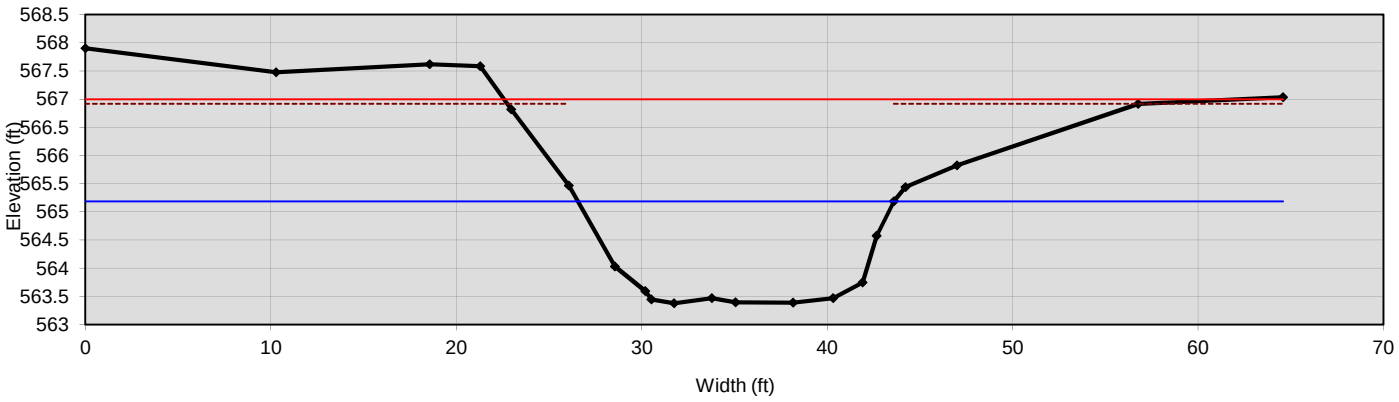
Flow Resistance

Manning's "n": ---
D'Arcy - Weisbach "f": 0.06

Note:

easting (ft)	northing (ft)	Distance (ft)	Elevation (ft)	Omit Bkf	Notes
		0	560.252		
		10.39	559.168		
		18.42	558.804		
		25.25	558.478		
		36.52	558.145		
		39.16	557.969		
		42.97	558.092		
		49.86	558.117		
		73.53	558.042		
		74.22	557.699		
		75	556.872		
		75.99	556.566		
		77.18	556.376		
		77.84	555.853		
		79.14	554.91		
		80.13	555.371		
		80.82	555.393		
		81.57	555.713		
		81.68	556.55		
		82.14	557.106		
		82.66	557.969		
		83.46	558.773		
		85.92	559.255		
		89.53	559.216		
		94.96	558.634		
		98.95	559.221		
		106.54	559.412		
		117.4	559.171		
		128.41	559.33		
		139.38	559.622		
		150.53	559.868		
		164.74	560.401		
		178.66	560.729		
		198.96	561.975		

Cross Section 3 FOUST REACH 1 RIFFLE



Bankfull Dimensions		Flood Dimensions		Materials	
24.9	x-section area (ft.sq.)	39.5	W flood prone area (ft)		D50 Riffle (mm)
17.0	width (ft)	2.3	entrenchment ratio		D84 Riffle (mm)
1.5	mean depth (ft)	3.5	low bank height (ft)	19	threshold grain size (mm):
1.8	max depth (ft)	2.0	low bank height ratio		
18.0	wetted parimeter (ft)				
1.4	hyd radi (ft)				
11.7	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
3.8	velocity (ft/s)	0.033	Manning's roughness	0.45	channel slope (%)
94.8	discharge rate (cfs)	0.11	D'Arcy-Weisbach fric.	0.39	shear stress (lb/sq.ft.)
0.57	Froude number	---	resistance factor u/u*	0.45	shear velocity (ft/s)
		---	relative roughness	1.56	unit strm power (lb/ft/s)

Cross Section

reference ID	3	
longitudinal station	110+12	---
alignment	straight line	
feature		

Bankfull Stage

elevation	565.186	---

Low Bank Height

elevation	566.915	

Flood Prone Area

width fpa		39.5

Channel Slope

percent slope	0.45	---

Flow Resistance

Manning's "n"	0.0325	---
D'Arcy - Weisbach "f"		---

easting (ft)	northing (ft)	Distance (ft)	Elevation (ft)	Omit Rkf	Notes
		0	567.902		
		10.29	567.477		
		18.57	567.618		
		21.3	567.582		
		22.97	566.819		
		26.08	565.464		
		28.56	564.032		
		30.2	563.593		
		30.53	563.448		
		31.75	563.376		
		33.8	563.47		
		35.07	563.394		
		38.18	563.391		
		40.33	563.471		
		41.92	563.747		
		42.68	564.577		
		43.61	565.186		
		44.23	565.439		
		47.02	565.822		
		56.78	566.915		
		64.59	567.035		

REACH 2 REACHWIDE PEBBLE COUNT FOR CLASSIFICATION

Feature Percent of Reach

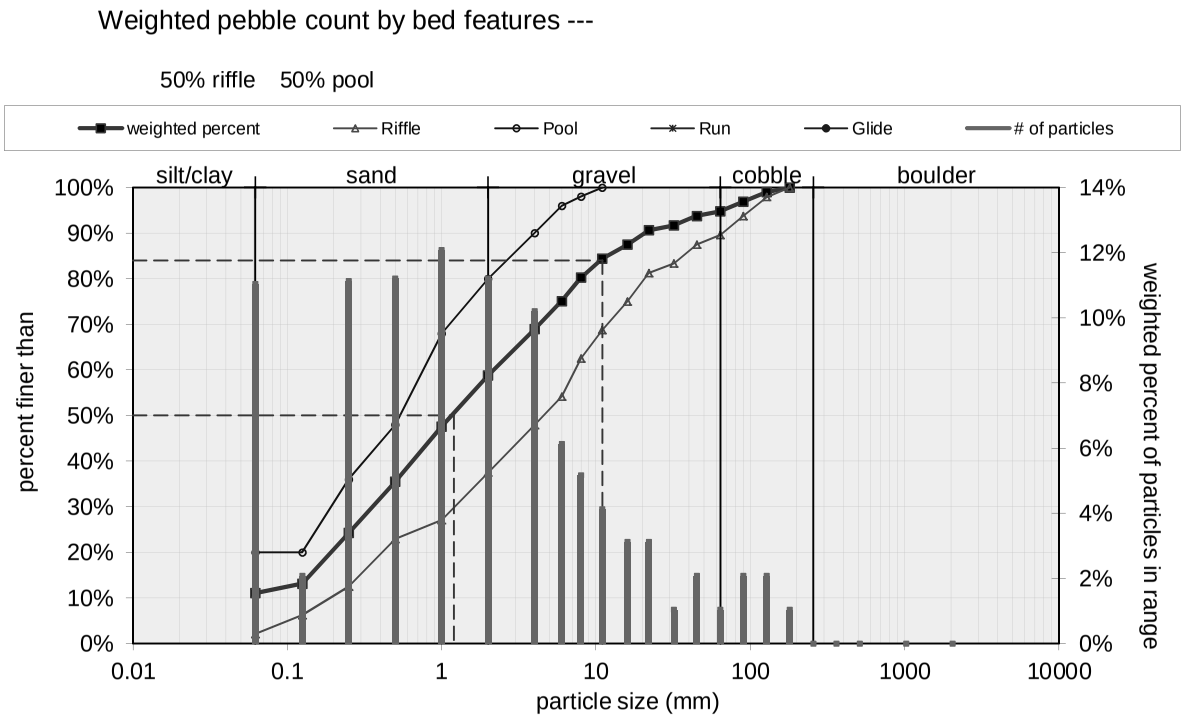
Riffle, Pool, Run, Glide

Riffle	**50**	%	Run		%
Pool	**50**	%	Glide		%

Weighted pebble count by bed features

Material	Size Range (mm)	weighted
silt/clay	0 - 0.062	11.0
very fine sand	0.062 - 0.125	2.1
fine sand	0.125 - 0.25	11.1
medium sand	0.25 - 0.5	11.2
coarse sand	0.5 - 1	12.1
very coarse sand	1 - 2	11.2
very fine gravel	2 - 4	10.2
fine gravel	4 - 6	6.1
fine gravel	6 - 8	5.2
medium gravel	8 - 11	4.1
medium gravel	11 - 16	3.1
coarse gravel	16 - 22	3.1
coarse gravel	22 - 32	1.0
very coarse gravel	32 - 45	2.1
very coarse gravel	45 - 64	1.0
small cobble	64 - 90	2.1
medium cobble	90 - 128	2.1
large cobble	128 - 180	1.0
very large cobble	180 - 256	0.0
small boulder	256 - 362	0.0
small boulder	362 - 512	0.0
medium boulder	512 - 1024	0.0
large boulder	1024 - 2048	0.0
very large boulder	2048 - 4096	0.0
total particle weighted count:		100
bedrock ----------		2.0
clay hardpan ----------		0.0
detritus/wood ----------		0.0
artificial ----------		0.0
total weighted count:		102.0

Note:

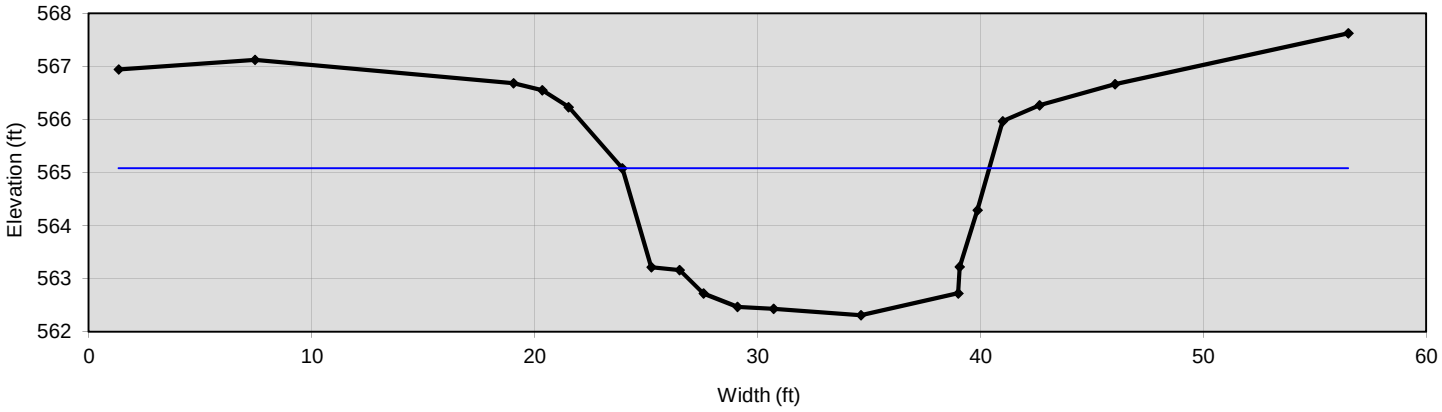


Size (mm)	
D16	0.15
D35	0.49
D50	1.2
D65	3.1
D84	11
D95	66

Size Distribution	
mean	1.3
dispersion	8.6
skewness	0.02

Type			
silt/clay	11%	bedrock	2%
sand	47%		
gravel	35%		
cobble	5%		
boulder	0%		

Cross Section 4 FOUST REACH 1 POOL



Bankfull Dimensions

37.1	x-section area (ft.sq.)
16.5	width (ft)
2.3	mean depth (ft)
2.8	max depth (ft)
19.0	wetted parimeter (ft)
2.0	hyd radi (ft)
7.3	width-depth ratio

Flood Dimensions

---	W flood prone area (ft)
---	entrenchment ratio
---	low bank height (ft)
---	low bank height ratio

Materials

	D50 Riffle (mm)
	D84 Riffle (mm)
27	threshold grain size (mm):

Bankfull Flow

4.8	velocity (ft/s)
178.7	discharge rate (cfs)
0.61	Froude number

Flow Resistance

0.033	Manning's roughness
0.10	D'Arcy-Weisbach fric.
---	resistance factor u/u*
---	relative roughness

Forces & Power

0.45	channel slope (%)
0.55	shear stress (lb/sq.ft.)
0.53	shear velocity (ft/s)
3	unit strm power (lb/ft/s)

Cross Section

reference ID: 4
longitudinal station: 110+43 ---
alignment feature: straight line

Bankfull Stage

elevation: 565.079 ---

Low Bank Height

elevation:

Flood Prone Area

width fpa: ---

Channel Slope

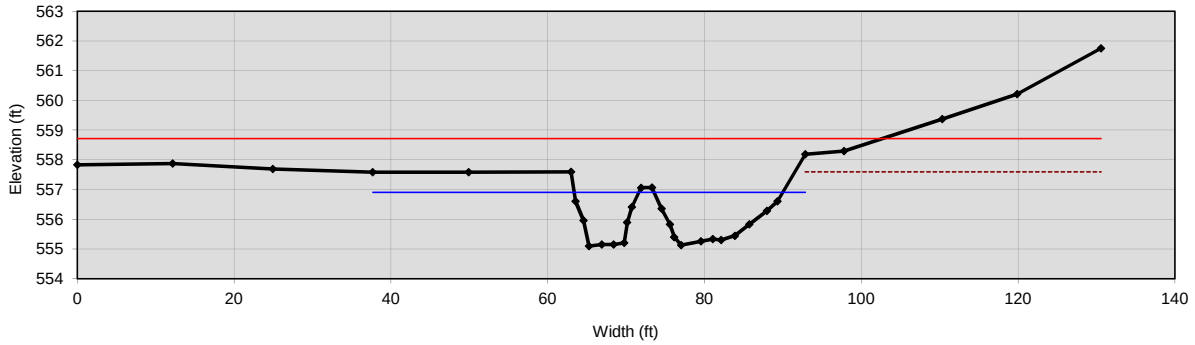
percent slope: 0.45 ---

Flow Resistance

Manning's "n": 0.0325 ---

easting (ft)	northing (ft)	Distance (ft)	Elevation (ft)	Omit Pt?	Notes
		1.34	566.939		
		7.46	567.122		
		19.06	566.681		
		20.35	566.55		
		21.53	566.233		
		23.94	565.079		
		25.24	563.215		
		26.51	563.162		
		27.58	562.719		
		29.11	562.47		
		30.73	562.433		
		34.64	562.309		
		39.01	562.724		
		39.07	563.22		
		39.87	564.289		
		41	565.963		
		42.66	566.266		
		46.04	566.667		
		56.5	567.624		

Cross Section 5 FOUST REACH 2 RIFFLE



Bankfull Dimensions

30.0	x-section area (ft.sq.)
24.7	width (ft)
1.2	mean depth (ft)
1.8	max depth (ft)
26.8	wetted parimeter (ft)
1.1	hyd radi (ft)
20.3	width-depth ratio

Flood Dimensions

180.0	W flood prone area (ft)
7.3	entrenchment ratio
2.5	low bank height (ft)
1.4	low bank height ratio

Materials

66	D50 Riffle (mm)
120	D84 Riffle (mm)
26	threshold grain size (mm):

Bankfull Flow

3.5	velocity (ft/s)
105.0	discharge rate (cfs)
0.58	Froude number

Flow Resistance

0.040	Manning's roughness
0.18	D'Arcy-Weisbach fric.
5.9	resistance factor u/u*
3.1	relative roughness

Forces & Power

0.76	channel slope (%)
0.53	shear stress (lb/sq.ft.)
0.52	shear velocity (ft/s)
2	unit strm power (lb/ft/s)

Cross Section

reference ID	5	
longitudinal station	127+39	---
alignment	straight line	
feature		

Bankfull Stage

elevation	556.9	---

Low Bank Height

elevation	557.59	

Flood Prone Area

width fpa	250	102.6

Channel Slope

percent slope	0.76	---

Flow Resistance

Manning's "n"	0.04	0.046
D'Arcy - Weisbach "f"		0.23

Note:

easting (ft)	northing (ft)	Distance (ft)	Elevation (ft)	Omit Bkf	Notes
		0	557.824		
		12.15	557.868		
		24.94	557.693		
		37.7	557.583		
		49.91	557.576		
		62.97	557.591		
		63.57	556.599		
		64.59	555.956		
		65.26	555.092		
		66.92	555.15		
		68.4	555.151		
		69.76	555.206		
		70.15	555.887		
		70.75	556.404		
		71.94	557.059		
		73.3	557.064		
		74.53	556.352		
		75.6	555.83		
		76.15	555.395		
		77.02	555.13		
		79.58	555.252		
		81.07	555.327		
		82.14	555.294		
		83.87	555.444		
		85.72	555.828		
		87.96	556.281		
		89.31	556.599		
		92.85	558.18		
		97.8	558.295		
		110.35	559.364		
		119.88	560.203		
		130.57	561.75		

REACH 3A REACHWIDE PEBBLE COUNT FOR CLASSIFICATION

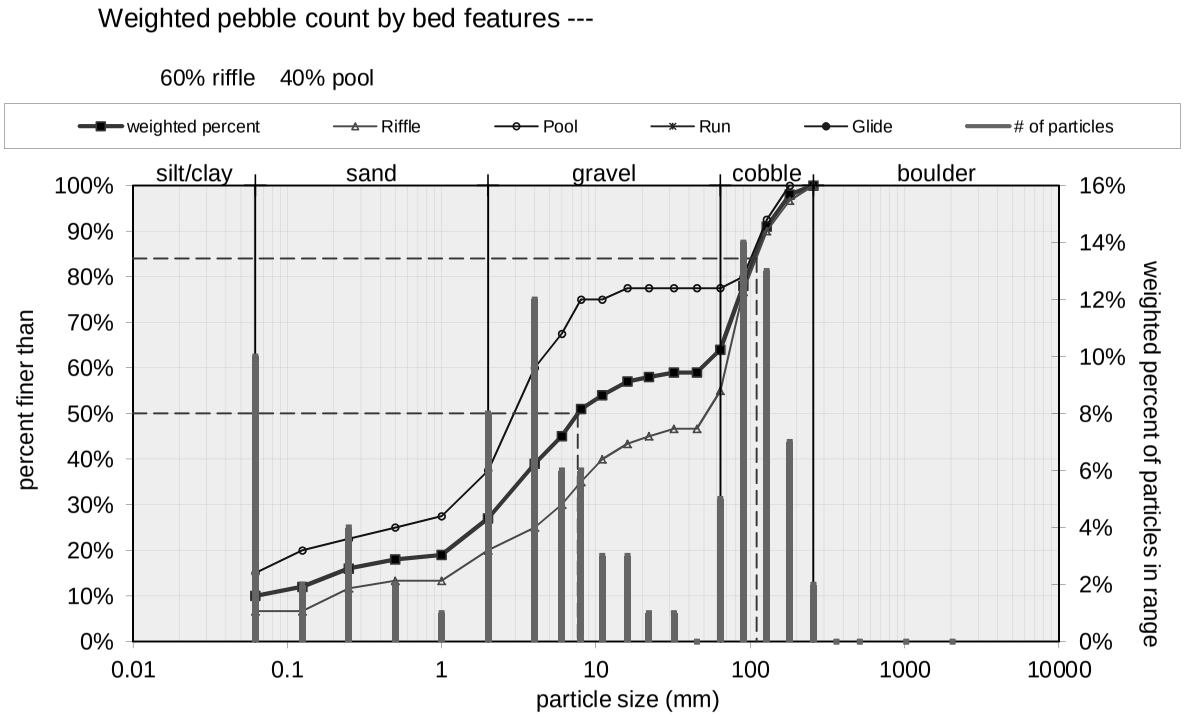
Feature Percent of Reach

Riffle, Pool, Run, Glide	Riffle	**60**	%	Run	%
	Pool	**40**	%	Glide	%

Weighted pebble count by bed features

Material	Size Range (mm)	weighted
silt/clay	0 - 0.062	10.0
very fine sand	0.062 - 0.125	2.0
fine sand	0.125 - 0.25	4.0
medium sand	0.25 - 0.5	2.0
coarse sand	0.5 - 1	1.0
very coarse sand	1 - 2	8.0
very fine gravel	2 - 4	12.0
fine gravel	4 - 6	6.0
fine gravel	6 - 8	6.0
medium gravel	8 - 11	3.0
medium gravel	11 - 16	3.0
coarse gravel	16 - 22	1.0
coarse gravel	22 - 32	1.0
very coarse gravel	32 - 45	0.0
very coarse gravel	45 - 64	5.0
small cobble	64 - 90	14.0
medium cobble	90 - 128	13.0
large cobble	128 - 180	7.0
very large cobble	180 - 256	2.0
small boulder	256 - 362	0.0
small boulder	362 - 512	0.0
medium boulder	512 - 1024	0.0
large boulder	1024 - 2048	0.0
very large boulder	2048 - 4096	0.0
total particle weighted count:		100
bedrock ----------		0.0
clay hardpan ----------		0.0
detritus/wood ----------		0.0
artificial ----------		0.0
total weighted count:		100.0

Note:

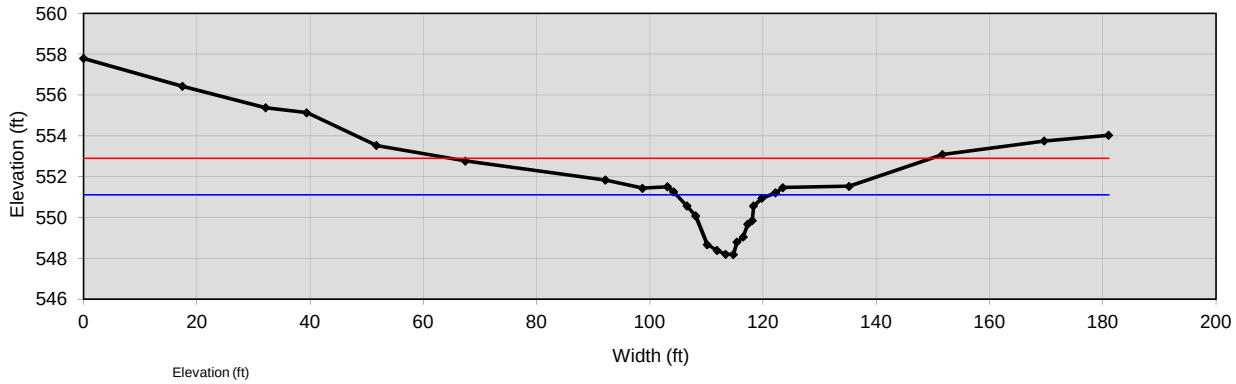


Size (mm)	
D16	0.25
D35	3.2
D50	7.6
D65	66
D84	110
D95	160

Size Distribution	
mean	5.2
dispersion	22.4
skewness	-0.10

Type	
silt/clay	10%
sand	17%
gravel	37%
cobble	36%
boulder	0%

Cross Section 7 FOUST REACH 3A POOL



Elevation (ft)

Bankfull Dimensions

25.4	x-section area (ft.sq.)
16.6	width (ft)
1.5	mean depth (ft)
2.9	max depth (ft)
18.3	wetted parimeter (ft)
1.4	hyd radi (ft)
10.8	width-depth ratio

Flood Dimensions

85.0	W flood prone area (ft)
5.1	entrenchment ratio
---	low bank height (ft)
---	low bank height ratio

Materials

13	D50 Riffle (mm)
100	D84 Riffle (mm)
---	threshold grain size (mm):

Bankfull Flow

---	velocity (ft/s)
---	discharge rate (cfs)
---	Froude number

Flow Resistance

0.039	Manning's roughness
0.16	D'Arcy-Weisbach fric.
7.1	resistance factor u/u*
4.7	relative roughness

Forces & Power

---	channel slope (%)
---	shear stress (lb/sq.ft.)
---	shear velocity (ft/s)
---	unit strm power (lb/ft/s)

Cross Section

reference ID: 7
longitudinal station: 136+13 ---
alignment: straight line
feature:

Bankfull Stage

elevation: 551.1 ---

Low Bank Height

elevation:

Flood Prone Area

width fpa: 85.0

Channel Slope

percent slope: ---

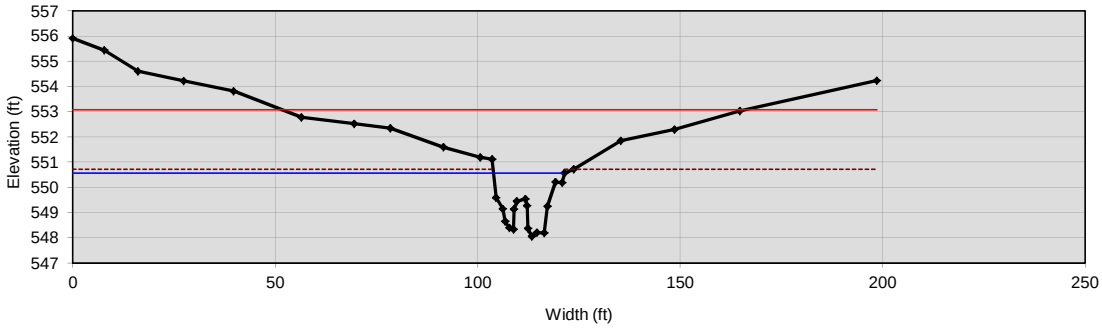
Flow Resistance

Manning's "n": ---
D'Arcy - Weisbach "f": 0.16

Note:

easting (ft)	northing (ft)	Distance (ft)	Elevation (ft)	Omit Bkf	Notes
		0	557.788		
		17.46	556.43		
		32.16	555.377		
		39.38	555.13		
		51.69	553.527		
		67.4	552.764		
		92.15	551.832		
		98.71	551.429		
		103.11	551.501		
		104.19	551.252		
		106.59	550.556		
		108.11	550.071		
		110.12	548.673		
		111.87	548.38		
		113.39	548.193		
		114.79	548.183		
		115.4	548.789		
		116.5	549.035		
		117.33	549.672		
		118.12	549.841		
		118.32	550.559		
		119.81	550.942		
		122.22	551.201		
		123.55	551.461		
		135.23	551.526		
		151.73	553.088		
		169.71	553.746		
		181.07	554.03		

Cross Section 8 FOUST REACH 3A RIFFLE



Bankfull Dimensions

25.3	x-section area (ft.sq.)
17.5	width (ft)
1.4	mean depth (ft)
2.5	max depth (ft)
20.8	wetted parimeter (ft)
1.2	hyd radi (ft)
12.2	width-depth ratio

Flood Dimensions

114.2	W flood prone area (ft)
6.5	entrenchment ratio
2.7	low bank height (ft)
1.1	low bank height ratio

Materials

13	D50 Riffle (mm)
100	D84 Riffle (mm)
41	threshold grain size (mm):

Bankfull Flow

4.4	velocity (ft/s)
112.3	discharge rate (cfs)
0.71	Froude number

Flow Resistance

0.040	Manning's roughness
0.17	D'Arcy-Weisbach fric.
6.7	resistance factor u/u*
4.4	relative roughness

Forces & Power

1.1	channel slope (%)
0.83	shear stress (lb/sq.ft.)
0.66	shear velocity (ft/s)
4.4	unit strm power (lb/ft/s)

Cross Section

reference ID: 8
longitudinal station: 136+65 ---
alignment feature: straight line

Bankfull Stage

elevation: 550.56 ---

Low Bank Height

elevation: 550.716

Flood Prone Area

width fpa: 114.2

Channel Slope

percent slope: 1.1 ---

Flow Resistance

Manning's "n": 0.04 0.040
D'Arcy - Weisbach "f": 0.18

Note:

easting (ft)	northing (ft)	Distance (ft)	Elevation (ft)	Omit	Notes
		0	555.911		
		7.88	555.432		
		16.18	554.599		
		27.42	554.22		
		39.8	553.818		
		56.55	552.773		
		69.6	552.522		
		78.46	552.344		
		91.62	551.589		
		100.66	551.187		
		103.59	551.109		
		104.58	549.591		
		106.25	549.141		
		106.84	548.641		
		107.86	548.388		
		108.88	548.331		
		108.99	549.131		
		109.74	549.443		
		111.82	549.541		
		112.26	549.265		
		112.44	548.373		
		113.38	548.048		
		114.69	548.201		
		116.46	548.192		
		117.27	549.242		
		119.25	550.203		
		120.91	550.186		
		121.49	550.56		
		123.78	550.716		
		135.39	551.849		
		148.63	552.292		
		164.79	553.029		
		198.59	554.23		

2) Weighted Pebble Count

REACH 3B REACHWIDE PEBBLE COUNT FOR CLASSIFICATION

Feature Percent of Reach

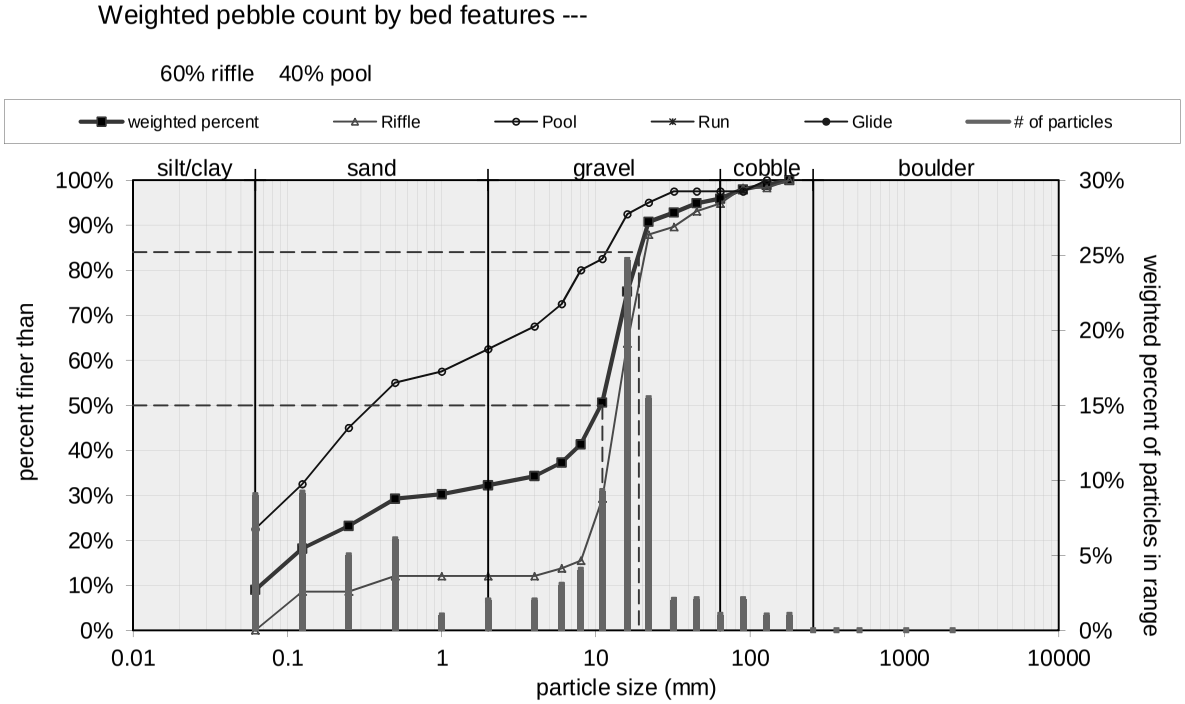
Riffle, Pool, Run, Glide

Riffle	**60**	%	Run		%
Pool	**40**	%	Glide		%

Weighted pebble count by bed features

Material	Size Range (mm)		weighted
silt/clay	0	- 0.062	9.0
very fine sand	0.062	- 0.125	9.2
fine sand	0.125	- 0.25	5.0
medium sand	0.25	- 0.5	6.1
coarse sand	0.5	- 1	1.0
very coarse sand	1	- 2	2.0
very fine gravel	2	- 4	2.0
fine gravel	4	- 6	3.0
fine gravel	6	- 8	4.0
medium gravel	8	- 11	9.3
medium gravel	11	- 16	24.7
coarse gravel	16	- 22	15.5
coarse gravel	22	- 32	2.0
very coarse gravel	32	- 45	2.1
very coarse gravel	45	- 64	1.0
small cobble	64	- 90	2.1
medium cobble	90	- 128	1.0
large cobble	128	- 180	1.0
very large cobble	180	- 256	0.0
small boulder	256	- 362	0.0
small boulder	362	- 512	0.0
medium boulder	512	- 1024	0.0
large boulder	1024	- 2048	0.0
very large boulder	2048	- 4096	0.0
total particle weighted count:			100
bedrock ----------			2.0
clay hardpan ----------			0.0
detritus/wood ----------			0.0
artificial ----------			0.0
total weighted count:			102.0

Note:

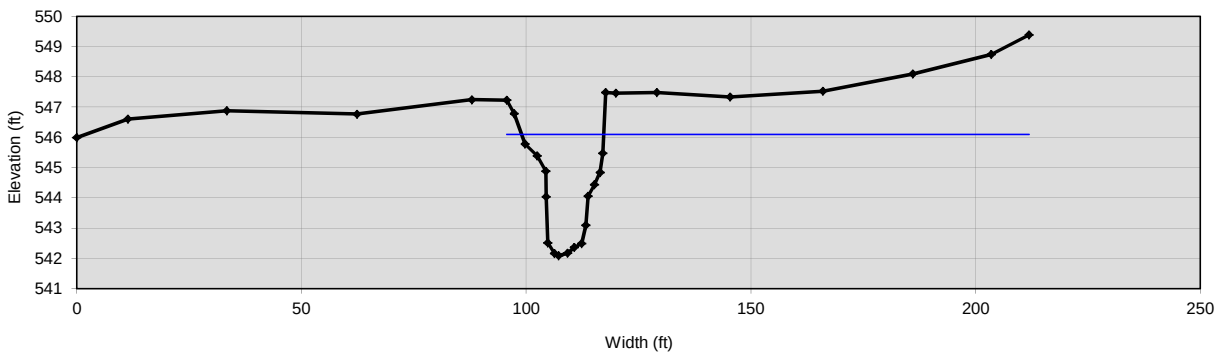


Size (mm)	
D16	0.11
D35	4.4
D50	11
D65	14
D84	19
D95	47

Size Distribution	
mean	1.4
dispersion	50.9
skewness	-0.59

Type			
silt/clay	9%	bedrock	2%
sand	23%		
gravel	62%		
cobble	4%		
boulder	0%		

Cross Section 9 FOUST REACH 3B POOL



Bankfull Dimensions		Flood Dimensions		Materials	
42.9	x-section area (ft.sq.)	---	W flood prone area (ft)	11	D50 Riffle (mm)
18.3	width (ft)	---	entrenchment ratio	20	D84 Riffle (mm)
2.3	mean depth (ft)	---	low bank height (ft)	---	threshold grain size (mm):
4.0	max depth (ft)	---	low bank height ratio		
22.1	wetted parimeter (ft)				
1.9	hyd radi (ft)				
7.8	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
---	velocity (ft/s)	0.025	Manning's roughness	---	channel slope (%)
---	discharge rate (cfs)	0.06	D'Arcy-Weisbach fric.	---	shear stress (lb/sq.ft.)
---	Froude number	11.9	resistance factor u/u*	---	shear velocity (ft/s)
		35.8	relative roughness	---	unit strm power (lb/ft/s)

Cross Section

reference ID: 9
longitudinal station: 146+66 ---
alignment feature: straight line

Bankfull Stage

elevation: 546.1 ---

Low Bank Height

elevation:

Flood Prone Area

width fpa: ---

Channel Slope

percent slope: ---

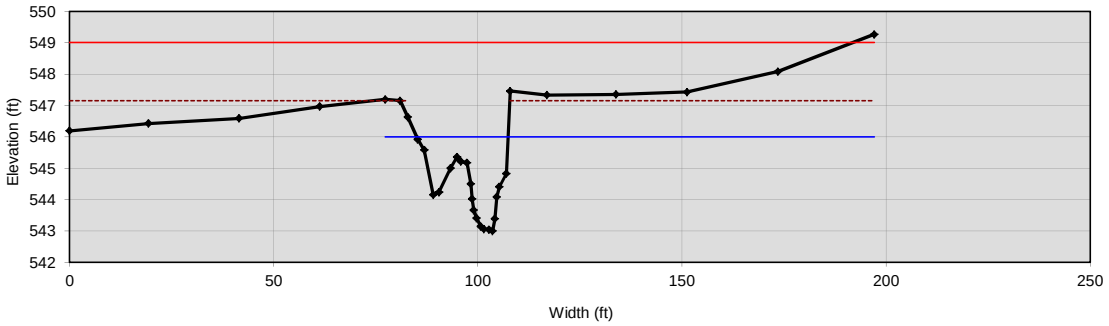
Flow Resistance

Manning's "n": ---
D'Arcy - Weisbach "f": 0.06

Note:

easting (ft)	northing (ft)	Distance (ft)	Elevation (ft)	Omit Bkf	Notes
		0	545.988		
		11.4	546.604		
		33.4	546.876		
		62.37	546.767		
		87.96	547.243		
		95.71	547.229		
		97.33	546.787		
		99.77	545.783		
		102.46	545.389		
		104.36	544.881		
		104.45	544.038		
		104.78	542.516		
		106.32	542.164		
		107.23	542.092		
		109.22	542.174		
		110.71	542.365		
		112.39	542.493		
		113.3	543.088		
		113.76	544.057		
		115.19	544.437		
		116.45	544.838		
		117.09	545.475		
		117.72	547.478		
		119.99	547.462		
		129.06	547.482		
		145.41	547.337		
		166.07	547.528		
		186.04	548.094		
		203.5	548.735		
		211.87	549.382		

Cross Section 10 FOUST REACH 3B RIFFLE



Bankfull Dimensions

34.6	x-section area (ft.sq.)
22.4	width (ft)
1.5	mean depth (ft)
3.0	max depth (ft)
25.2	wetted parimeter (ft)
1.4	hyd radi (ft)
14.6	width-depth ratio

Flood Dimensions

276.1	W flood prone area (ft)
12.3	entrenchment ratio
4.2	low bank height (ft)
1.4	low bank height ratio

Materials

11	D50 Riffle (mm)
20	D84 Riffle (mm)
13	threshold grain size (mm):

Bankfull Flow

3.4	velocity (ft/s)
116.0	discharge rate (cfs)
0.51	Froude number

Flow Resistance

0.030	Manning's roughness
0.09	D'Arcy-Weisbach fric.
11.1	resistance factor u/u*
23.5	relative roughness

Forces & Power

0.3	channel slope (%)
0.26	shear stress (lb/sq.ft.)
0.36	shear velocity (ft/s)
0.97	unit strm power (lb/ft/s)

Cross Section

reference ID: 10
longitudinal station: 146+84 ---
alignment feature: straight line

Bankfull Stage

elevation: 546 ---

Low Bank Height

elevation: 547.151

Flood Prone Area

width fpa: 276.1 191.8

Channel Slope

percent slope: 0.3 ---

Flow Resistance

Manning's "n": 0.03 0.025
D'Arcy - Weisbach "f": 0.07

Note:

easting (ft)	northing (ft)	Distance (ft)	Elevation (ft)	Omit Bkf	Notes
		0	546.19		
		19.4	546.421		
		41.56	546.586		
		61.28	546.964		
		77.34	547.194		
		80.97	547.151		
		82.86	546.626		
		85.26	545.917		
		86.9	545.576		
		89.09	544.154		
		90.5	544.227		
		93.38	544.998		
		94.9	545.357		
		95.88	545.213		
		97.35	545.169		
		98.27	544.494		
		98.58	544.013		
		99	543.656		
		99.72	543.409		
		100.74	543.145		
		101.5	543.063		
		102.79	543.035		
		103.64	542.997		
		104.16	543.383		
		104.67	544.081		
		105.27	544.403		
		107.02	544.826		
		107.91	547.458		
		116.93	547.33		
		133.89	547.351		
		151.3	547.428		
		173.52	548.084		
		197.08	549.268		

Appendix 7 Resource Agency Correspondence

WILDLANDS
ENGINEERING

December 14, 2012

Renee Gledhill-Earley
State Historic Preservation Office
4617 Mail Service Center
Raleigh, NC 27699-4617

Subject: EEP Stream mitigation project in Alamance County.
Foust Creek Mitigation Project

Dear Ms. Gledhill-Earley,

The Ecosystem Enhancement Program (EEP) requests review and comment on any possible issues that might emerge with respect to archaeological or cultural resources associated with a potential stream and wetland restoration project on the attached site (USGS site map with approximate areas of potential ground disturbance is enclosed).

The Foust site has been identified for the purpose of providing in-kind mitigation for unavoidable stream channel and wetland impacts. Several sections of channel have been identified as significantly degraded. The site has historically been disturbed due to agricultural purposes, specifically for cattle. No architectural structures or archaeological artifacts have been observed or noted during preliminary surveys of the site for restoration purposes.

We ask that you review this site based on the attached information to determine the presence of any historic properties.

We thank you in advance for your timely response and cooperation. Please feel free to contact us with any questions that you may have concerning the extent of site disturbance associated with this project.

Sincerely,

Andrea S. Eckardt

Andrea S. Eckardt
Senior Environmental Planner
aeckardt@wildlandseng.com

North Carolina Department of Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Pat McCrory, Governor
Susan W. Kluttz, Secretary
Kevin Cherry, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

January 9, 2013

Andrea Eckardt
Wildlands Engineering
1430 South Mint Street
Suite 104
Charlotte, NC 28203

Re: Foust Creek Stream Mitigation, Alamance County, ER 12-2349

Dear Ms. Eckardt:

Thank you for your letter of December 14, 2012, concerning the above project.

We have conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579. In all future communication concerning this project, please cite the above-referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona M. Bartos

U.S. Fish & Wildlife Service

Endangered Species, Threatened Species,Federal Species of Concern, and Candidate Species,

Alamance County, North Carolina

Updated: 09-22-2010

Common Name	Scientific name	Federal Status	Record Status
Vertebrate:			
American eel	*Anguilla rostrata*	FSC	Current
Carolina darter	*Etheostoma collis lepidinion*	FSC	Probable/potential
Invertebrate:			
Carolina creekshell	*Villosa vaughaniana*	FSC	Current
Yellow lampmussel	*Lampsilis cariosa*	FSC	Historic
Vascular Plant:			
Buttercup phacelia	*Phacelia covillei*	FSC	Current
Sweet pinesap	*Monotropsis odorata*	FSC	Obscure
Nonvascular Plant:			
Lichen:			

Definitions of Federal Status Codes:
E = endangered. A taxon "in danger of extinction throughout all or a significant portion of its range."
T = threatened. A taxon "likely to become endangered within the foreseeable future throughout all or a significant portion of its range."
C = candidate. A taxon under consideration for official listing for which there is sufficient information to support listing. (Formerly "C1" candidate species.)
BGPA =Bald and Golden Eagle Protection Act. See below.
FSC = federal species of concern. A species under consideration for listing, for which there is insufficient information to support listing at this time. These species may or may not be listed in the future, and many of these species were formerly recognized as "C2" candidate species.
T(S/A) = threatened due to similarity of appearance. A taxon that is threatened due to similarity of appearance with another listed species and is listed for its protection. Taxa listed as T(S/A) are not

biologically endangered or threatened and are not subject to Section 7 consultation. See below.
EXP = experimental population. A taxon listed as experimental (either essential or nonessential). Experimental, nonessential populations of endangered species (e.g., red wolf) are treated as threatened species on public land, for consultation purposes, and as species proposed for listing on private land.
P = proposed. Taxa proposed for official listing as endangered or threatened will be noted as "PE" or "PT", respectively.

Bald and Golden Eagle Protection Act (BGPA):

In the July 9, 2007 Federal Register(72:37346-37372), the bald eagle was declared recovered, and removed (de-listed) from the Federal List of Threatened and Endangered wildlife. This delisting took effect August 8,2007. After delisting, the Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. 668-668d) becomes the primary law protecting bald eagles. The Eagle Act prohibits take of bald and golden eagles and provides a statutory definition of "take" that includes "disturb". The USFWS has developed National Bald Eagle Management Guidelines to provide guidance to land managers, landowners, and others as to how to avoid disturbing bald eagles. For mor information, visit http://www.fws.gov/migratorybirds/baldeagle.htm

Threatened due to similarity of appearance(T(S/A)):

In the November 4, 1997 Federal Register (55822-55825), the northern population of the bog turtle (from New York south to Maryland) was listed as T (threatened), and the southern population (from Virginia south to Georgia) was listed as T(S/A) (threatened due to similarity of appearance). The T(S/A) designation bans the collection and interstate and international commercial trade of bog turtles from the southern population. The T(S/A) designation has no effect on land management activities by private landowners in North Carolina, part of the southern population of the species. In addition to its official status as T(S/A), the U.S. Fish and Wildlife Service considers the southern population of the bog turtle as a Federal species of concern due to habitat loss.

Definitions of Record Status:
Current - the species has been observed in the county within the last 50 years.
Historic - the species was last observed in the county more than 50 years ago.
Obscure - the date and/or location of observation is uncertain.
Incidental/migrant - the species was observed outside of its normal range or habitat.
Probable/potential - the species is considered likely to occur in this county based on the proximity of known records (in adjacent counties), the presence of potentially suitable habitat, or both.

WILDLANDS
ENGINEERING

December 14, 2012

Dale Suiter
US Fish and Wildlife Service
Raleigh Field Office
P.O. Box 33726
Raleigh, NC 27636

Subject: **Foust Creek Mitigation Site**
Alamance County, North Carolina

Dear Mr. Suiter,

The Foust Creek Mitigation Site has been identified for the purpose of providing in-kind mitigation for unavoidable stream channel and wetland impacts. Several sections of stream channels throughout the site have been identified as significantly degraded as a result of past agricultural activities, specifically cattle operations.

Please provide comments on any possible issues that might emerge with respect to migratory birds or other trust resources from the construction of a stream and wetland restoration project on the subject property. A USGS map showing the approximate property lines and area of potential ground disturbance is enclosed. The figure was prepared from the Snow Camp, NC 7.5-Minute Topographic Quadrangle.

If we have not heard from you in 30 days we will assume that you do not have any comments regarding associated laws and that you do not have any information relevant to this project at the current time.

We thank you in advance for your timely response and cooperation. Please feel free to contact us with any questions that you may have concerning the extent of site disturbance associated with this project.

Sincerely,

Andrea S. Eckardt

Andrea S. Eckardt
Senior Environmental Planner

Attachment:
USGS Topographic Map

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

January 11, 2013

Andrea Eckardt
Wildlands Engineering
1430 South Mint Street, Suite 104
Charlotte, NC 28203

Re: Foust Creek Mitigation Site- Alamance County, NC

Dear Ms. Eckardt:

This letter is to inform you that a list of all federally-protected endangered and threatened species with known occurrences in North Carolina is now available on the U.S. Fish and Wildlife Service's (Service) web page at http://www.fws.gov/raleigh. Therefore, if you have projects that occur within the Raleigh Field Office's area of responsibility (see attached county list), you no longer need to contact the Raleigh Field Office for a list of federally-protected species.

Our web page contains a complete and frequently updated list of all endangered and threatened species protected by the provisions of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)(Act), and a list of federal species of concern[1] that are known to occur in each county in North Carolina.

Section 7 of the Act requires that all federal agencies (or their designated non-federal representative), in consultation with the Service, insure that any action federally authorized, funded, or carried out by such agencies is not likely to jeopardize the continued existence of any federally-listed endangered or threatened species. A biological assessment or evaluation may be prepared to fulfill that requirement and in determining whether additional consultation with the Service is necessary. In addition to the federally-protected species list, information on the species' life histories and habitats and information on completing a biological assessment or evaluation and can be found on our web page at http://www.fws.gov/raleigh. Please check the web site often for updated information or changes.

---

[1] The term "federal species of concern" refers to those species which the Service believes might be in need of concentrated conservation actions. Federal species of concern receive no legal protection and their designation does not necessarily imply that the species will eventually be proposed for listing as a federally endangered or threatened species. However, we recommend that all practicable measures be taken to avoid or minimize adverse impacts to federal species of concern.

If your project contains suitable habitat for any of the federally-listed species known to be present within the county where your project occurs, the proposed action has the potential to adversely affect those species. As such, we recommend that surveys be conducted to determine the species' presence or absence within the project area. The use of North Carolina Natural Heritage program data should not be substituted for actual field surveys.

If you determine that the proposed action may affect (i.e., likely to adversely affect or not likely to adversely affect) a federally-protected species, you should notify this office with your determination, the results of your surveys, survey methodologies, and an analysis of the effects of the action on listed species, including consideration of direct, indirect, and cumulative effects, before conducting any activities that might affect the species. If you determine that the proposed action will have no effect (i.e., no beneficial or adverse, direct or indirect effect) on federally listed species, then you are not required to contact our office for concurrence (unless an Environmental Impact Statement is prepared). However, you should maintain a complete record of the assessment, including steps leading to your determination of effect, the qualified personnel conducting the assessment, habitat conditions, site photographs, and any other related articles.

With regard to the above-referenced project, we offer the following remarks. Our comments are submitted pursuant to, and in accordance with, provisions of the Endangered Species Act.

Based on the information provided and other information available, it appears that the proposed action is not likely to adversely affect any federally-listed endangered or threatened species, their formally designated critical habitat, or species currently proposed for listing under the Act at these sites. We believe that the requirements of section 7(a)(2) of the Act have been satisfied for your project. Please remember that obligations under section 7 consultation must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered; (2) this action is subsequently modified in a manner that was not considered in this review; or, (3) a new species is listed or critical habitat determined that may be affected by the identified action.

However, the Service is concerned about the potential impacts the proposed action might have on aquatic species. Aquatic resources are highly susceptible to sedimentation. Therefore, we recommend that all practicable measures be taken to avoid adverse impacts to aquatic species, including implementing directional boring methods and stringent sediment and erosion control measures. An erosion and sedimentation control plan should be submitted to and approved by the North Carolina Division of Land Resources, Land Quality Section prior to construction. Erosion and sedimentation controls should be installed and maintained between the construction site and any nearby down-gradient surface waters. In addition, we recommend maintaining natural, vegetated buffers on all streams and creeks adjacent to the project site.

The North Carolina Wildlife Resources Commission has developed a Guidance Memorandum (a copy can be found on our website at (http://www.fws.gov/raleigh) to address and mitigate secondary and cumulative impacts to aquatic and terrestrial wildlife resources and water quality. We recommend that you consider this document in the development of your projects and in completing an initiation package for consultation (if necessary).

We hope you find our web page useful and informative and that following the process described above will reduce the time required, and eliminate the need, for general correspondence for species' lists. If you have any questions or comments, please contact John Ellis of this office at (919) 856-4520 ext. 26.

Sincerely,

Pete Benjamin
Field Supervisor

List of Counties in the Service's Raleigh Field Office Area of Responsibility

Alamance
Beaufort
Bertie
Bladen
Brunswick
Camden
Carteret
Caswell
Chatham
Chowan
Columbus
Craven
Cumberland
Currituck
Dare
Duplin
Durham
Edgecombe
Franklin
Gates
Granville
Greene
Guilford
Halifax
Harnett
Hertford
Hoke
Hyde
Johnston
Jones
Lee
Lenoir
Martin
Montgomery
Moore
Nash
New Hanover
Northampton
Onslow
Orange
Pamlico
Pasquotank
Pender
Perquimans
Person
Pitt
Randolph
Richmond
Robeson
Rockingham
Sampson
Scotland
Tyrrell
Vance
Wake
Warren
Washington
Wayne
Wilson

WILDLANDS
ENGINEERING

December 14, 2012

Shannon Deaton
North Carolina Wildlife Resource Commission
Division of Inland Fisheries
1721 Mail Service Center
Raleigh, NC 27699

Subject: **Foust Creek Mitigation Site**
Alamance County, North Carolina

Dear Ms. Deaton,

The purpose of this letter is to request review and comment on any possible issues that might emerge with respect to fish and wildlife issues associated with a potential stream and wetland restoration project on the attached site. A USGS map showing the approximate property lines and areas of potential ground disturbance is enclosed. The figure was prepared from the Snow Camp, NC 7.5-Minute Topographic Quadrangles.

The Foust Site has been identified for the purpose of providing in-kind mitigation for unavoidable stream channel and wetland impacts. Several sections of channel throughout the site have been identified as significantly degraded as a result of past agricultural activities, specifically cattle operations.

We thank you in advance for your timely response and cooperation. Please feel free to contact us with any questions that you may have concerning the extent of site disturbance associated with this project.

Sincerely,

Andrea S. Eckardt

Andrea S. Eckardt
Senior Environmental Planner

Attachment:
USGS Topographic Map

1430 South Mint Street, Suite 104, Charlotte, NC 28203 ◦ (P) 704-332-7754 ◦ (F) 704-332-3306

North Carolina Wildlife Resources Commission

Gordon Myers, Executive Director

10 January 2013

Andrea S. Eckardt, Senior Environmental Planner
Wildlands Engineering
1430 South Mint Street, Suite 104
Charlotte, NC 28203

Subject: Foust Creek Mitigation Site, Alamance County, North Carolina.

Dear Ms. Eckardt:

Biologists with the North Carolina Wildlife Resources Commission have reviewed the subject information. Our comments are provided in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667e) and North Carolina General Statutes (G.S. 113-131 et seq.).

The proposed project would provide in-kind mitigation for unavoidable stream and wetland impacts. Several sections of channel throughout the site have been identified as significantly degraded from past agricultural activities including cattle operations. The project site includes Foust Creek, a tributary to Cane Creek in the Cape Fear River basin. There are records for the federal species of concern and state endangered Carolina creekshell (*Villosa vaughaniana*), the state special concern notched rainbow (*Villosa constricta*), and the state significantly rare Eastern creekshell (*Villosa delumbis*) in Cane Creek.

Stream restoration projects often improve water quality and aquatic habitat. Establishing native, forested buffers in riparian areas will help protect water quality, improve aquatic and terrestrial habitats, and provide a travel corridor for wildlife species. Provided measures are taken to minimize erosion and sedimentation from construction/restoration activities, we do not anticipate the project to result in significant adverse impacts to aquatic and terrestrial wildlife resources.

Thank you for the opportunity to review this proposed project. If we can provide further assistance, please contact our office at (336) 449-7625 or shari.bryant@ncwildlife.org.

Sincerely,

Shari L. Bryant
Piedmont Region Coordinator
Habitat Conservation Program

cc: Ryan Heise, NCWRC

Mailing Address: Division of Inland Fisheries • 1721 Mail Service Center • Raleigh, NC 27699-1721
Telephone: (919) 707-0220 • **Fax:** (919) 707-0028

Categorical Exclusion Form for Ecosystem Enhancement Program Projects
Version 1.4

Note: Only Appendix A should to be submitted (along with any supporting documentation) as the environmental document.

Part 1: General Project Information	
Project Name:	Foust Creek Mitigation Site
County Name:	Alamance County
EEP Number:	#95715, RFP 16-004357
Project Sponsor:	Wildlands Engineering, Inc.
Project Contact Name:	Andrea Eckardt
Project Contact Address:	1430 S. Mint Street, Suite 104, Charlotte, NC 28203
Project Contact E-mail:	aeckardt@wildlandseng.com
EEP Project Manager:	Perry Sugg

Project Description

The Foust Creek Mitigation Site is a stream and wetland mitigation project located in Alamance County, NC, south of the City of Burlington. The project is located on Foust Creek and one unnamed tributary. The project will provide stream and wetland mitigation units to NCEEP in the Cape Fear River Basin (03030002). The mitigation project involves a combination of stream restoration and enhancement and wetland restoration.

For Official Use Only

Reviewed By:

1-31-13
Date


EEP Project Manager

Conditional Approved By:

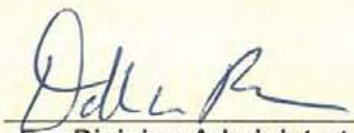
Date

For Division Administrator
FHWA

☐ **Check this box if there are outstanding issues**

Final Approval By:

2-6-13
Date


For Division Administrator
FHWA

Part 2: All Projects Regulation/Question	Response
Coastal Zone Management Act (CZMA)	
1. Is the project located in a CAMA county?	☐ Yes ☑ No
2. Does the project involve ground-disturbing activities within a CAMA Area of Environmental Concern (AEC)?	☐ Yes ☐ No ☑ N/A
3. Has a CAMA permit been secured?	☐ Yes ☐ No ☑ N/A
4. Has NCDCM agreed that the project is consistent with the NC Coastal Management Program?	☐ Yes ☐ No ☑ N/A
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)	
1. Is this a "full-delivery" project?	☑ Yes ☐ No
2. Has the zoning/land use of the subject property and adjacent properties ever been designated as commercial or industrial?	☐ Yes ☑ No ☐ N/A
3. As a result of a limited Phase I Site Assessment, are there known or potential hazardous waste sites within or adjacent to the project area?	☐ Yes ☑ No ☐ N/A
4. As a result of a Phase I Site Assessment, are there known or potential hazardous waste sites within or adjacent to the project area?	☐ Yes ☐ No ☑ N/A
5. As a result of a Phase II Site Assessment, are there known or potential hazardous waste sites within the project area?	☐ Yes ☐ No ☑ N/A
6. Is there an approved hazardous mitigation plan?	☐ Yes ☐ No ☑ N/A
National Historic Preservation Act (Section 106)	
1. Are there properties listed on, or eligible for listing on, the National Register of Historic Places in the project area?	☐ Yes ☑ No
2. Does the project affect such properties and does the SHPO/THPO concur?	☐ Yes ☐ No ☑ N/A
3. If the effects are adverse, have they been resolved?	☐ Yes ☐ No ☑ N/A
Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act)	
1. Is this a "full-delivery" project?	☑ Yes ☐ No
2. Does the project require the acquisition of real estate?	☑ Yes ☐ No ☐ N/A
3. Was the property acquisition completed prior to the intent to use federal funds?	☐ Yes ☑ No ☐ N/A
4. Has the owner of the property been informed: * prior to making an offer that the agency does not have condemnation authority; and * what the fair market value is believed to be?	☑ Yes ☐ No ☐ N/A

Part 3: Ground-Disturbing Activities Regulation/Question	Response
American Indian Religious Freedom Act (AIRFA)	
1. Is the project located in a county claimed as "territory" by the Eastern Band of Cherokee Indians?	☐ Yes ☑ No
2. Is the site of religious importance to American Indians?	☐ Yes ☐ No ☑ N/A
3. Is the project listed on, or eligible for listing on, the National Register of Historic Places?	☐ Yes ☐ No ☑ N/A
4. Have the effects of the project on this site been considered?	☐ Yes ☐ No ☑ N/A
Antiquities Act (AA)	
1. Is the project located on Federal lands?	☐ Yes ☑ No
2. Will there be loss or destruction of historic or prehistoric ruins, monuments or objects of antiquity?	☐ Yes ☐ No ☑ N/A
3. Will a permit from the appropriate Federal agency be required?	☐ Yes ☐ No ☑ N/A
4. Has a permit been obtained?	☐ Yes ☐ No ☑ N/A
Archaeological Resources Protection Act (ARPA)	
1. Is the project located on federal or Indian lands (reservation)?	☐ Yes ☑ No
2. Will there be a loss or destruction of archaeological resources?	☐ Yes ☐ No ☑ N/A
3. Will a permit from the appropriate Federal agency be required?	☐ Yes ☐ No ☑ N/A
4. Has a permit been obtained?	☐ Yes ☐ No ☑ N/A
Endangered Species Act (ESA)	
1. Are federal Threatened and Endangered species and/or Designated Critical Habitat listed for the county?	☐ Yes ☑ No
2. Is Designated Critical Habitat or suitable habitat present for listed species?	☐ Yes ☐ No ☑ N/A
3. Are T&E species present or is the project being conducted in Designated Critical Habitat?	☐ Yes ☐ No ☑ N/A
4. Is the project "likely to adversely affect" the species and/or "likely to adversely modify" Designated Critical Habitat?	☐ Yes ☐ No ☑ N/A
5. Does the USFWS/NOAA-Fisheries concur in the effects determination?	☐ Yes ☐ No ☑ N/A
6. Has the USFWS/NOAA-Fisheries rendered a "jeopardy" determination?	☐ Yes ☐ No ☑ N/A

Executive Order 13007 (Indian Sacred Sites)	
1. Is the project located on Federal lands that are within a county claimed as "territory" by the EBCI?	☐ Yes ☑ No
2. Has the EBCI indicated that Indian sacred sites may be impacted by the proposed project?	☐ Yes ☐ No ☑ N/A
3. Have accommodations been made for access to and ceremonial use of Indian sacred sites?	☐ Yes ☐ No ☑ N/A
Farmland Protection Policy Act (FPPA)	
1. Will real estate be acquired?	☑ Yes ☐ No
2. Has NRCS determined that the project contains prime, unique, statewide or locally important farmland?	☑ Yes ☐ No ☐ N/A
3. Has the completed Form AD-1006 been submitted to NRCS?	☑ Yes ☐ No ☐ N/A
Fish and Wildlife Coordination Act (FWCA)	
1. Will the project impound, divert, channel deepen, or otherwise control/modify any water body?	☑ Yes ☐ No
2. Have the USFWS and the NCWRC been consulted?	☑ Yes ☐ No ☐ N/A
Land and Water Conservation Fund Act (Section 6(f))	
1. Will the project require the conversion of such property to a use other than public, outdoor recreation?	☐ Yes ☑ No
2. Has the NPS approved of the conversion?	☐ Yes ☐ No ☑ N/A
Magnuson-Stevens Fishery Conservation and Management Act (Essential Fish Habitat)	
1. Is the project located in an estuarine system?	☐ Yes ☑ No
2. Is suitable habitat present for EFH-protected species?	☐ Yes ☐ No ☑ N/A
3. Is sufficient design information available to make a determination of the effect of the project on EFH?	☐ Yes ☐ No ☑ N/A
4. Will the project adversely affect EFH?	☐ Yes ☐ No ☑ N/A
5. Has consultation with NOAA-Fisheries occurred?	☐ Yes ☐ No ☑ N/A
Migratory Bird Treaty Act (MBTA)	
1. Does the USFWS have any recommendations with the project relative to the MBTA?	☐ Yes ☑ No
2. Have the USFWS recommendations been incorporated?	☐ Yes ☐ No ☑ N/A
Wilderness Act	
1. Is the project in a Wilderness area?	☐ Yes ☑ No
2. Has a special use permit and/or easement been obtained from the maintaining federal agency?	☐ Yes ☐ No ☑ N/A

Foust Creek Mitigation Site

Categorical Exclusion

Summary

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) provides a Federal "Superfund" to clean up uncontrolled or abandoned hazardous-waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment.

As the Foust Creek Mitigation Site is a full-delivery project; an EDR Radius Map Report with Geocheck was ordered for the site through Environmental Data Resources, Inc. on December 17, 2012. Neither the target property, nor the adjacent properties, were listed in any of the Federal, State, or Tribal environmental databases searched by EDR. There are no known or potential hazardous waste sites identified within or immediately adjacent to the project area. The Executive Summary of the EDR report is included in the Appendix. The full report is available if needed.

National Historic Preservation Act (Section 106)

The National Historic Preservation Act declares a national policy of historic preservation to protect, rehabilitate, restore, and reuse districts, sites, buildings, structures, and objects significant in American architecture, history, archaeology, and culture, and Section 106 mandates that federal agencies take into account the effect of an undertaking on a property that is included in, or is eligible for inclusion in, the National Register of Historic Places.

Wildlands Engineering, Inc. (Wildlands) requested review and comment from the State Historic Preservation Office (SHPO) with respect to any archeological and architectural resources related to the Foust Creek Mitigation Site on December 14, 2012. SHPO responded on January 9, 2013 and stated they were aware of no historic resources that would be affected by the project. All correspondence related to Section 106 is included in the Appendix.

Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act)

These acts, collectively known as the Uniform Act, provide for uniform and equitable treatment of persons displaced from their homes, businesses, non-profit associations, or farms by federal and federally-assisted programs, and establish uniform and equitable land acquisition policies.

Foust Creek Mitigation Site is a full-delivery project that includes land acquisition. Notification of the fair market value of the project property and the lack of condemnation authority by Wildlands was included in the signed option agreements for the project properties. Copies of the relevant section of the option agreements are included in the Appendix.

Endangered Species Act (ESA)

Section 7 of the ESA requires federal agencies, in consultation with and with the assistance of the Secretary of the Interior or of Commerce, as appropriate, to ensure that actions they authorize, fund or carry out are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat for these species.

There are no federal endangered or threatened species listed for Alamance County. The US Fish and Wildlife Service (USFWS) list of *Endangered Species, Threatened Species, Federal Species of Concern, and Candidate Species for Alamance County* is included in the Appendix.

Farmland Protection Policy Act (FPPA)

The FPPA requires that, before taking or approving any federal action that would result in conversion of farmland, the agency must examine the effects of the action using the criteria set forth in the FPPA, and, if there are adverse effects, must consider alternatives to lessen them.

The Foust Creek Mitigation Site includes the conversion of prime farmland. As such, Form AD-1006 has been completed and submitted to the Natural Resources Conservation Service (NRCS). The completed form and correspondence documenting its submittal is included in the Appendix.

Fish and Wildlife Coordination Act (FWCA)

The FWCA requires consultation with the USFWS and the appropriate state wildlife agency on projects that alter or modify a water body. Reports and recommendations prepared by these agencies document project effects on wildlife and identify measures that may be adopted to prevent loss or damage to wildlife resources.

The Foust Creek Mitigation Site includes stream restoration and enhancement and wetland restoration. Wildlands requested comment on the project from both the USFWS and the North Carolina Wildlife Resources Commission (NCWRC) on December 14, 2012. USFWS responded on January 11, 2013 and had no objections to the project. NCWRC responded on January 10, 2013 and stated they "do not anticipate the project to result in significant adverse impacts to aquatic and terrestrial wildlife resources". All correspondence with the two agencies is included in the Appendix.

Migratory Bird Treaty Act (MBTA)

The MBTA makes it unlawful for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird. The indirect killing of birds by destroying their nests and eggs is covered by the MBTA, so construction in nesting areas during nesting seasons can constitute a taking.

Wildlands requested comment on the Foust Creek Mitigation Site from the USFWS in regards to migratory birds on December 14, 2012. USFWS commented on January 11, 2013, but had no comments regarding migratory birds. All correspondence with USFWS is included in the Appendix.

Foust Creek Mitigation Site

Categorical Exclusion

Appendix

Foust Creek Mitigation Site
6905 Snow Camp Road
Snow Camp, NC 27349

Inquiry Number: 3478916.2s
December 17, 2012

The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

6905 SNOW CAMP ROAD
SNOW CAMP, NC 27349

COORDINATES

Latitude (North):	35.9167000 - 35° 55' 0.12''
Longitude (West):	79.4019000 - 79° 24' 6.84''
Universal Tranverse Mercator:	Zone 17
UTM X (Meters):	644193.6
UTM Y (Meters):	3975689.0
Elevation:	560 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	35079-H4 SNOW CAMP, NC
Most Recent Revision:	1978

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	2009, 2010
Source:	USDA

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL---------- National Priority List

EXECUTIVE SUMMARY

Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ---------- National Priority List Deletions

Federal CERCLIS list

CERCLIS ---------- Comprehensive Environmental Response, Compensation, and Liability Information System
FEDERAL FACILITY ---------- Federal Facility Site Information listing

Federal CERCLIS NFRAP site List

CERC-NFRAP ---------- CERCLIS No Further Remedial Action Planned

Federal RCRA CORRACTS facilities list

CORRACTS ---------- Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG ---------- RCRA - Large Quantity Generators
RCRA-SQG ---------- RCRA - Small Quantity Generators
RCRA-CESQG ---------- RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

US ENG CONTROLS ---------- Engineering Controls Sites List
US INST CONTROL ---------- Sites with Institutional Controls
LUCIS ---------- Land Use Control Information System

Federal ERNS list

ERNS ---------- Emergency Response Notification System

State- and tribal - equivalent NPL

NC HSDS ---------- Hazardous Substance Disposal Site

State- and tribal - equivalent CERCLIS

SHWS ---------- Inactive Hazardous Sites Inventory

State and tribal landfill and/or solid waste disposal site lists

SWF/LF ---------- List of Solid Waste Facilities
OLI ---------- Old Landfill Inventory

State and tribal leaking storage tank lists

LUST ---------- Regional UST Database

LUST TRUST ..... State Trust Fund Database
LAST ..... Leaking Aboveground Storage Tanks
INDIAN LUST ..... Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

UST ..... Petroleum Underground Storage Tank Database
AST ..... AST Database
INDIAN UST ..... Underground Storage Tanks on Indian Land
FEMA UST ..... Underground Storage Tank Listing

State and tribal institutional control / engineering control registries

INST CONTROL ..... No Further Action Sites With Land Use Restrictions Monitoring

State and tribal voluntary cleanup sites

VCP ..... Responsible Party Voluntary Action Sites
INDIAN VCP ..... Voluntary Cleanup Priority Listing

State and tribal Brownfields sites

BROWNFIELDS ..... Brownfields Projects Inventory

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ..... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

DEBRIS REGION 9 ..... Torres Martinez Reservation Illegal Dump Site Locations
ODI ..... Open Dump Inventory
HIST LF ..... Solid Waste Facility Listing
SWRCY ..... Recycling Center Listing
INDIAN ODI ..... Report on the Status of Open Dumps on Indian Lands

Local Lists of Hazardous waste / Contaminated Sites

US CDL ..... Clandestine Drug Labs
US HIST CDL ..... National Clandestine Laboratory Register

Local Land Records

LIENS 2 ..... CERCLA Lien Information

Records of Emergency Release Reports

HMIRS ..... Hazardous Materials Information Reporting System

Other Ascertainable Records

RCRA-NonGen ..... RCRA - Non Generators

DOT OPS	Incident and Accident Data
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
MINES	Mines Master Index File
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
FINDS	Facility Index System/Facility Registry System
RAATS	RCRA Administrative Action Tracking System
IMD	Incident Management Database
UIC	Underground Injection Wells Listing
DRYCLEANERS	Drycleaning Sites
NPDES	NPDES Facility Location Listing
INDIAN RESERV	Indian Reservations
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
2020 COR ACTION	2020 Corrective Action Program List
FINANCIAL ASSURANCE	Financial Assurance Information Listing
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
COAL ASH DOE	Steam-Electric Plant Operation Data
COAL ASH	Coal Ash Disposal Sites
PCB TRANSFORMER	PCB Transformer Registration Database
US FIN ASSUR	Financial Assurance Information
EPA WATCH LIST	EPA WATCH LIST
PRP	Potentially Responsible Parties

EDR PROPRIETARY RECORDS

EDR Proprietary Records

Manufactured Gas Plants	EDR Proprietary Manufactured Gas Plants

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were not identified.

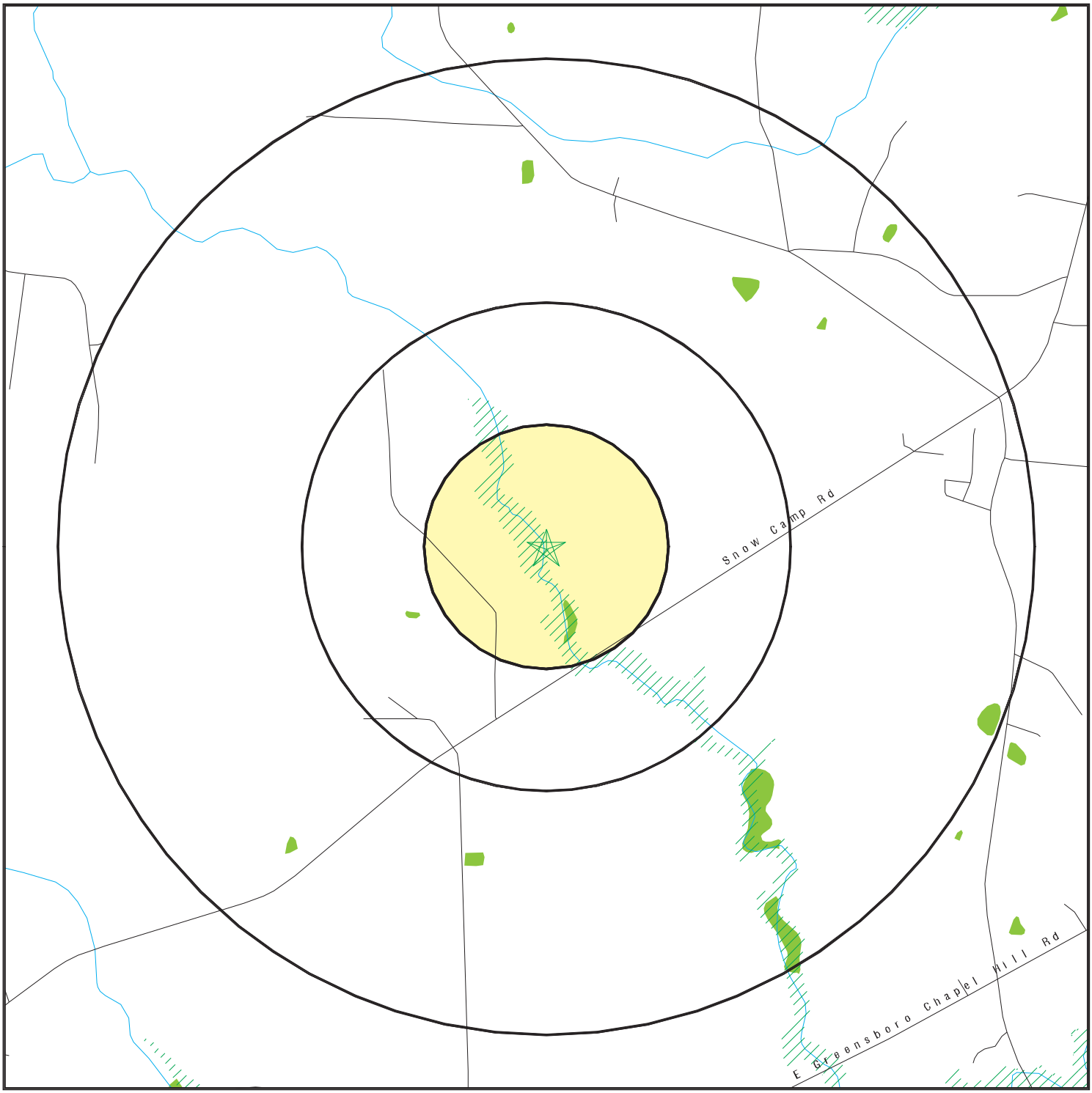
Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 19 records.

Site Name	Database(s)
SNOW CAMP	IMD, LAST
ALAMANCE COUNTY LANDFILL	SWF/LF
DAVIS AUTO (L. M. CRAWFORD)	LUST
JOHNSON ESTATE, LULA	LUST
CEARLY GROCERY	LUST
LINDLEY PROPERTY, BILL	LUST
KING PROPERTY, EDWARD	LUST
SANDY DAVIS GROCERY	UST
ELI WHITNEY SCHOOL	UST
DALE DODSON WELL CO.. INC.	UST
J.R. TULLOCH & SONS SERVICE	UST
PAYNES STORE	UST
DAVID LEE HOLT	UST
BRENDA'S FLORIST	UST
N C FOREST SERVICE	UST
WALL'S GARAGE	UST
INEZ FOGLEMAN SERVICE	UST
WAYNE AUTO SALVAGE	RCRA-NonGen
GRAHAM AUTU SALVAGE	RCRA-NonGen

OVERVIEW MAP - 3478916.2s



0 1/4 1/2 1 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Oil & Gas pipelines from USGS
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Hazardous Substance Disposal Sites

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	Foust Creek Mitigation Site	CLIENT:	Wildlands Eng, Inc.
ADDRESS:	6905 Snow Camp Road Snow Camp NC 27349	CONTACT:	Andrea Eckardt
LAT/LONG:	35.9167 / 79.4019	INQUIRY #:	3478916.2s
		DATE:	December 17, 2012 2:26 pm

WILDLANDS
ENGINEERING

December 14, 2012

Renee Gledhill-Earley
State Historic Preservation Office
4617 Mail Service Center
Raleigh, NC 27699-4617

Subject: EEP Stream mitigation project in Alamance County.
Foust Creek Mitigation Project

Dear Ms. Gledhill-Earley,

The Ecosystem Enhancement Program (EEP) requests review and comment on any possible issues that might emerge with respect to archaeological or cultural resources associated with a potential stream and wetland restoration project on the attached site (USGS site map with approximate areas of potential ground disturbance is enclosed).

The Foust site has been identified for the purpose of providing in-kind mitigation for unavoidable stream channel and wetland impacts. Several sections of channel have been identified as significantly degraded. The site has historically been disturbed due to agricultural purposes, specifically for cattle. No architectural structures or archaeological artifacts have been observed or noted during preliminary surveys of the site for restoration purposes.

We ask that you review this site based on the attached information to determine the presence of any historic properties.

We thank you in advance for your timely response and cooperation. Please feel free to contact us with any questions that you may have concerning the extent of site disturbance associated with this project.

Sincerely,

Andrea S. Eckardt

Andrea S. Eckardt
Senior Environmental Planner
aeckardt@wildlandseng.com

North Carolina Department of Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Pat McCrory, Governor
Susan W. Kluttz, Secretary
Kevin Cherry, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

January 9, 2013

Andrea Eckardt
Wildlands Engineering
1430 South Mint Street
Suite 104
Charlotte, NC 28203

Re: Foust Creek Stream Mitigation, Alamance County, ER 12-2349

Dear Ms. Eckardt:

Thank you for your letter of December 14, 2012, concerning the above project.

We have conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579. In all future communication concerning this project, please cite the above-referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona M. Bartos

3.3 Assignment. Optionee shall have the right to assign this Agreement without the consent of Optionor. No assignment shall be effective, however, unless the assignee has delivered to Optionor a written assumption of Optionee's obligations under this Agreement. Optionor hereby releases Optionee from any obligations under this Agreement arising after the effective date of any assignment of this Agreement by Optionee.

3.4 Value of Conservation Easement; No Power of Eminent Domain. in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Optionee hereby notifies Optionor that: (i) Optionee believes that the fair market value of the Conservation Easement is an amount equal to the Purchase Price; and (ii) Optionee does not have the power of eminent domain.

3.5 Waivers. No waiver of any breach of any covenant or provision herein contained shall be deemed a waiver of any preceding or succeeding breach thereof, or of any other covenant or provision herein contained.

3.6 Survival of Obligations. Notwithstanding any provision of this Agreement, the covenants, representations, warranties, hold harmless, defense and indemnification obligations made by each party herein shall survive the Closing.

3.7 Successors and Assigns. This Agreement shall be binding upon and shall inure to the benefit of the successors and assigns of the parties hereto.

3.8 Attorneys' Fees. If either party commences an action against the other to interpret or enforce any of the terms of this Agreement or because of the breach by the other party of any of the terms hereof, the losing party shall pay to the prevailing party reasonable attorneys' fees, costs and expenses and court costs and other costs of action incurred in connection with the prosecution or defense of such action, whether or not the action is prosecuted to a final judgment.

3.9 Memorandum of Option. Concurrently with the execution of this Agreement, Optionee and Optionor agree to execute, acknowledge and record a **"Memorandum of Agreement,"** which shall be in the form attached hereto as Exhibit C. Optionee shall record the Memorandum of Agreement against the Property in the Official Records of Alamannce County within five (5) days after the Effective Date of this Agreement.

3.10 Entire Agreement. This Agreement (including all exhibits attached hereto) is the final expression of, and contains the entire agreement between, the parties with respect to the subject matter hereof and supersedes all prior understandings with respect thereto. This Agreement may not be modified, changed, supplemented, superseded, canceled or terminated, nor may any obligations hereunder be waived, except by written instrument signed by the party to be charged or by its agent duly authorized in writing or as otherwise expressly permitted herein. Notwithstanding any rule or maxim of construction to the contrary, any ambiguity or uncertainty shall not be construed against either Optionor Optionee based upon authorship of any of the provisions hereof.

3.11 Time of Essence. Optionor and Optionee hereby acknowledge and agree that time is strictly of the essence with respect to each and every term, condition, obligation and provision hereof and that failure to timely perform any of the terms, conditions, obligations or provisions hereof by either party shall constitute a material breach of and a non-curable default under this Agreement by the party so failing to perform.

3.12 Governing Law. The parties hereto acknowledge that this Agreement has been negotiated and entered into in the State of North Carolina. The parties hereto expressly agree that this Agreement shall be governed by, interpreted under, and construed and enforced in accordance with the laws of the State of North Carolina.

3.13 Counterparts. This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which, together, shall constitute one and the same instrument.

3.14 Recitals/Exhibits. The Recitals set forth in this Agreement and the exhibits referenced herein are incorporated herein by this reference.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the dates set forth below.

OPTIONEE:

WILDLANDS ENGINEERING, INC., a North Carolina corporation

By: _____

Print Name: _Shawn D. Wilkerson

Title: President

Date: 2-1-12

OPTIONOR:

By: _____

By: David G. Cheek

Print Name: **David G. Cheek**

Date: 1-30-12

3.3 Assignment. Optionee shall have the right to assign this Agreement without the consent of Optionor. No assignment shall be effective, however, unless the assignee has delivered to Optionor a written assumption of Optionee's obligations under this Agreement. Optionor hereby releases Optionee from any obligations under this Agreement arising after the effective date of any assignment of this Agreement by Optionee.

3.4 Value of Conservation Easement; No Power of Eminent Domain. in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Optionee hereby notifies Optionor that: (i) Optionee believes that the fair market value of the Conservation Easement is an amount equal to the Purchase Price; and (ii) Optionee does not have the power of eminent domain.

3.5 Waivers. No waiver of any breach of any covenant or provision herein contained shall be deemed a waiver of any preceding or succeeding breach thereof, or of any other covenant or provision herein contained.

3.6 Survival of Obligations. Notwithstanding any provision of this Agreement, the covenants, representations, warranties, hold harmless, defense and indemnification obligations made by each party herein shall survive the Closing.

3.7 Successors and Assigns. This Agreement shall be binding upon and shall inure to the benefit of the successors and assigns of the parties hereto.

3.8 Attorneys' Fees. If either party commences an action against the other to interpret or enforce any of the terms of this Agreement or because of the breach by the other party of any of the terms hereof, the losing party shall pay to the prevailing party reasonable attorneys' fees, costs and expenses and court costs and other costs of action incurred in connection with the prosecution or defense of such action, whether or not the action is prosecuted to a final judgment.

3.9 Memorandum of Option. Concurrently with the execution of this Agreement, Optionee and Optionor agree to execute, acknowledge and record a **"Memorandum of Agreement,"** which shall be in the form attached hereto as Exhibit C. Optionor and Optionee shall record the Memorandum of Agreement against the Property in the Official Records of Alamannce County within five (5) days after the Effective Date of this Agreement.

3.10 Entire Agreement. This Agreement (including all exhibits attached hereto) is the final expression of, and contains the entire agreement between, the parties with respect to the subject matter hereof and supersedes all prior understandings with respect thereto. This Agreement may not be modified, changed, supplemented, superseded, canceled or terminated, nor may any obligations hereunder be waived, except by written instrument signed by the party to be charged or by its agent duly authorized in writing or as otherwise expressly permitted herein. Notwithstanding any rule or maxim of construction to the contrary, any ambiguity or uncertainty shall not be construed against either Optionor Optionee based upon authorship of any of the provisions hereof.

3.11 Time of Essence. Optionor and Optionee hereby acknowledge and agree that time is strictly of the essence with respect to each and every term, condition, obligation and provision hereof and that failure to timely perform any of the terms, conditions, obligations or provisions hereof by either party shall constitute a material breach of and a non-curable default under this Agreement by the party so failing to perform.

3.12 Governing Law. The parties hereto acknowledge that this Agreement has been negotiated and entered into in the State of North Carolina. The parties hereto expressly agree that this Agreement shall be governed by, interpreted under, and construed and enforced in accordance with the laws of the State of North Carolina.

3.13 Counterparts. This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which, together, shall constitute one and the same instrument.

3.14 Recitals/Exhibits. The Recitals set forth in this Agreement and the exhibits referenced herein are incorporated herein by this reference.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the dates set forth below.

OPTIONEE:

WILDLANDS ENGINEERING, INC., a North Carolina corporation

By: _____

Print Name: _Shawn D. Wilkerson

Title: President

Date: 11-20-2011

OPTIONOR:

By:

By: _____

Print Name: **Walter Steven Payne**

Date: 11-15-11

By: _____

Print Name: **Pamela Mae Payne**

Date: 11-15-11

U.S. Fish & Wildlife Service

Endangered Species, Threatened Species,Federal Species of Concern, and Candidate Species,

Alamance County, North Carolina

Updated: 09-22-2010

Common Name	Scientific name	Federal Status	Record Status
Vertebrate:			
American eel	*Anguilla rostrata*	FSC	Current
Carolina darter	*Etheostoma collis lepidinion*	FSC	Probable/potential
Invertebrate:			
Carolina creekshell	*Villosa vaughaniana*	FSC	Current
Yellow lampmussel	*Lampsilis cariosa*	FSC	Historic
Vascular Plant:			
Buttercup phacelia	*Phacelia covillei*	FSC	Current
Sweet pinesap	*Monotropsis odorata*	FSC	Obscure
Nonvascular Plant:			
Lichen:			

Definitions of Federal Status Codes:
E = endangered. A taxon "in danger of extinction throughout all or a significant portion of its range."
T = threatened. A taxon "likely to become endangered within the foreseeable future throughout all or a significant portion of its range."
C = candidate. A taxon under consideration for official listing for which there is sufficient information to support listing. (Formerly "C1" candidate species.)
BGPA =Bald and Golden Eagle Protection Act. See below.
FSC = federal species of concern. A species under consideration for listing, for which there is insufficient information to support listing at this time. These species may or may not be listed in the future, and many of these species were formerly recognized as "C2" candidate species.
T(S/A) = threatened due to similarity of appearance. A taxon that is threatened due to similarity of appearance with another listed species and is listed for its protection. Taxa listed as T(S/A) are not

biologically endangered or threatened and are not subject to Section 7 consultation. See below.
EXP = experimental population. A taxon listed as experimental (either essential or nonessential). Experimental, nonessential populations of endangered species (e.g., red wolf) are treated as threatened species on public land, for consultation purposes, and as species proposed for listing on private land.
P = proposed. Taxa proposed for official listing as endangered or threatened will be noted as "PE" or "PT", respectively.

Bald and Golden Eagle Protection Act (BGPA):

In the July 9, 2007 Federal Register(72:37346-37372), the bald eagle was declared recovered, and removed (de-listed) from the Federal List of Threatened and Endangered wildlife. This delisting took effect August 8,2007. After delisting, the Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. 668-668d) becomes the primary law protecting bald eagles. The Eagle Act prohibits take of bald and golden eagles and provides a statutory definition of "take" that includes "disturb". The USFWS has developed National Bald Eagle Management Guidelines to provide guidance to land managers, landowners, and others as to how to avoid disturbing bald eagles. For mor information, visit http://www.fws.gov/migratorybirds/baldeagle.htm

Threatened due to similarity of appearance(T(S/A)):

In the November 4, 1997 Federal Register (55822-55825), the northern population of the bog turtle (from New York south to Maryland) was listed as T (threatened), and the southern population (from Virginia south to Georgia) was listed as T(S/A) (threatened due to similarity of appearance). The T(S/A) designation bans the collection and interstate and international commercial trade of bog turtles from the southern population. The T(S/A) designation has no effect on land management activities by private landowners in North Carolina, part of the southern population of the species. In addition to its official status as T(S/A), the U.S. Fish and Wildlife Service considers the southern population of the bog turtle as a Federal species of concern due to habitat loss.

Definitions of Record Status:
Current - the species has been observed in the county within the last 50 years.
Historic - the species was last observed in the county more than 50 years ago.
Obscure - the date and/or location of observation is uncertain.
Incidental/migrant - the species was observed outside of its normal range or habitat.
Probable/potential - the species is considered likely to occur in this county based on the proximity of known records (in adjacent counties), the presence of potentially suitable habitat, or both.

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 12/12/12
Name Of Project Foust Creek Mitigation Site	Federal Agency Involved FHWA - NCEEP
Proposed Land Use Stream and Wetland Restoration	County And State Alamance County, NC
PART II *(To be completed by NRCS)*	Date Request Received By NRCS 12/12/12

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply -- do not complete additional parts of this form).*	Yes ☑	No ☐	Acres Irrigated None	Average Farm Size 118

Major Crop(s) Corn	Farmable Land In Govt. Jurisdiction Acres: 240,623 % 86	Amount Of Farmland As Defined in FPPA Acres: 179,301 % 64
Name Of Land Evaluation System Used Alamance County LESA	Name Of Local Site Assessment System	Date Land Evaluation Returned By NRCS 12/17/12

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	20.3			
B. Total Acres To Be Converted Indirectly				
C. Total Acres In Site	20.3	0.0	0.0	0.0
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	0.0			
B. Total Acres Statewide And Local Important Farmland	1.1			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	0.0			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	60.0			
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	60	0	0	0

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points				
1. Area In Nonurban Use	15	15			
2. Perimeter In Nonurban Use	10	10			
3. Percent Of Site Being Farmed	20	20			
4. Protection Provided By State And Local Government	20	20			
5. Distance From Urban Builtup Area	15	15			
6. Distance To Urban Support Services	15	10			
7. Size Of Present Farm Unit Compared To Average	10	10			
8. Creation Of Nonfarmable Farmland	10	0			
9. Availability Of Farm Support Services	5	5			
10. On-Farm Investments	20	0			
11. Effects Of Conversion On Farm Support Services	10	0			
12. Compatibility With Existing Agricultural Use	10	0			
TOTAL SITE ASSESSMENT POINTS	160	105	0	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	60	0	0	0
Total Site Assessment *(From Part VI above or a local site assessment)*	160	105	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	165	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection:

Andrea Eckardt

From: Andrea Eckardt
Sent: Thursday, January 03, 2013 3:51 PM
To: 'May, Kristin - NRCS, Salisbury, NC'
Subject: RE: AD1006 Form - Alamance County - Foust Creek Mitigation Site
Attachments: AD1006 Foust Final.pdf

Kristin-
Attached is the completed Foust Creek Mitigation Site AD1006 form for your files.

Thanks again for your help.

Andrea

Andrea Spangler Eckardt
Wildlands Engineering, Inc.
704-332-7754 ext 101

From: May, Kristin - NRCS, Salisbury, NC [mailto:kristin.may@nc.usda.gov]
Sent: Monday, December 17, 2012 2:24 PM
To: Andrea Eckardt
Cc: Britt, Shauntae - NRCS, Burlington, NC
Subject: RE: AD1006 Form - Alamance County - Foust Creek Mitigation Site

HI Andrea-

Here is the other request.

Kristin

Kristin May
Resource Soil Scientist
USDA – NRCS
(704) 637-2400 x 104
(704) 754-6734 cell

From: Andrea Eckardt [mailto:aeckardt@wildlandseng.com]
Sent: Monday, December 17, 2012 10:30 AM
To: May, Kristin - NRCS, Salisbury, NC
Subject: AD1006 Form - Alamance County - Foust Creek Mitigation Site

Kristin-
Attached is the AD1006 form for the NCEEP Foust Creek Mitigation Site located in Alamance County.

Also attached is a soils map and USGS Topo map of the project site.

The soils breakdown is as follows

- Georgeville silty clay loam, 6-10% slopes (GbC3) - 0.3 acres
- Georgeville silty clay loam, 10-15% slopes (GbD3) - 3.7 acres
- Local alluvial land (Lc) - 15.2 acres
- Orange silt loam, 6-10% slopes (ObC2) - 1.1 acres

Please let me know if you need any additional information to complete the AD1006 Form.

Have a great holiday.

Andrea

Andrea Spangler Eckardt
Senior Environmental Planner
Wildlands Engineering, Inc.
1430 South Mint Street, Suite 104
Charlotte, NC 28203
704-332-7754 ext 101
www.wildlandseng.com

WILDLANDS
ENGINEERING

December 14, 2012

Dale Suiter
US Fish and Wildlife Service
Raleigh Field Office
P.O. Box 33726
Raleigh, NC 27636

Subject: **Foust Creek Mitigation Site**
Alamance County, North Carolina

Dear Mr. Suiter,

The Foust Creek Mitigation Site has been identified for the purpose of providing in-kind mitigation for unavoidable stream channel and wetland impacts. Several sections of stream channels throughout the site have been identified as significantly degraded as a result of past agricultural activities, specifically cattle operations.

Please provide comments on any possible issues that might emerge with respect to migratory birds or other trust resources from the construction of a stream and wetland restoration project on the subject property. A USGS map showing the approximate property lines and area of potential ground disturbance is enclosed. The figure was prepared from the Snow Camp, NC 7.5-Minute Topographic Quadrangle.

If we have not heard from you in 30 days we will assume that you do not have any comments regarding associated laws and that you do not have any information relevant to this project at the current time.

We thank you in advance for your timely response and cooperation. Please feel free to contact us with any questions that you may have concerning the extent of site disturbance associated with this project.

Sincerely,

Andrea S. Eckardt

Andrea S. Eckardt
Senior Environmental Planner

Attachment:
USGS Topographic Map

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

January 11, 2013

Andrea Eckardt
Wildlands Engineering
1430 South Mint Street, Suite 104
Charlotte, NC 28203

Re: Foust Creek Mitigation Site- Alamance County, NC

Dear Ms. Eckardt:

This letter is to inform you that a list of all federally-protected endangered and threatened species with known occurrences in North Carolina is now available on the U.S. Fish and Wildlife Service's (Service) web page at http://www.fws.gov/raleigh. Therefore, if you have projects that occur within the Raleigh Field Office's area of responsibility (see attached county list), you no longer need to contact the Raleigh Field Office for a list of federally-protected species.

Our web page contains a complete and frequently updated list of all endangered and threatened species protected by the provisions of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)(Act), and a list of federal species of concern[1] that are known to occur in each county in North Carolina.

Section 7 of the Act requires that all federal agencies (or their designated non-federal representative), in consultation with the Service, insure that any action federally authorized, funded, or carried out by such agencies is not likely to jeopardize the continued existence of any federally-listed endangered or threatened species. A biological assessment or evaluation may be prepared to fulfill that requirement and in determining whether additional consultation with the Service is necessary. In addition to the federally-protected species list, information on the species' life histories and habitats and information on completing a biological assessment or evaluation and can be found on our web page at http://www.fws.gov/raleigh. Please check the web site often for updated information or changes.

---

[1] The term "federal species of concern" refers to those species which the Service believes might be in need of concentrated conservation actions. Federal species of concern receive no legal protection and their designation does not necessarily imply that the species will eventually be proposed for listing as a federally endangered or threatened species. However, we recommend that all practicable measures be taken to avoid or minimize adverse impacts to federal species of concern.

If your project contains suitable habitat for any of the federally-listed species known to be present within the county where your project occurs, the proposed action has the potential to adversely affect those species. As such, we recommend that surveys be conducted to determine the species' presence or absence within the project area. The use of North Carolina Natural Heritage program data should not be substituted for actual field surveys.

If you determine that the proposed action may affect (i.e., likely to adversely affect or not likely to adversely affect) a federally-protected species, you should notify this office with your determination, the results of your surveys, survey methodologies, and an analysis of the effects of the action on listed species, including consideration of direct, indirect, and cumulative effects, before conducting any activities that might affect the species. If you determine that the proposed action will have no effect (i.e., no beneficial or adverse, direct or indirect effect) on federally listed species, then you are not required to contact our office for concurrence (unless an Environmental Impact Statement is prepared). However, you should maintain a complete record of the assessment, including steps leading to your determination of effect, the qualified personnel conducting the assessment, habitat conditions, site photographs, and any other related articles.

With regard to the above-referenced project, we offer the following remarks. Our comments are submitted pursuant to, and in accordance with, provisions of the Endangered Species Act.

Based on the information provided and other information available, it appears that the proposed action is not likely to adversely affect any federally-listed endangered or threatened species, their formally designated critical habitat, or species currently proposed for listing under the Act at these sites. We believe that the requirements of section 7(a)(2) of the Act have been satisfied for your project. Please remember that obligations under section 7 consultation must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered; (2) this action is subsequently modified in a manner that was not considered in this review; or, (3) a new species is listed or critical habitat determined that may be affected by the identified action.

However, the Service is concerned about the potential impacts the proposed action might have on aquatic species. Aquatic resources are highly susceptible to sedimentation. Therefore, we recommend that all practicable measures be taken to avoid adverse impacts to aquatic species, including implementing directional boring methods and stringent sediment and erosion control measures. An erosion and sedimentation control plan should be submitted to and approved by the North Carolina Division of Land Resources, Land Quality Section prior to construction. Erosion and sedimentation controls should be installed and maintained between the construction site and any nearby down-gradient surface waters. In addition, we recommend maintaining natural, vegetated buffers on all streams and creeks adjacent to the project site.

The North Carolina Wildlife Resources Commission has developed a Guidance Memorandum (a copy can be found on our website at (http://www.fws.gov/raleigh) to address and mitigate secondary and cumulative impacts to aquatic and terrestrial wildlife resources and water quality. We recommend that you consider this document in the development of your projects and in completing an initiation package for consultation (if necessary).

We hope you find our web page useful and informative and that following the process described above will reduce the time required, and eliminate the need, for general correspondence for species' lists. If you have any questions or comments, please contact John Ellis of this office at (919) 856-4520 ext. 26.

Sincerely,

Pete Benjamin
Field Supervisor

WILDLANDS
ENGINEERING

December 14, 2012

Shannon Deaton
North Carolina Wildlife Resource Commission
Division of Inland Fisheries
1721 Mail Service Center
Raleigh, NC 27699

Subject: **Foust Creek Mitigation Site**
Alamance County, North Carolina

Dear Ms. Deaton,

The purpose of this letter is to request review and comment on any possible issues that might emerge with respect to fish and wildlife issues associated with a potential stream and wetland restoration project on the attached site. A USGS map showing the approximate property lines and areas of potential ground disturbance is enclosed. The figure was prepared from the Snow Camp, NC 7.5-Minute Topographic Quadrangles.

The Foust Site has been identified for the purpose of providing in-kind mitigation for unavoidable stream channel and wetland impacts. Several sections of channel throughout the site have been identified as significantly degraded as a result of past agricultural activities, specifically cattle operations.

We thank you in advance for your timely response and cooperation. Please feel free to contact us with any questions that you may have concerning the extent of site disturbance associated with this project.

Sincerely,

Andrea S. Eckardt

Andrea S. Eckardt
Senior Environmental Planner

Attachment:
USGS Topographic Map

1430 South Mint Street, Suite 104, Charlotte, NC 28203 ◦ (P) 704-332-7754 ◦ (F) 704-332-3306

North Carolina Wildlife Resources Commission

Gordon Myers, Executive Director

10 January 2013

Andrea S. Eckardt, Senior Environmental Planner
Wildlands Engineering
1430 South Mint Street, Suite 104
Charlotte, NC 28203

Subject: Foust Creek Mitigation Site, Alamance County, North Carolina.

Dear Ms. Eckardt:

Biologists with the North Carolina Wildlife Resources Commission have reviewed the subject information. Our comments are provided in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667e) and North Carolina General Statutes (G.S. 113-131 et seq.).

The proposed project would provide in-kind mitigation for unavoidable stream and wetland impacts. Several sections of channel throughout the site have been identified as significantly degraded from past agricultural activities including cattle operations. The project site includes Foust Creek, a tributary to Cane Creek in the Cape Fear River basin. There are records for the federal species of concern and state endangered Carolina creekshell (*Villosa vaughaniana*), the state special concern notched rainbow (*Villosa constricta*), and the state significantly rare Eastern creekshell (*Villosa delumbis*) in Cane Creek.

Stream restoration projects often improve water quality and aquatic habitat. Establishing native, forested buffers in riparian areas will help protect water quality, improve aquatic and terrestrial habitats, and provide a travel corridor for wildlife species. Provided measures are taken to minimize erosion and sedimentation from construction/restoration activities, we do not anticipate the project to result in significant adverse impacts to aquatic and terrestrial wildlife resources.

Thank you for the opportunity to review this proposed project. If we can provide further assistance, please contact our office at (336) 449-7625 or shari.bryant@ncwildlife.org.

Sincerely,

Shari L. Bryant

Shari L. Bryant
Piedmont Region Coordinator
Habitat Conservation Program

ec: Ryan Heise, NCWRC

Mailing Address: Division of Inland Fisheries • 1721 Mail Service Center • Raleigh, NC 27699-1721
Telephone: (919) 707-0220 • **Fax:** (919) 707-0028

Foust Creek Mitigation Site

Categorical Exclusion

Figures

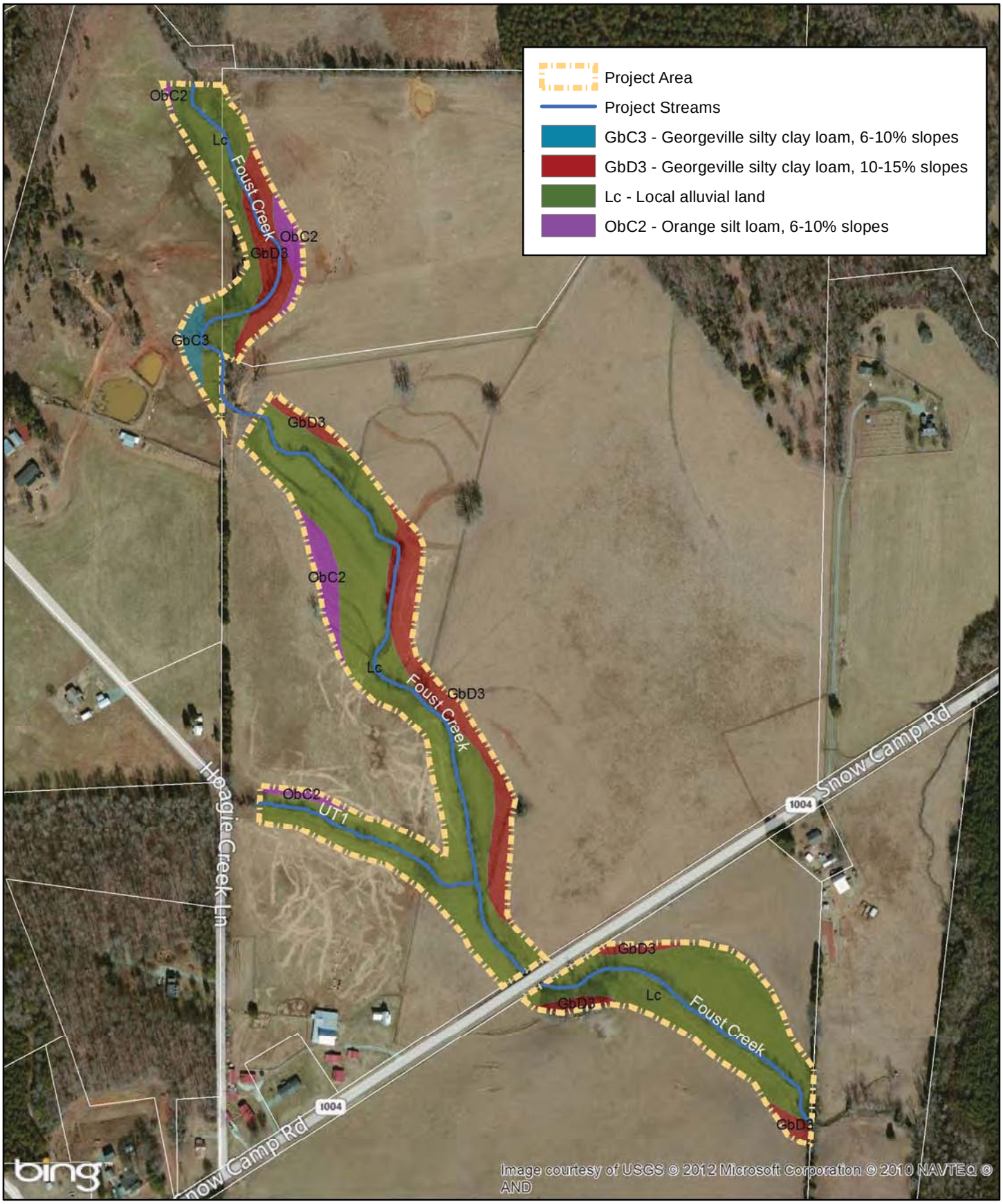
WILDLANDS ENGINEERING

0 500 1,000 Feet

N

USGS Topographic Map
Foust Creek Mitigation Site
Cape Fear River Basin (03030002)

Alamance County, NC



WILDLANDS ENGINEERING

0 250 500 Feet

N

Soils Map
Foust Creek Mitigation Site
Cape Fear River Basin (03030002)

Alamance County, NC

Appendix 8 Floodplain Requirements Checklist

EEP Floodplain Requirements Checklist

This form was developed by the National Flood Insurance program, NC Floodplain Mapping program and Ecosystem Enhancement Program to be filled for all EEP projects. The form is intended to summarize the floodplain requirements during the design phase of the projects. The form should be submitted to the Local Floodplain Administrator with three copies submitted to NFIP (attn. State NFIP Engineer), NC Floodplain Mapping Unit (attn. State NFIP Coordinator) and NC Ecosystem Enhancement Program.

Project Location

Name of project:	Foust Creek Mitigation Site
Name if stream or feature:	Foust Creek and an unnamed tributary to Foust Creek (UT1)
County:	Alamance
Name of river basin:	Cape Fear
Is project urban or rural?	Rural
Name of Jurisdictional municipality/county:	Alamance
DFIRM panel number for entire site:	8788 and 8879
Consultant name:	Wildlands Engineering Inc. Mike Fowler, PE
Phone number:	434.202.8642
Address:	Wildlands Engineering, Inc. 1430 South Mint Street, Suite 104 Charlotte, NC 28203

Design Information

Provide a general description of project (one paragraph). Include project limits on a reference orthophotograph at a scale of 1" = 500".

Wildlands Engineering is designing a stream and wetland restoration project to provide stream and wetland mitigation units (SMUs and WMUs) for the NC Ecosystem Enhancement Program. Foust Creek is mapped as ZONE AE and is in a detailed study area as represented on DFIRM panels 8788 and 8879. *UT1 to Foust Creek is not mapped. See Figure 2 and 8 of the Foust Creek Mitigation Plan for project limits on a reference orthophotograph and a copy of the FEMA flood map*

Summarize stream reaches or wetland areas according to their restoration priority.

Example

Reach	Length / Acreage	Priority
Foust Creek Reach 1	*814*	*Enhancement II*
Foust Creek Reach 2	*2438*	*Priority I Restoration*
Foust Creek Reach 3A	*340*	*Priority I Restoration*
Foust Creek Reach 3B	*1203*	*Enhancement II* *Priority I/II Restoration*
UT1 to Foust Creek	*788*	*Priority I/II Restoration*
Wetland RW-1	*0.03*	*Rehabilitation*
Wetland RW-2	*0.11*	*Rehabilitation*
Wetland RW-3	*0.27*	*Rehabilitation*
Wetland RW-4	*0.71*	*Rehabilitation / Re-establishment*
Wetland RW-5	*2.85*	*Rehabilitation / Re-establishment*
Wetland RW-6	*1.10*	*Rehabilitation / Re-establishment*
Wetland RW-7	*1.73*	*Rehabilitation / Re-establishment*

Floodplain Information

Is project located in a Special Flood Hazard Area (SFHA)?

☉ Yes ○ No

If project is located in a SFHA, check how it was determined:

☐ Redelineation

☑ Detailed Study

☐ Limited Detail Study

☐ Approximate Study

☐ Don't know

List flood zone designation:

Check if applies:

☑ AE Zone

- ◉ Floodway
- ○ Non-Encroachment
- ○ None

☐ A Zone

- ○ Local Setbacks Required
- ◉ No Local Setbacks Required

If local setbacks are required, list how many feet:

Does proposed channel boundary encroach outside floodway/non-encroachment/setbacks?

○ Yes ○ No

Land Acquisition (Check)

☐ State owned (fee simple)

☐ Conservation easment (Design Bid Build)

☑ Conservation Easement (Full Delivery Project)

Note: if the project property is state-owned, then all requirements should be addressed to the Department of Administration, State Construction Office (attn: Herbert Neily, (919) 807-4101)

Is community/county participating in the NFIP program?

◉ Yes ○ No

Note: if community is not participating, then all requirements should be addressed to NFIP (attn: State NFIP Engineer, (919) 715-8000)

Name of Local Floodplain Administrator: Jason S. Martin
Phone Number: 336.570.4052

Floodplain Requirements

This section to be filled by designer/applicant following verification with the LFPA

☐ No Action

☐ No Rise

☐ Letter of Map Revision

☑ Conditional Letter of Map Revision

☐ Other Requirements

List other requirements:

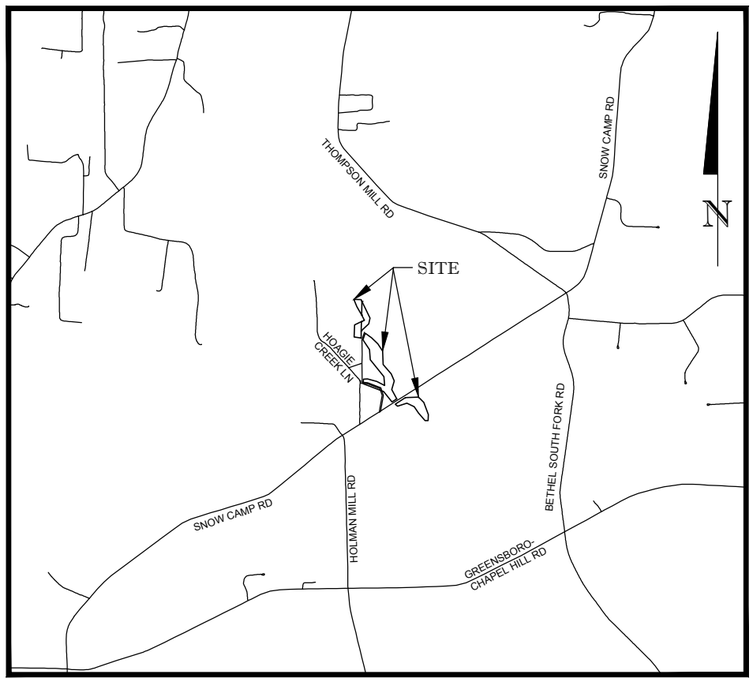
Comments:

Name: Mike Fowler, PE Signature:

Title: Senior Water Resources Engineer Date: 10 - 2 - 2013

Foust Creek Mitigation Site

Cape Fear River Basin HUC 03030002
Alamance County, NC
for
North Carolina Ecosystem Enhancement Program



Vicinity Map
Not to Scale

Ecosystem Enhancement PROGRAM

BEFORE YOU DIG!
CALL 1-800-632-4949
N.C. ONE-CALL CENTER
IT'S THE LAW!

FINAL PLANS
ISSUED JAN. 31, 2014

Sheet Index

Project Directory

Surveying:
Turner Land Surveying, PLLC
P.O. Box 41023
Raleigh, NC 27629
David S. Turner, PLS
919-875-1378

Engineering:
Wildlands Engineering, Inc
License No. F-0831
5605 Chapel Hill Road
Raleigh, NC 27607
Angela N Gardner, PE
919-851-9986

Owner:
NC Ecosystem
Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652
Perry Sugg
919-707-8937
EEP Project ID: 95715

Directions to Project Site

The Site is located in south Alamance County, south of Burlington. From Burlington take Route 87 south 10.9 miles. Turn right on Snow Camp Rd. Travel 4.0 miles. Site is to the north and south of Snow Camp Rd. at the crossing with Foust Creek.

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

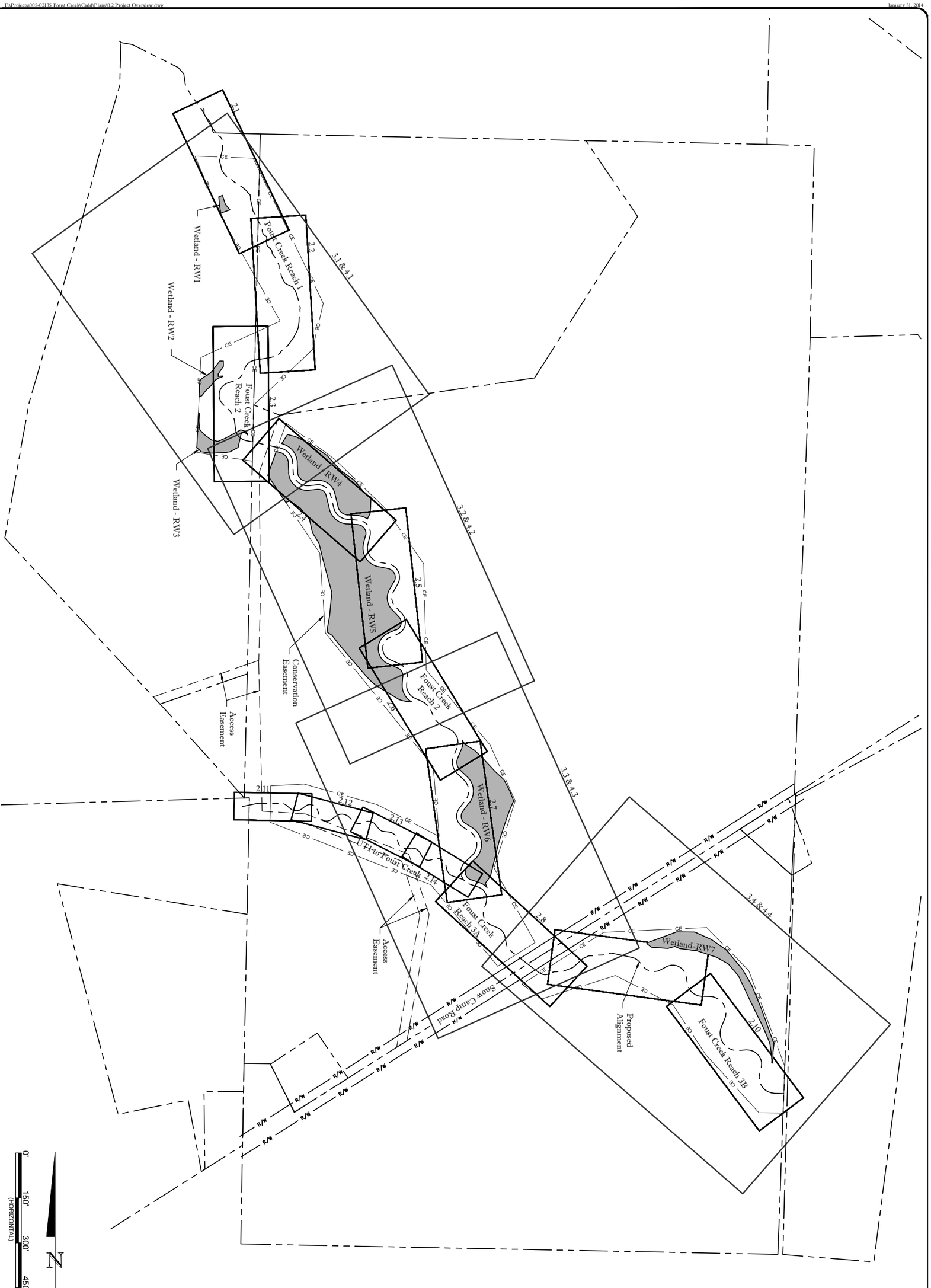
Foust Creek Mitigation Site
Alamance County, NC

Title Sheet

Revisions:

Date: 01.31.2014
Job Number: 095-02315
Project Engineer: ANG
Drawn By: CLM
Checked By: SDW

Sheet 0.1



Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

0.2

Sheet

Revisions:

Foust Creek Mitigation Site
Alamance County, NC

Project Overview

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

WILDLANDS
ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831

January 31, 2014

General Construction Notes for all Reaches

1) All erosion and sediment control practices shall comply with the North Carolina Erosion and Sediment Control Planning and Design Manual
2) Contractor will install pump-around systems to divert flow while working in live, flowing channels. The Contractor shall operate and maintain the pump-around system 24 hours a day unless all disturbed areas within the pump-around work area can be stabilized by the end of the work day. Contractor shall not remove pump-around systems and advance to the next work area until the current work area is completed and stabilized.
3) No material from the off-line proposed stream channel excavation many be backfilled into the adjacent existing stream channel until the newly-constructed proposed stream section is completed, stabilized, and the stream flow has been diverted into it, not even if that section of old/ existing stream is being pumped.
4) In areas without a pump-around system, Contractor shall disturb only as much channel bank as can be stabilized with temporary seeding, mulch and erosion control matting by the end of each work day.
5) When crossing an active section of new or old stream channel, a Timber Mat shall be installed according to the details and specifications.
6) All graded areas with slopes steeper than 3:1 will be stabilized within seven working days. All other areas will be stabilized within 14 days.
7) Locations for staging and stockpile areas and stream crossings have been provided on the Plans. Additional or alternative staging and/or stockpile areas and stream crossings may be used by the Contractor provided that all practices comply with the North Carolina Erosion and Sediment Control Planning and Design manual and the area is approved by the Engineer prior to implementation.
8) Various types of constructed riffles are specified on the plans. Contractor shall build the specific types of constructed riffles at locations shown on the Plans. Changes in constructed riffle type must be approved by the Engineer.
9) Contractor is to make every effort to avoid damaging or removing existing trees. Contractor will preserve trees within the Limits of Disturbance as directed by the Engineer. No work shall occur within the drip line of trees identified to be preserved.
10) Under no circumstances will the Contractor exceed the limits of disturbance shown on the Plans.

Construction Sequence

Foust Creek Mitigation Site construction will follow the construction sequence protocol as described below, unless otherwise noted.

Initial Site Preparation

1) Contact North Carolina "ONE CALL" Center (1.800.632.4949) before any excavation.
2) Contact Land Quality (336-771-5000) before any work begins on the project and notify them of the start date.
3) Mobilize equipment and materials to the Site.
4) Identify and establish construction entrance, staging and stockpile areas, haul roads, silt fencing, tree protection fencing and temporary stream crossings as indicated on the Plans for work areas. Note: all construction traffic will enter the site from the construction entrances shown on the Plans at Snow Camp Road.
5) All haul roads shall be monitored for sediment loss on a daily basis. In the event of sediment loss, silt fence or other acceptable sediment and erosion control practices shall be installed. Silt fence outlets shall be located at points of low elevation or a minimum spacing of 150 ft.
6) Set up temporary facilities, locate equipment within the staging area, and stockpile materials needed for the initial stages of construction within the stockpile area(s).
7) Install and maintain an onsite rain gauge and log book to record the rainfall amounts and dates. Complete the self-inspection as required by DENR permit.

Foust Creek and UT1 Construction

1) Perform any necessary clearing and grubbing in phases as work progresses. Bank vegetation and vegetation immediately adjacent to live channels shall be left undisturbed as long as possible. Remove all non-native and invasive vegetation prior to beginning the channel construction.
2) Harvest existing Tag Alders for transplanting as directed by engineer. Transplants should be kept in a shaded place and watered appropriately.
3) Construction should generally progress from upstream to downstream to prevent sediment runoff from upstream construction on completed downstream reaches and use a pump around as shown on the plans and discussed in the General Notes.
4) Where feasible, more than one offline section may be constructed concurrently. Offline sections shall be tied online sequentially from downstream to upstream.
5) As work progresses, remove and stockpile the top three inches of soil from the active grading area. Stockpiled topsoil shall be kept separate for onsite replacement prior to floodplain seeding.
6) Construct proposed stream channel to the grade specified in the cross sections and profile. Transfer coarse material from abandoned channel riffles to new channel riffles utilizing a pump around when doing so.
7) Grade the adjacent floodplain and wetland areas according to the grades shown on the plans.
8) Install structures (log vane, j-hook log vane, log sills, constructed riffles etc.) and in-bank bioengineering such as brush toe after channel grading is completed.
9) Construct stream crossings as shown in the plans and details and as directed by the Engineer.
10) Seed, mat and mulch streambanks.
11) Backfill abandoned channel sections with stockpiled soil according to the grades shown on the Plans. Non-native and invasive vegetation (e.g. privet, multiflora rose, Japanese honeysuckle) shall be removed from the existing channel prior to backfilling.
12) Prepare floodplain for seeding by applying stockpiled topsoil to the floodplain between bankfull elevation and the grading limits, ripping and raking/smoothing. Seed and mulch. Any areas within the conservation easement that have not been graded shall be treated according to the planting plan.
13) If at any time a circumstance should arise where water has been turned into the new channel and additional work must be done on the floodplain, silt fence will be installed along the new channel to protect it from sedimentation.
14) Once all phases of channel, floodplain, and wetland construction are complete, prepare the floodplain and wetland areas for planting per the specifications.

Fencing

1) install 5-strand barbed wire fencing and gates, offset one foot outside of the conservation easement as shown on the plans and according to the specifications and details.

Construction Demobilization

1) Remove temporary stream crossings
2) Contractor shall ensure that the site is free of trash and leftover materials prior to demobilization of equipment from the site.
3) Complete the removal of any additional stockpiled material from the site.
4) Demobilize grading equipment from the site.
5) All rock and other stockpiled materials must be removed from the limits of disturbance and conservation easement. All areas outside the conservation easement shall be returned to pre-project conditions or better.
6) Seed, mulch, and stabilize staging areas, stockpile areas, haul roads, and construction entrances. Pasture seed mix is to be applied to areas of disturbance outside of the conservation easement. Remove all temporary fencing.

Existing Features

- Existing Property Boundary
- Existing 1' Minor Contour
- Existing 5' Major Contour
- Existing Fenceline
- Existing Thalweg
- Existing Right of Way (R/W)
- Existing Overhead Electric Line (OHE)
- Existing Edge of Pavement
- Existing Overhead Electric Pole
- Existing Concrete Structure
- Existing Ford Crossing
- Existing Farm Road
- Existing Bedrock/Boulders/Outcrop
- Existing Wetlands
- Existing Treeline
- Existing Tree
- Existing Telephone Box (T)

Proposed Features

- Proposed Limits of Disturbance (LOD)
- Proposed Conservation Easement (CE)
- Proposed Stream Alignment (10+00)
- Proposed Bankfull
- Proposed 5' Major Contour
- Proposed 1' Minor Contour
- Proposed Constructed Riffle (CR-X) See Details 1-4, Sheet 7.1
- Proposed Angled Log Sill See Detail 2, Sheet 7.2
- Proposed Angled Log Step Pool See Detail 3, Sheet 7.2
- Proposed Log J-Hook See Detail 4, Sheet 7.2
- Proposed Brush Toe See Details 1 & 2, Sheet 7.3
- Proposed Rock A-Vane See Detail 1, Sheet 7.2
- Proposed Live Transplanted Woody Vegetation
- Proposed Log Vane See Detail 3, Sheet 7.4
- Proposed Rock Cross Vane See Detail 4, Sheet 7.4
- Proposed Boulder Sill See Detail 1, Sheet 7.5
- Proposed Permanent Ford Crossing See Detail 2, Sheet 7.5
- Permanent Culvert Crossing See Details 1 & 2, Sheet 7.6
- Proposed Wetland Rehabilitation
- Proposed Wetland Re-establishment
- Proposed Permanent Fence See Detail 2, Sheet 7.8
- Proposed Fence Gate See Detail 1, Sheet 7.8

Erosion Control

- Proposed Construction Entrance See Detail 2, Sheet 7.7
- Proposed Silt Fence See Detail 3, Sheet 7.5
- Silt Fence Outlet See Detail 4, Sheet 7.7
- Proposed Temporary Stream Crossing (Timber Mat) See Detail 4, Sheet 7.5
- Proposed Pump Around See Detail 1, Sheet 7.7
- Proposed Haul Road
- Proposed Stockpile/ Staging Area
- Limits Of Disturbance (LOD)
- Tree Protection Fencing (SAF) See Detail 3, Sheet 7.7

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831

PRELIMINARY DO NOT USE FOR CONSTRUCTION

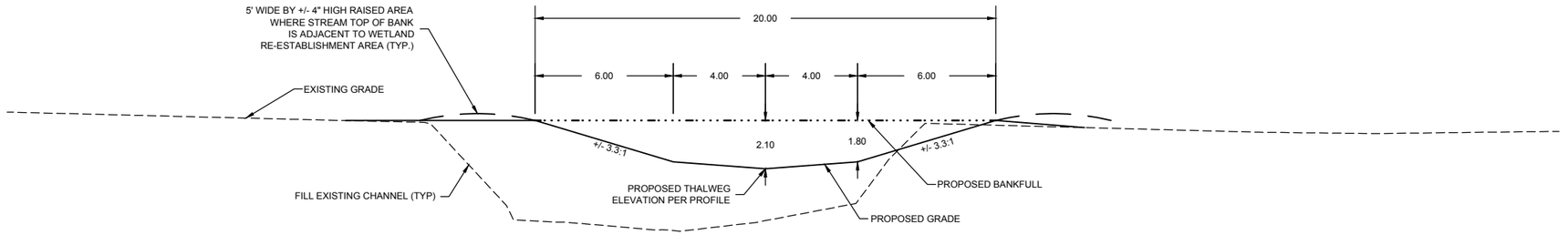
Foust Creek Mitigation Site
Alamance County, NC

General Notes and Symbols

Revisions:

Date: 01.31.2014
Job Number: 005-03135
Project Engineer: ANC
Drawn By: CTM
Checked By: SDW

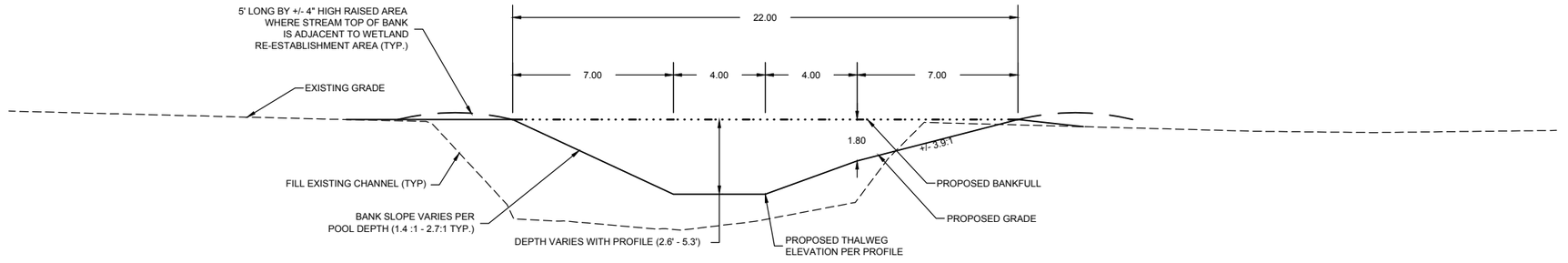
Sheet 0.3



Foust Creek Reach 2 - Typical Section: Riffle

STA: 110+00 to 114+42 and 115+27 to 135+23

Not to Scale



Foust Creek Reach 2 - Typical Section: Pool

STA: 110+00 to 114+42 and 115+27 to 135+23

Not to Scale

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

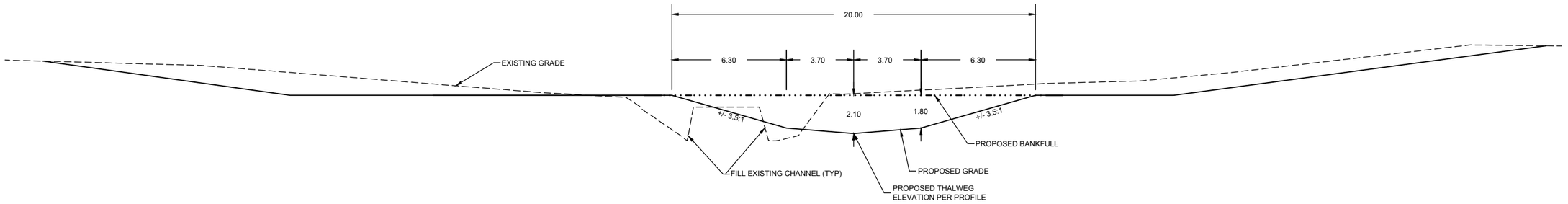
Foust Creek Mitigation Site
Alamance County, NC

Foust Creek Reach 2
Typical Sections

Revisions:

Date: 01.31.2014
Job Number: 005-02135
Project Engineer: ANC
Drawn By: CLM
Checked By: SDW

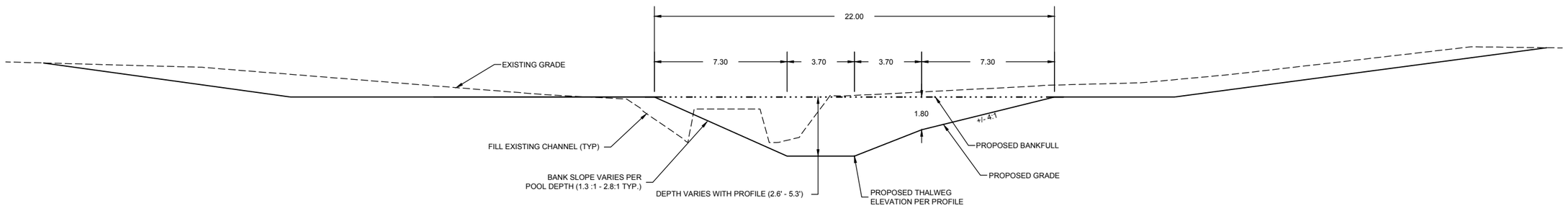
Sheet 1.1



Foust Creek Reach 3A - Typical Section: Riffle

STA: 135+23 to 138+44

Not to Scale



Foust Creek Reach 3A - Typical Section: Pool

STA: 135+23 to 138+44

Not to Scale

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. P-0831

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

Foust Creek Mitigation Site
Alamance County, NC

Foust Creek Reach 3A
Typical Sections

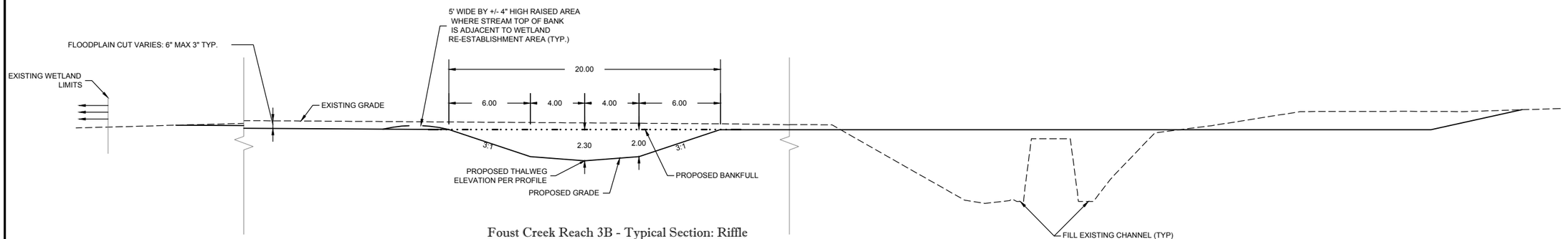
Revisions:

Date: 01.31.2014
Job Number: 005-02135
Project Engineer: ANC
Drawn By: CLM
Checked By: SDW

1.2
Sheet

January 31, 2014

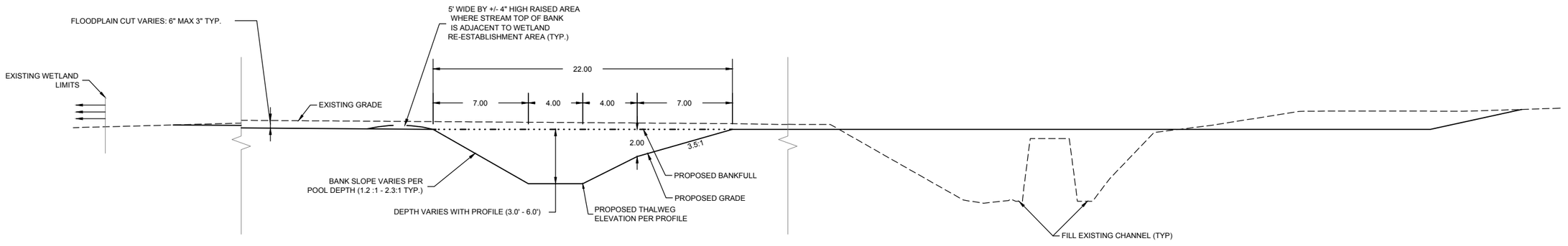
P:\Projects\005-02135 Foust Creek\Co-Ord\Plans\02135 Typical Sections.dgn



Foust Creek Reach 3B - Typical Section: Riffle

STA: 142+74 to 151+30

Not to Scale



Foust Creek Reach 3B - Typical Section: Pool

STA: 142+74 to 151+30

Not to Scale

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. P-0831

PRELIMINARY DO NOT USE FOR CONSTRUCTION

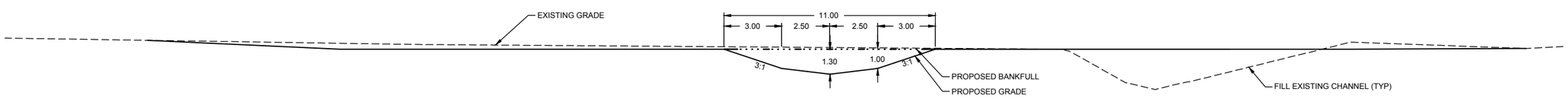
Foust Creek Mitigation Site
Alamance County, NC

Foust Creek Reach 3B
Typical Sections

Revisions:

Date:	01.31.2014
Job Number:	005-03135
Project Engineer:	ANG
Drawn By:	CTM
Checked By:	SDW

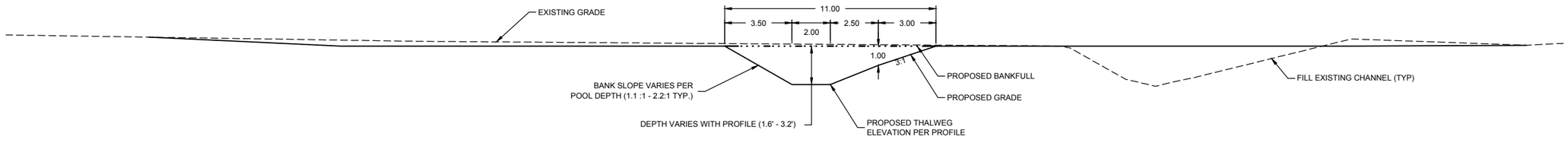
Sheet 1.3



UT1 to Foust Creek - Typical Section: Riffle

STA: 200+94 to 208+82

Not to Scale



UT1 to Foust Creek - Typical Section: Pool

STA: 200+94 to 208+82

Not to Scale

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

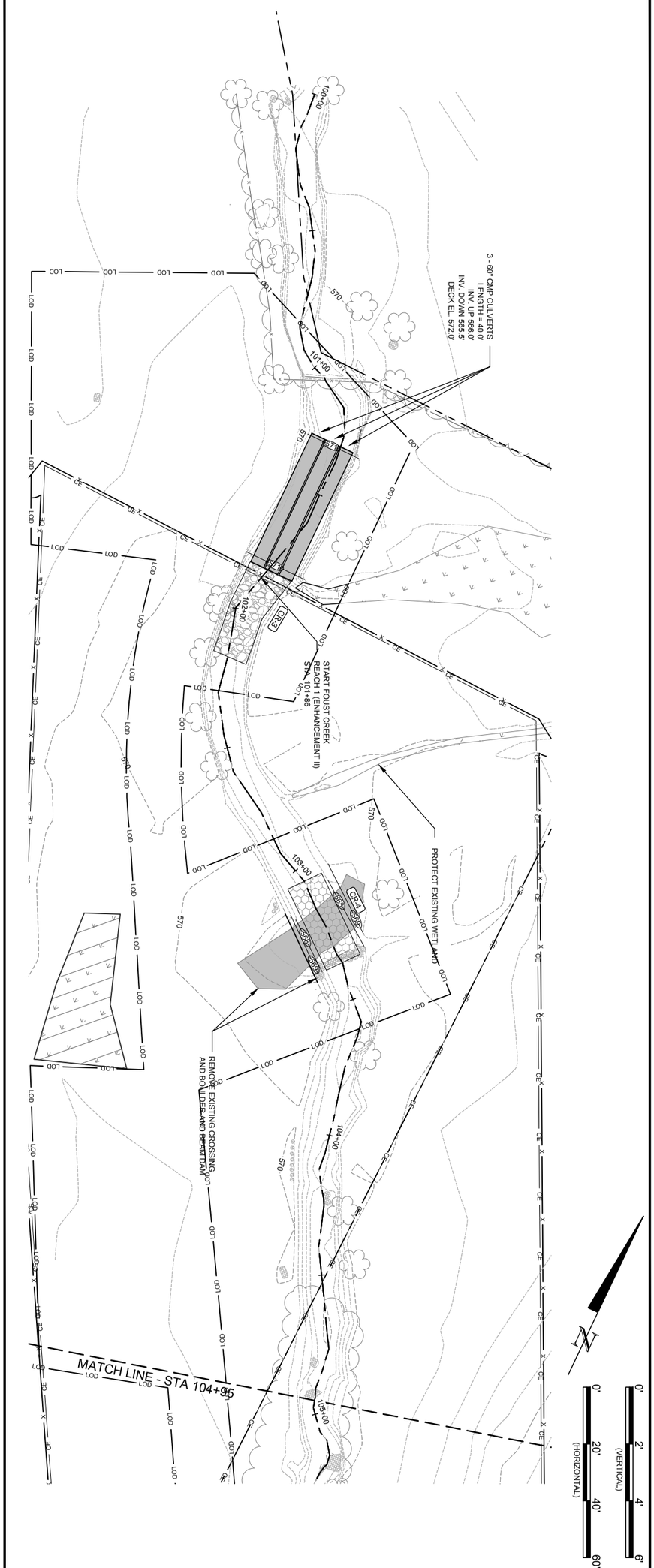
Foust Creek Mitigation Site
Alamance County, NC

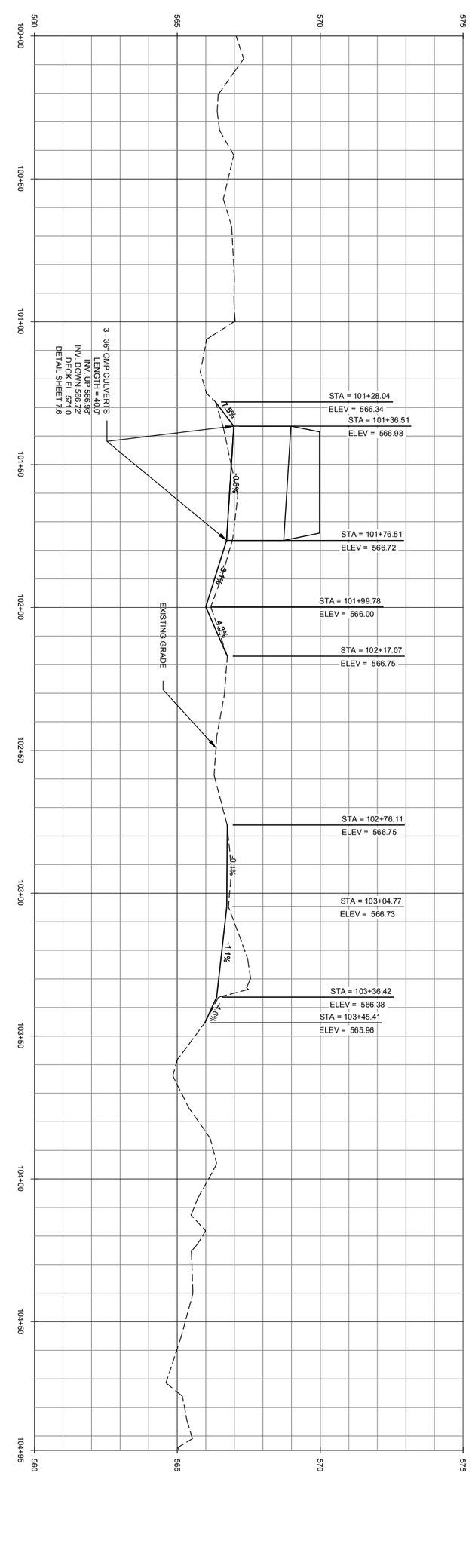
UT1 to Foust Creek
Typical Sections

Revisions:

Date:	01.31.2014
Job Number:	005-03135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

Sheet 1.4





Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

2.1
Sheet

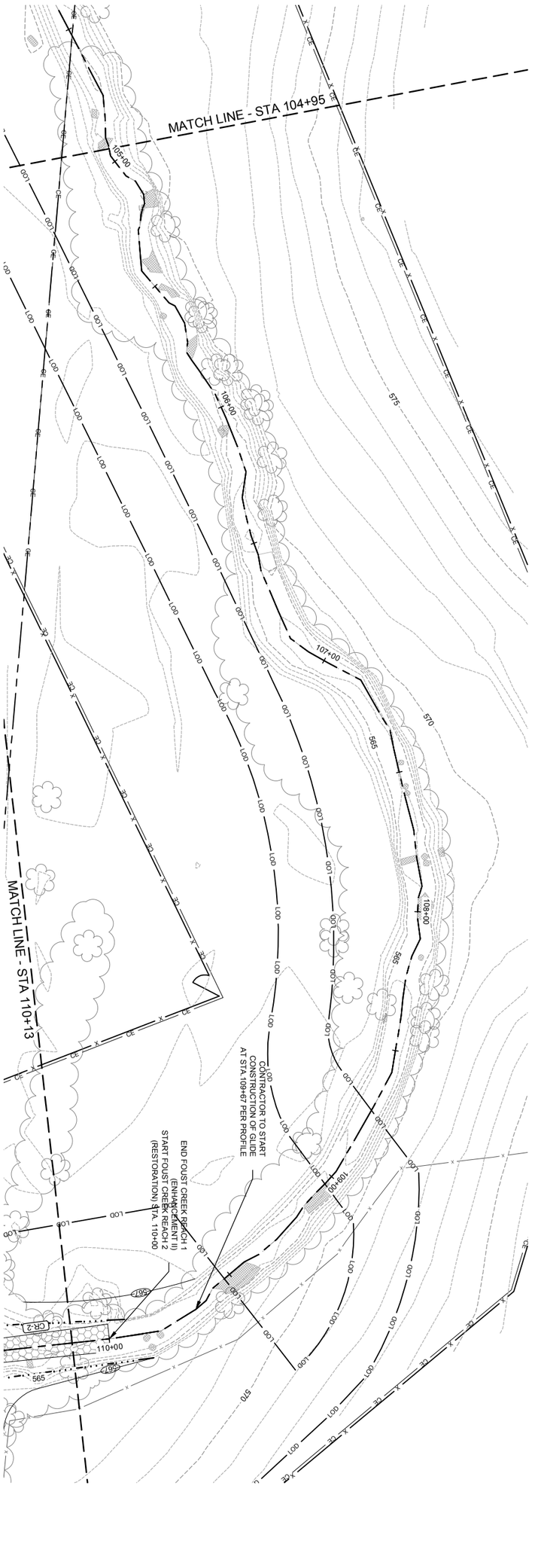
Revisions:

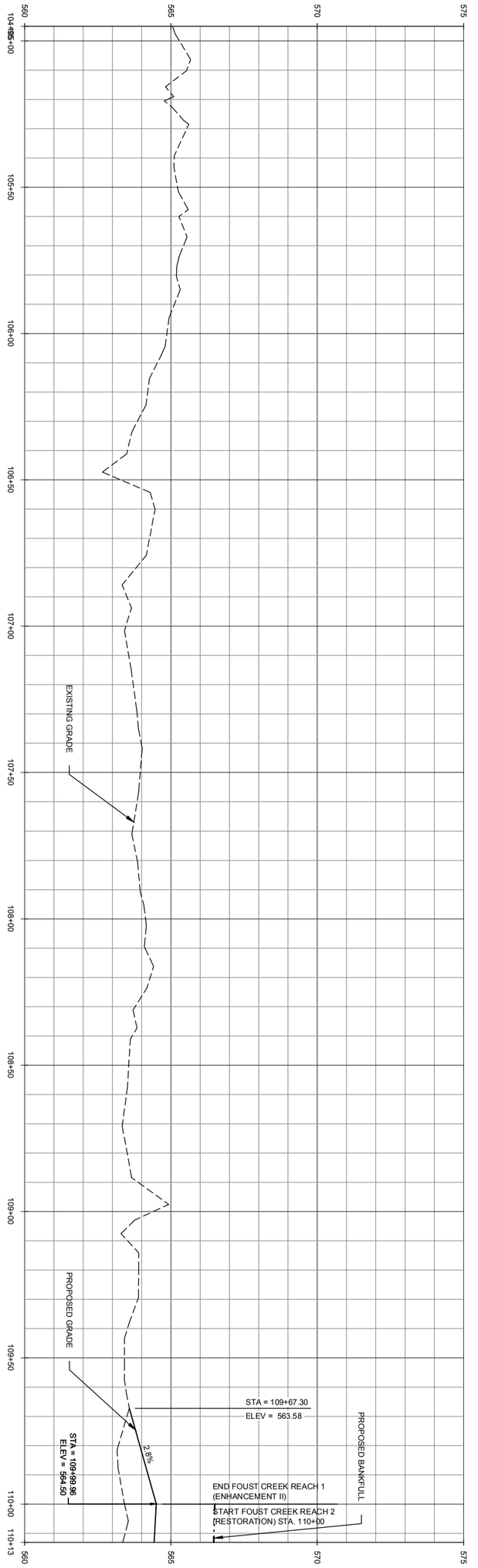
Foust Creek Mitigation Site
Alamance County, NC

Foust Creek
Stream Plan and Profile

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

WILDLANDS
ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831





Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

2.2
Sheet

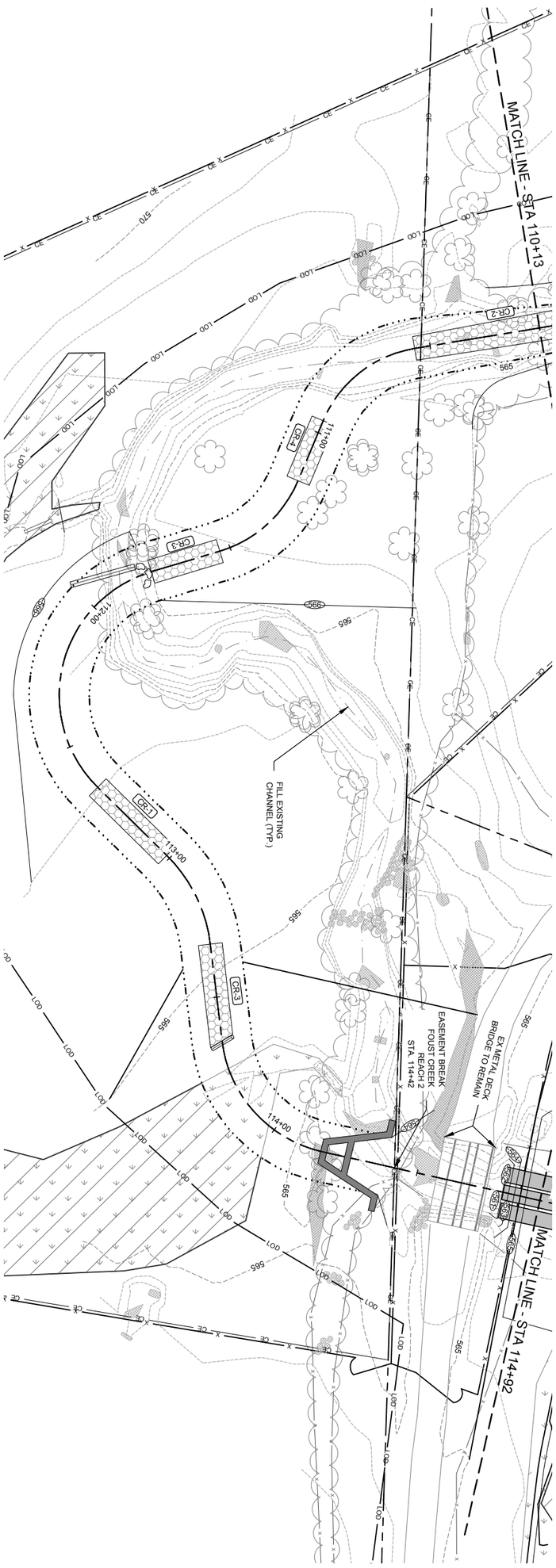
Revisions:

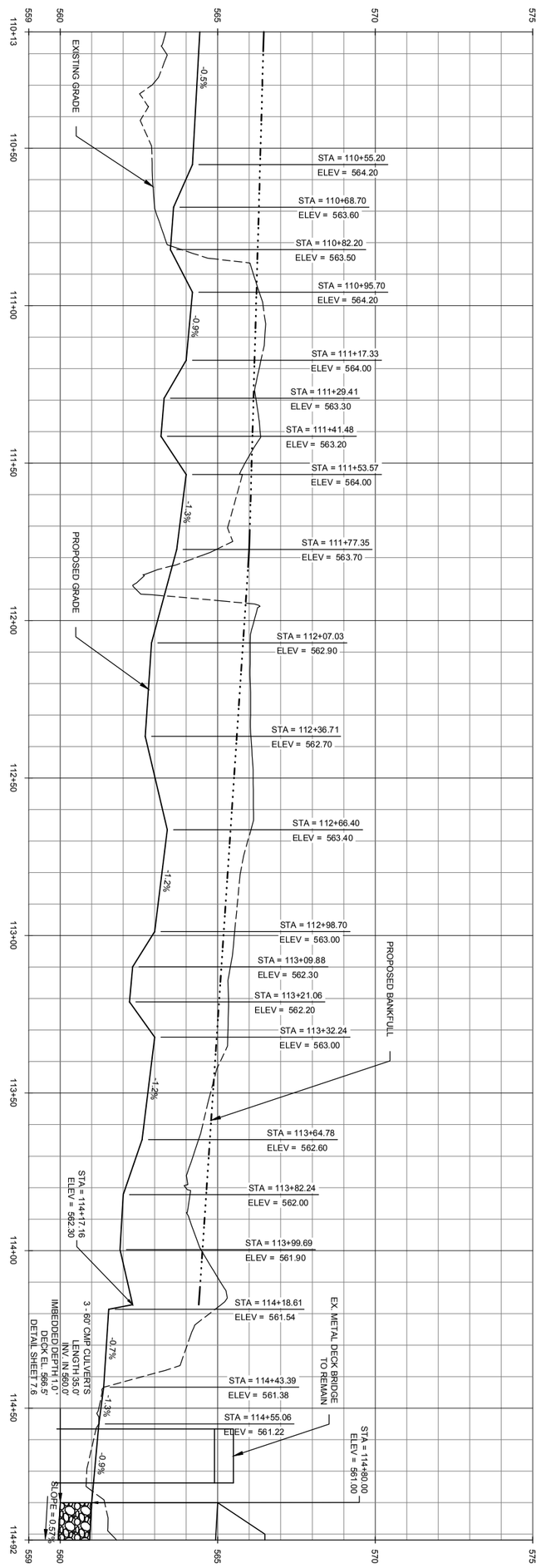
Foust Creek Mitigation Site
Alamance County, NC

Foust Creek
Stream Plan and Profile

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

WILDLANDS
ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831





Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

Revisions:

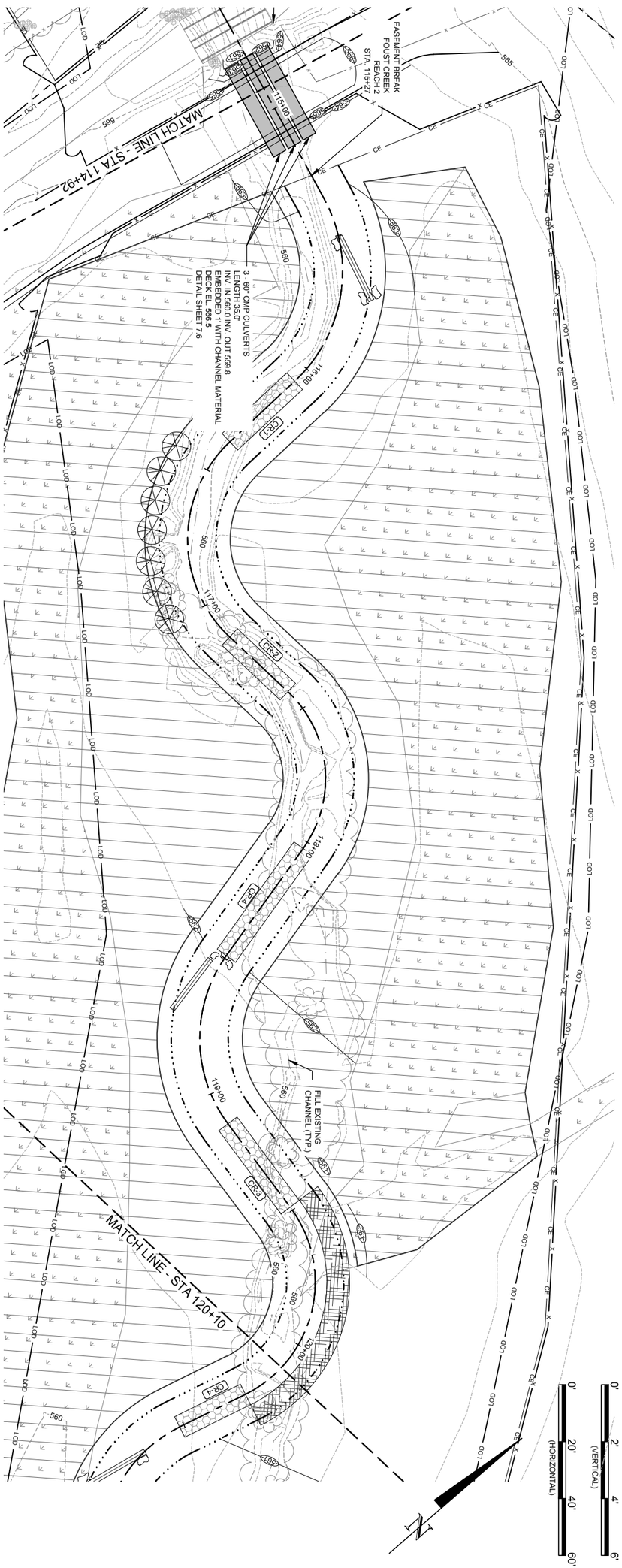
2.3
Sheet

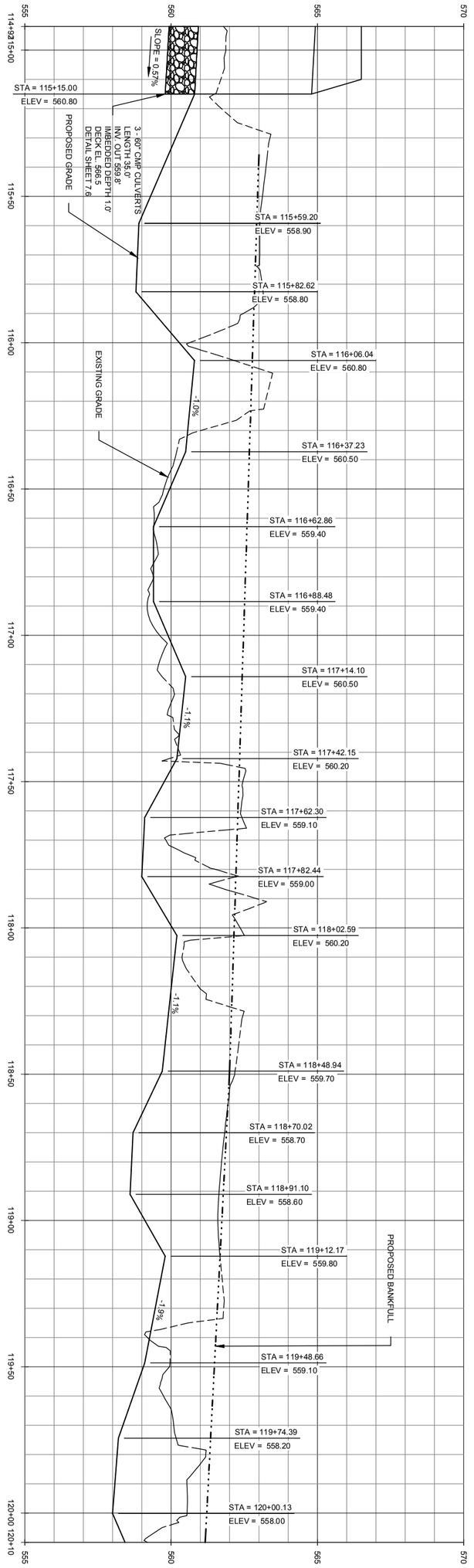
Foust Creek Mitigation Site
Alamance County, NC

Foust Creek
Stream Plan and Profile

PRELIMINARY DO NOT USE FOR CONSTRUCTION

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831





Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

2.4
Sheet

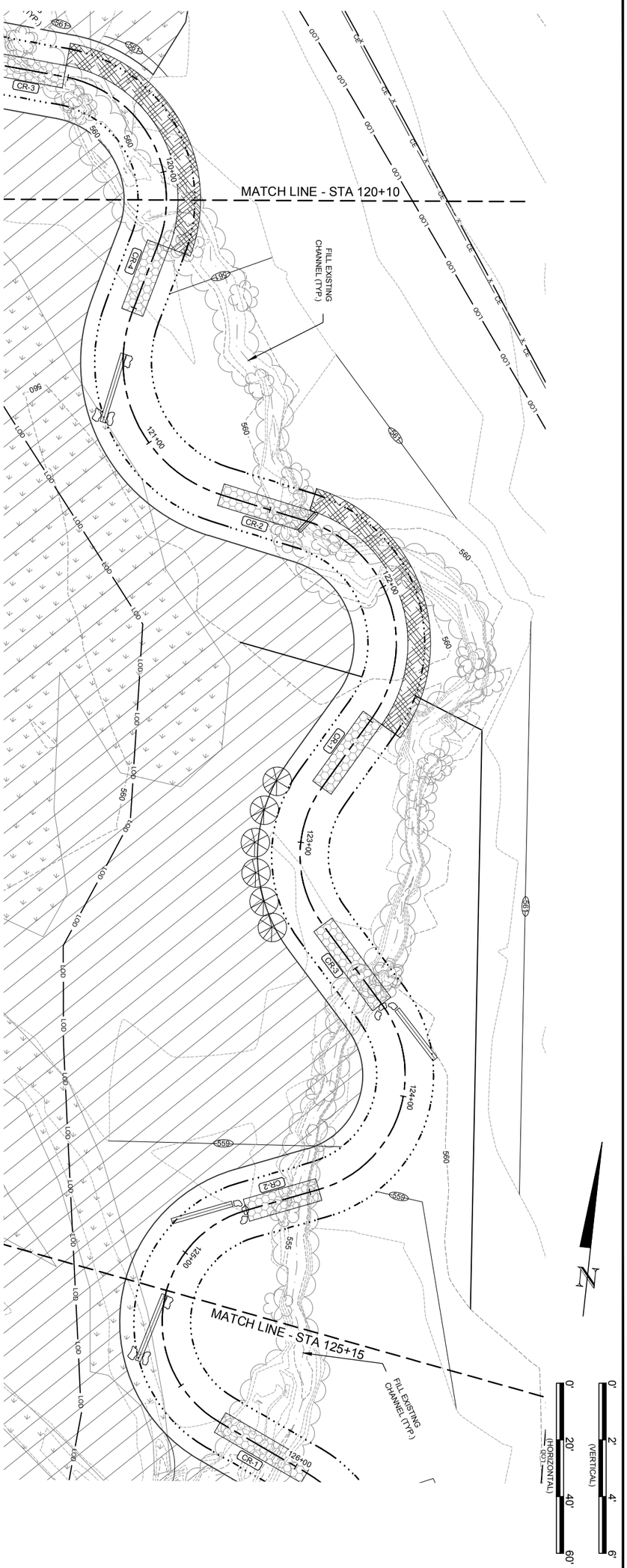
Revisions:

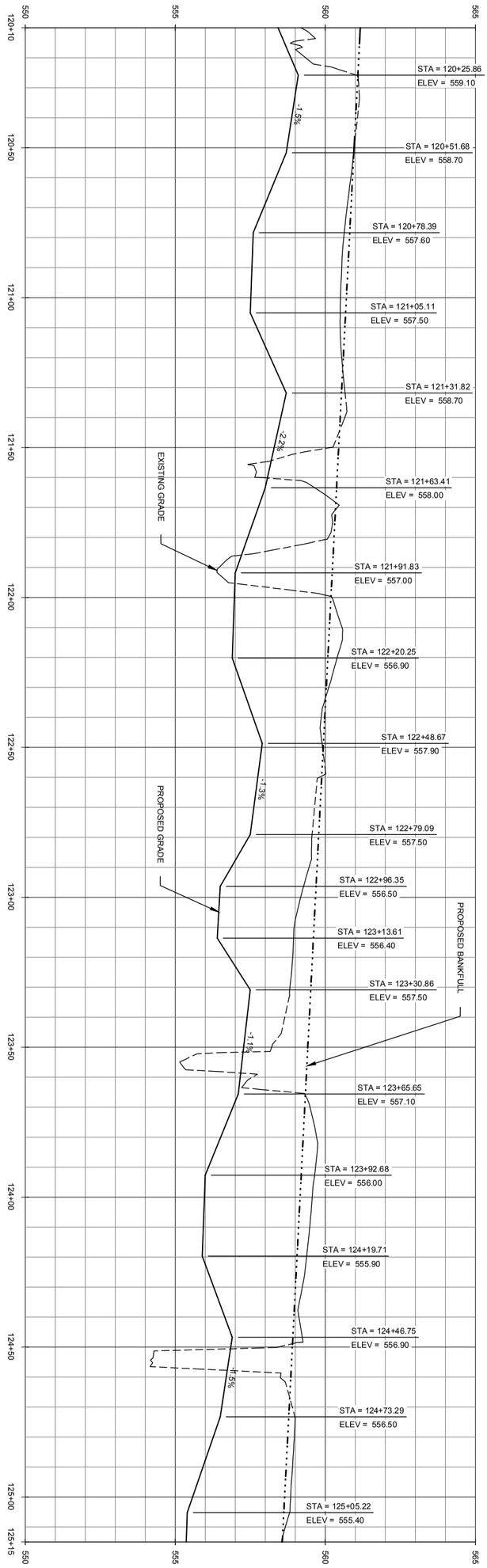
Foust Creek Mitigation Site
Alamance County, NC

Foust Creek
Stream Plan and Profile

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

WILDLANDS
ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831





Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

2.5
Sheet

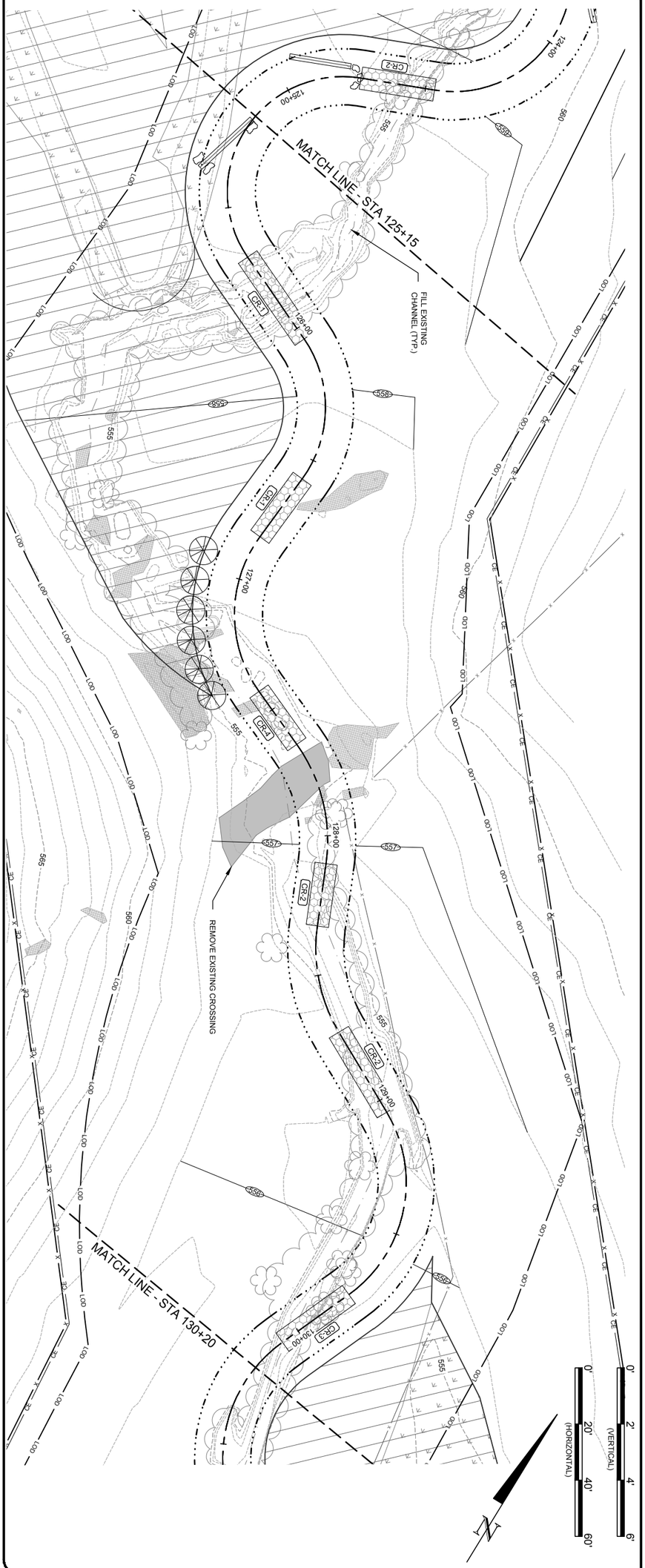
Revisions:

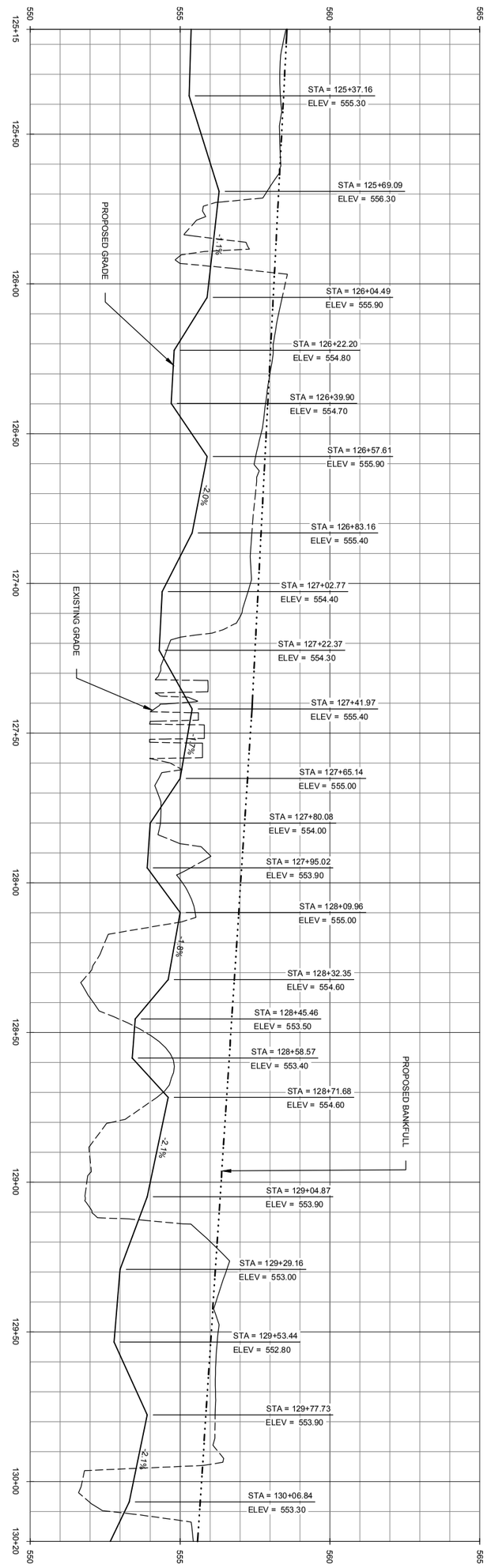
Foust Creek Mitigation Site
Alamance County, NC

Foust Creek
Stream Plan and Profile

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

WILDLANDS
ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831





Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

2.6
Sheet

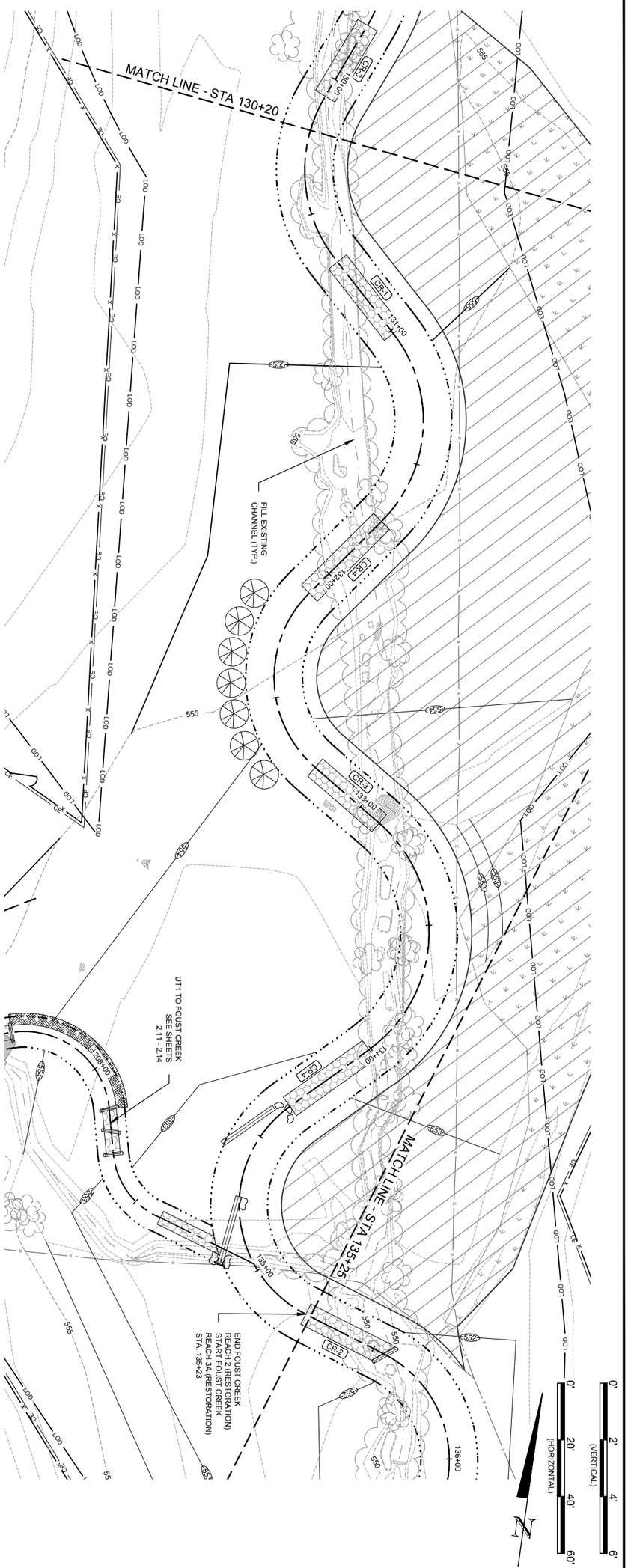
Revisions:

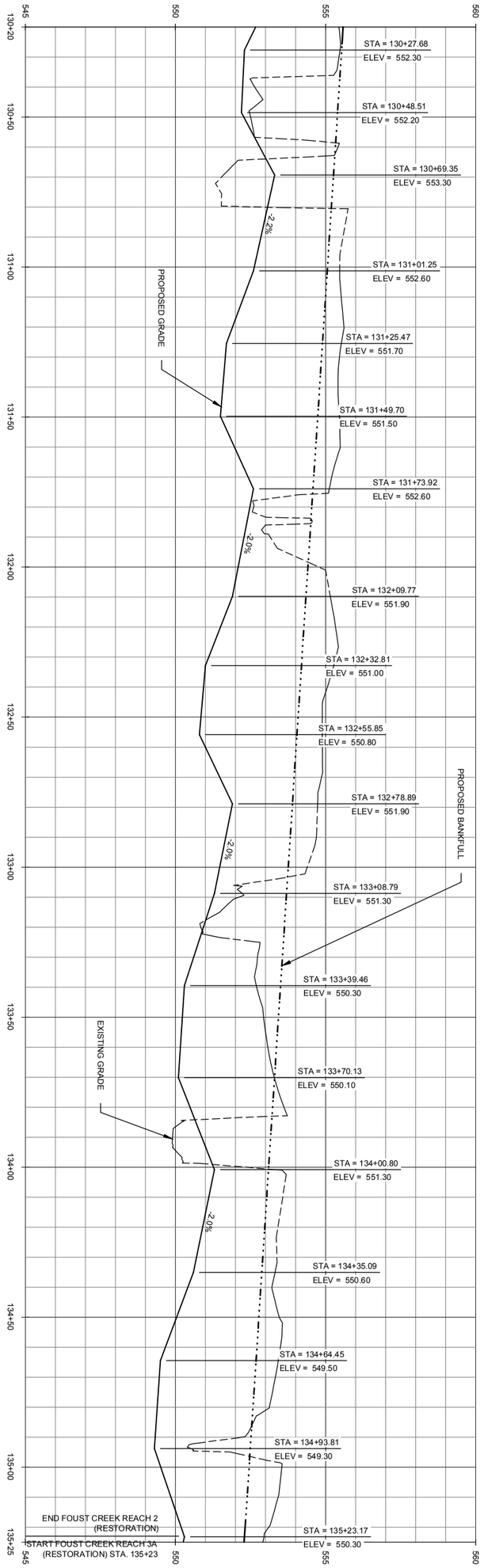
Foust Creek Mitigation Site
Alamance County, NC

Foust Creek
Stream Plan and Profile

PRELIMINARY DO NOT USE FOR CONSTRUCTION

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831





Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

2.7
Sheet

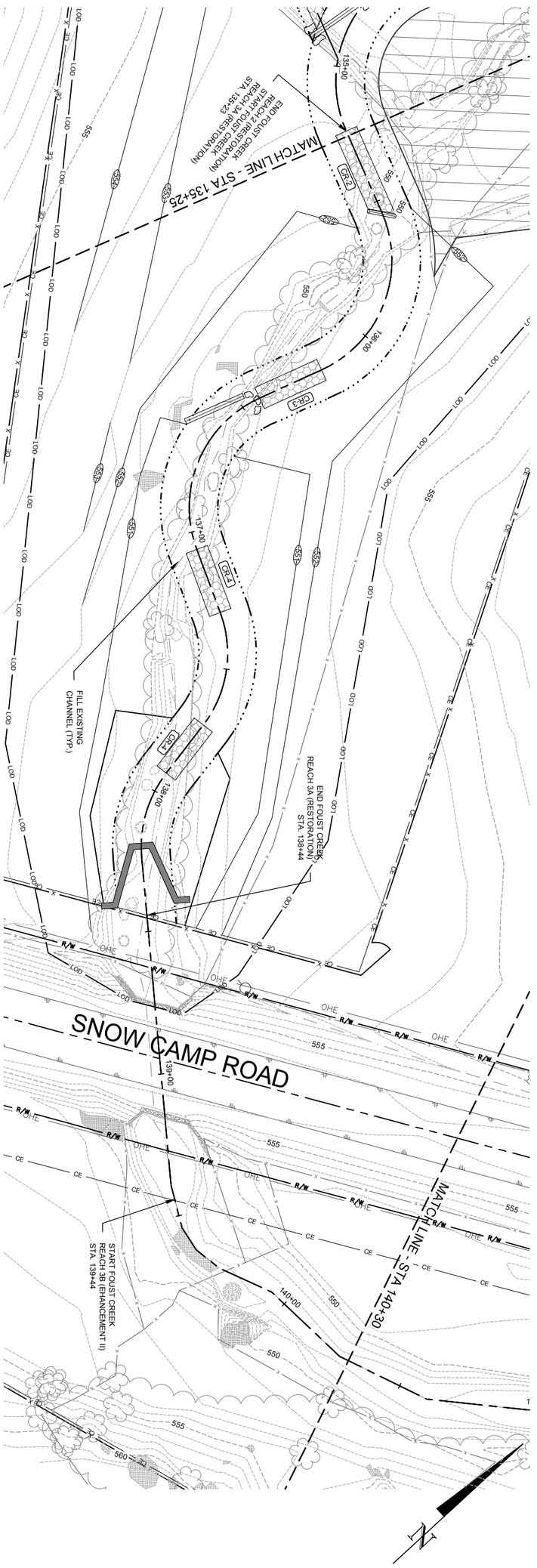
Revisions:

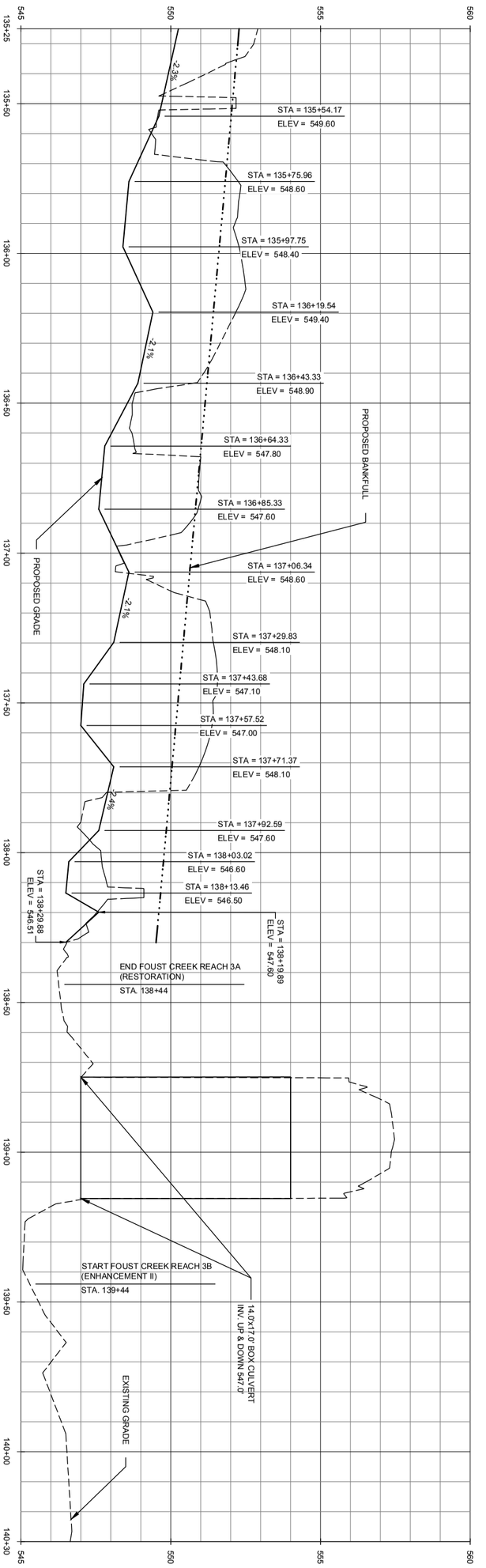
Foust Creek Mitigation Site
Alamance County, NC

Foust Creek
Stream Plan and Profile

PRELIMINARY DO NOT USE FOR CONSTRUCTION

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831





Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

Revisions:

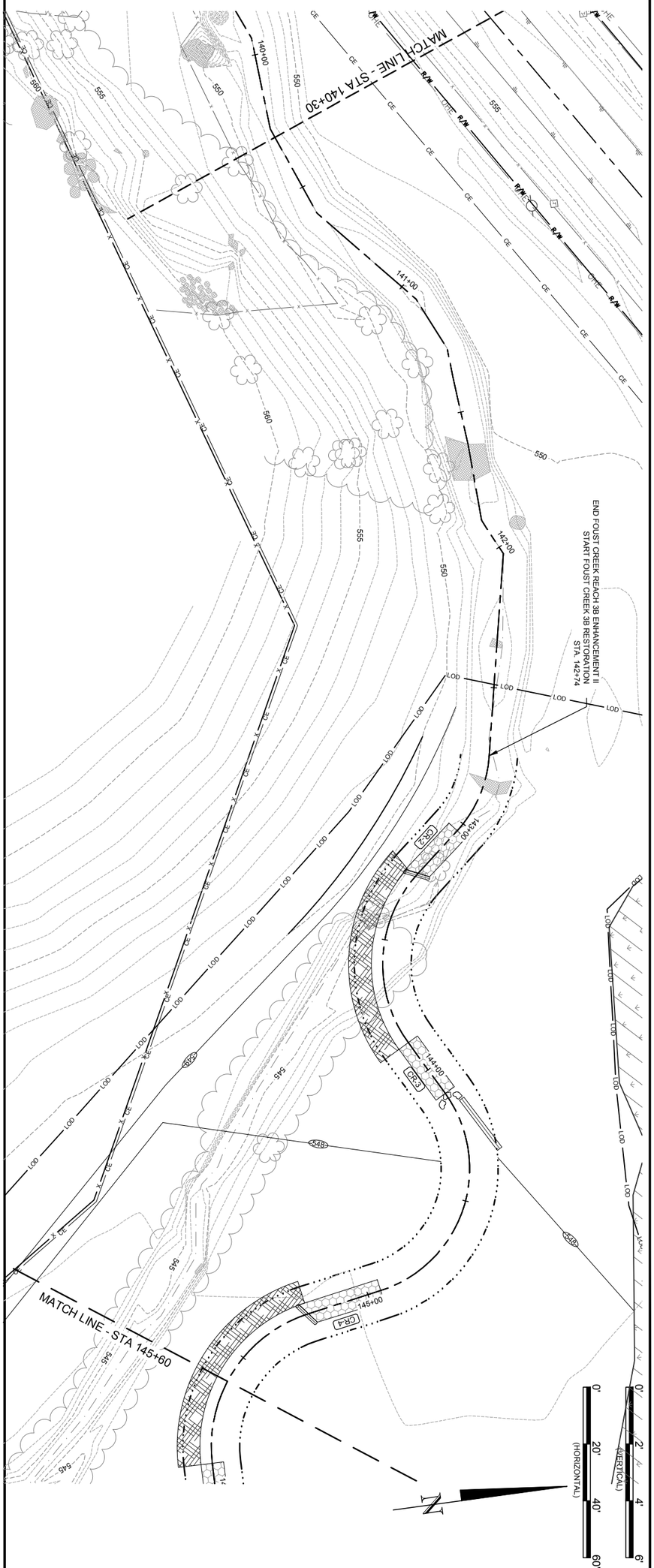
2.8
Sheet

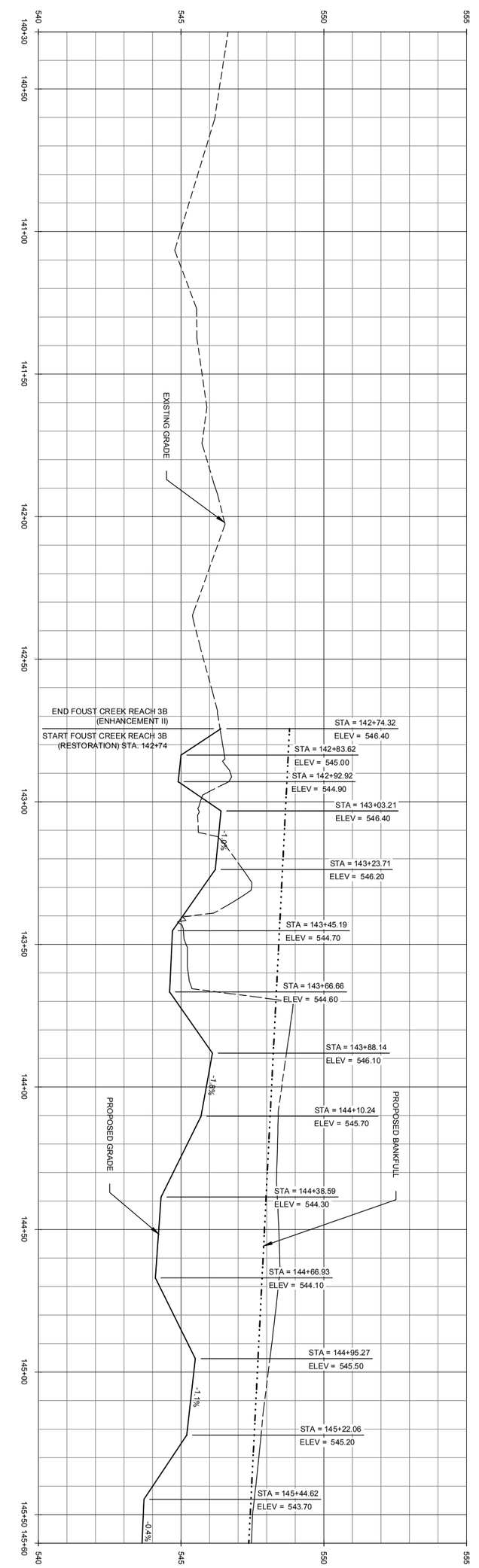
Foust Creek Mitigation Site
Alamance County, NC

Foust Creek
Stream Plan and Profile

PRELIMINARY DO NOT USE FOR CONSTRUCTION

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831





Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

2.9
Sheet

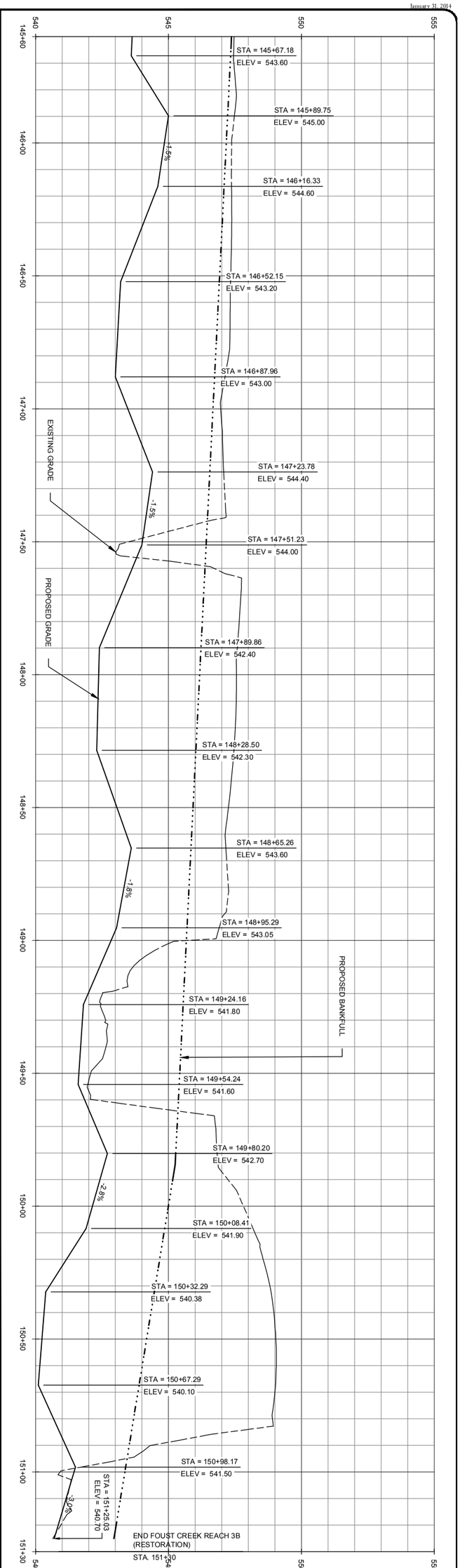
Revisions:

Foust Creek Mitigation Site
Alamance County, NC

Foust Creek
Stream Plan and Profile

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831



Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

2.10
Sheet

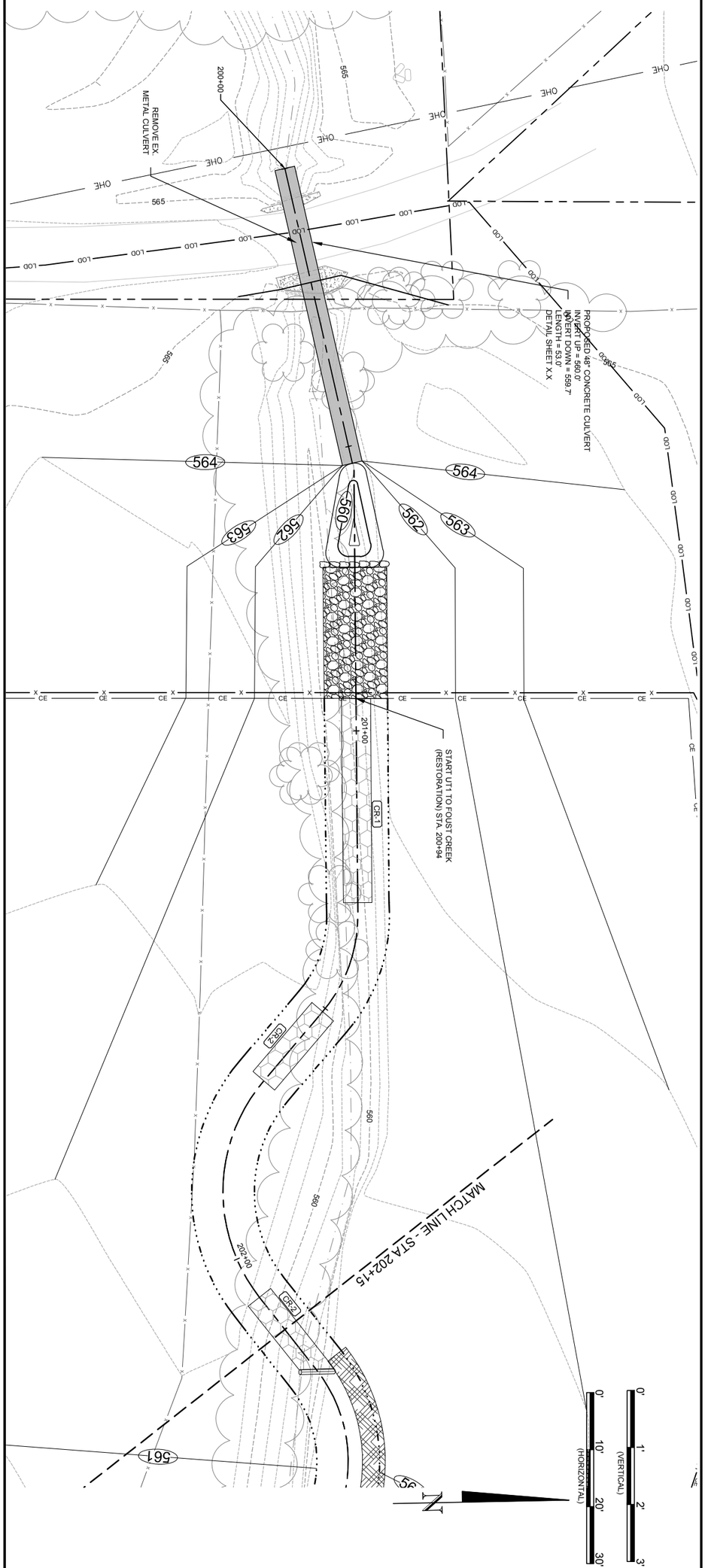
Revisions:

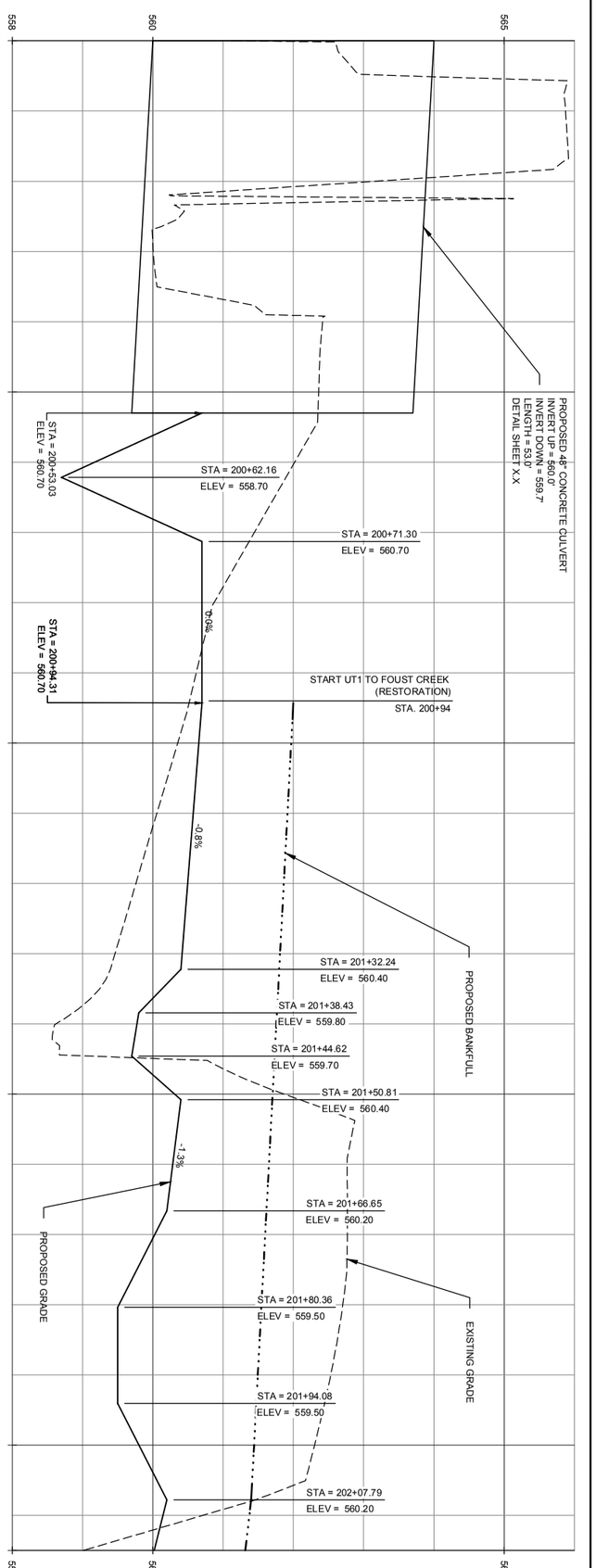
Foust Creek Mitigation Site
Alamance County, NC

Foust Creek
Stream Plan and Profile

PRELIMINARY DO NOT USE FOR CONSTRUCTION

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831





Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

2.11
Sheet

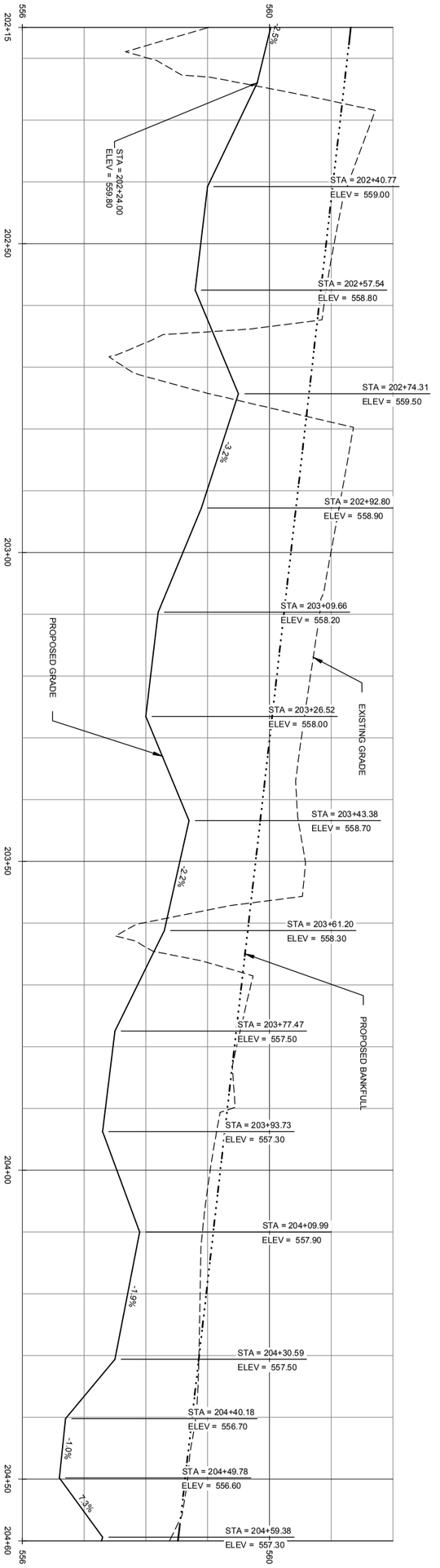
Revisions:

Foust Creek Mitigation Site
Alamance County, NC

UT1 to Foust Creek
Stream Plan and Profile

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

WILDLANDS
ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831



Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

2.12
Sheet

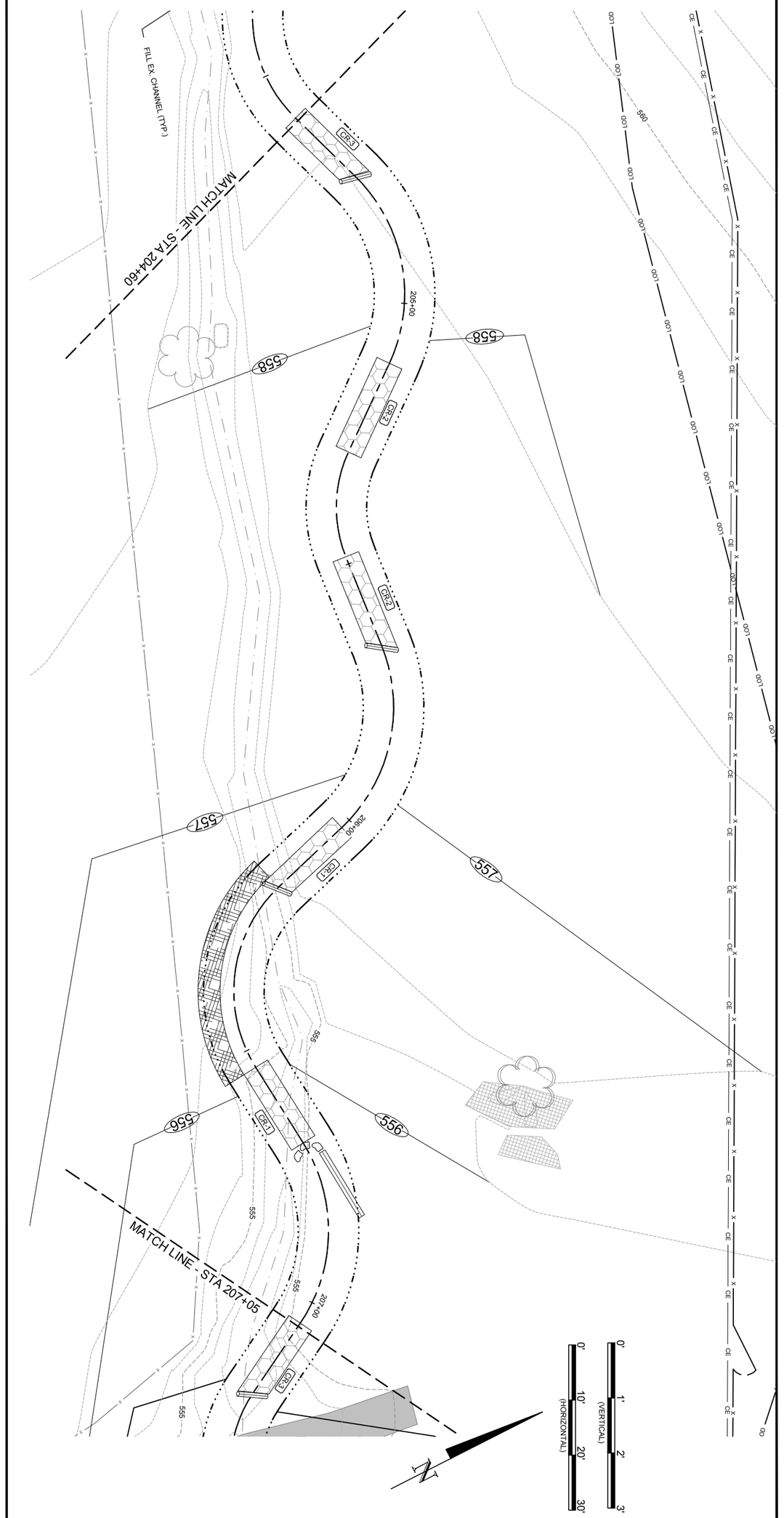
Revisions:

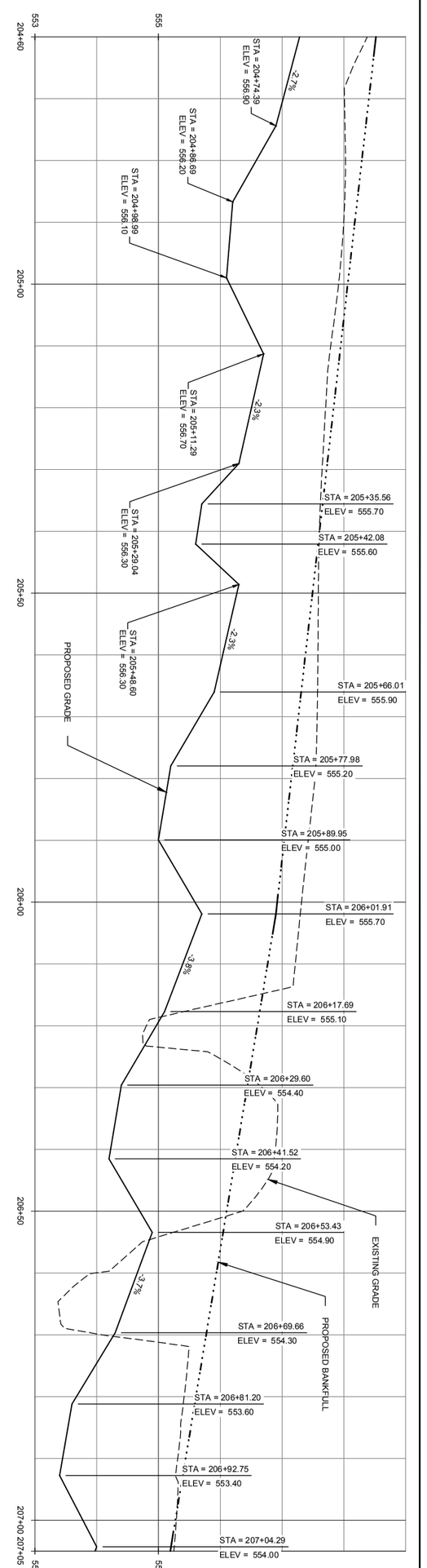
Foust Creek Mitigation Site
Alamance County, NC

UT1 to Foust Creek
Stream Plan and Profile

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

WILDLANDS
ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831





Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

2.13
Sheet

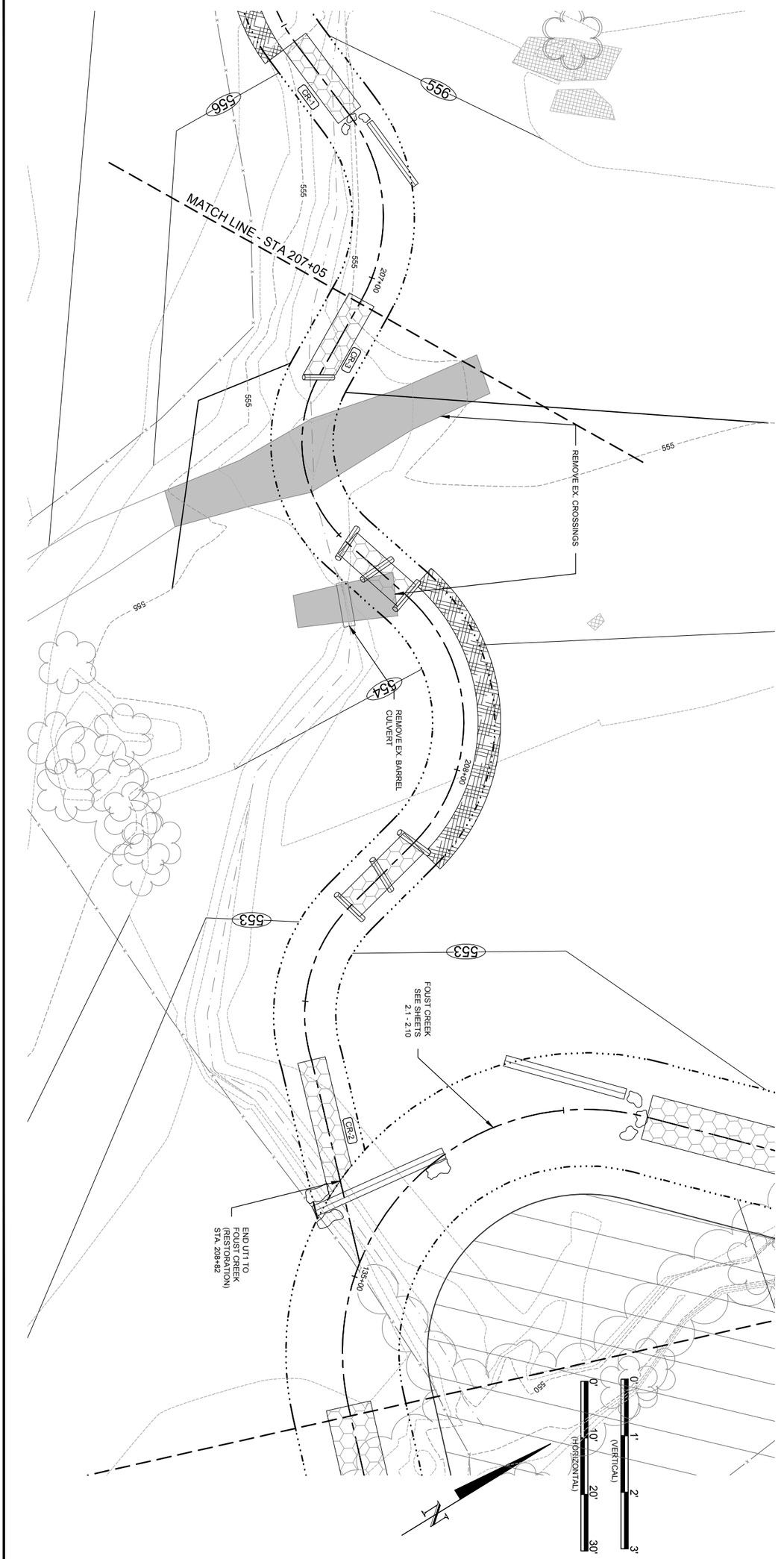
Revisions:

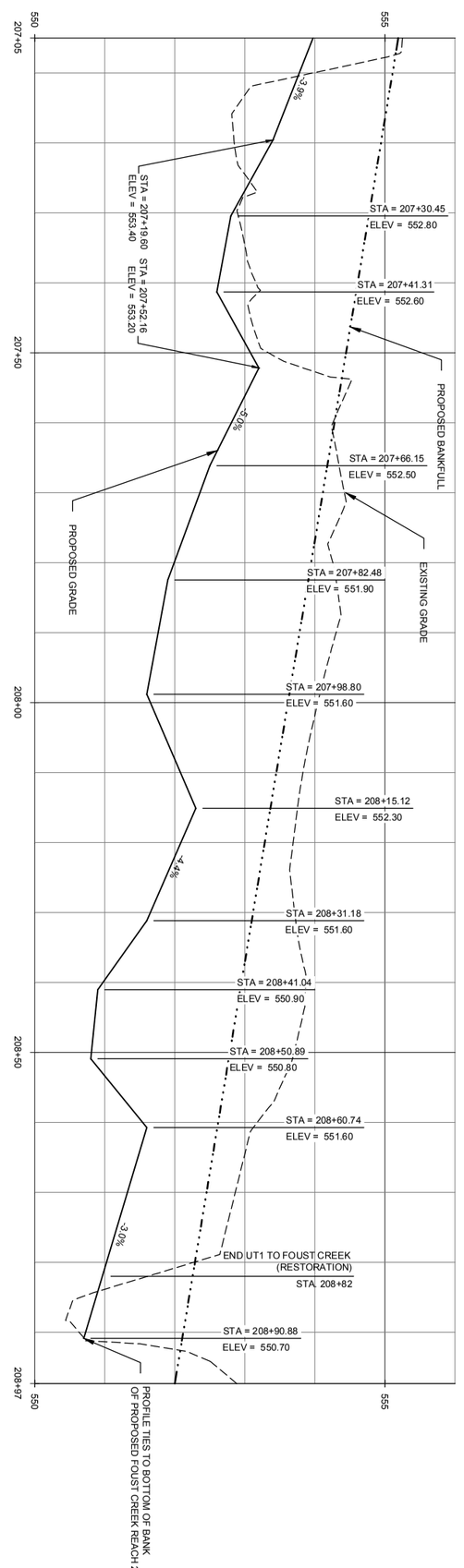
Foust Creek Mitigation Site
Alamance County, NC

UT1 to Foust Creek
Stream Plan and Profile

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

WILDLANDS
ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831





Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

2.14
Sheet

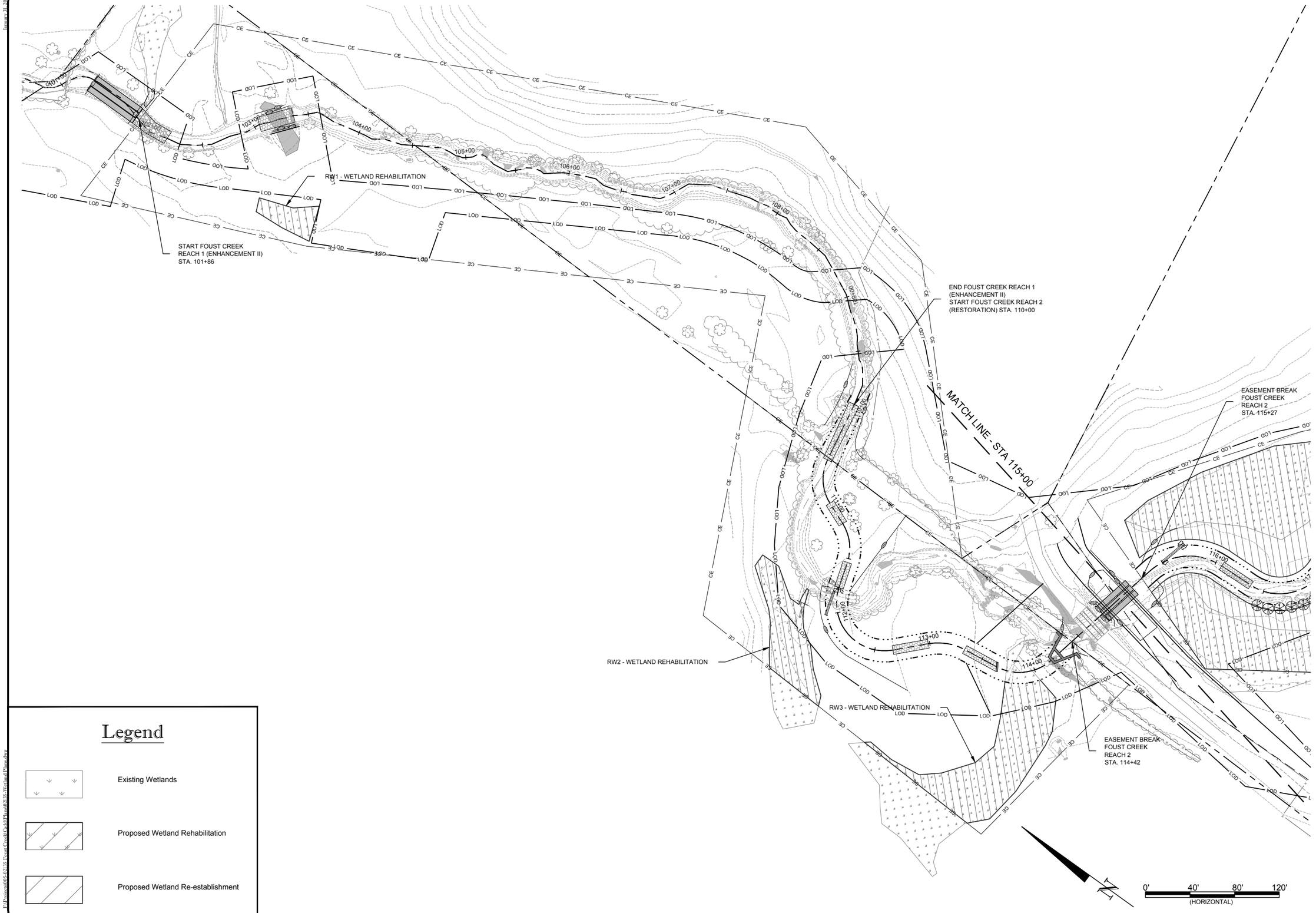
Revisions:

Foust Creek Mitigation Site
Alamance County, NC

UT1 to Foust Creek
Stream Plan and Profile

PRELIMINARY DO NOT USE FOR CONSTRUCTION

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831



Legend

- Existing Wetlands
- Proposed Wetland Rehabilitation
- Proposed Wetland Re-establishment

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

Foust Creek Mitigation Site
Alamance County, NC

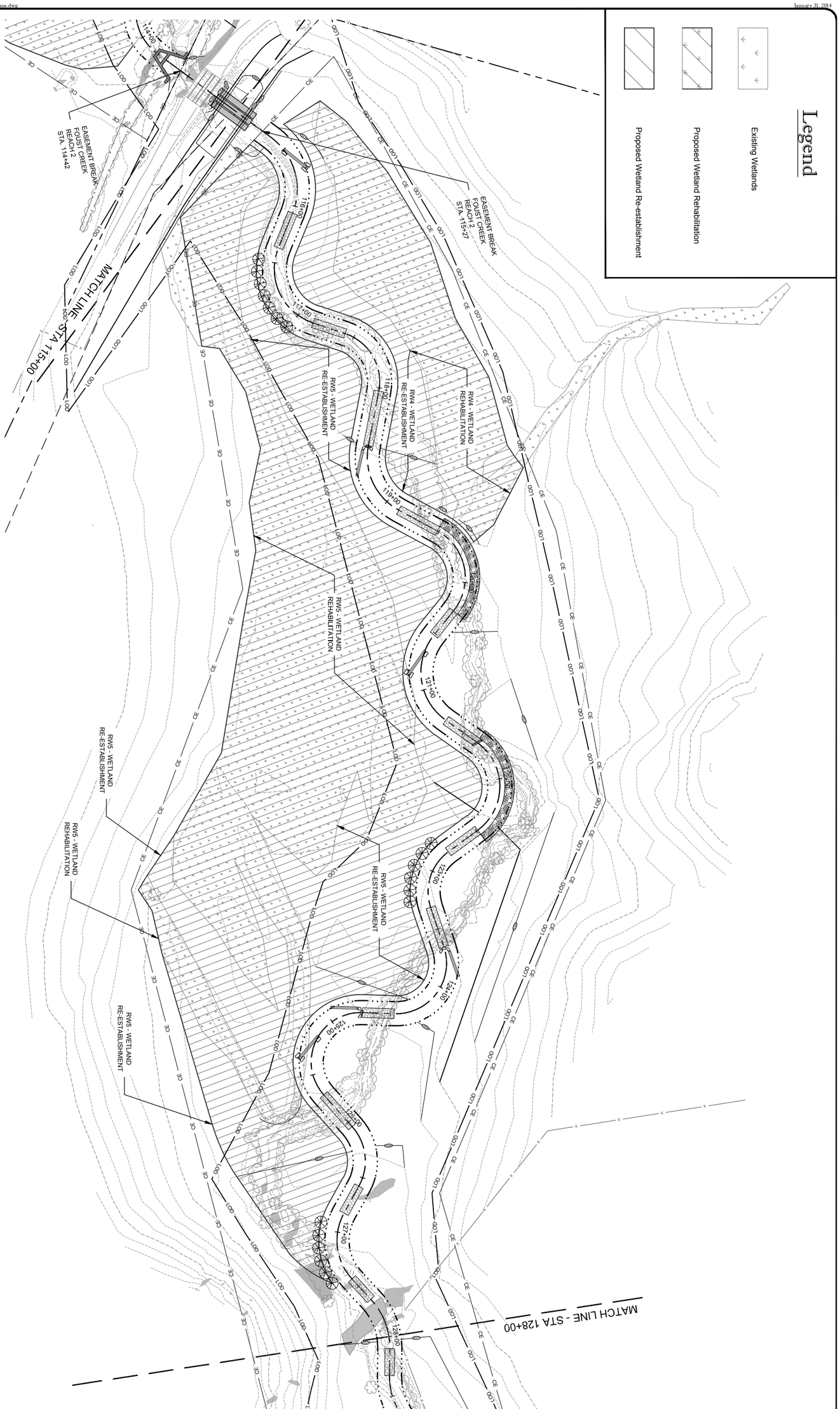
Wetland Rehabiliation & Re-establishment
Wetland Plans

Revisions:

Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

Sheet 3.1

I:\Projects\005-02135 Foust Creek\Cad\Plans\02135-Wetland Plans.dwg
January 31, 2014



Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

3.2
Sheet

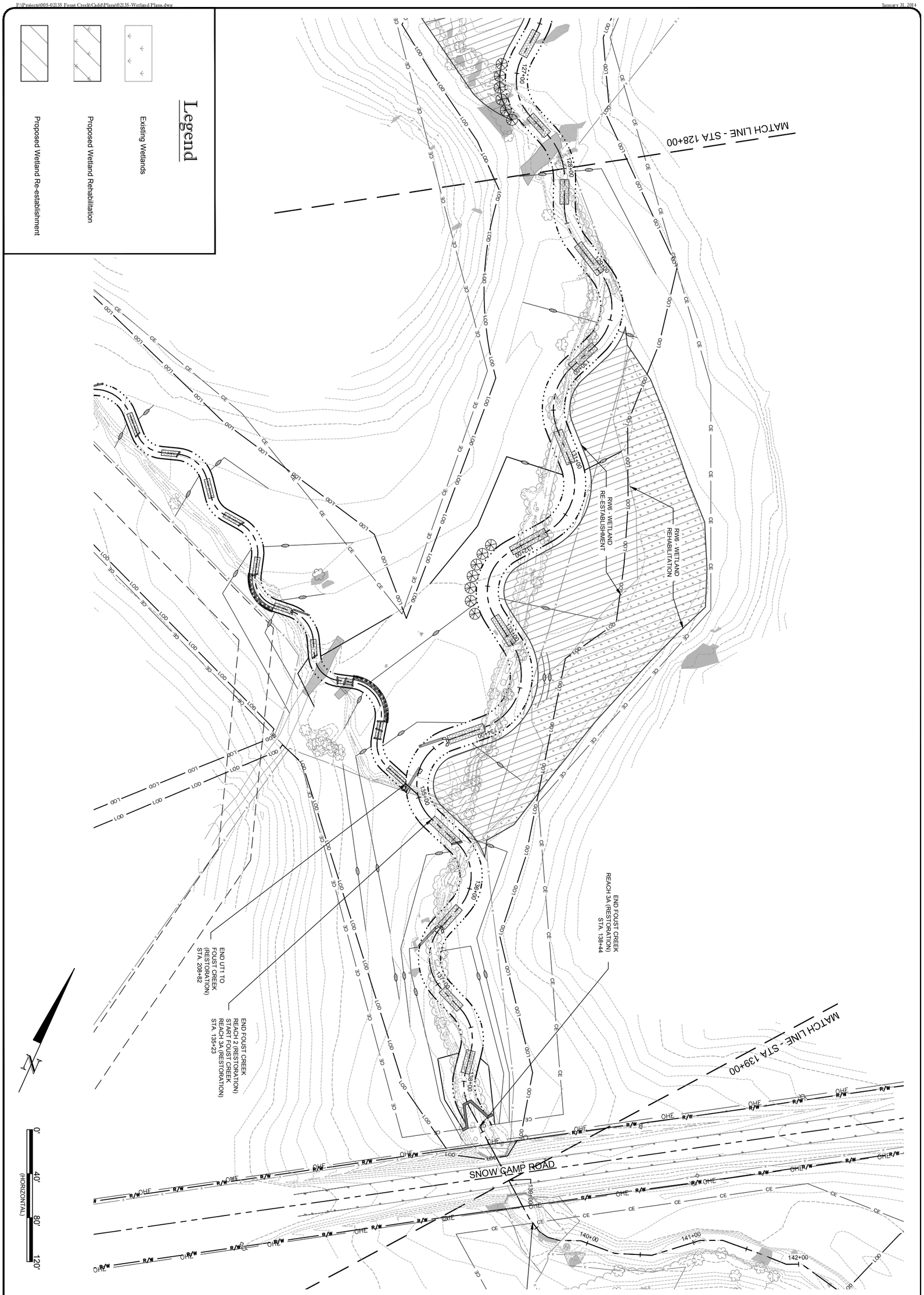
Revisions:

Foust Creek Mitigation Site
Alamance County, NC

Wetland Rehabiliation & Re-establishment
Wetland Plans

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

WILDLANDS
ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831



Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

3.3
Sheet

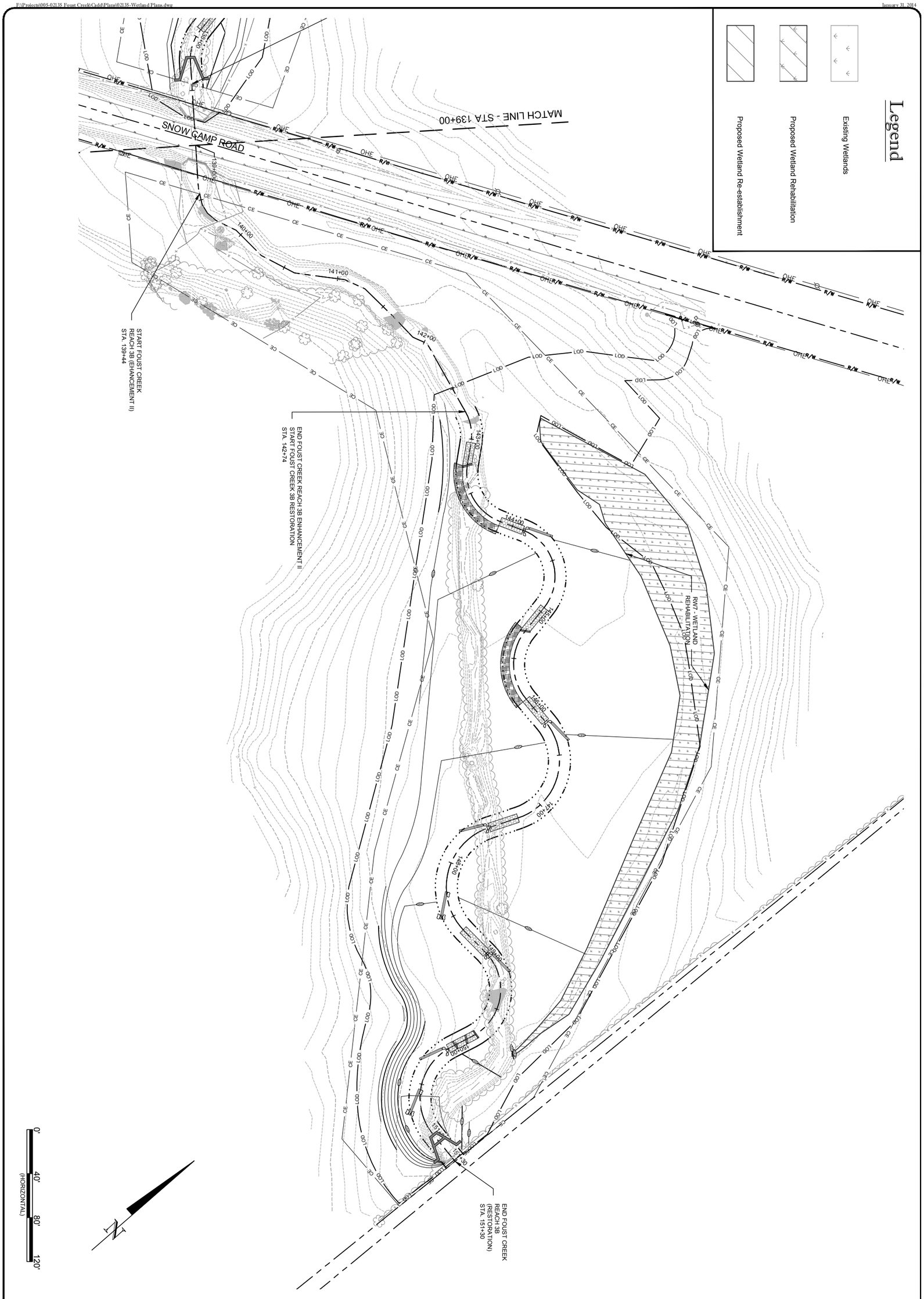
Revisions:

Foust Creek Mitigation Site
Alamance County, NC

Wetland Rehabiliation & Re-establishment
Wetland Plans

PRELIMINARY DO NOT USE FOR CONSTRUCTION

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831



Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

3.4
Sheet

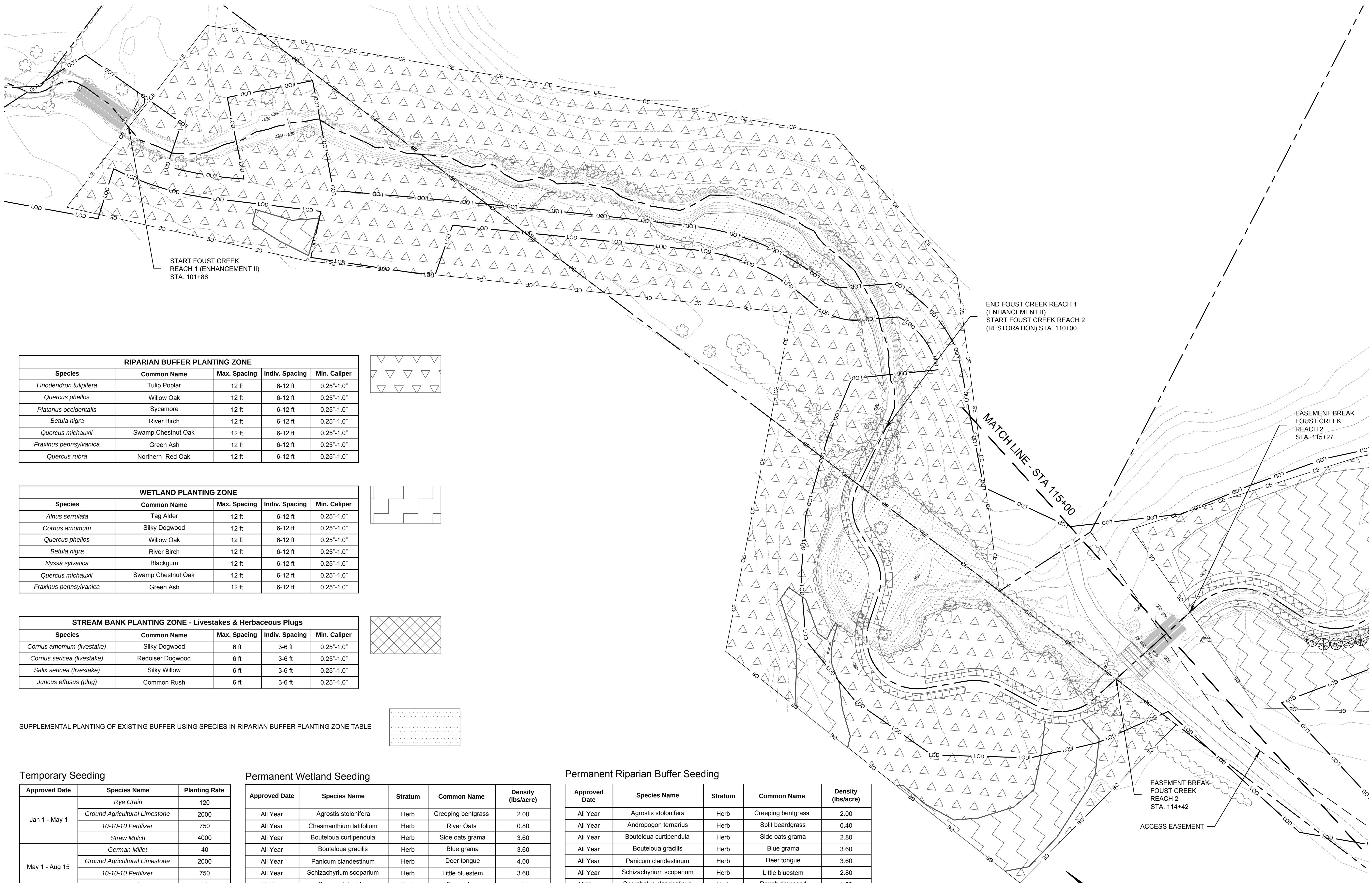
Revisions:

Foust Creek Mitigation Site
Alamance County, NC

Wetland Rehabiliation & Re-establishment
Wetland Plans

PRELIMINARY DO NOT USE FOR CONSTRUCTION

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831



RIPARIAN BUFFER PLANTING ZONE				
Species	Common Name	Max. Spacing	Indiv. Spacing	Min. Caliper
Liriodendron tulipifera	Tulip Poplar	12 ft	6-12 ft	0.25"-1.0"
Quercus phellos	Willow Oak	12 ft	6-12 ft	0.25"-1.0"
Platanus occidentalis	Sycamore	12 ft	6-12 ft	0.25"-1.0"
Betula nigra	River Birch	12 ft	6-12 ft	0.25"-1.0"
Quercus michauxii	Swamp Chestnut Oak	12 ft	6-12 ft	0.25"-1.0"
Fraxinus pennsylvanica	Green Ash	12 ft	6-12 ft	0.25"-1.0"
Quercus rubra	Northern Red Oak	12 ft	6-12 ft	0.25"-1.0"

WETLAND PLANTING ZONE				
Species	Common Name	Max. Spacing	Indiv. Spacing	Min. Caliper
Alnus serrulata	Tag Alder	12 ft	6-12 ft	0.25"-1.0"
Cornus amomum	Silky Dogwood	12 ft	6-12 ft	0.25"-1.0"
Quercus phellos	Willow Oak	12 ft	6-12 ft	0.25"-1.0"
Betula nigra	River Birch	12 ft	6-12 ft	0.25"-1.0"
Nyssa sylvatica	Blackgum	12 ft	6-12 ft	0.25"-1.0"
Quercus michauxii	Swamp Chestnut Oak	12 ft	6-12 ft	0.25"-1.0"
Fraxinus pennsylvanica	Green Ash	12 ft	6-12 ft	0.25"-1.0"

STREAM BANK PLANTING ZONE - Livestakes & Herbaceous Plugs				
Species	Common Name	Max. Spacing	Indiv. Spacing	Min. Caliper
Cornus amomum (livestake)	Silky Dogwood	6 ft	3-6 ft	0.25"-1.0"
Cornus sericea (livestake)	Redoiser Dogwood	6 ft	3-6 ft	0.25"-1.0"
Salix sericea (livestake)	Silky Willow	6 ft	3-6 ft	0.25"-1.0"
Juncus effusus (plug)	Common Rush	6 ft	3-6 ft	0.25"-1.0"

SUPPLEMENTAL PLANTING OF EXISTING BUFFER USING SPECIES IN RIPARIAN BUFFER PLANTING ZONE TABLE

Temporary Seeding

Approved Date	Species Name	Planting Rate
Jan 1 - May 1	*Rye Grain*	120
	Ground Agricultural Limestone	2000
	10-10-10 Fertilizer	750
	Straw Mulch	4000
May 1 - Aug 15	*German Millet*	40
	Ground Agricultural Limestone	2000
	10-10-10 Fertilizer	750
	Straw Mulch	4000
Aug 15 - Dec 30	*Rye Grain*	120
	Ground Agricultural Limestone	2000
	10-10-10 Fertilizer	1000
	Straw Mulch	4000

Permanent Wetland Seeding

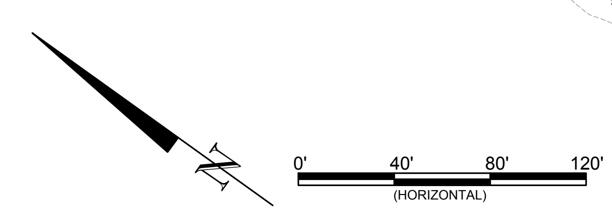
Approved Date	Species Name	Stratum	Common Name	Density (lbs/acre)
All Year	Agrostis stolonifera	Herb	Creeping bentgrass	2.00
All Year	Chasmanthium latifolium	Herb	River Oats	0.80
All Year	Bouteloua curtipendula	Herb	Side oats grama	3.60
All Year	Bouteloua gracilis	Herb	Blue grama	3.60
All Year	Panicum clandestinum	Herb	Deer tongue	4.00
All Year	Schizachyrium scoparium	Herb	Little bluestem	3.60
All Year	Carex vulpinoidea	Herb	Fox sedge	1.60
All Year	Vicia villosa	Herb	Hairy vetch	0.80

Pasture Seeding - Total Rate 42 lbs/acre

SCIENTIFIC NAME	COMMON NAME	DENSITY (LBS/ ACRE)
Dactylis qlomerata	Orchard Grass	40
Trifolium repens	White Ladino Clover	2

Permanent Riparian Buffer Seeding

Approved Date	Species Name	Stratum	Common Name	Density (lbs/acre)
All Year	Agrostis stolonifera	Herb	Creeping bentgrass	2.00
All Year	Andropogon ternarius	Herb	Split beardgrass	0.40
All Year	Bouteloua curtipendula	Herb	Side oats grama	2.80
All Year	Bouteloua gracilis	Herb	Blue grama	3.60
All Year	Panicum clandestinum	Herb	Deer tongue	3.60
All Year	Schizachyrium scoparium	Herb	Little bluestem	2.80
All Year	Sporobolus clandestinus	Herb	Rough dropseed	1.60
All Year	Vicia villosa	Herb	Hairy vetch	0.80
All Year	Chasmanthium latifolium	Herb	River Oats	1.60
All Year	Carex vulpinoidea	Herb	Fox sedge	0.80



WILDLANDS
ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

Foust Creek Mitigation Site
Alamance County, NC

Foust Creek
Planting Plan

Revisions:

Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

Sheet 4.1

January 31, 2014
F:\Projects\005-02135 Foust Creek\Cadd\Plans\02135-Planting Plans.dwg

January 31, 2014

Temporary Seeding

Approved Date	Species Name	Planting Rate
Jan 1 - May 1	*Rye Grain*	120
	Ground Agricultural Limestone	2000
	10-10-10 Fertilizer	750
	Straw Mulch	4000
May 1 - Aug 15	*German Millet*	40
	Ground Agricultural Limestone	2000
	10-10-10 Fertilizer	750
	Straw Mulch	4000
Aug 15 - Dec 30	*Rye Grain*	120
	Ground Agricultural Limestone	2000
	10-10-10 Fertilizer	1000
	Straw Mulch	4000

Permanent Wetland Seeding

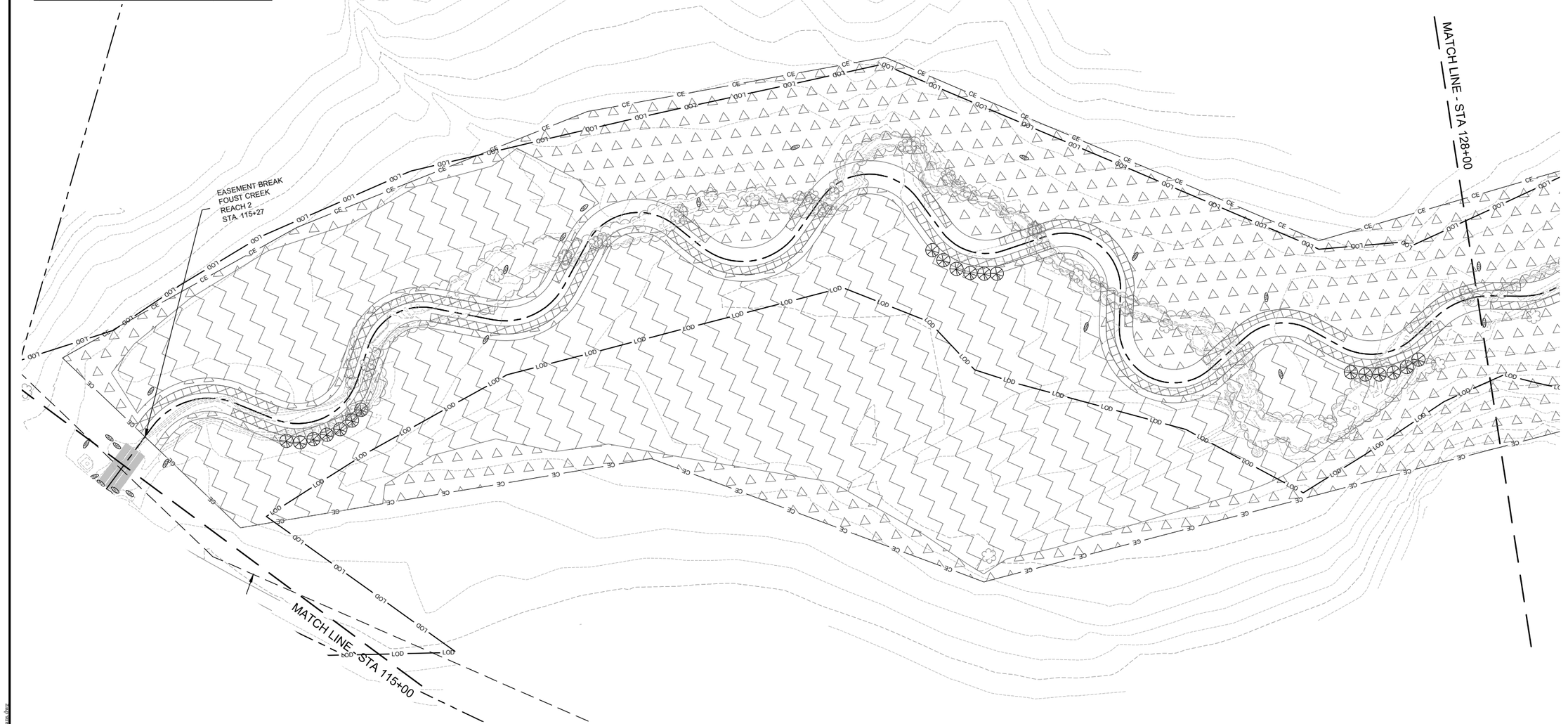
Approved Date	Species Name	Stratum	Common Name	Density (lbs/acre)
All Year	Agrostis stolonifera	Herb	Creeping bentgrass	2.00
All Year	Chasmanthium latifolium	Herb	River Oats	0.80
All Year	Bouteloua curtipendula	Herb	Side oats grama	3.60
All Year	Bouteloua gracilis	Herb	Blue grama	3.60
All Year	Panicum clandestinum	Herb	Deer tongue	4.00
All Year	Schizachyrium scoparium	Herb	Little bluestem	3.60
All Year	Carex vulpinoidea	Herb	Fox sedge	1.60
All Year	Vicia villosa	Herb	Hairy vetch	0.80

Permanent Riparian Buffer Seeding

Approved Date	Species Name	Stratum	Common Name	Density (lbs/acre)
All Year	Agrostis stolonifera	Herb	Creeping bentgrass	2.00
All Year	Andropogon ternarius	Herb	Split beardgrass	0.40
All Year	Bouteloua curtipendula	Herb	Side oats grama	2.80
All Year	Bouteloua gracilis	Herb	Blue grama	3.60
All Year	Panicum clandestinum	Herb	Deer tongue	3.60
All Year	Schizachyrium scoparium	Herb	Little bluestem	2.80
All Year	Sporobolus clandestinus	Herb	Rough dropseed	1.60
All Year	Vicia villosa	Herb	Hairy vetch	0.80
All Year	Chasmanthium latifolium	Herb	River Oats	1.60
All Year	Carex vulpinoidea	Herb	Fox sedge	0.80

Pasture Seeding - Total Rate 42 lbs/acre

SCIENTIFIC NAME	COMMON NAME	DENSITY (LBS/ ACRE)
Dactylis glomerata	Orchard Grass	40
Trifolium repens	White Ladino Clover	2



RIPARIAN BUFFER PLANTING ZONE

Species	Common Name	Max. Spacing	Indiv. Spacing	Min. Caliper
Liriodendron tulipifera	Tulip Poplar	12 ft	6-12 ft	0.25"-1.0"
Quercus phellos	Willow Oak	12 ft	6-12 ft	0.25"-1.0"
Platanus occidentalis	Sycamore	12 ft	6-12 ft	0.25"-1.0"
Betula nigra	River Birch	12 ft	6-12 ft	0.25"-1.0"
Quercus michauxii	Swamp Chestnut Oak	12 ft	6-12 ft	0.25"-1.0"
Fraxinus pennsylvanica	Green Ash	12 ft	6-12 ft	0.25"-1.0"
Quercus rubra	Northern Red Oak	12 ft	6-12 ft	0.25"-1.0"

WETLAND PLANTING ZONE

Species	Common Name	Max. Spacing	Indiv. Spacing	Min. Caliper
Alnus serrulata	Tag Alder	12 ft	6-12 ft	0.25"-1.0"
Cornus amomum	Silky Dogwood	12 ft	6-12 ft	0.25"-1.0"
Quercus phellos	Willow Oak	12 ft	6-12 ft	0.25"-1.0"
Betula nigra	River Birch	12 ft	6-12 ft	0.25"-1.0"
Nyssa sylvatica	Blackgum	12 ft	6-12 ft	0.25"-1.0"
Quercus michauxii	Swamp Chestnut Oak	12 ft	6-12 ft	0.25"-1.0"
Fraxinus pennsylvanica	Green Ash	12 ft	6-12 ft	0.25"-1.0"

STREAM BANK PLANTING ZONE - Livestakes & Herbaceous Plugs

Species	Common Name	Max. Spacing	Indiv. Spacing	Min. Caliper
Cornus amomum (livestake)	Silky Dogwood	6 ft	3-6 ft	0.25"-1.0"
Cornus sericea (livestake)	Redoiser Dogwood	6 ft	3-6 ft	0.25"-1.0"
Salix sericea (livestake)	Silky Willow	6 ft	3-6 ft	0.25"-1.0"
Juncus effusus (plug)	Common Rush	6 ft	3-6 ft	0.25"-1.0"

0' 40' 80' 120'
(HORIZONTAL)

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

Foust Creek Mitigation Site
Alamance County, NC

Foust Creek
Planting Plan

Revisions:

Date: 01.31.2014
Job Number: 005-02135
Project Engineer: ANG
Drawn By: CLM
Checked By: SDW

Sheet 4.2

STREAM BANK PLANTING ZONE - Livestakes & Herbaceous Plugs				
Species	**Common Name**	**Max. Spacing**	**Indiv. Spacing**	**Min. Caliper**
Cornus amomum (livestake)	Silky Dogwood	6 ft	3-6 ft	0.25"-1.0"
Cornus sericea (livestake)	Redoiser Dogwood	6 ft	3-6 ft	0.25"-1.0"
Salix sericea (livestake)	Silky Willow	6 ft	3-6 ft	0.25"-1.0"
Juncus effusus (plug)	Common Rush	6 ft	3-6 ft	0.25"-1.0"

Temporary Seeding

Approved Date	Species Name	Planting Rate
Jan 1 - May 1	*Rye Grain*	120
	Ground Agricultural Limestone	2000
	10-10-10 Fertilizer	750
	Straw Mulch	4000
May 1 - Aug 15	*German Millet*	40
	Ground Agricultural Limestone	2000
	10-10-10 Fertilizer	750
	Straw Mulch	4000
Aug 15 - Dec 30	*Rye Grain*	120
	Ground Agricultural Limestone	2000
	10-10-10 Fertilizer	1000
	Straw Mulch	4000

Permanent Riparian Buffer Seeding

Approved Date	Species Name	Stratum	Common Name	Density (lbs/acre)
All Year	Agrostis stolonifera	Herb	Creeping bentgrass	2.00
All Year	Andropogon ternarius	Herb	Split beardgrass	0.40
All Year	Bouteloua curtipendula	Herb	Side oats grama	2.80
All Year	Bouteloua gracilis	Herb	Blue grama	3.60
All Year	Panicum clandestinum	Herb	Deer tongue	3.60
All Year	Schizachyrium scoparium	Herb	Little bluestem	2.80
All Year	Sporobolus clandestinus	Herb	Rough dropseed	1.60
All Year	Vicia villosa	Herb	Hairy vetch	0.80
All Year	Chasmanthium latifolium	Herb	River Oats	1.60
All Year	Carex vulpinoidea	Herb	Fox sedge	0.80

RIPARIAN BUFFER PLANTING ZONE				
Species	**Common Name**	**Max. Spacing**	**Indiv. Spacing**	**Min. Caliper**
Liriodendron tulipifera	Tulip Poplar	12 ft	6-12 ft	0.25"-1.0"
Quercus phellos	Willow Oak	12 ft	6-12 ft	0.25"-1.0"
Platanus occidentalis	Sycamore	12 ft	6-12 ft	0.25"-1.0"
Betula nigra	River Birch	12 ft	6-12 ft	0.25"-1.0"
Quercus michauxii	Swamp Chestnut Oak	12 ft	6-12 ft	0.25"-1.0"
Fraxinus pennsylvanica	Green Ash	12 ft	6-12 ft	0.25"-1.0"
Quercus rubra	Northern Red Oak	12 ft	6-12 ft	0.25"-1.0"

WETLAND PLANTING ZONE				
Species	**Common Name**	**Max. Spacing**	**Indiv. Spacing**	**Min. Caliper**
Alnus serrulata	Tag Alder	12 ft	6-12 ft	0.25"-1.0"
Cornus amomum	Silky Dogwood	12 ft	6-12 ft	0.25"-1.0"
Quercus phellos	Willow Oak	12 ft	6-12 ft	0.25"-1.0"
Betula nigra	River Birch	12 ft	6-12 ft	0.25"-1.0"
Nyssa sylvatica	Blackgum	12 ft	6-12 ft	0.25"-1.0"
Quercus michauxii	Swamp Chestnut Oak	12 ft	6-12 ft	0.25"-1.0"
Fraxinus pennsylvanica	Green Ash	12 ft	6-12 ft	0.25"-1.0"

MATCH LINE - STA 128+00

MATCH LINE - STA 139+00

START UT1 TO FOUST CREEK (RESTORATION) STA. 200+94

END FOUST CREEK REACH 3A (RESTORATION) STA. 138+44

END FOUST CREEK REACH 2 (RESTORATION) START FOUST CREEK REACH 3A (RESTORATION) STA. 135+23

END UT1 TO FOUST CREEK (RESTORATION) STA. 208+82

SNOW CAMP ROAD

ACCESS EASEMENT

0' 40' 80' 120' (HORIZONTAL)

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. P-0831

PRELIMINARY DO NOT USE FOR CONSTRUCTION

Foust Creek Mitigation Site
Alamance County, NC

Foust Creek & UT1
Planting Plan

Revisions:

Date: 01.31.2014
Job Number: 095-02135
Project Engineer: ANG
Drawn By: CLM
Checked By: STDW

Sheet 4.3

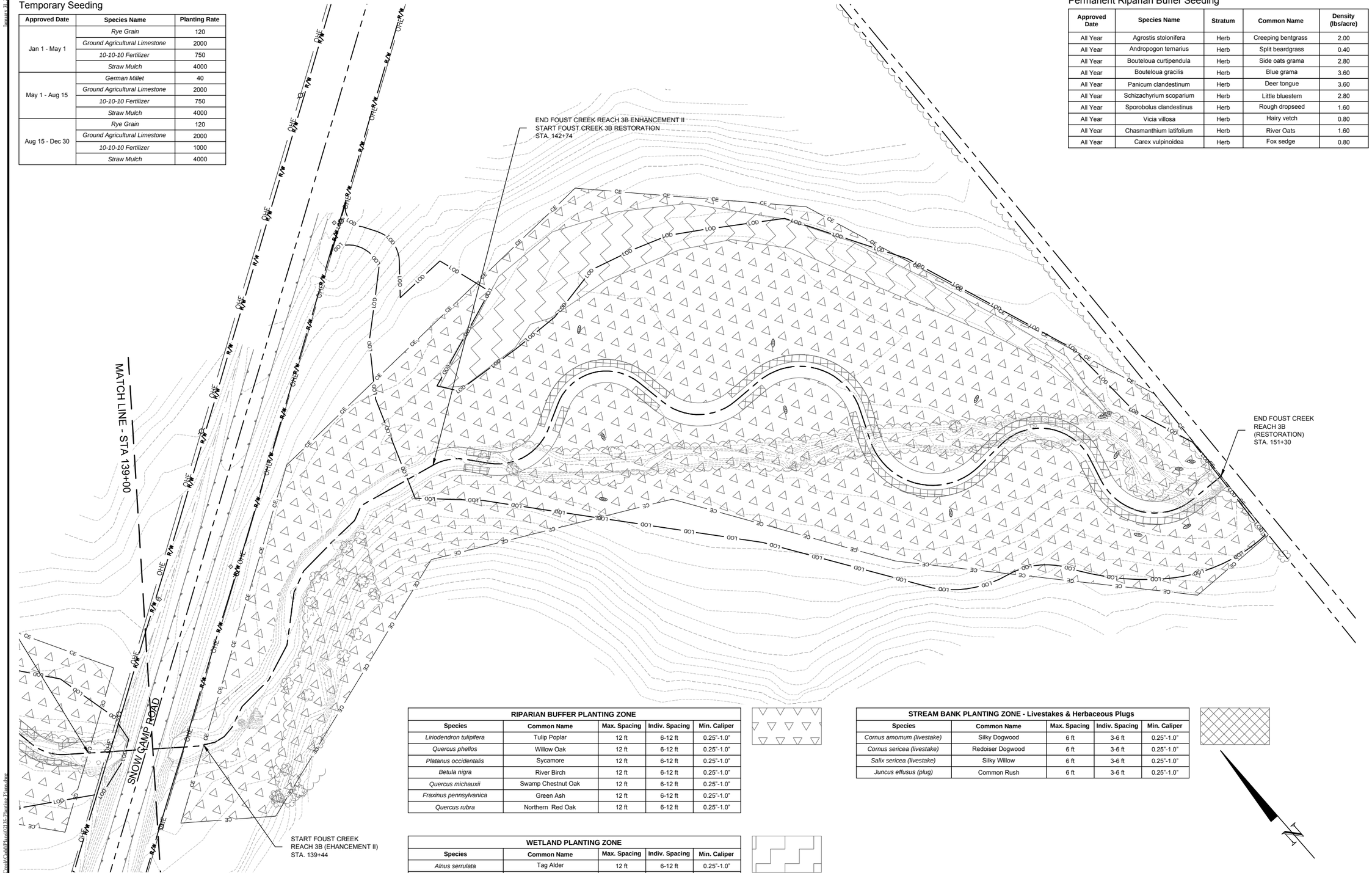
January 31, 2014

Temporary Seeding

Approved Date	Species Name	Planting Rate
Jan 1 - May 1	*Rye Grain*	120
	Ground Agricultural Limestone	2000
	10-10-10 Fertilizer	750
	Straw Mulch	4000
May 1 - Aug 15	*German Millet*	40
	Ground Agricultural Limestone	2000
	10-10-10 Fertilizer	750
	Straw Mulch	4000
Aug 15 - Dec 30	*Rye Grain*	120
	Ground Agricultural Limestone	2000
	10-10-10 Fertilizer	1000
	Straw Mulch	4000

Permanent Riparian Buffer Seeding

Approved Date	Species Name	Stratum	Common Name	Density (lbs/acre)
All Year	Agrostis stolonifera	Herb	Creeping bentgrass	2.00
All Year	Andropogon ternarius	Herb	Split beardgrass	0.40
All Year	Bouteloua curtipendula	Herb	Side oats grama	2.80
All Year	Bouteloua gracilis	Herb	Blue grama	3.60
All Year	Panicum clandestinum	Herb	Deer tongue	3.60
All Year	Schizachyrium scoparium	Herb	Little bluestem	2.80
All Year	Sporobolus clandestinus	Herb	Rough dropseed	1.60
All Year	Vicia villosa	Herb	Hairy vetch	0.80
All Year	Chasmanthium latifolium	Herb	River Oats	1.60
All Year	Carex vulpinoidea	Herb	Fox sedge	0.80



RIPARIAN BUFFER PLANTING ZONE				
Species	**Common Name**	**Max. Spacing**	**Indiv. Spacing**	**Min. Caliper**
Liriodendron tulipifera	Tulip Poplar	12 ft	6-12 ft	0.25"-1.0"
Quercus phellos	Willow Oak	12 ft	6-12 ft	0.25"-1.0"
Platanus occidentalis	Sycamore	12 ft	6-12 ft	0.25"-1.0"
Betula nigra	River Birch	12 ft	6-12 ft	0.25"-1.0"
Quercus michauxii	Swamp Chestnut Oak	12 ft	6-12 ft	0.25"-1.0"
Fraxinus pennsylvanica	Green Ash	12 ft	6-12 ft	0.25"-1.0"
Quercus rubra	Northern Red Oak	12 ft	6-12 ft	0.25"-1.0"

WETLAND PLANTING ZONE				
Species	**Common Name**	**Max. Spacing**	**Indiv. Spacing**	**Min. Caliper**
Alnus serrulata	Tag Alder	12 ft	6-12 ft	0.25"-1.0"
Cornus amomum	Silky Dogwood	12 ft	6-12 ft	0.25"-1.0"
Quercus phellos	Willow Oak	12 ft	6-12 ft	0.25"-1.0"
Betula nigra	River Birch	12 ft	6-12 ft	0.25"-1.0"
Nyssa sylvatica	Blackgum	12 ft	6-12 ft	0.25"-1.0"
Quercus michauxii	Swamp Chestnut Oak	12 ft	6-12 ft	0.25"-1.0"
Fraxinus pennsylvanica	Green Ash	12 ft	6-12 ft	0.25"-1.0"

STREAM BANK PLANTING ZONE - Livestakes & Herbaceous Plugs				
Species	**Common Name**	**Max. Spacing**	**Indiv. Spacing**	**Min. Caliper**
Cornus amomum (livestake)	Silky Dogwood	6 ft	3-6 ft	0.25"-1.0"
Cornus sericea (livestake)	Redoiser Dogwood	6 ft	3-6 ft	0.25"-1.0"
Salix sericea (livestake)	Silky Willow	6 ft	3-6 ft	0.25"-1.0"
Juncus effusus (plug)	Common Rush	6 ft	3-6 ft	0.25"-1.0"

0' 40' 80' 120'
(HORIZONTAL)

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

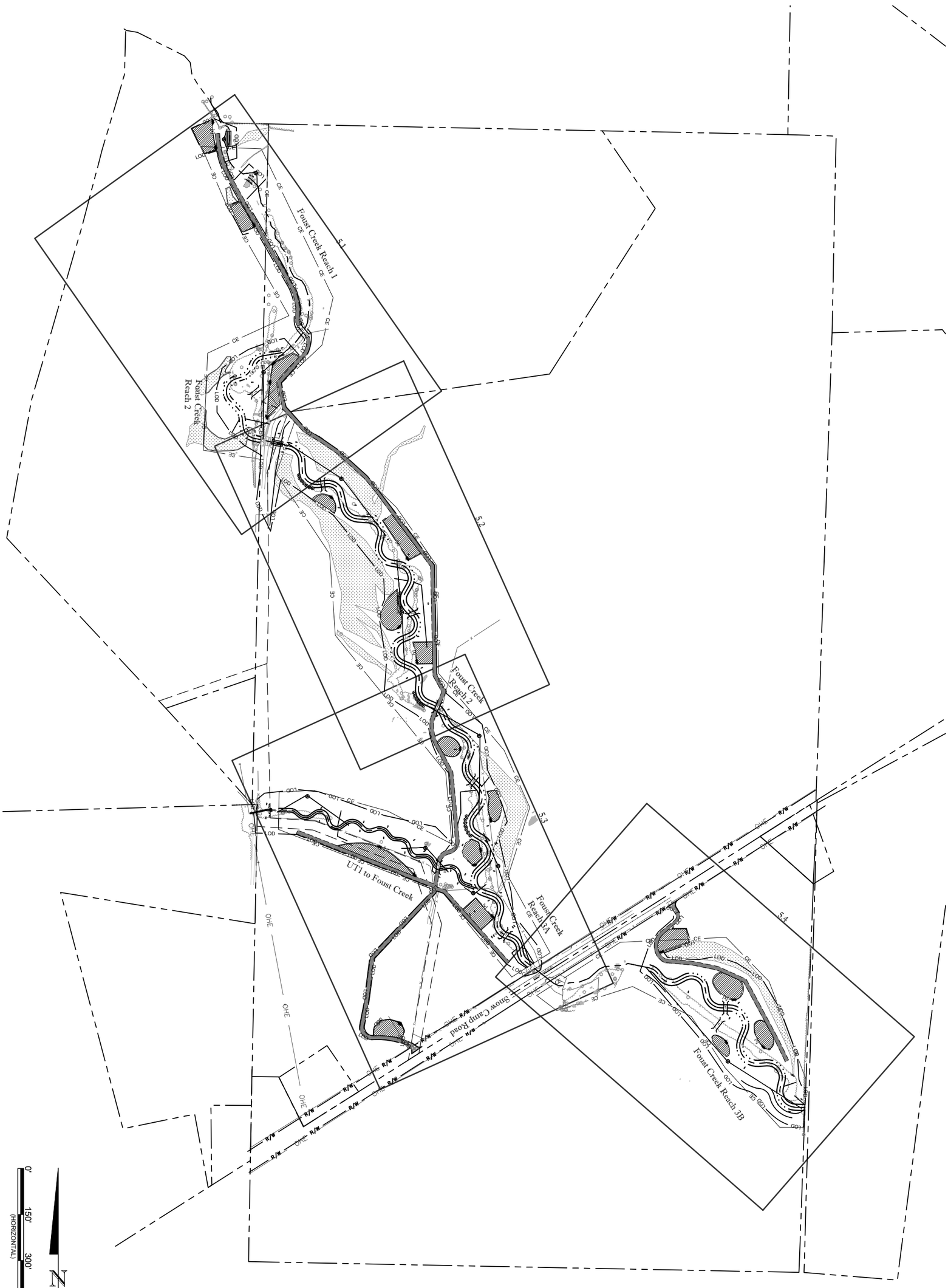
Foust Creek Mitigation Site
Alamance County, NC

Foust Creek
Planting Plan

Revisions:

Date: 01.31.2014
Job Number: 006-02135
Project Engineer: JNG
Drawn By: CTM
Checked By: SDW

Sheet 4.4



Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

5.0

Sheet

Revisions:

Foust Creek Mitigation Site
Alamance County, NC

Erosion and Sediment Control Overview

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

WILDLANDS
ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831

Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

5.1
Sheet

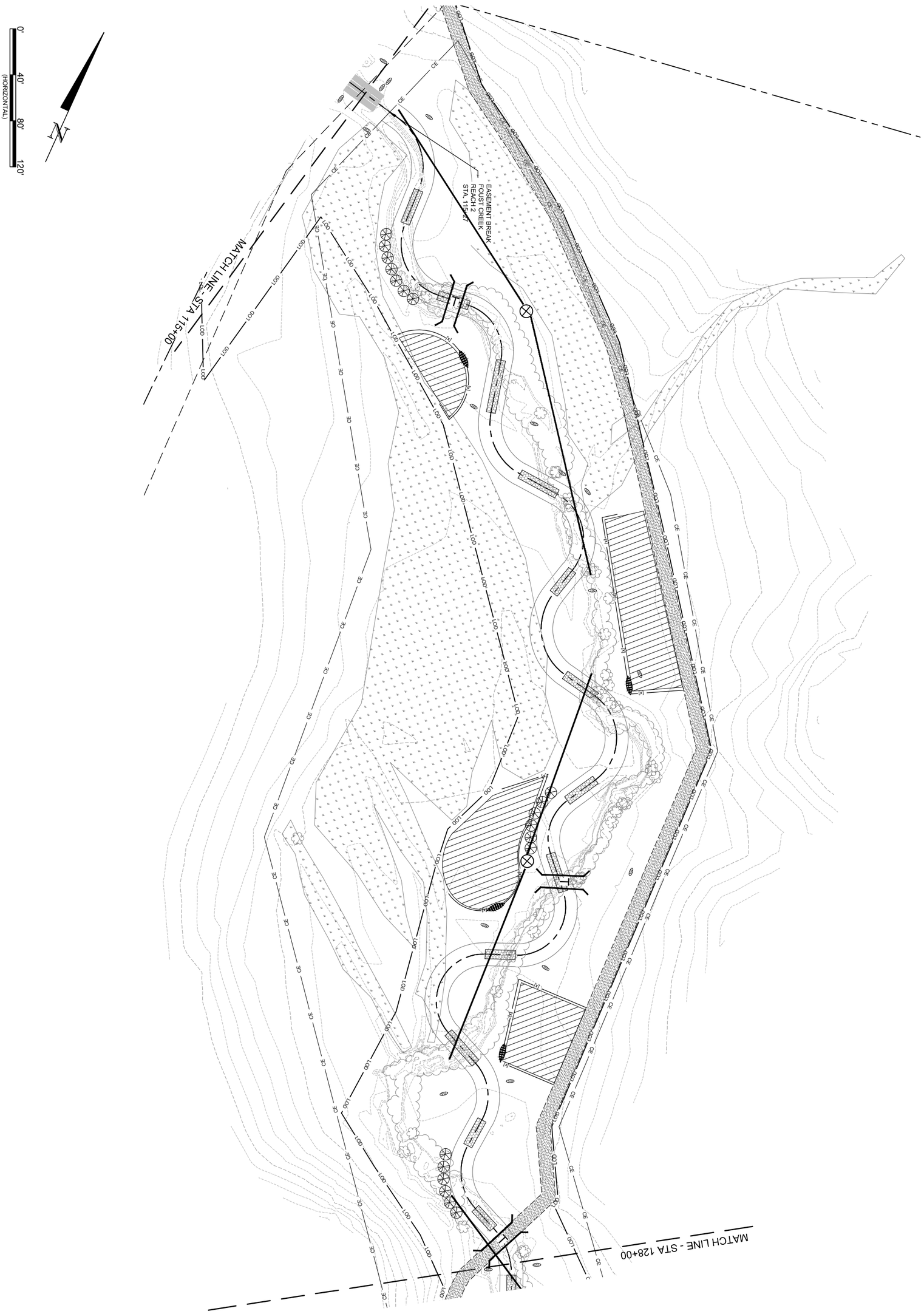
Revisions:

Foust Creek Mitigation Site
Alamance County, NC

Foust Creek
Erosion and Sediment Control Plan

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

WILDLANDS
ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831



Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

5.2
Sheet

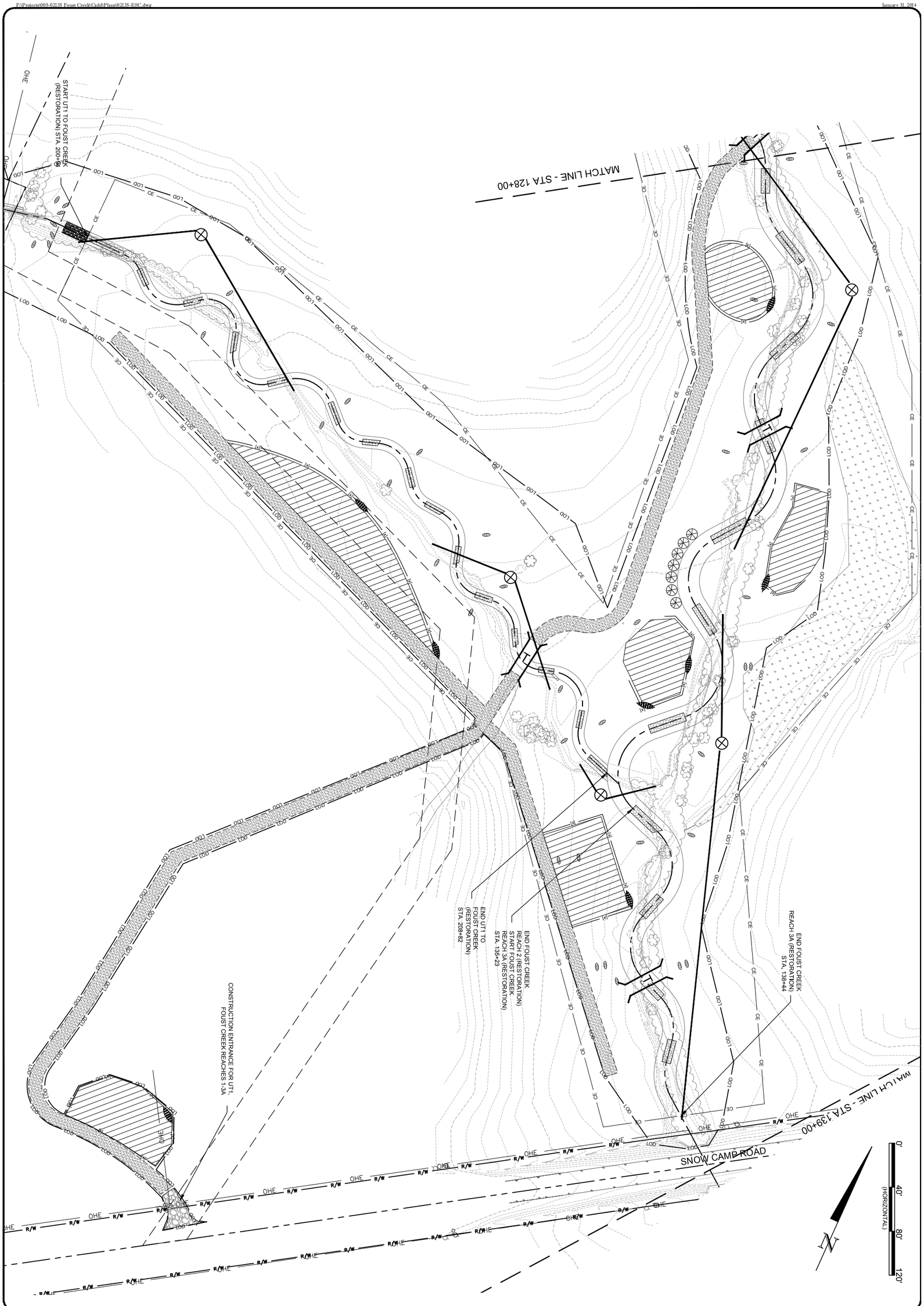
Revisions:

Foust Creek Mitigation Site
Alamance County, NC

Foust Creek
Erosion and Sediment Control Plan

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

WILDLANDS
ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831



Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

5.3
Sheet

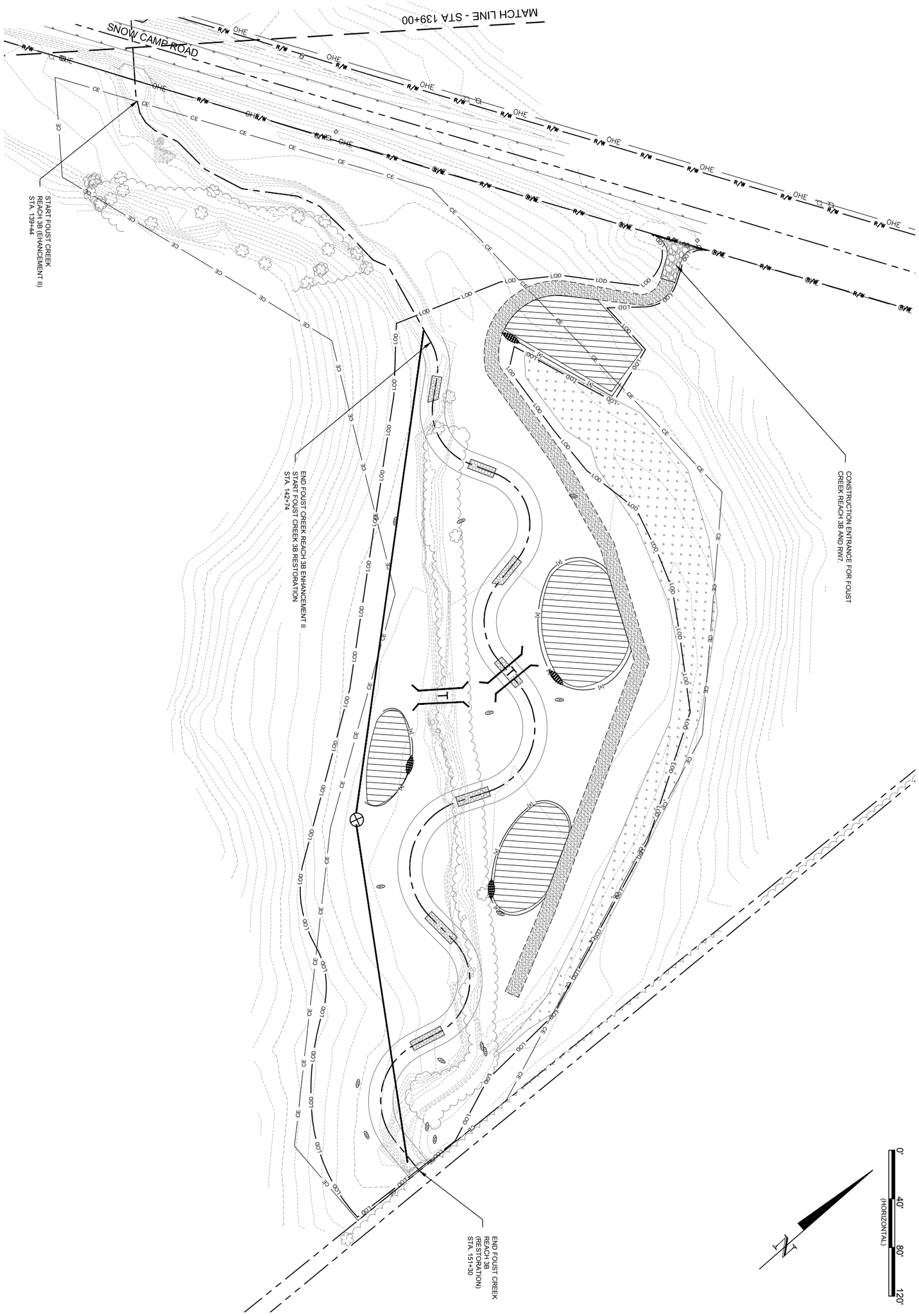
Revisions:

Foust Creek Mitigation Site
Alamance County, NC

Foust Creek & UT1
Erosion and Sediment Control Plan

PRELIMINARY DO NOT USE FOR CONSTRUCTION

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831



Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

5.4
Sheet

Revisions:

Foust Creek Mitigation Site
Alamance County, NC

Foust Creek
Erosion and Sediment Control Plan

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

WILDLANDS
ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831

Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

6.0
Sheet

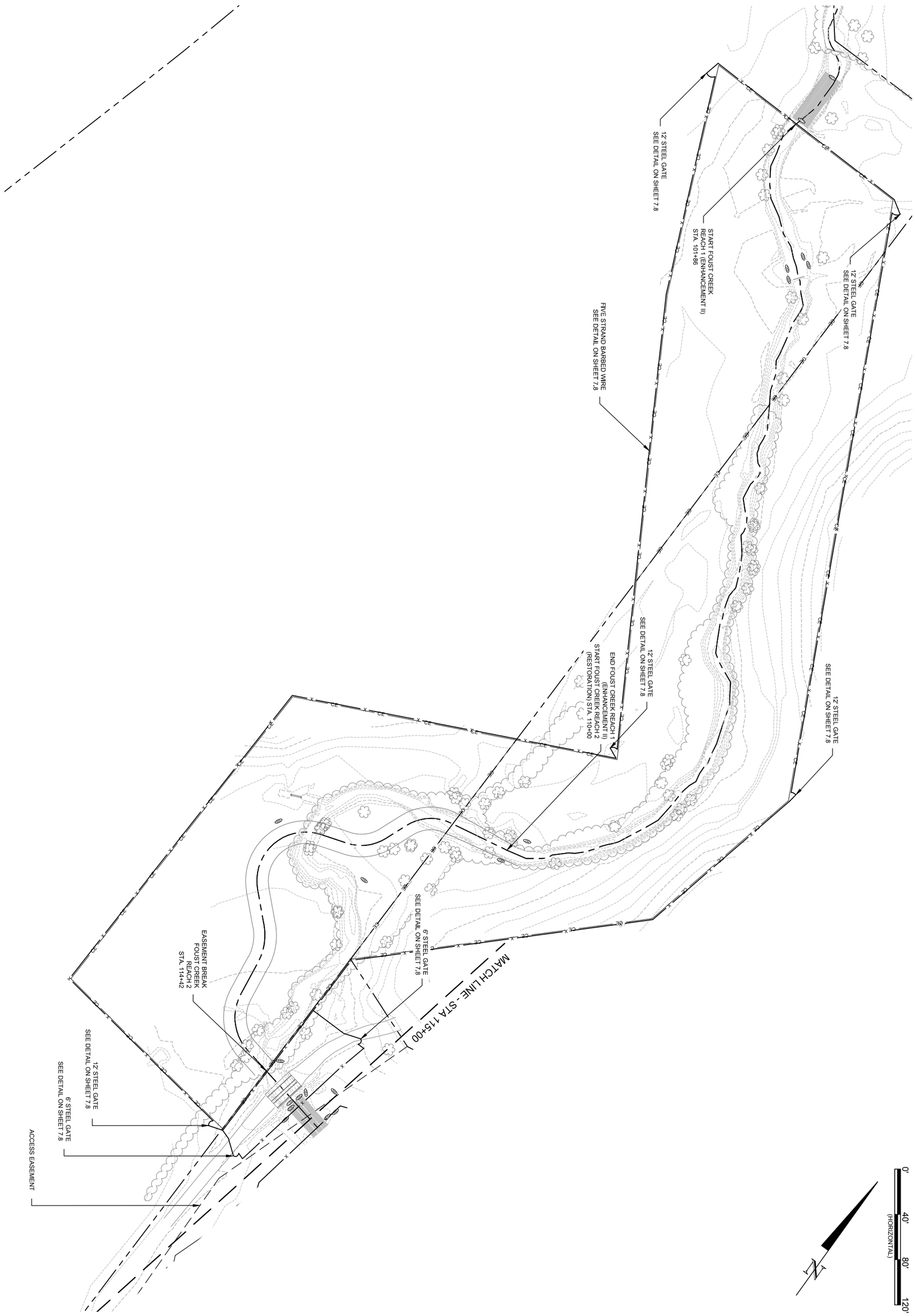
Revisions:

Foust Creek Mitigation Site
Alamance County, NC

Fencing Overview

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

WILDLANDS
ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831



Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

Revisions:

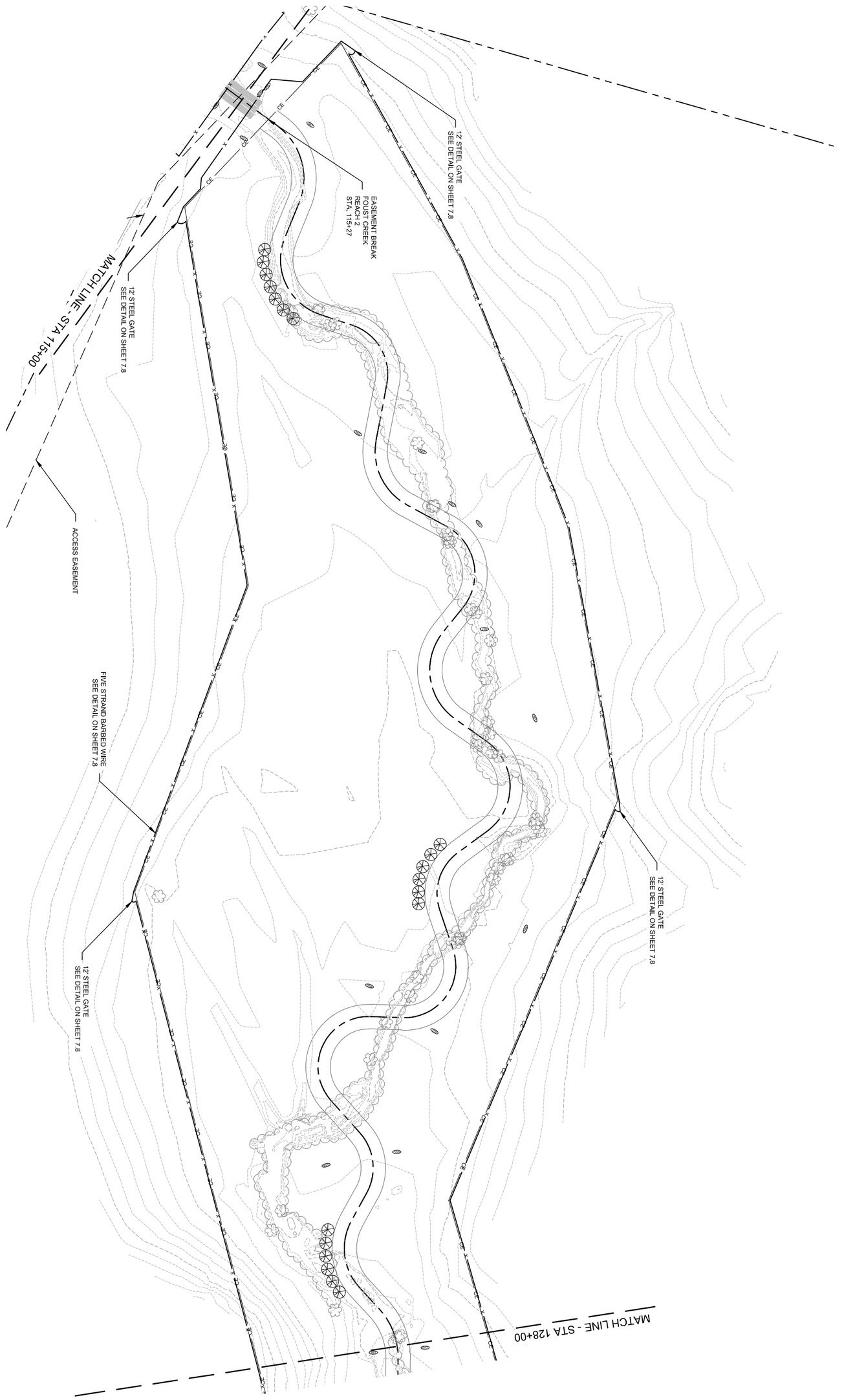
6.1
Sheet

Foust Creek Mitigation Site
Alamance County, NC

Foust Creek
Fencing Plan

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

WILDLANDS
ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831



Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

6.2
Sheet

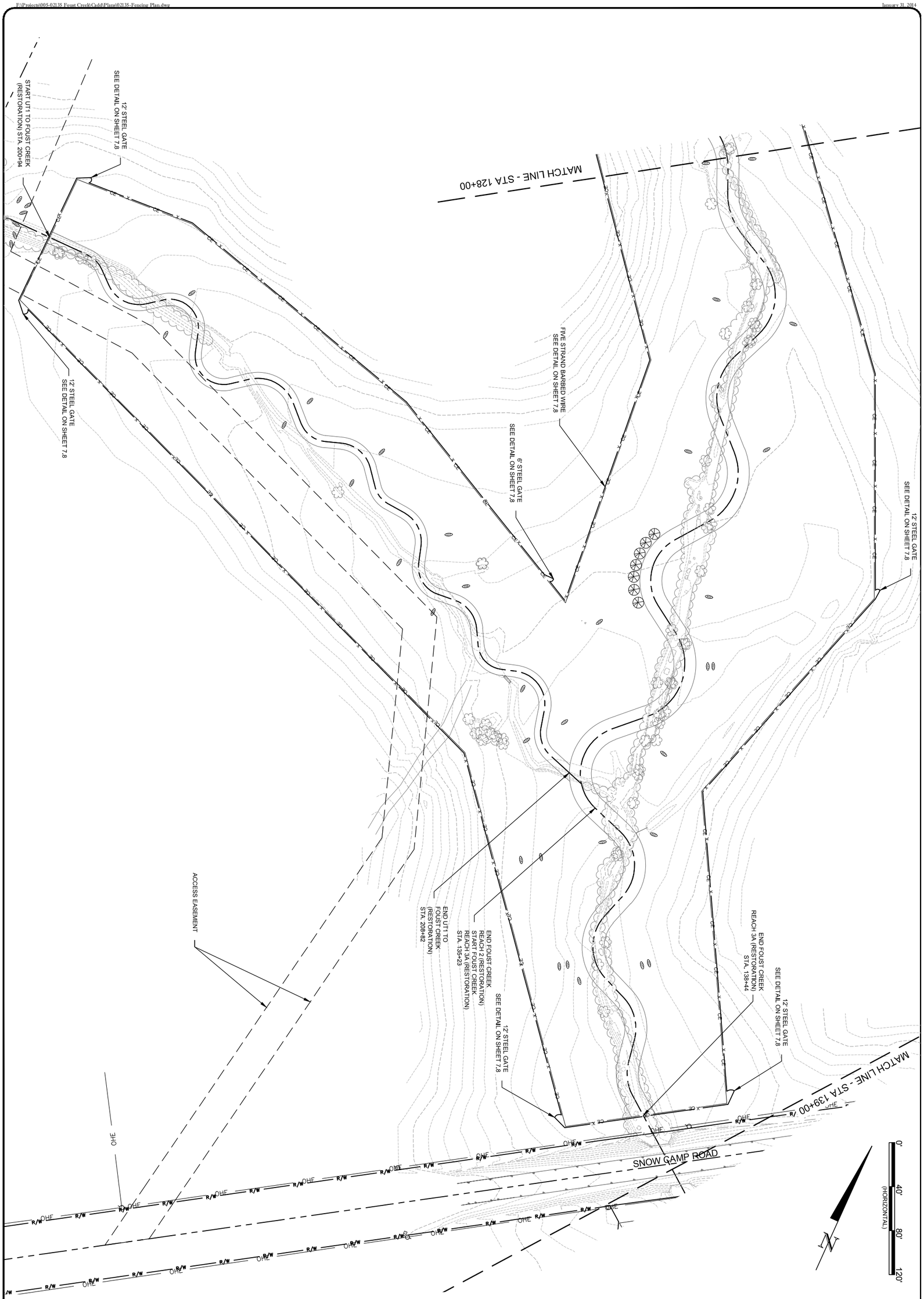
Revisions:

Foust Creek Mitigation Site
Alamance County, NC

Foust Creek
Fencing Plan

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

WILDLANDS
ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831



Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

Revisions:

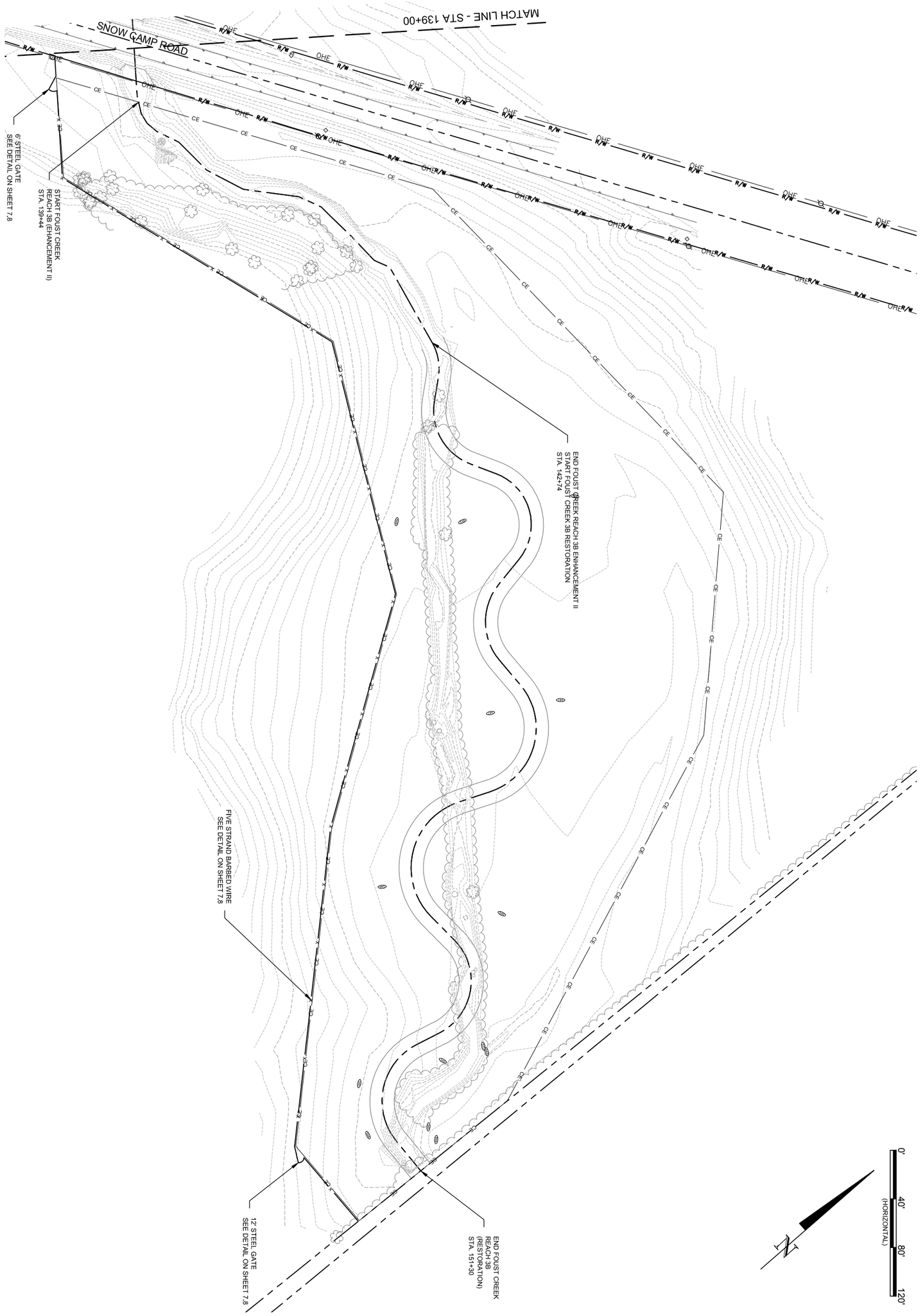
6.3
Sheet

Foust Creek Mitigation Site
Alamance County, NC

Foust Creek & UT1
Fencing Plan

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

WILDLANDS
ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831



Date:	01.31.2014
Job Number:	005-02135
Project Engineer:	ANG
Drawn By:	CLM
Checked By:	SDW

6.4
Sheet

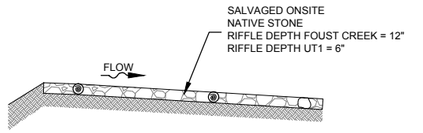
Revisions:

Foust Creek Mitigation Site
Alamance County, NC

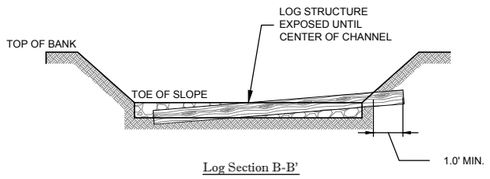
Foust Creek
Fencing Plan

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

WILDLANDS
ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831



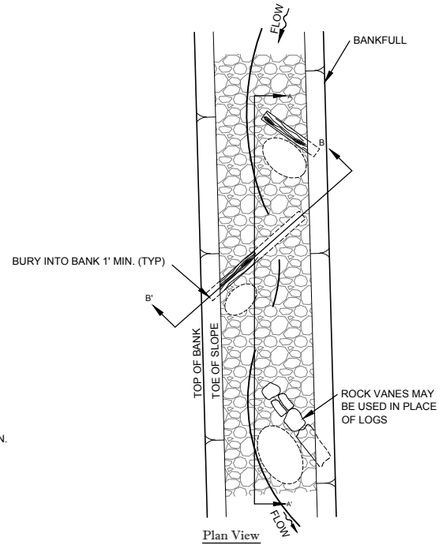
Profile View
A-A'



Log Section B-B'

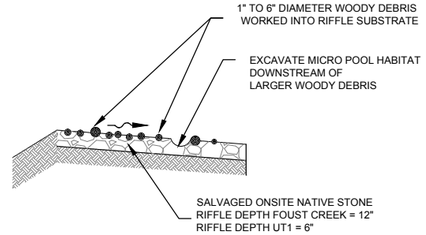
NOTES:

- LOGS AND / OR BOULDER FEATURES SHOULD VARY IN SIZE AND TYPE WITHIN EACH RIFFLE.
- LOGS MAY BE SUBSTITUTED WITH ROCK VANES AT ENGINEERS DISCRETION.

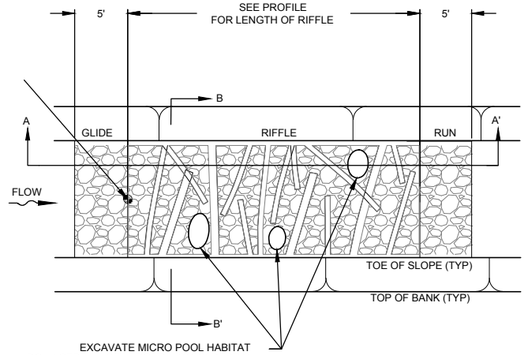


Plan View

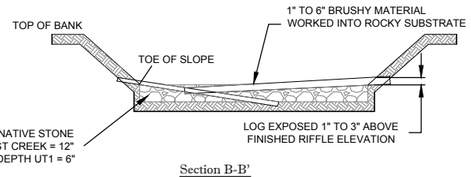
1 / 7.1 Jazz Riffle Structure — Not to Scale — CR-1



Section A-A'



Plan View



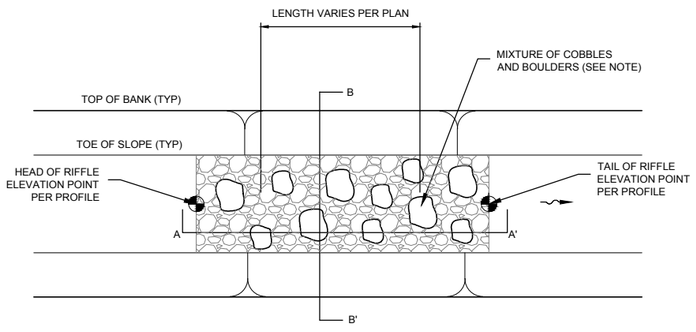
Section B-B'

2 / 7.1 Woody Riffle — Not to Scale

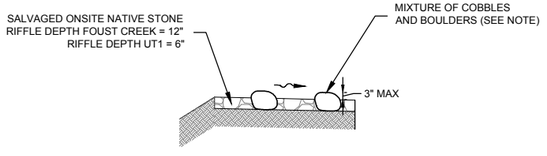
CR-1 | CR-2

CR-3 | CR-4

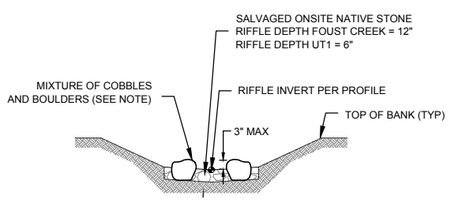
CONTRACTOR TO USE ONSITE NATIVE STONE IN THE CONSTRUCTION OF RIFFLES CR-1 – CR-4 AS DIRECTED BY THE ENGINEER AND DESCRIBED IN THE PROJECT SPECIFICATIONS



Plan View



Section A-A'



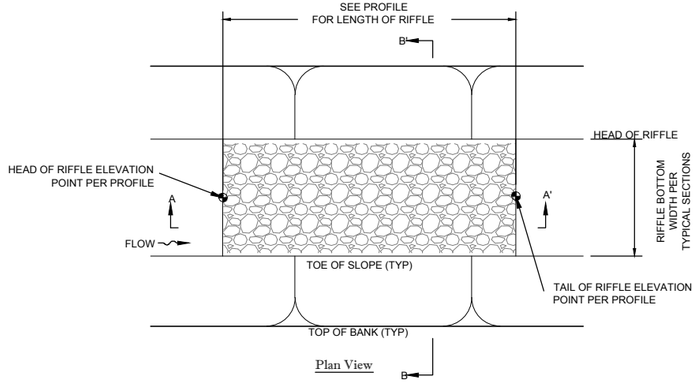
Section B-B'

NOTE:

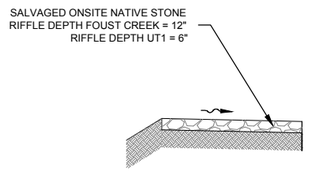
FOR THE MIXTURE OF COBBLES AND BOULDERS THE CONTRACTOR SHALL USE ONSITE NATIVE STONE SIZED IN ACCORDANCE WITH THE CLASS SIZES DESCRIBED BELOW. QUARRY STONE MAY BE SUBSTITUTED WITH THE PRIOR APPROVAL OF THE ENGINEER.

1. USE CLASS B AND CLASS 1 STONE ON FOUST CREEK.
2. USE CLASS AND CLASS B STONE ON UT1 TO FOUST CREEK.

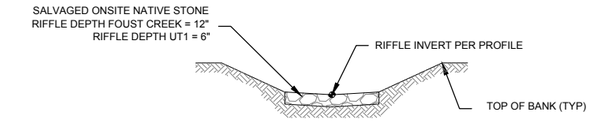
3 / 7.1 Chunky Riffle — Not to Scale — CR-3



Plan View



Profile A-A'



Section B-B'

4 / 7.1 Constructed Riffle — Not to Scale — CR-4

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. P-0831

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

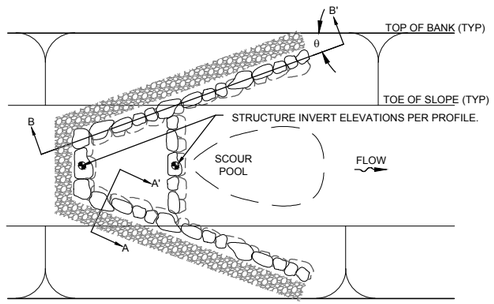
Foust Creek Mitigation Site
Alamance County, NC

Details

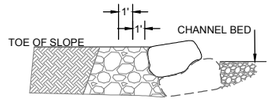
Revisions

Date: 01.31.2014
Job Number: 095-02435
Project Engineer: ANG
Drawn By: CLM
Checked By: SDW

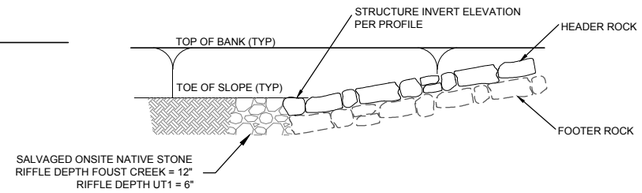
Sheet 7.1



Plan View



Section A-A'

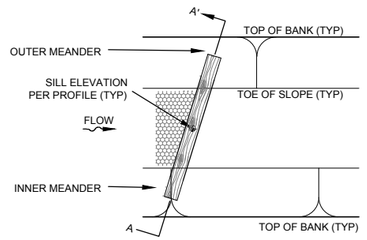


Profile View

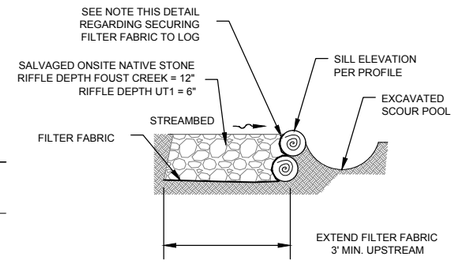
1/7.2 Rock A Vane
Not to Scale

NOTE:

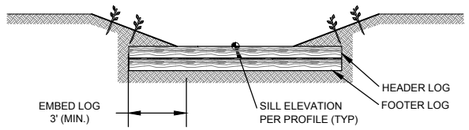
FOLD EDGE OF FABRIC AND SECURE TO MIDDLE OF LOG WITH GALVANIZED ROOFING NAIL.



Plan View

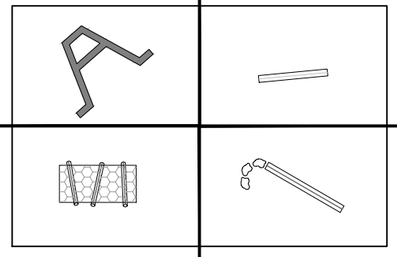


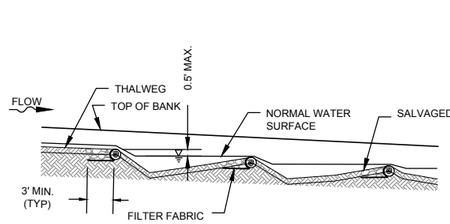
Profile View



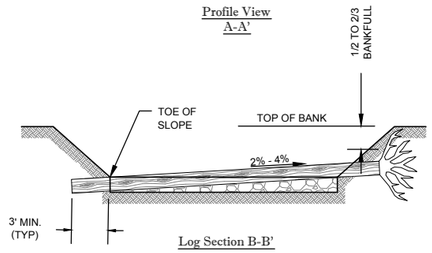
Section A - A'

2/7.2 Angled Log Sill
Not to Scale





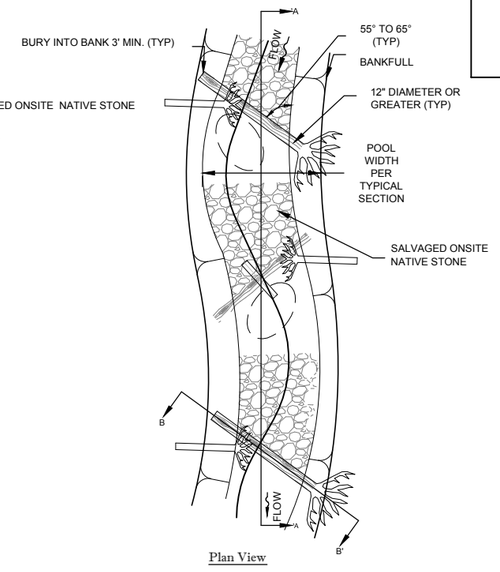
Profile View
A-A'



Log Section B-B'

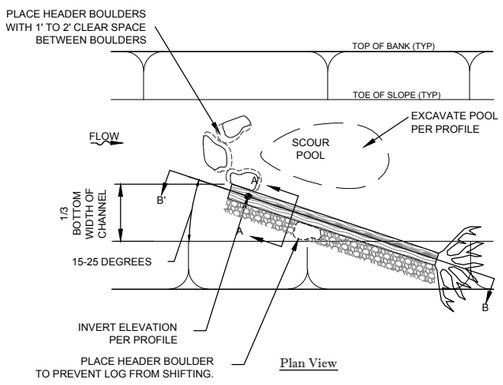
NOTE:

1. LOGS WITHOUT ROOT MASS MAY BE USED ONLY IF APPROVED BY THE PROJECT ENGINEER.
2. BOULDER MATERIAL CAN BE SUBSTITUTED IN PLACE OF ANGLED LOGS WITH APPROVAL OF ENGINEER.

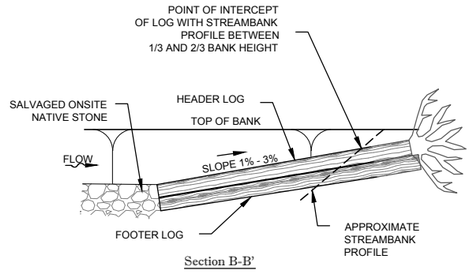


Plan View

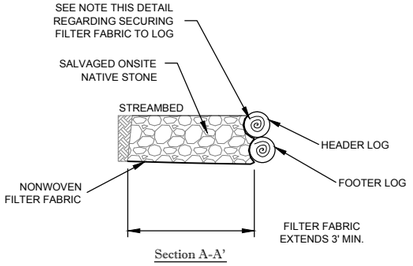
3/7.2 Angled Log Step Pool
Not to Scale



Plan View



Section B-B'



Section A-A'

4/7.2 Log J-Hook
Not to Scale

NOTE:

FOLD EDGE OF FABRIC AND SECURE TO MIDDLE OF LOG WITH GALVANIZED ROOFING NAIL.

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. P-0831

PRELIMINARY DO NOT USE FOR CONSTRUCTION

Foust Creek Mitigation Site
Alamance County, NC

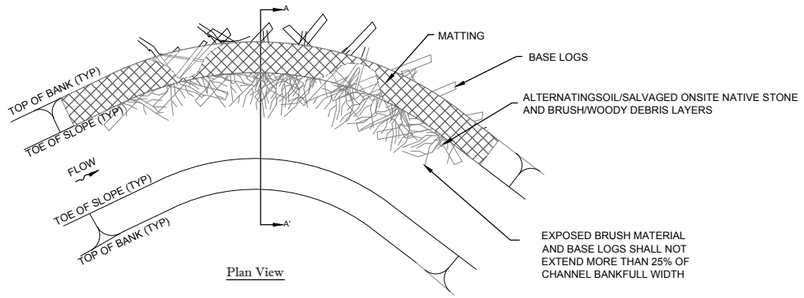
Details

Revisions:

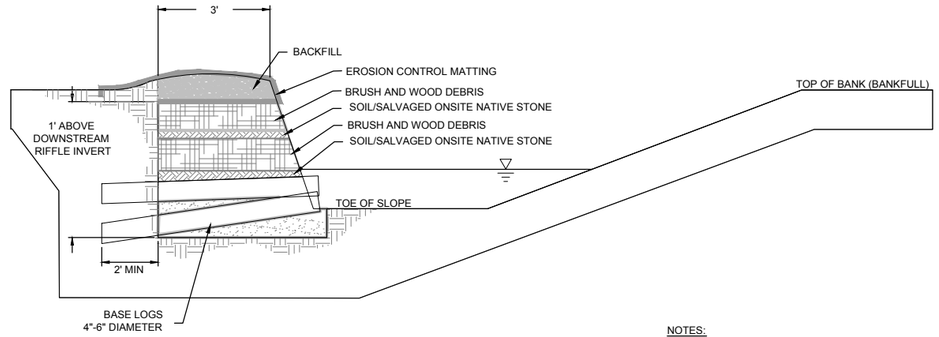
Date:	01.31.2014
Job Number:	005-021S
Project Engineer:	ANG
Drawn By:	CTM
Checked By:	SDW

7.2

Sheet



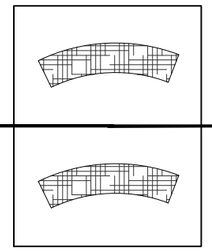
Plan View

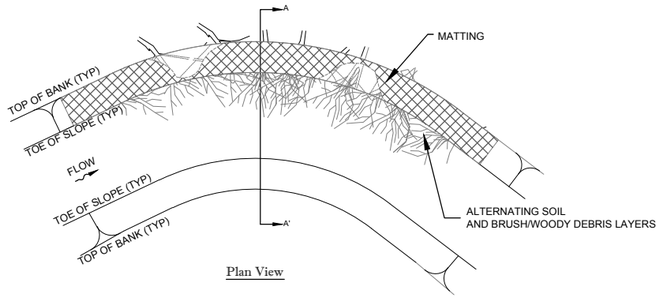


Section A-A'

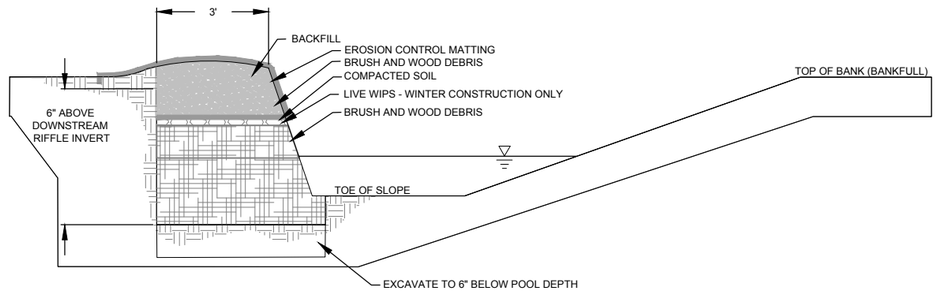
NOTES:
1. OVEREXCAVATE 3' OUTSIDE OF TOP OF BANK (BANKFULL).
2. INSTALL BASE LOGS IN A CRISS CROSS PATTERN, DRIVING THEM INTO THE EXISTING BANK A MINIMUM OF 2'. BASE LOGS SHALL BE 6"-12" DIAMETER.
3. INSTALL A LAYER OF SOIL/SALVAGED ONSITE NATIVE STONE ON TOP OF THE BASE LOGS.
4. LIGHTLY SPREAD SOIL/SALVAGED ONSITE NATIVE STONE TO FILL VOIDS BETWEEN BASE LOGS. AVOID HEAVY COMPACTION TO PREVENT DAMAGE TO THE BASE LOGS.
5. INSTALL A LAYER OF BRUSH/WOODY DEBRIS, WHICH SHALL CONSIST OF SMALL BRANCHES AND ROOTS COLLECTED ON-SITE. LIGHTLY COMPACT BRUSH/WOODY DEBRIS LAYER.
6. BRUSH SHOULD BE ALIGNED SO STEMS ARE ROUGHLY PARALLEL AND IS INSTALLED POINTING SLIGHTLY UPSTREAM.
7. INSTALL EARTH BACKFILL OVER FINAL BRUSH/WOODY LAYER ACCORDING TO TYPICAL SECTION DIMENSIONS.
8. INSTALL EROSION CONTROL MATTING AND BANK STABILIZATION PER PLANS.

1/7.3 Brush Toe - Foust Creek
Not to Scale





Plan View



Section A-A'

2/7.3 Brush Toe - UT1 to Foust Creek
Not to Scale

NOTES:
1. OVEREXCAVATE 3' OUTSIDE OF TOP OF BANK (BANKFULL).
2. INSTALL A LAYER OF BRUSH/WOODY DEBRIS, WHICH SHALL CONSIST OF SMALL BRANCHES AND ROOTS COLLECTED ON-SITE. LIGHTLY COMPACT BRUSH/WOODY DEBRIS LAYER.
3. BRUSH SHOULD BE ALIGNED SO STEMS ARE ROUGHLY PARALLEL AND IS INSTALLED POINTING SLIGHTLY UPSTREAM.
4. INSTALL EARTH BACKFILL OVER BRUSH/WOODY LAYER ACCORDING TO TYPICAL SECTION DIMENSIONS.
5. INSTALL EROSION CONTROL MATTING AND BANK STABILIZATION PER PLANS.

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. P-0831

PRELIMINARY DO NOT USE FOR CONSTRUCTION

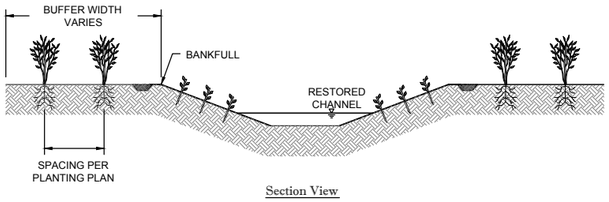
Foust Creek Mitigation Site
Alamance County, NC

Details

Revisions

Date: 01.31.2014
Job Number: 095-02435
Project Engineer: ANG
Drawn By: CLM
Checked By: SDW

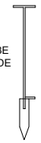
Sheet 7.3



Section View

DIBBLE BAR

PLANTING BAR SHALL HAVE A BLADE WITH A TRIANGULAR CROSS-SECTION, AND SHALL BE 12 INCHES LONG, 4 INCHES WIDE AND 1 INCH THICK AT CENTER.

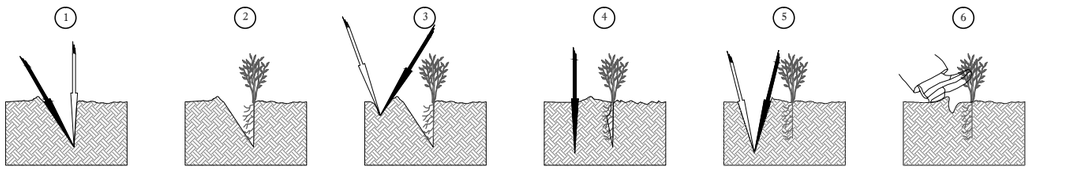


ROOTING PRUNING

ALL ROOTS SHALL BE PRUNED TO AN APPORIATE LENGTH TO PREVENT J-ROOTING.

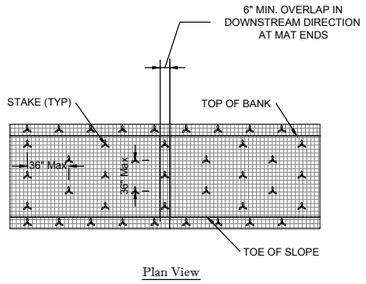
NOTES:

1. ALL SOILS WITHIN THE BUFFER PLANTING AREA SHALL BE DISKED, AS REQUIRED, PRIOR TO PLANTING.
2. ALL PLANTS SHALL BE PROPERLY HANDLED PRIOR TO INSTALLATION TO INSURE SURVIVAL.

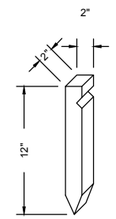


1. INSERT THE DIBBLE, OR SHOVEL, STRAIGHT DOWN INTO THE SOIL TO THE FULL DEPTH OF THE BLADE AND PULL BACK ON THE HANDLE TO OPEN THE PLANTING HOLE. (DO NOT ROCK THE SHOVEL BACK AND FORTH AS THIS CAUSES SOIL IN THE PLANTING HOLE TO BE COMPACTED, INHIBITING ROOT GROWTH.
2. REMOVE THE DIBBLE, OR SHOVEL, AND PUSH THE SEEDLING ROOTS DEEP INTO THE PLANTING HOLE. PULL THE SEEDLING BACK UP TO THE CORRECT PLANTING DEPTH (THE ROOT COLLAR SHOULD BE 1 TO 3 INCHES BELOW THE SOIL SURFACE). GENTLY SHAKE THE SEEDLING TO ALLOW THE ROOTS TO STRAIGHTEN OUT. DO NOT TWIST OR SPIN THE SEEDLING OR LEAVE THE ROOTS J-ROOTED.
3. INSERT THE DIBBLE, OR SHOVEL, SEVERAL INCHES IN FRONT OF THE SEEDLING AND PUSH THE BLADE HALFWAY INTO THE SOIL. TWIST AND PUSH THE HANDLE FORWARD TO CLOSE THE TOP OF THE SLIT TO HOLD THE SEEDLING IN PLACE.
4. PUSH THE DIBBLE, OR SHOVEL, DOWN TO THE FULL DEPTH OF THE BLADE.
5. PULL BACK ON THE HANDLE TO CLOSE THE BOTTOM OF THE PLANTING HOLD. THEN PUSH FORWARD TO CLOSE THE TOP, ELIMINATING AIR POCKETS AROUND THE ROOT.
6. REMOVE THE DIBBLE, OR SHOVEL, AND CLOSE AND FIRM UP THE OPENING WITH YOUR HEEL. BE CAREFUL TO AVOID DAMAGING THE SEEDLING.

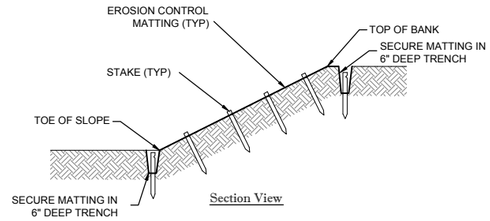
1/7.4 Bare Root Planting
Not to Scale



Plan View



Typical Stake

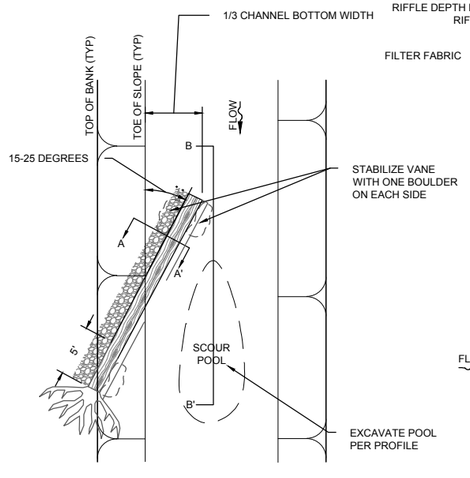


Section View

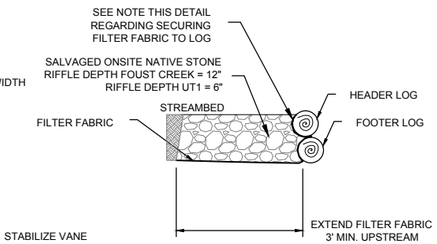
2/7.4 Erosion Control Matting
Not to Scale

NOTE:

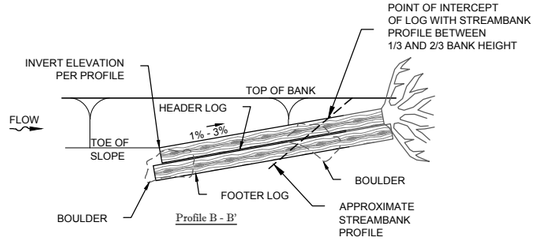
FOLD EDGE OF FABRIC AND SECURE TO MIDDLE OF LOG WITH GALVANIZED ROOFING NAIL.



Plan View

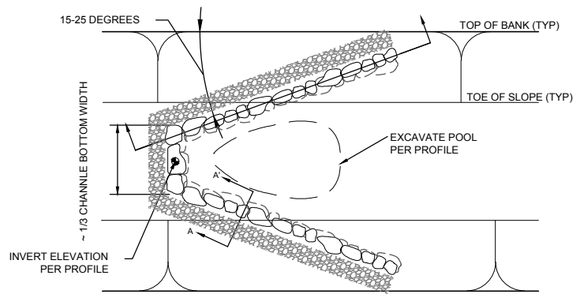


Section A-A'

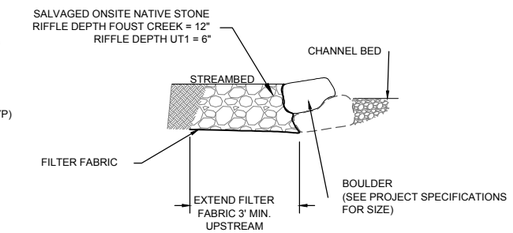


Profile B - B'

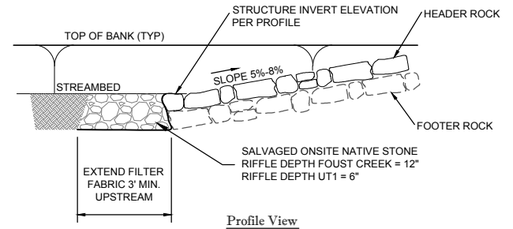
3/7.4 Log Vane
Not to Scale



Plan View



Section A-A'



Profile View

4/7.4 Rock Cross Vane
Not to Scale

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831

PRELIMINARY DO NOT USE FOR CONSTRUCTION

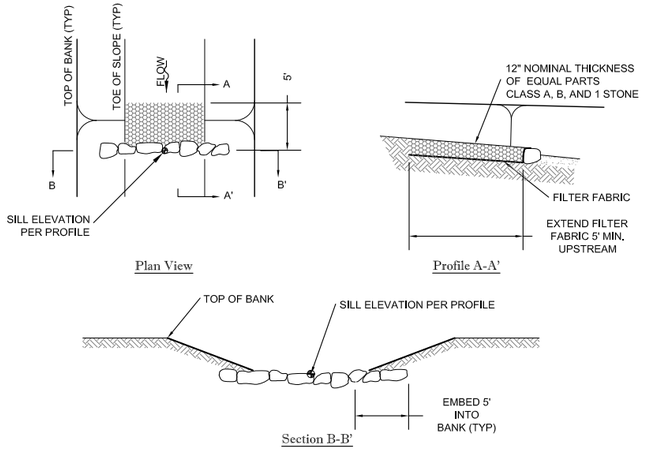
Foust Creek Mitigation Site
Alamance County, NC

Details

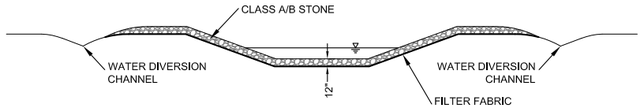
Revisions:

Date: 01.31.2014
Job Number 095-02135
Project Engineer ANG
Drawn By: CLM
Checked By: SDW

Sheet 7.4



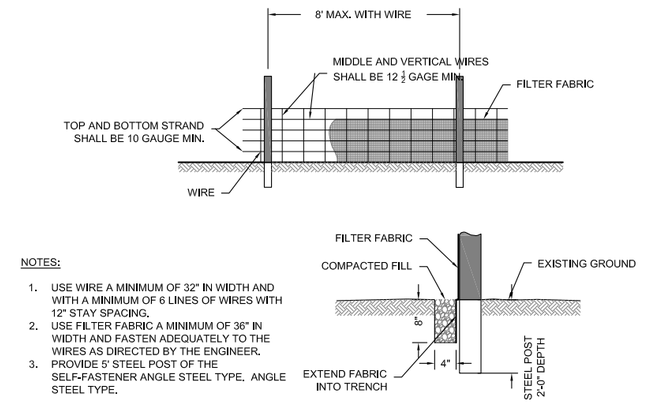
1/7.5 Boulder Sill
Not to Scale



NOTES:

1. FORD CROSSING SHALL BE INSTALLED PERPENDICULAR TO CHANNEL BANKS.
2. MAINTAIN DIVERSION CHANNEL TO INSURE RUNOFF DOES NOT ENTER CHANNEL.
3. CONTRACTOR SHALL DETERMINE APPROPRIATE FORD DIMENSIONS.

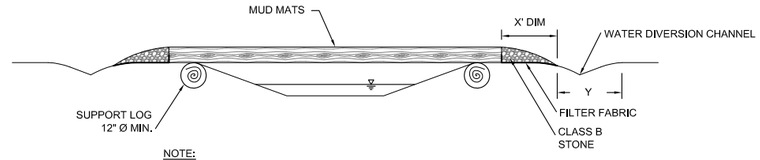
2/7.5 Permanent Ford Crossing
Not to Scale



NOTES:

1. USE WIRE A MINIMUM OF 32" IN WIDTH AND WITH A MINIMUM OF 6 LINES OF WIRES WITH 12" STAY SPACING.
2. USE FILTER FABRIC A MINIMUM OF 36" IN WIDTH AND FASTEN ADEQUATELY TO THE WIRES AS DIRECTED BY THE ENGINEER.
3. PROVIDE 5' STEEL POST OF THE SELF-FASTENER ANGLE STEEL TYPE. ANGLE STEEL TYPE.

3/7.5 Temporary Silt Fence
Not to Scale



NOTE:

1. CONSTRUCT STREAM CROSSING WHEN FLOW IS AT NORMAL BASEFLOW.
2. MINIMIZE CLEARING AND EXCAVATION OF STREAMBANKS. DO NOT EXCAVATE CHANNEL BOTTOM.
3. INSTALL STREAM CROSSING PERPENDICULAR TO THE FLOW.
4. MAINTAIN CROSSING SO THAT RUNOFF IN THE CONSTRUCTION ROAD DOES NOT ENTER EXISTING CHANNEL.
5. STABILIZE AN ACCESS RAMP OF CLASS B STONE TO THE EDGE OF THE MUD MAT.
6. CONTRACTOR SHALL DETERMINE AN APPROPRIATE RAMP ANGLE ACCORDING TO EQUIPMENT UTILIZED.

4/7.5 Temporary Stream Crossing - Timber Mat
Not to Scale

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831

PRELIMINARY DO NOT USE FOR CONSTRUCTION

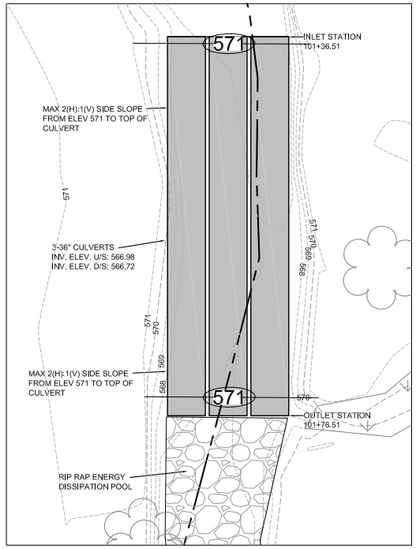
Foust Creek Mitigation Site
Alamance County, NC

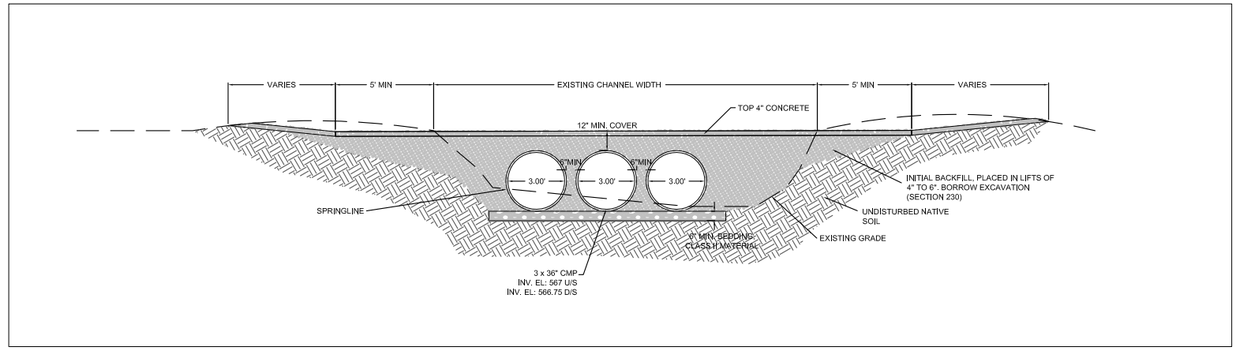
Details

Revisions:

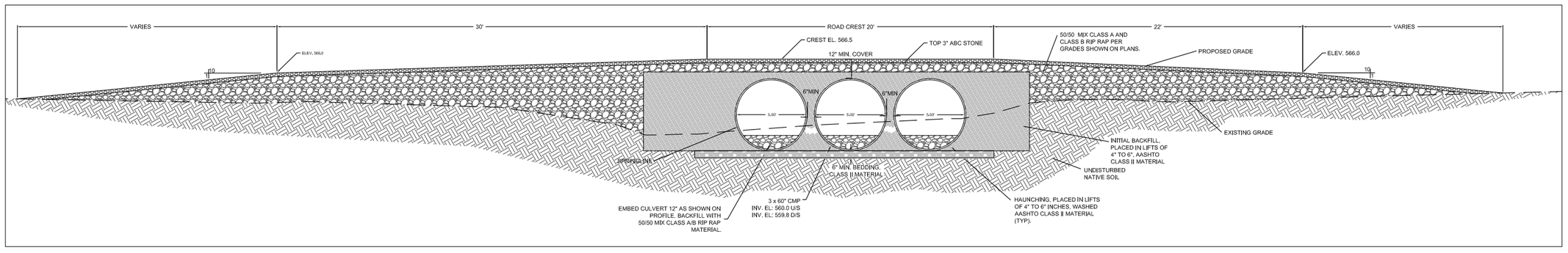
Date: 01.31.2014
Job Number: 005-02135
Project Engineer: ANG
Drawn By: CLM
Checked By: SLW

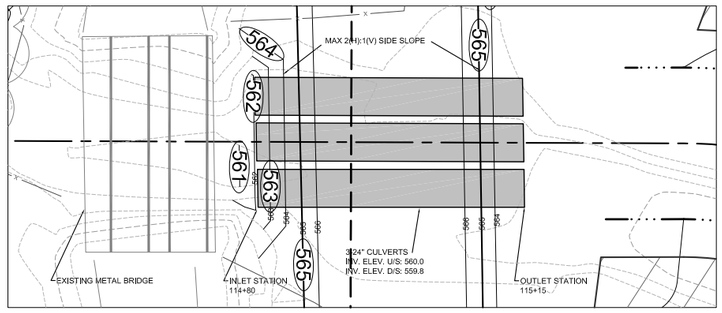
Sheet 7.5





1/7.6 Permanent Culvert Crossing (Foust Creek STA 101+31.5)
Not to Scale





2/7.6 Permanent Culvert Crossing (Foust Creek STA 114+80)
Not to Scale

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

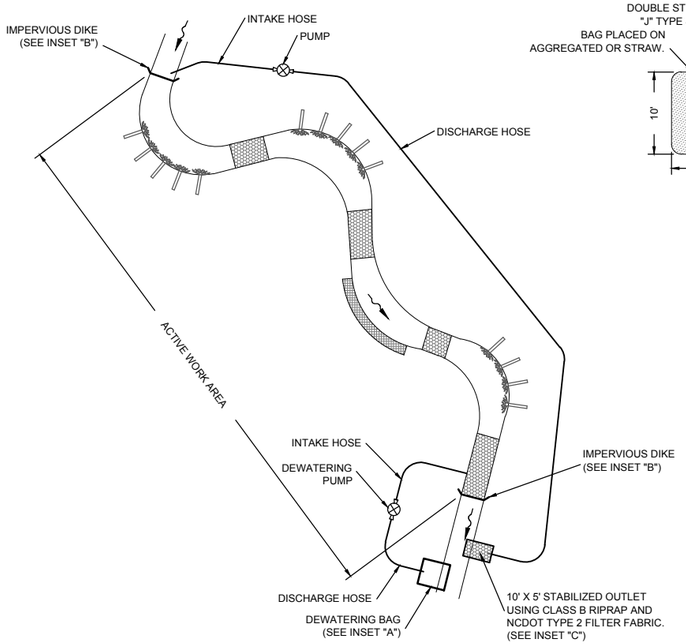
Foust Creek Mitigation Site
Alamance County, NC

Details

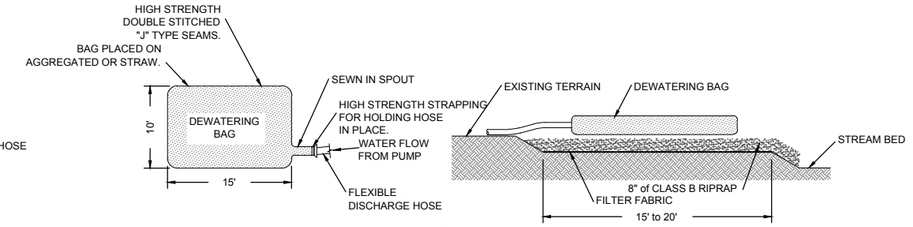
Revisions:

Date: 01.31.2014
Job Number: 005-02135
Project Engineer: ANC
Drawn By: CLM
Checked By: SDW

Sheet 7.6



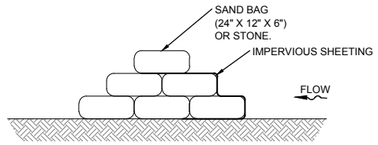
Plan View



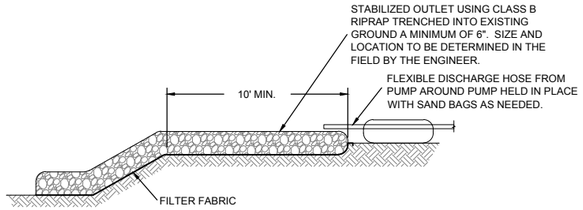
Inset "A"
Dewatering Bag

NOTE:

1. PROVIDE STABILIZED OUTLET TO STREAMBED.

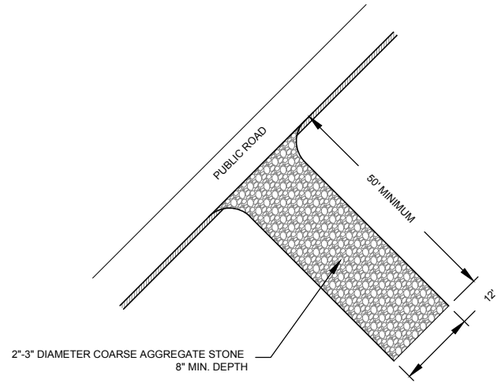


Inset "B"
Impervious Dike



Inset "C"
Stabilized Outlet

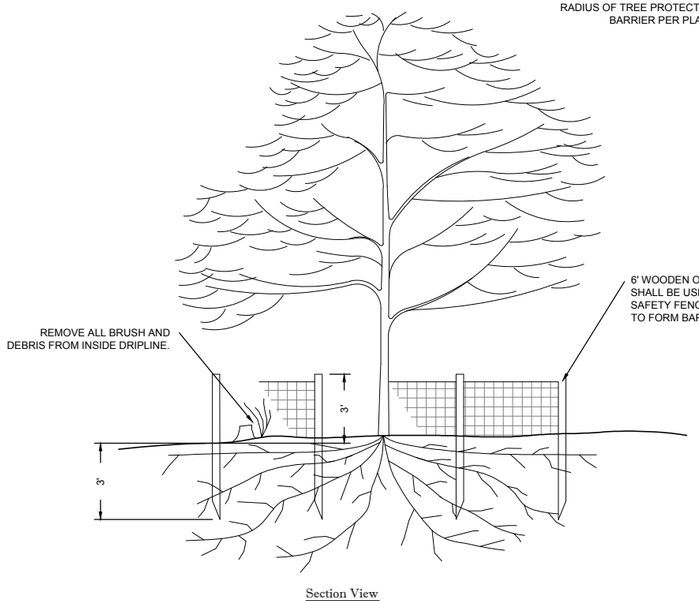
1 / 7.7 **Pump Around System**
Not to Scale



NOTES:

1. PROVIDE TURNING RADIUS SUFFICIENT TO ACCOMMODATE LARGE TRUCKS.
2. LOCATE CONSTRUCTION ENTRANCE AT ALL POINTS OF INGRESS AND EGRESS UNTIL SITE IS STABILIZED. PROVIDE FREQUENT CHECKS OF THE DEVICE AND TIMELY MAINTENANCE.
3. MUST BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR DIRECT FLOW OF MUD ONTO STREETS. PERIODIC TOP DRESSING WITH STONE WILL BE NECESSARY.
4. ENTRANCE WILL BE EXTENDED AS NEEDED TO PROVIDE ADEQUATE SEDIMENT REMOVAL.
5. ANY MATERIAL TRACKED ONTO THE ROADWAY MUST BE CLEANED IMMEDIATELY.
6. USE 2"-3" DIAMETER COARSE AGGREGATE STONE APPROVED BY THE ENGINEER.
7. PLACE FILTER FABRIC BENEATH STONE.

2 / 7.7 **Construction Entrance**
Not to Scale



Plan View

Section View

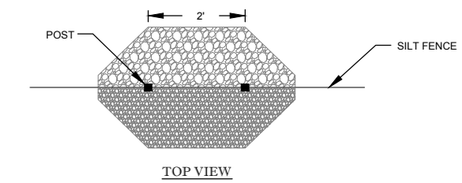
NOTES:

1. ALL TREE PROTECTION BARRIERS SHALL BE REMOVED PRIOR TO CONTRACTOR DEMOBILIZATION.
2. SEE PLANS FOR LOCATION OF ALL TREE PROTECTION BARRIERS.

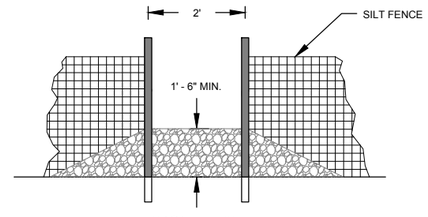
3 / 7.7 **Tree Protection**
Not to Scale

NOTES:

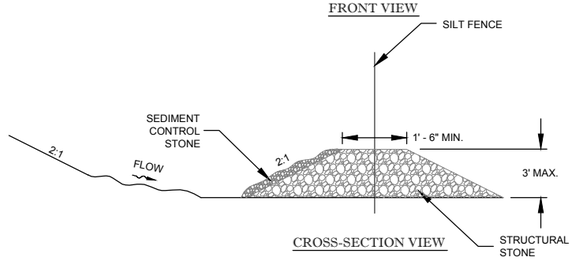
1. STRUCTURAL STONE SHALL BE (CLASS "B") STONE FOR EROSION CONTROL PURPOSES.
2. SEDIMENT CONTROL STONE SHALL BE NO. 5 OR NO. 57 STONE.



TOP VIEW



FRONT VIEW



CROSS-SECTION VIEW

4 / 7.7 **Stone Outlet**
Not to Scale

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. P-0831

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

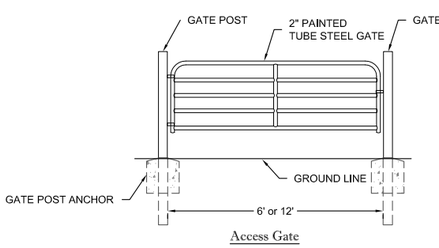
Foust Creek Mitigation Site
Alamance County, NC

Details

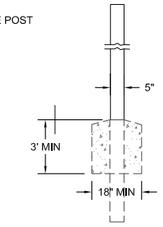
Revisions:

Date: 01.31.2014
Job Number: 095-021S
Project Engineer: ANG
Drawn By: CLM
Checked By: SDW

Sheet 7.7

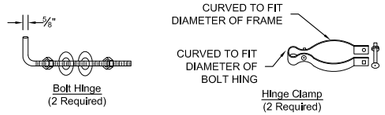


Access Gate



Detail of Gate
Post Anchor

USE CLASS "B" CONCRETE AT GATE POSTS OR WHERE REQUIRED BY SOIL CONDITIONS. CONCRETE MAY ALSO BE USED IN LIEU OF SETTING POSTS TO THEIR MAXIMUM DEPTH.



Hinge Assembly

GENERAL NOTES:

ALL POSTS AND BRACES MAY BE EITHER ROUND OR SQUARE AT THE OPTION OF THE CONTRACTOR, PROVIDED THE SAME TYPE IS USED THROUGHOUT THE PROJECT. DIMENSIONS SHOWN ARE THE DIAMETER OF ROUND OR EDGE DIMENSIONS OF SQUARE POSTS AND BRACES.

ERECT LINE BRACES BETWEEN END, CORNER OR GATE POSTS. PLACE LINE BRACES AT INTERVALS NOT TO EXCEED 300' AND AT THE END OF THE BARBED WIRE ROLL.

THE 300' INTERVAL MAY BE REDUCED BY THE ENGINEER ON CURVES WHERE THE DEGREE OF CURVATURE IS GREATER THAN 3 DEGREES.

NOTCH BRACE POSTS 1" MINIMUM FOR HORIZONTAL BRACES. PLACE TWO GALVANIZED 12d OR THREE GALVANIZED 10d NAILS AT EACH END OF ALL BRACES.

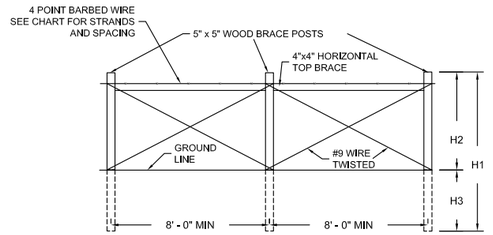
PLACE THE BRACE WIRE AROUND THE POST. DRAW ALL BRACE WIRE TAUT BY TWISTING BETWEEN EACH POST.

INSTALL THE FENCE FACING THE PROPERTY OWNER EXCEPT THAT ON HORIZONTAL CURVES GREATER THAN THREE DEGREES (3°) INSTALL THE FENCE TO PULL AGAINST ALL POSTS. SEE NCDOT STD. 866.02 FOR FENCING AT DITCH CROSSINGS, BREAKS IN GRADES AND R/W BREAKS.

USE LATCH DEVICE APPROVED BY THE ENGINEER. HINGE ASSEMBLY AS SHOWN IS SUGGESTED. SUBSTITUTION MAY BE SUBJECT TO APPROVAL BY THE ENGINEER. USED 2" PAINTED STEEL PIPE FOR GATE FRAME EXCEPT AS SHOWN HERE.

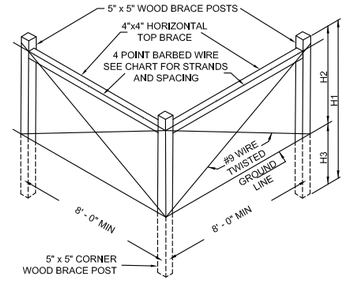
ANY COMBINATION OF GATE AND FENCE TYPE MEETING THE APPROVAL OF THE ENGINEER IS ACCEPTABLE AND IS NOT LIMITED TO THE EXAMPLES SHOWN HEREON.

1 / 7.8 2" Tube Steel Gate
Not to Scale



LINE BRACES
(MAXIMUM SPACING 330')

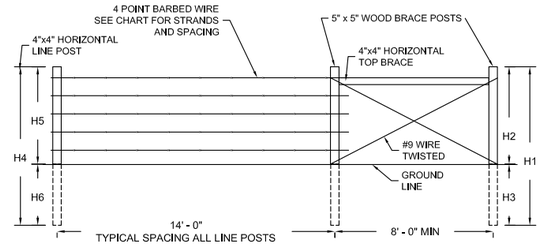
ALTERNATE TYPES OF STAPLES
USE ONE #9 STAPLE OR TWO #16 STAPLES
AT EACH POINT OF ATTACHMENT.



CORNER BRACE
USE WHEN CORNER ANGLE IS 15° OR GREATER

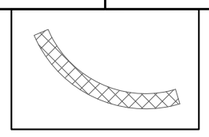
BARBED WIRE FENCE CHART

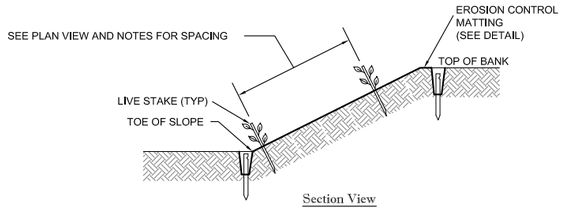
NUMBER OF BARBED WIRE STRANDS			2	3	4	5	6	7
STRAND SPACING		A	8"	4"	3"	3"	3"	3"
		B	12"	12"	15"	12"	10"	8"
		C	21"	13"	11"	8"	6"	8"
BRACE POSTS	LENGTH	H1	6' - 0"	6' - 0"	8" - 0"	8" - 0"	8" - 0"	8" - 0"
	EXPOSED	H2	3' - 5"	3' - 5"	4' - 11"	4' - 11"	4' - 11"	4' - 11"
	EMBEDMENT	H3	2' - 7"	2' - 7"	3' - 1"	3' - 1"	3' - 1"	3' - 1"
LINE POSTS	LENGTH	H4	6' - 0"	6' - 0"	7' - 6"	7' - 6"	7' - 6"	7' - 6"
	EXPOSED	H5	3' - 5"	3' - 5"	4' - 11"	4' - 11"	4' - 11"	4' - 11"
	EMBEDMENT	H6	2' - 7"	2' - 7"	2' - 7"	2' - 7"	2' - 7"	2' - 7"
HORIZONTAL BRACE			8' - 0"	8' - 0"	8' - 0"	8' - 0"	8' - 0"	8' - 0"



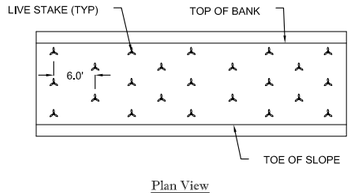
END OR GATE BRACES

2 / 7.8 Five-Strand Barbed Wire Fence - Permanent CE Fencing
Not to Scale





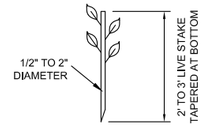
Section View



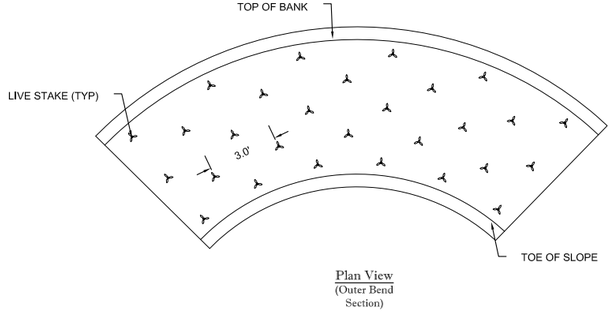
Plan View
(Tangent Section)

NOTE:

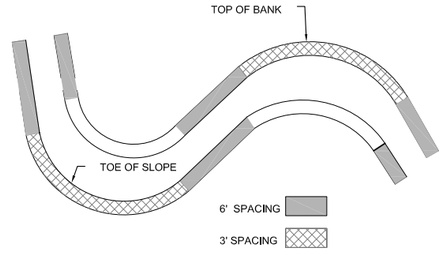
1. LIVE STAKES TO BE PLANTED IN AREAS AS SHOWN ON PLANS AND DIRECTED BY THE ENGINEER.
2. IF THE PROPOSED BANK HEIGHT IS LESS THAN THE PROPOSED LIVE STAKE ROW SPACING THE FIRST ROW SHALL BE PLACED AT TOP OF BANK AND THE SECOND ROW SHALL BE PLANTED JUST ABOVE THE TOE OF BANK



Live Stake Detail



Plan View
(Outer Bend
Section)



3 / 7.8 Live Staking
Not to Scale

WILDLANDS ENGINEERING
5605 Chapel Hill Road, Ste 122
Raleigh, NC 27607
Tel: 919.851.9986
Fax: 919.851.9987
Firm License No. F-0831

PRELIMINARY
DO NOT
USE FOR
CONSTRUCTION

Foust Creek Mitigation Site
Alamance County, NC

Details

Revisions

Date: 01.31.2014
Job Number: 005-02135
Project Engineer: ANC
Drawn By: CLM
Checked By: SDW

Sheet 7.8