K. Corson

UT Altamahaw Creek Site

Alamance County, NC
State Construction Project No. 09-0762301
EEP Project No. 92837

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

2728 Capital Boulevard, Suite 1H 103
Raleigh, NC 27604

Ecosystem Enhancement PROGRAM

Final Mitigation Plan

May 25, 2010

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Prepared by:

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1.0 Introduction

Ecological Engineering, LLP (Ecological Engineering) has entered into an open services design contract with the NC Department of Environment and Natural Resources, Ecosystem Enhancement Program (EEP) to provide designs and construction management for stream enhancement (Level II) within the Cape Fear River Basin. The Project Site, also referred to as the UT Altamahaw Creek Site, is situated approximately 6.1 miles west-northwest of Burlington and 1.3 miles east-southeast of the Altamahaw community (Figure 1). Approximately 1,477 linear feet of perennial stream channels and 0.026 acres of jurisdictional wetlands are included within the 3.6-acre easement area.

Project implementation will include supplemental riparian buffer planting under the mitigation category of stream enhancement (Level II), auxiliary spillway enhancement immediately outside of the easement area and design of a modified level spreader to diffuse surface runoff in the vicinity of the existing stream crossing. In addition, the Alamance County Soil and Water Conservation District is also providing plans and construction oversight for enhancing the current stream crossing, adjacent pasture areas, fencing, and livestock watering facilities. The plans however, will be presented under separate cover.

Mitigation credits will be derived from stream enhancement activities. The following table provides mitigation-related information pertaining to the project.

Table 1. Project Components and Structure
UT Altamahaw Creek – SCO Project Number 09-0762301, EEP Project Number 92837

Project Component or Reach ID	Existing Feet/Acres	Restoration Level	Approach	Footage or Acreage	Stationing	Buffer Acres	Comment
Unnamed Tributary #1 (main channel)	1347 lf	EII	P4	1347 lf	n/a	-	Entire reach on property
Unnamed Tributary #2	130 lf	EII	P4	130	n/a	-	Entire reach on property

Component Summations

Restoration Level	Stream (lf)	Riparian Wetland (Ac)		Non-Riparian Wetland (Ac)	Upland (Ac)	Buffer (Ac)	BMP
		Riverine	Non-riverine				
Enhancement (Level II)	1477 lf	0.026 ac	-	-	-	-	-
Totals	**1477 lf**	**0.026 ac**		-	-	-	-

Mitigation Activity Multipliers*

Mitigation Type	Stream Mitigation Units (SMU)	Riparian Wetland Mitigation Units (rWMU)	Non-riparian Wetland Mitigation Units (nWMU)	Buffer Mitigation Units (BMU)
Enhancement		0.03		
Enhancement II	591			
Total	**591**	**0.02**		

* This summation assumes the following Mitigation Activity Multiplier:
Stream Enhancement (Level II) – 2.5
Wetland Enhancement – 2.0

2.0 Watershed Planning Background Information

The following information was ascertained from the Little Alamance, Travis, and Tickle Creek Watersheds Restoration Plan (2008), prepared by The Piedmont Triad Council of Governments (PTCOG) and funded by EEP.

The Project Site is within Targeted Watershed (TT8) of the Little Alamance, Travis & Tickle Creek Watershed (LATT) along the Alamance/ Guilford County boundary. This watershed occupies 52 square miles, immediately north of Interstate 40. The LATT Restoration Plan (2008) identifies potential sites, including the UT Altamahaw Creek Site, as areas for suitable for conservation and restoration. Alamance County is historically an agrarian community, with Burlington and Graham providing an industrial center focused on textiles. Recently, the urban areas of Burlington and Graham have expanded, and contributed low-density impervious coverage to the watersheds. The current urban area occupies 57% of the land in the LATT watersheds (PTCOG, 2008). The NC Ecosystem Enhancement Program Local Watershed Plan (LWP) process was used to develop a plan to remedy these water quality issues. The LWP is designed to assess watershed conditions and identify opportunities to improve and protect watershed functions. This process also helps address EEP's institutional need to mitigate impacts to streams and wetlands in the Haw River Basin from NC Department of Transportation (NCDOT) projects and other development-related impacts.

PTCOG (2008) denotes the need to approach watershed restoration with both projects and policies. Projects should address obvious impacts to current watershed health, such as eroding streambanks and policy changes should provide a more long-term strategy for sustainable watershed stewardship. In the LATT watersheds, the major impact to water quality impairment is likely stormwater (PTCOG, 2008).

The UT Altamahaw Creek Site, identified as one of the critical parcels, currently lacks any controls to prohibit livestock access within the riparian system associated with the unnamed tributaries flowing into the Haw River. According to PTCOG (2008), this parcel is situated along a tributary of Basin Creek (unnamed on current the current US Geological Survey Map), which is the most degraded stream in the Travis and Tickle Creek Watershed. Recommendations include preserving this property and its surrounding area for agriculture and open space. Fencing, stream and associated riparian enhancements are also recommended.

Based on PTCOG (2008), six goals are stated in the local watershed restoration plan. They are:

1. Increase local government awareness of the impacts of urban growth on water resources;
2. Strengthen watershed protection standards;
3. Improve water quality through stormwater management;
4. Identify and rank parcels for retrofits, stream repair, preservation, and/or conservation;
5. Assess aquatic health to identify stressors that are the most likely causes of poor biological conditions; and
6. Meet requirements of outside funding sources for implementation of projects.

Possible sources and/or stressors listed for the watershed area associated with the Project Site were identified as agriculture, impervious surfaces and one National Pollutant Discharge Elimination System (NPDES) discharger.

3.0 Project Goals and Objectives

Current landuse is the main reason for degradation throughout the Project Site. Livestock are offered no barriers across the property which has resulted in degradation to the two unnamed tributaries and associated wetland and riparian buffer areas. By removing livestock from the conservation easement area and planting supplemental vegetation along the existing stream corridors, the project will uplift existing natural and biological processes. It will also improve the overall function and habitat associated with the stream channel and riparian areas.

The goals are to reduce nutrient and sediment water quality stressors, provide for uplift in water quality functions, improve instream and wetland aquatic habitat, including riparian terrestrial habitat and provide for greater overall instream and wetland habitat complexity and quality. One main component, stream enhancement, will serve as the dominant input for achieving this goal.

The objectives are to exclude livestock in their entirety from the easement area and install plantings designed to maintain vertical stability, lateral stability and habitat, as well as revegetate and supplement those areas lacking suitable vegetation along the easement area. Ultimately, this supplemental planting will provide opportunities for the filtration of pollutants and nutrients prior to entering the stream channel as well as, the stabilization of sediment along the associated stream banks.

4.0 Existing Conditions

The UT Altamahaw Creek Site is situated in northern Alamance County. It covers approximately 3.6 acres of riparian land situated between two pastures and is immediately downstream of a 4.3-acre agricultural pond. As previously mentioned, livestock have complete access to the riparian area, as well as the two stream channels. The entire area, including the stream channels has been impacted from current landuse conditions. Photographs of the area are provided in Appendix 1.

The UT Altamahaw Creek Site is situated within the Piedmont physiographic province. Elevations range from approximately 625 feet to 640 feet above Mean Sea Level. According to the Natural Resources Conservation Service (NRCS), its underlying soils are mapped as Worsham sandy loam (2 to 6 percent slopes). Worsham sandy loam is formed from alluvium and/or colluvium over saprolite derived from granite or gneiss. It is common along depressions and classified as poorly drained (NRCS, 2009). Worsham sandy loam is considered a Hydric A soil in Alamance County (Gregory, 2000). It has a moderate water capacity and depth to groundwater is usually between 0 and 12 inches, although likely deeper at the Project Site due to stream incision.

The following table provides a summary of the existing conditions at the Project Site. An aerial photograph is provided as part of Figure 2.

Table 2. Existing Conditions Summary
UT Altamahaw Creek – SCO Project Number 09-0762301, EEP Project Number 92837

Physiographic Province	Piedmont	**County**	Alamance
River Basin Name	Cape Fear	**Property Owner Name**	Charles Hursey
USGS 8-digit HUC	03030002	**Property Owner Contact Info**	(336) 584-1377
USGS 14-digit HUC	03030002030010	**Stream #1 (Main Channel) Name**	UT Altamahaw Creek
NCDWQ Subbasin	03-06-02	**Drainage Area**	0.51 sq. mi. (334 acres)
Underlying Mapped Soil(s)	Worsham sandy loam	**NCDWQ Score**	44.25 & 46.75 (Perennial)
Drainage Class	Poorly drained	**Rosgen Classification**	C/E 5
Hydric Status	A	**Stream #2 (Tributary) Name**	UT to UT Altamahaw Creek
Slope	0-3 %	**Drainage Area**	0.39 sq. mi. (251 acres)
Available Water Capacity	Moderate	**NCDWQ Score**	39.25 (Perennial)
FEMA Classification	Zone AE (lower end)	**Rosgen Classification**	C/E 5
Native Vegetation Observed	Green ash (*Fraxinus pennsylvanica*), white oak (*Quercus alba*), northern red oak (*Quercus rubra*), sweetgum (*Liquidambar styraciflua*), tulip poplar (*Liriodendron tulipifera*), mockernut hickory (*Carya tomentosa*), sycamore (*Platanus occidentalis*), willow oak (*Quercus phellos*), blackgum (*Nyssa sylvatica*), ironwood (*Carpinus caroliniana*), red maple (*Acer rubrum*), boxelder (*Acer negundo*), black willow (*Salix nigra*), Eastern red cedar (*Juniperus virginiana*), flowering dogwood (*Cornus florida*), American holly (*Ilex opaca*), grape (*Vitis* sp.), poison ivy (*Toxicodendron radicans*), greenbrier (*Smilax* sp.), thistle (*Carduus* sp.), blackberry (*Rubus* sp.),		
Exotic Vegetation Observed	Tree-of-heaven (*Ailanthus altissima*) – limited number Chinese privet (*Ligustrum sinense*) – limited number		

4.1 Jurisdictional Resources

Jurisdictional resources at the Project Site were delineated on July 22, 2009 and verified by the US Army Corps of Engineers (USACE) on November 5, 2009. Delineations were based on protocols described within the 1987 Corps of Engineers Wetlands Delineation Manual and subsequent updates. Based on our findings and concurrence by the USACE, there are 0.026 acres of wetlands and 1,477 linear feet of perennial surface waters within the Project Area. Additional jurisdictional information is provided in Appendix 2.

4.2 Soil Assessment

Soil samples were collected and submitted to the NC Department of Agriculture and Consumer Services (NCDA&CS), Agronomic Division Soil Testing Section in September 2009. These samples were taken from randomly selected areas with the easement area. According to the NCDA&CS, recommendations for soil enhancement include the addition of 80 to 120 lbs/acre of nitrogen (N), 20 to 80 lbs/acre of phosphate (P_2O_5) and 0 to 20 lbs/acre of potash (K_2O). No lime enhancements were recommended. The full test results are provided in Appendix 3.

4.3 FEMA Information

The UT Altamahaw Creek Site is located on Panel 8858 of Map Number 3710885800J of the National Flood Insurance Program Flood Insurance Rate Map (FIRM), dated September 6, 2006. A small portion of the downstream end of the Project Site is situated within a backwater finger of a Federal Emergency Management Agency (FEMA) 100-year floodplain. Since implementation work at the Project Site involves only enhancement planting, no changes will occur to the existing FEMA model.

5.0 Reference Study

Based on conversations between EEP and Ecological Engineering, it was determined that the supplemental planting would follow species types consistent with the description provided by Schafale and Weakley (1990) of the Piedmont Bottomland Forest Community. This community was selected due to its overall topographic position, watershed size and species composition. According to Schafale and Weakley (1990), it is described as occurring on floodplain ridges and terraces other than active levees adjacent to the river channel. The hydrology is palustrine with intermittent flooding and the underlying soils consist of various alluvial soils. Its overall variation in wetness is related to the existing height of ridges and terraces and the overall degree of channel incision. Each site varies due to different alluvial material and its effect on soil fertility (Schafale and Weakley, 1990).

The following description is taken in its entirety from Schafale and Weakley (1990). Common species occurring in the Piedmont Bottomland Forest Community include tulip poplar (*Liriodendron tulipifera*), sweetgum (*Liquidambar styraciflua*), cherrybark oak (*Quercus pagoda*), swamp chestnut oak (*Quercus michauxii*), American elm (*Ulmus americana*), sugarberry (*Celtis laevigata*), green ash (*Fraxinus pennsylvanica*), loblolly pine (*Pinus taeda*), shagbark hickory (*Carya ovata*) and bitternut hickory (*Carya cordiformis*). Understory species include ironwood (*Carpinus caroliniana*), southern sugar maple (*Acer floridanum*), red maple (*Acer rubrum*), flowering dogwood (*Cornus florida*), American holly (*Ilex opaca*) and paw paw (*Asimina triloba*). Shrubs include species such as painted buckeye (*Aesculus sylvatica*), strawberry bush (*Euonymus americanus*) and occasional dense thickets of giant cane (*Arundinaria gigantea*). This description will serve as the general reference community for the planting plan.

6.0 Restoration Plan

Implementation of the plan will require supplemental riparian buffer planting, auxiliary spillway enhancement immediately outside of the easement area and design of a modified level spreader to diffuse surface runoff in the vicinity of the existing stream crossing. Figure 3 depicts a description of the proposed design.

6.1 Soil Amendments

Soil amendments will ensure suitable growth opportunities for the trees, shrubs and associated temporary seed mix. Based on conversations with the NC Cooperative Extension Service (Keith Wood, Pers. Comm., 2009), fertilizer recommendations include (1) 150lbs of 33-0-0 pellet fertilizer per acre and (2) 150 lbs of 18-46-0 pellet fertilizer per acre. The following table provides detailed soil amendment information per Zone. Herbicide applications are discussed in detail in Section 6.3.1.

Table 3. Soil Amendment Summary per Zone
UT Altamahaw Creek – SCO Project Number 09-0762301, EEP Project Number 92837

Zone 1 – Streamside Area						**Acres**	0.5
Mechanical Treatment	**Approx. Date**	**Ground Cover Fabric**	**Mulch Type**	**Mulch Density / Thickness**	**Nutrient Amendments**	**Nutrient Total lbs[1]**	
n/a	7/10 – 12/10	n/a	n/a	n/a	n/a	n/a	
					Subtotal	n/a	
Zone 2 – Semi-Forested Area						**Acres**	2.1
Mechanical Treatment	**Approx. Date**	**Ground Cover Fabric**	**Mulch Type**	**Mulch Density / Thickness**	**Nutrient Amendments**	**Nutrient Total lbs**	
Herbicide[1]	7/10 - 10/10	n/a	n/a	n/a	n/a	n/a	
n/a	7/10 – 12/10	n/a	n/a	n/a	Pellet Fertilizer 33-0-0	400	
n/a	7/10 – 12/10	n/a	n/a	n/a	Pellet Fertilizer 18-46-0	400	
					Subtotal	800	
Zone 3 – Open Area						**Acres**	1.0
Mechanical Treatment	**Approx. Date**	**Ground Cover Fabric**	**Mulch Type**	**Mulch Density / Thickness**	**Nutrient Amendments**	**Nutrient Total lbs**	
Herbicide[1]	7/10 - 10/10	n/a	n/a	n/a	n/a	n/a	
n/a	7/10 – 12/10	n/a	n/a	n/a	Pellet Fertilizer 33-0-0	225	
n/a	7/10 – 12/10	n/a	n/a	n/a	Pellet Fertilizer 18-46-0	225	
					Subtotal	450	
Zone 4 – Wetland Area						**Acres**	<0.1
Mechanical Treatment	**Approx. Date**	**Ground Cover Fabric**	**Mulch Type**	**Mulch Density / Thickness**	**Nutrient Amendments**	**Nutrient Total lbs**	
n/a	7/10 – 12/10	n/a	n/a	n/a	n/a	n/a	
					Subtotal	n/a	
					Total	1,250	4.6

Notes: [1] Herbicide applications will only be performed in areas exhibiting non-native species.

6.2 Planting Plan

The planting plan for the Project Site will provide post-construction erosion control and habitat enhancement. It will also attempt to blend existing vegetative communities into the recently enhanced areas. Plantings along the riparian areas will include native species appropriate for the Piedmont physiographic province and the Project Site. A variety of trees and shrubs will be planted to provide cover and habitat for wildlife, as well as soil stabilization. Natural plant community enhancement will follow the description of the Piedmont Bottomland Forest Community by Schafale and Weakley (1990).

Prior to the planting of trees and shrubs, any disturbed areas associated with the Project Site will be seeded first with a temporary seed mix. This mix will include one of the following seed types:

- grain rye (*Secale cereale*);
- brown-top millet (*Panicum ramosum*);
- German millet (*Setaria italica*); or
- orchard grass (*Dactylis glomerata*).

The seed material will be selected according to the time period selected for implementation. Currently, implementation is proposed for the late summer, fall and winter of 2010. Table 4 summarizes preferred seed types, application rates and planting periods.

Table 4. Temporary Seeding Summary
UT Altamahaw Creek – SCO Project Number 09-0762301, EEP Project Number 92837

Temporary Seeding Throughout Disturbed Areas				**Acres**	0.71
Year round	*Secale cereale*	Herb	Grain rye	130 lbs/ac	Single species to be applied
May - September	*Panicum ramosum*	Herb	Brown top millet	40 lbs/ac	
May – September	*Setaria italica*	Herb	German millet	25 lbs/ac	
September – March	*Dactylis glomerata*	Herb	Orchard grass	15 lbs/ac	

No permanent seed mix will be applied. As previously mentioned, all areas exhibiting disturbance will be planted with a temporary seed mix. These areas include hardened stabilization along the auxiliary spillway and construction of a level spreader, neither requiring permanent vegetation cover. The remainder of the easement area will be planted with trees and shrubs. Due to the existing conditions, mechanized soil enhancement is not proposed.

The easement area has been divided into four vegetated zones. These zones were identified based on landscape position, hydrology and existing cover. Zone 1, also referred to as the "streamside area," is situated along the tributaries and covers the area from bankfull outward approximately six feet. Zone 2 covers the "semi-forested areas" and Zone 3 covers the "open areas" along the easement location. Zone 4 includes the small "wetland area" near the downstream end of the Project Area. Table 5 provides a summary of the species recommended for planting within the zones. The table also includes species numbers, types, density and desired spacing.

Table 5. Proposed Planting Summary UT Altamahaw Creek – SCO Project Number 09-0762301, EEP Project Number 92837					
Scientific Name	**Common Name**	**Number of Individuals**	**Type**	**Density**	**Spacing**
Zone 1: Streamside Area					
Alnus serrulata	Tag alder	200	Tubling	4840 stems/acre	3 feet on center
Cornus amomum	Silky dogwood	600	Live stake		
Salix nigra	Black willow	600	Live stake		
Sambucus canadensis	Elderberry	500	Live stake		
	Zone 1 Total	1900			
Zone 2: Semi-Forested Area					
Asimina triloba	Paw paw	64	Bare root	300 stems/acre	12 feet on center
Carpinus caroliniana	Ironwood	64	Bare root		
Carya ovata	Shagbark hickory	64	Bare root		
Celtis laevigata	Sugarberry	64	Bare root		
Cornus florida	Flowering dogwood	64	Bare root		
Fraxinus pennsylvanica	Green ash	64	Bare root		
Ilex opaca	American holly	64	Bare root		
Quercus michauxii	Swamp chestnut oak	64	Bare root		
Quercus falcata var. pagodaefloia	Cherrybark oak	64	Bare root		
Ulmus americana	American elm	64	Bare root		
	Zone 2 Total	640			
Zone 3: Open Area					
Asimina triloba	Paw paw	68	Bare root	680 stems/acre	8 feet on center
Carpinus caroliniana	Ironwood	68	Bare root		
Carya ovata	Shagbark hickory	68	Bare root		
Celtis laevigata	Sugarberry	68	Bare root		
Cornus florida	Flowering dogwood	68	Bare root		
Fraxinus pennsylvanica	Green ash	68	Bare root		
Ilex opaca	American holly	68	Bare root		
Quercus michauxii	Swamp chestnut oak	68	Bare root		
Quercus falcata var. pagodaefloia	Cherrybark oak	68	Bare root		
Ulmus americana	American elm	68	Bare root		
	Zone 3 Total	680			
Zone 4: Wetland Area					
Alnus serrulata	Tag alder	6	Tubling	680 stems/acre	8 feet on center
Cephalanthus occidentalis	Buttonbush	6	Tubling		
Salix nigra	Black willow	6	Tubling		
	Zone 4 Total	18			
	Project Total	3718			

The planting of subcanopy and shrub species will dominate Zone 1. Due to the location and the flooding regime, these species must be conducive to periodic flooding. Species such as black willow, silky dogwood (*Cornus amomum*), tag alder and elderberry (*Sambucus canadensis*) will be planted. These species will be inserted as live stakes, except for tag alder, which will be planted as a tubling.

Zones 2 and 3 will be planted with the same mix of species with the difference being density. Zone 2 covers the semi-forested areas of the easement while Zone 3 includes the open areas. Species proposed are compatible with the reference community discussed in Section 5.0 and known to be available with local suppliers. They include paw paw, ironwood, shagbark hickory, sugarberry, flowering dogwood, green ash, American holly, swamp chestnut oak, cherrybark oak (*Quercus falcata* var. *pagodaefloia*) and American elm. The planting of both zones is considered supplemental since vegetation currently exists. The density proposed in Zone 2 is 300 stems per acre (approximately 12-foot on center) and Zone 3 is 680 stems per acre (8 feet on center).

Due to the small total area of Zone 4, less than 20 individual stems of tag alder (*Alnus serrulata*), buttonbush (*Cephalanthus occidentalis*) and black willow will be planted as supplemental species. The proposed density is 680 stems per acre (every 8 feet on center). These species are considered hydrophytic species, capable of undergoing extended periods of inundation or saturation. Tublings are the preferred plant type.

Vegetation will be planted in a random fashion in an effort to mimic natural plant communities. Colonization of local herbaceous vegetation will inevitably occur, which will provide additional soil stability. Planting stock will be culled to remove inferior specimens, allowing only healthy, viable stock to be planted at the Project Site. Plantings will be dormant and will be performed to the extent practicable between November 3rd and March 30th.

6.3 Invasive Species Management

6.3.1 Vegetative Species

Invasive species observed within the easement area include Chinese privet (*Ligustrum sinense*) and tree-of-heaven (*Ailanthus altissima*). If left unrestricted, these species could become the dominant species within and surrounding the Project Site. Therefore, steps must be followed to ensure that these species are controlled to a point where they do not provide competition for native vegetative species.

Control methods are widely variable concerning species types and density. Invasive species within the Project Site are competing with native vegetation; however, they are in the process of being controlled by existing landuse variables, such as cattle browse and periodic mowing. Once cattle are restricted from the area and the site is allowed to undergo natural succession, this vegetation will compete with native and planted vegetation.

Young seedlings (no more than 0.5 inches in diameter) of Chinese privet and tree-of-heaven can be effectively controlled by hand-pulling. Stems up to 2 inches in diameter can be manually removed by tools designed for this purpose. Larger plants can be killed by spraying the foliage with a 2.0 percent solution of glyphosate or triclopyr and a 0.5 percent nonionic surfactant. Ideally, the plants should be sprayed in the late fall or early spring when temperatures are above 65 degrees Fahrenheit and many native species are dormant. As long as the ground is not frozen, this shrub can also be killed by cutting it down within 6 inches of the ground and immediately spraying the freshly cut stump with a 50 percent solution of triclopyr. All treatments should be followed up the following year to monitor and control basal sprouts and root suckers (Smith, 2008).

The construction contractor will provide mechanized removal for stems of Chinese privet and tree-of-heaven. These individuals will be removed in their entirety and disposed in an appropriate manner. It is anticipated that invasive species management will occur throughout the monitoring period. As seedbeds and their associated soils are disturbed, it is likely that other invasive species may appear within the Project Site. Periodical assessments will be conducted to determine if these species are posing a threat to native population levels. The threats will be determined on an annual basis as well as, their remedial activities, as necessary.

6.3.2 Non-Vegetative Species

Evidence of beaver activity was observed immediately downstream of the easement area. This species, though not technically classified as an invasive species, can significantly affect the overall success of the project. EEP will contract with the NCWRC or other appropriate entity to remove and/or relocate the existing beavers from the Project Site during the implementation and monitoring time periods.

6.4 Spillway Enhancement

Based on the contract signed between EEP and the property owner, EEP is providing a one-time enhancement to the existing emergency spillway located immediately south of the easement area. Floodflows from the pond and sheetflow from the adjacent pasture have caused severe erosion along the entire length of the current spillway. Enhancement activities will include lateral and vertical shaping and the placement of rip rap underlain by filter fabric under its entire length. A rip rap dissipater basin will be constructed adjacent to the existing stream channel. This basin will evenly distribute flows into the channel and floodplain area.

6.5 Sheetflow Diversion

Sheetflow diversion is needed along the northern side of the easement area in the vicinity of the existing stream crossing. Current conditions denote a small rill that has developed through this area that is contributing large quantities of sediment and livestock pollutants into the adjacent stream channel. This diversion will consist of a modified level spreader that will evenly distribute flows across the floodplain area. Once implemented, the diversion will serve to filter excess sediment and pollutants prior to entering the stream channel.

7.0 Performance Criteria

Performance criteria set forth for this project will be provided according to current EEP monitoring criteria and format. It will cover only vegetation assessments.

7.1 Vegetation

Vegetation will be assessed using several variables including plot layouts, transects and/or any other methods pertinent to determining vegetation success. The Mitigation Plan will outline these variables in detail. Stem counts will be conducted within strategically placed vegetation plots. The plots locations will be determined once implementation has been completed. Photos will also be provided as part of this task. One this is complete, all information will be summarized with the stream assessment information and inserted into the yearly monitoring report.

7.2 Schedule and Reporting

Monitoring reports will be submitted to the regulatory agencies on an annual basis. The first-year of monitoring will include two submittals; the As-Built drawings and the First Year Annual Monitoring Report. All drawings and monitoring will follow EEP protocols established during the project period. It is understood that EEP will coordinate any necessary monitoring report submittals with the regulatory agencies. If the monitoring reports indicate any deficiencies in achieving the success criteria on schedule, EEP will coordinate with the resource agencies, as applicable, to determine the extent of remedial actions necessary. In some cases, EEP may be required to submit remedial action plan, as necessary, as part of the annual monitoring report. Vegetative monitoring will be conducted during the late summer months (growing season) of each monitoring year. Monitoring reports will be provided no later than December 15. The proposed schedule is provided below detailing the monitoring dates.

Proposed Monitoring Schedule

2010	Complete construction/planting activities.
2011	Complete Year One Monitoring.
January 2012	Submit Year One Monitoring Report.
2012	Complete Year Two Monitoring.
January 2013	Submit Year Two Monitoring Report.
2013	Complete Year Three Monitoring.
January 2014	Submit Year Three Monitoring Report.
2014	Complete Year Four Monitoring.
January 2015	Submit Year Four Monitoring Report.
2015	Complete Year Five Monitoring.
January 2016	Submit Year Five Monitoring Report.

8.0 References

Environmental Laboratory, 1987. Corps of Engineers Wetlands Delineation Manual; Technical Report Y-87-1. United States Army Engineer Waterways Experiment Station, Vicksburg, MS.

Federal Emergency Management Agency (FEMA), 2006. National Flood Insurance Program, Flood Insurance Rate Map. Map Number 3710885800J. Panel Number 8858. Effective Date September 6, 2006. Available http://www.ncfloodmaps.com.

Gregory, James D., 2000. Hydric Soils and Growing Season: Wetland Delineation Data for North Carolina. Department of Forestry, NC State University, Raleigh, NC.

NC Department of Agriculture and Consumer Services (NCDA&CS), 2009. Soil Test Report No. 02184. Agronomic Division. Available http://www.ncagr.gov/agronomi/.

NC Department of Environment and Natural Resources, Division of Water Quality, 2005. Basinwide Planning Program :: 2005 Cape Fear River Basinwide Water Quality Plan. Available http://h2o.enr.state.nc.us/basinwide/draftCPFApril2005.htm.

North Carolina Division of Water Quality (NCDWQ), 2006. Stream Identification Form, Version 3.1, Effective February 28, 2005. Available at: http://h2o.enr.state.nc.us/ncwetlands/documents.

NC Division of Water Quality (NCDWQ), 2005. Identification Methods for the Origins of Intermittent and Perennial Streams, Version 3.1. North Carolina Department of Environment and Natural Resources, Division of Environmental Management; Raleigh, NC.

NC Division of Water Quality (NCDWQ), 1995. Guidance for Rating the Values of Wetlands in North Carolina - 4th Version. North Carolina Department of Environment and Natural Resources, Division of Environmental Management; Raleigh, NC.

Piedmont Triad Council of Government (PTCOG), 2008. Little Alamance, Travis and Tickle Creek Watershed Restoration Plan. Prepared for and Funded by EEP. Available: http://www.nceep.net/pages/lwplanning.htm.).

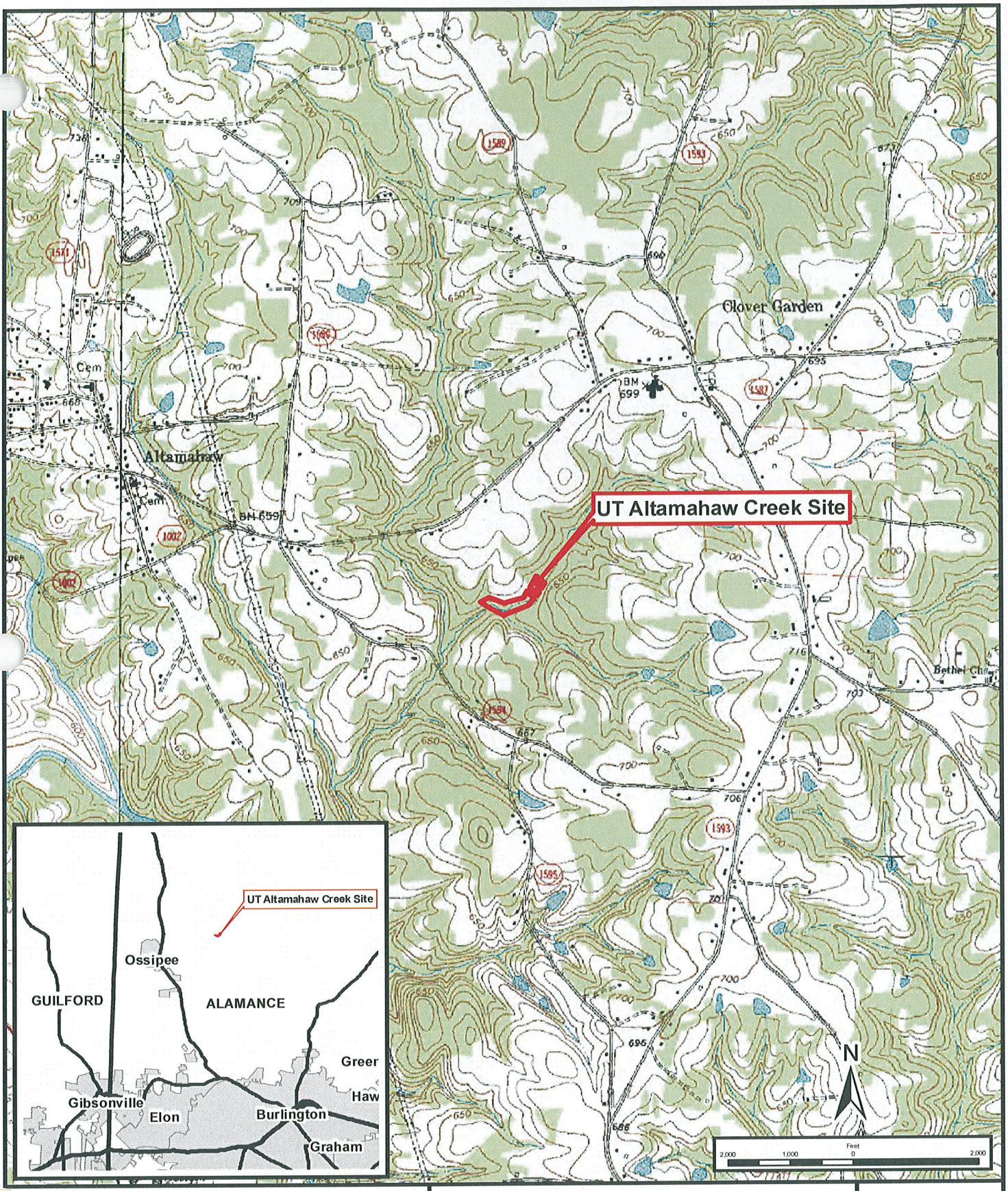
Radford, A.E., H.E. Ahles and C.R. Bell, 1968. Manual of the Vascular Flora of the Carolinas. University of North Carolina Press, Chapel Hill, NC.

Schafale, M.P. and A.S. Weakley, 1990. Classification of the Natural Communities of North Carolina, A Third Approximation. North Carolina Natural Heritage Program, Division of Parks and Recreation, Department of Environment, Health and Natural Resources, Raleigh, NC.

Smith, Cherri, 2008. Invasive Exotic Plants of North Carolina. NC Department of Transportation, Raleigh, NC. 189 pp.

USDA Natural Resources Conservation Service (NRCS), 2009. Map Unit Descriptions and Soil Maps. Available http://www.websoilsurveys.nrcs.usda.gov/app/WebSoilSurvey.aspx.

Wood, Keith, 2009. Personal Communication on October 28. NC Cooperative Extension Service.



Prepared By: Ecological Engineering, LLP
128 Raleigh Street
Holly Springs, NC 27540
(919) 557-0929

Prepared For: NCEEP
2728 Capital Boulevard
Suite 1H 103
Raleigh, NC 27604

Project Site Vicinity Map

UT Altamahaw Creek Site
Alamance County, NC
State Construction Office Project No. 09-0762301

October 29, 2009

Source: USGS Quadrangle Maps (Ossipee and Lake Burlington Quads)

FIGURE 1

Prepared By: Ecological Engineering, LLP
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Raleigh, NC 27604

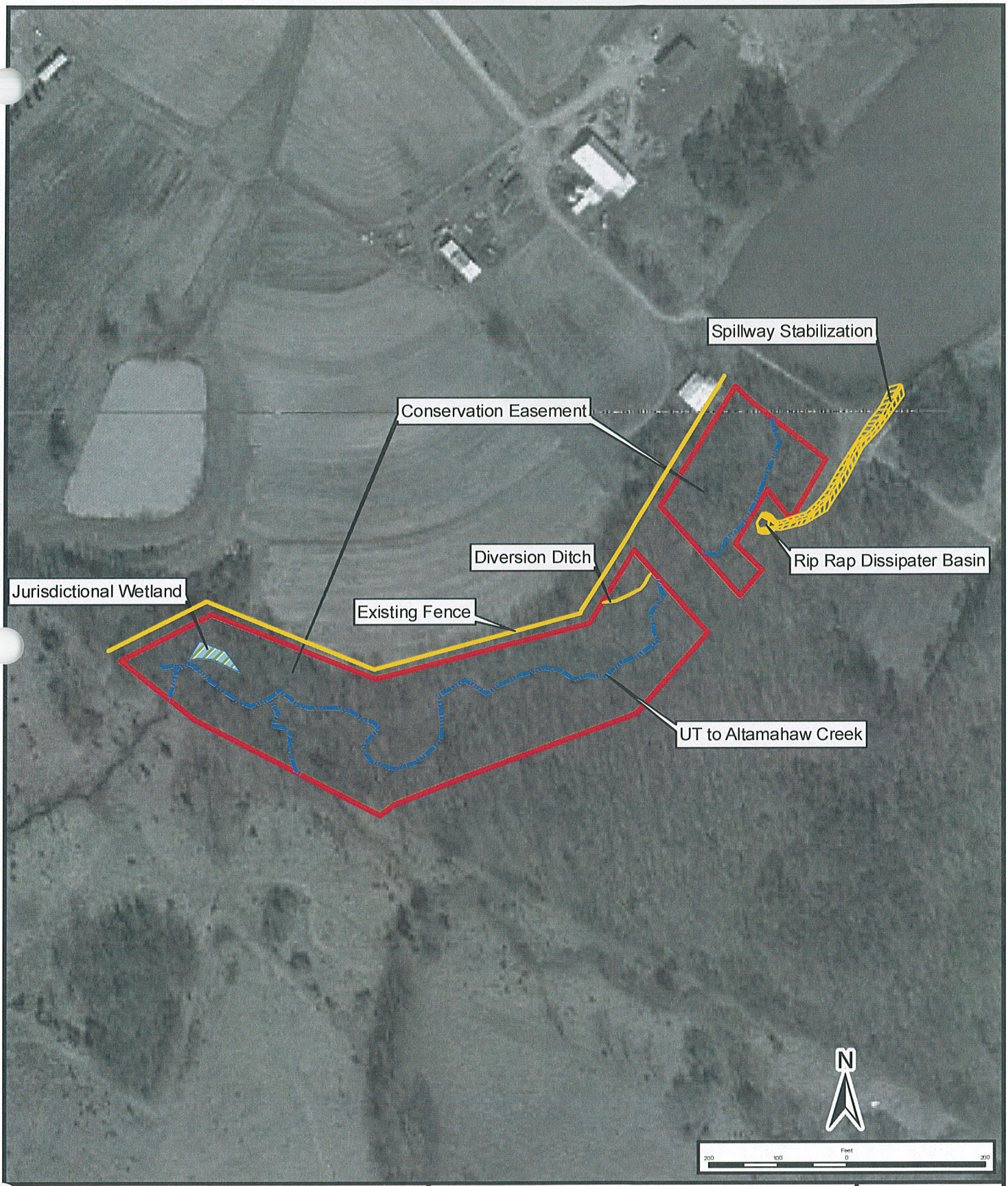
Project Site Aerial Map

UT Altamahaw Creek Site
Alamance County, NC
State Construction Office Project No. 09-0762301

October 29, 2009

Source: Orthophotography - NC One Map

FIGURE 2



Prepared By: Ecological Engineering, LLP
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Raleigh, NC 27604

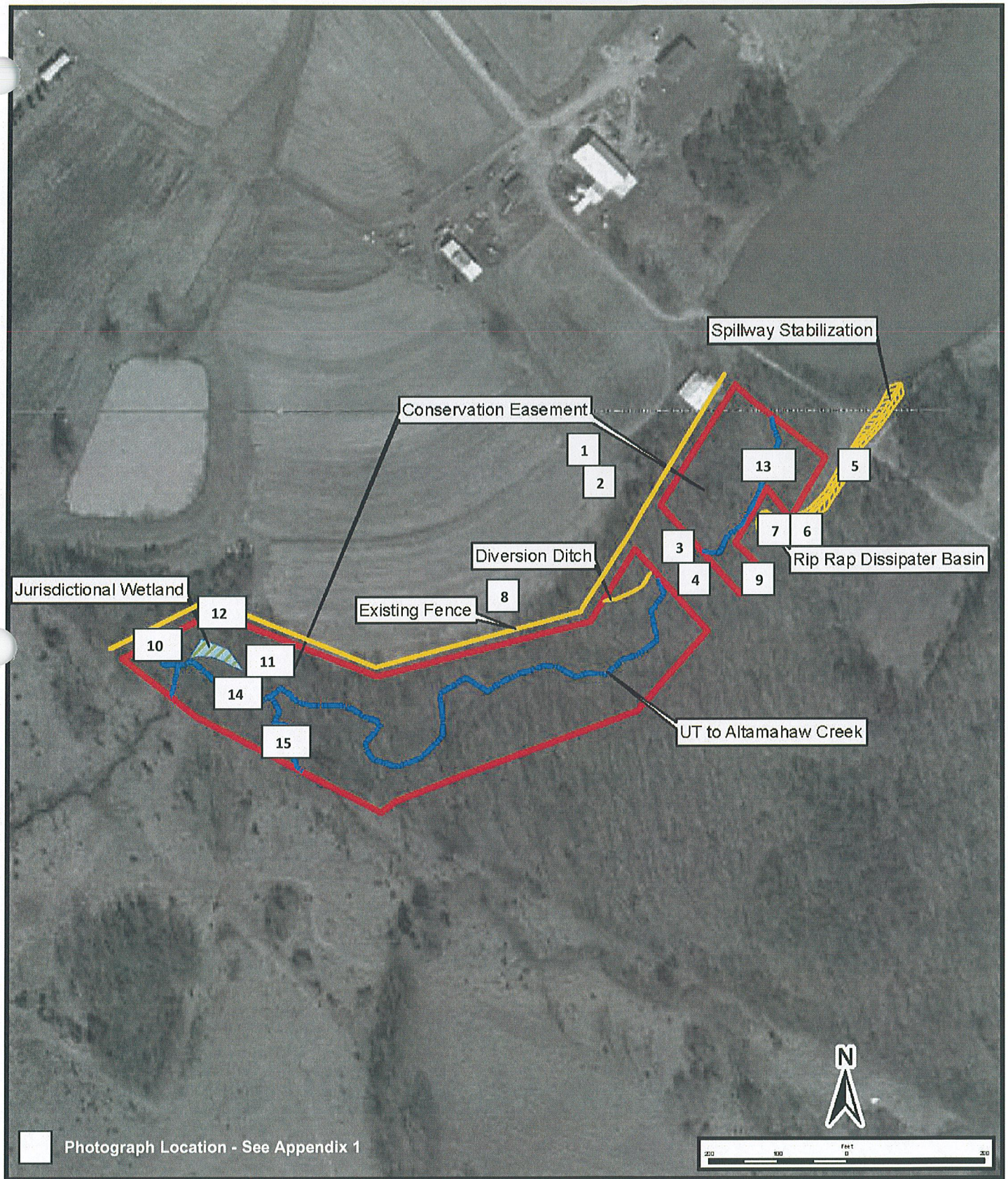
Stormwater Management Map

UT Altamahaw Creek Site
Alamance County, NC
State Construction Office Project No. 09-0762301

October 29, 2009

Source: Orthophotography - NC One Map

FIGURE 3



Prepared By: Ecological Engineering, LLP
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(919) 557-0929

Prepared For: NCEEP
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Raleigh, NC 27604

Photograph Locations

UT Altamahaw Creek Site
Alamance County, NC
State Construction Office Project No. 09-0762301

May 25, 2009 Source: Orthophotography - NC One Map

FIGURE 4

Appendix 1

Site Photographs

UT Altamahaw Creek Site Photographs – Taken July 2009

Photo 1.
Facing southwest at the conservation easement area along UT Altamahaw Creek. The existing crossing is immediately outside of the photograph to the left.

Photo 2.
Facing south at the conservation easement area along UT Altamahaw Creek.

Photo 3.
Facing northeast (upstream) along UT Altamahaw Creek from the existing stream crossing.

Photo 4.
Facing southwest (downstream) along UT Altamahaw Creek from the existing stream crossing.

Photo 5.
Facing southwest along the emergency spillway situated immediately outside of the conservation easement area.

Photo 6.
Facing northeast along the emergency spillway situated immediately outside of the conservation easement area.

Photo 7.
Facing northwest at the scour associated with the emergency spillway within the conservation easement area.

Photo 8.
Facing northeast along the conservation easement area within the existing fence.

Photo 9.
Facing west at the existing pipe that underlies the stream crossing.

Photo 10.
Facing east across the jurisdictional wetland towards Wetland Point A4.

Photo 11.
Facing west across the jurisdictional wetland.

Photo 12.
Facing southwest across the jurisdictional wetland at Wetland Point A6 and the UT Altamahaw Creek stream channel.

Photo 13.
Facing southwest (downstream) along the UT Altamahaw Creek Stream Segment #1 towards the existing culvert.

Photo 14.
Facing southeast (upstream) along the UT Altamahaw Creek Stream Segment #2 approximately 200 feet from the wetland area.

Photo 15.
Facing south (upstream) along UT Altamahaw Creek Stream Segment #3 near the current easement boundary.

Appendix 2

Jurisdictional Determination

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action Id. **SAW2009-02079** County: **Alamance** U.S.G.S. Quad: **Lake Burlington**

NOTIFICATION OF JURISDICTIONAL DETERMINATION

Property Owner/Agent: **G. Lane Sauls, Jr.**
Address: **Ecological Engineering, LLP**
128 Raleigh Street
Holly Springs, NC 27540
Telephone No.: **919-557-0929**

Property description:
Size (acres) **~4 acres** Nearest Town **Altamahaw**
Nearest Waterway **Altamahaw Creek** River Basin **Cape Fear**
USGS HUC **0303002** Coordinates N **-79.47856** W **36.17751**
Location description **Project area located on the southeast portion of the property at 2884 Altamahaw Union Ridge Road (SR1002), Green Level, 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).

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 project area 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 waters of the U.S. including wetlands on your project area 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.

_ The waters of the U.S. 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.

X 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 **9 December 2009**. 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 property 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 Washington, NC, at (252) 946-6481 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 **Steve Kichefski** at **919-554-4884 ext. 35**.

C. Basis For Determination

There are two perennial streams and one abutting wetland. The two perennial streams are unnamed tributaries to Altamahaw Creek and are relatively permanent waters (RPW). The unnamed tributaries flow to the named RPW of Altamahaw Creek. Altamahaw Creek flows to the Haw River, a traditionally navigable water (TNW), which is a tributary to the Cape Fear River a navigable water of the United States. The Ordinary High Water Marks (OHWMs) of the streams were indicated by the following physical characteristics: Bed and banks, clear natural line impressed on the bank, shelving, scour. The wetland meets the hydrophytic vegetation, wetland hydrology, and hydric soil criteria of the 1987 Corps of Engineers Wetland Delineation Manual and is contiguous with one of the unnamed tributaries on the site .

D. Remarks

Site is to be used for Stream Enhancement (Type II) by the EEP. Andy Williams and I met Lane Sauls Jr. of Ecological Engineering, LLP on-site for the Jurisdictional Determination. See attached map for the approximate locations of Jurisdictional Waters described in this determination. An overflow channel from a pond in the northeast portion of the project area was inspected and determined to be a nonjurisdictional drainage feature.

E. 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:

District Engineer, Wilmington Regulatory Division
Attn: Steve Kichefski, Regulatory Specialist,
Raleigh Regulatory Field Office
3331 Heritage Trade Drive, Suite 105
Wake Forest, North Carolina 27587

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 District 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 **February 8, 2010**.

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

Corps Regulatory Official: Steve Kichefski

Date **December 9, 2009** Expiration Date **December 9, 2014**

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 Customer Satisfaction Survey located at our website at http://regulatory.usacesurvey.com/ to complete the survey online.

Copy furnished:

Sue Homewood
North Carolina Department of Natural Resources
Division of Water Quality
585 Waughtown Street
Winston-Salem, NC 27107

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL		
Applicant: EEP- Agent: Lane Sauls, Ecological Engineering, LLP	File Number: SAW2009-02079	Date: December 9, 2009
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: Andrew Williams, Regulatory Project Manager Raleigh Regulatory Field Office U.S. Army Corps of Engineers 3331 Heritage Trade Drive, Suite 105 Wake Forest, North Carolina 27587	If you only have questions regarding the appeal process you may also contact: Mr. Mike Bell, Administrative Appeal Review Officer CESAD-ET-CO-R U.S. Army Corps of Engineers, South Atlantic Division 60 Forsyth Street, Room 9M15 Atlanta, Georgia 30303-8801

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.

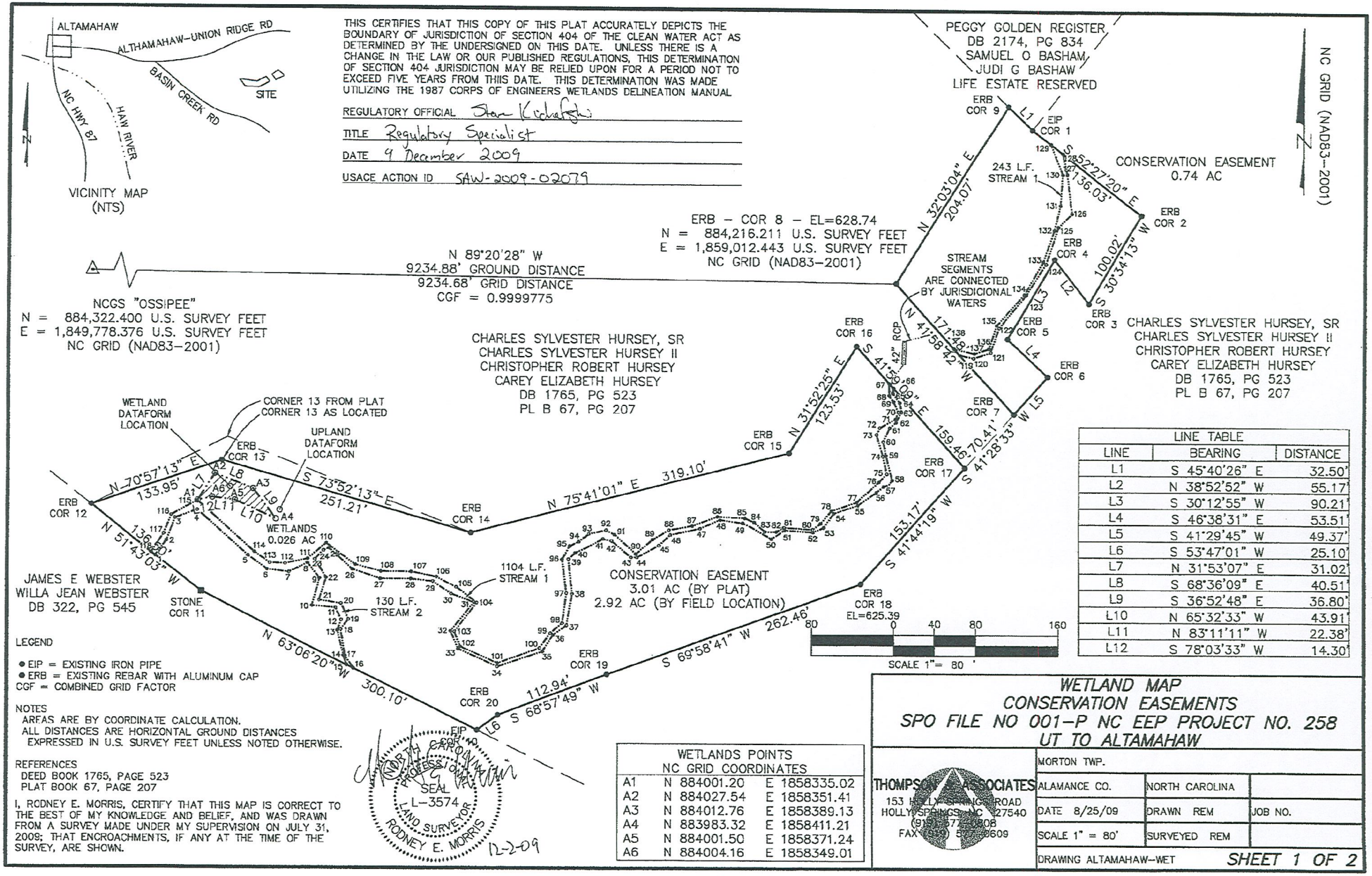
_____ Signature of appellant or agent.	Date:	Telephone number:

For appeals on Initial Proffered Permits and approved Jurisdictional Determinations send this form to:

District Engineer, Wilmington Regulatory Division, Attn:Andrew Williams, Project Manager, Raleigh Regulatory Field Office, 3331 Heritage Trade Drive, Suite 105, Wake Forest, North Carolina 27587

For Permit denials and Proffered Permits send this form to:

Division Engineer, Commander, U.S. Army Engineer Division, South Atlantic, Attn: Mr. Mike Bell, Administrative Appeal Officer, CESAD-ET-CO-R, 60 Forsyth Street, Room 9M15, Atlanta, Georgia 30303-8801



LINE TABLE		
LINE	BEARING	DISTANCE
L1	S 45°40'26" E	32.50'
L2	N 38°52'52" W	55.17'
L3	S 30°12'55" W	90.21'
L4	S 46°38'31" E	53.51'
L5	S 41°29'45" W	49.37'
L6	S 53°47'01" W	25.10'
L7	N 31°53'07" E	31.02'
L8	S 68°36'09" E	40.51'
L9	S 36°52'48" E	36.80'
L10	N 65°32'33" W	43.91'
L11	N 83°11'11" W	22.38'
L12	S 78°03'33" W	14.30'

LEGEND
- EIP = EXISTING IRON PIPE
- ERB = EXISTING REBAR WITH ALUMINUM CAP

CGF = COMBINED GRID FACTOR

NOTES
AREAS ARE BY COORDINATE CALCULATION.
ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES EXPRESSED IN U.S. SURVEY FEET UNLESS NOTED OTHERWISE.

REFERENCES
DEED BOOK 1765, PAGE 523
PLAT BOOK 67, PAGE 207

I, RODNEY E. MORRIS, CERTIFY THAT THIS MAP IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND WAS DRAWN FROM A SURVEY MADE UNDER MY SUPERVISION ON JULY 31, 2009; THAT ENCROACHMENTS, IF ANY AT THE TIME OF THE SURVEY, ARE SHOWN.

NORTH CAROLINA PROFESSIONAL SEAL L-3574 LAND SURVEYOR RODNEY E. MORRIS
12-2-09

WETLANDS POINTS NC GRID COORDINATES		
A1	N 884001.20	E 1858335.02
A2	N 884027.54	E 1858351.41
A3	N 884012.76	E 1858389.13
A4	N 883983.32	E 1858411.21
A5	N 884001.50	E 1858371.24
A6	N 884004.16	E 1858349.01

WETLAND MAP
CONSERVATION EASEMENTS
SPO FILE NO 001-P NC EEP PROJECT NO. 258
UT TO ALTAMAHAW

THOMPSON & ASSOCIATES
153 HOLLY SPRINGS ROAD
HOLLY SPRINGS, NC 27540
(919) 567-2808
FAX (919) 567-2609

MORTON TWP.		
ALAMANCE CO.	NORTH CAROLINA	
DATE 8/25/09	DRAWN REM	JOB NO.
SCALE 1" = 80'	SURVEYED REM	
DRAWING ALTAMAHAW-WET	SHEET 1 OF 2	

STREAM BANK LOCATION POINT	NORTHING	EASTING
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3	883983.9	1858313.2
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5	883947.9	1858384.3
6	883933.8	1858403.2
7	883931.2	1858424.4
8	883940.5	1858442.7
9	883925.3	1858454.4
10	883898.6	1858447.2
11	883896.7	1858469.7
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137	884148.3	1859089.6
138	884152.6	1859069.8

NORTH CAROLINA PROFESSIONAL SEAL L-3574 LAND SURVEYOR RODNEY E. MORRIS

12-2-09

I, RODNEY E. MORRIS, CERTIFY THAT THIS MAP IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND WAS DRAWN FROM A SURVEY MADE UNDER MY SUPERVISION ON JULY 31, 2009; THAT ENCROACHMENTS, IF ANY AT THE TIME OF THE SURVEY, ARE SHOWN.

THIS CERTIFIES THAT THIS COPY OF THIS PLAT ACCURATELY DEPICTS THE BOUNDARY OF JURISDICTION OF SECTION 404 OF THE CLEAN WATER ACT AS DETERMINED BY THE UNDERSIGNED ON THIS DATE. UNLESS THERE IS A CHANGE IN THE LAW OR OUR PUBLISHED REGULATIONS, THIS DETERMINATION OF SECTION 404 JURISDICTION MAY BE RELIED UPON FOR A PERIOD NOT TO EXCEED FIVE YEARS FROM THIS DATE. THIS DETERMINATION WAS MADE UTILIZING THE 1987 CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL

REGULATORY OFFICIAL Stan Kichefski

TITLE Regulatory Specialist

DATE 12/9/09

USACE ACTION ID SAW-2009-02079

WETLAND MAP
CONSERVATION EASEMENTS
SPO FILE NO 001-P NC EEP PROJECT NO. 258
UT TO ALTAMAHAW

THOMPSON & ASSOCIATES
153 HOLLY SPRINGS ROAD
HOLLY SPRINGS, NC 27540
(919) 577-1908
FAX (919) 557-2609

MORTON TWP.		
ALAMANCE CO.	NORTH CAROLINA	
DATE 8/25/09	DRAWN REM	JOB NO.
SCALE 1" = 80'	SURVEYED REM	
DRAWING ALTAMAHAW-WET	SHEET 2 OF 2	

Appendix 3

NCDA&CS Soil Test Results and Recommendations

NCDA&CS Agronomic Division	Phone: (919)733-2655	Web site: www.ncagr.gov/agronomi/	Report No: 02184

Field Information		Applied Lime			Recommendations												
Sample No.	Last Crop	Mo	Yr	T/A	Crop or Year		Lime	N	P_2O_5	K_2O	Mg	S	Cu	Zn	B	Mn	See Note
					1st Crop:	Hardwood,M		80-120	20-40	0	0	0	0	0			11
					2nd Crop:	Hardwood,M		80-120	20-40	0	0	0	0	0			11

Test Results

Soil Class	HM%	W/V	CEC	BS%	Ac	pH	P-I	K-I	Ca%	Mg%	Mn-I	Mn-AI(1)	Mn-AI(2)	Zn-I	Zn-AI	Cu-I	S-I	SS-I	NO_3-N	NH_4-N	Na
		0.96	11.2	89.0	1.2	6.3	22	50	65.0	22.0	1283			83	83	137					0.1

Field Information		Applied Lime			Recommendations												
Sample No.	Last Crop	Mo	Yr	T/A	Crop or Year		Lime	N	P_2O_5	K_2O	Mg	S	Cu	Zn	B	Mn	See Note
					1st Crop:	Hardwood,M		80-120	60-80	0-20	0	0	0	0			11
					2nd Crop:	Hardwood,M		80-120	60-80	0-20	0	0	0	0			11

Test Results

Soil Class	HM%	W/V	CEC	BS%	Ac	pH	P-I	K-I	Ca%	Mg%	Mn-I	Mn-AI(1)	Mn-AI(2)	Zn-I	Zn-AI	Cu-I	S-I	SS-I	NO_3-N	NH_4-N	Na
		0.95	10.3	77.0	2.4	5.4	3	35	50.0	25.0	606			66	66	108					0.1

North Carolina
Tobacco Trust Fund Commission

Reprogramming of the laboratory-information-management system that makes this report possible is being funded through a grant from the North Carolina Tobacco Trust Fund Commission.

Thank you for using agronomic services to manage nutrients and safeguard environmental quality.
- Steve Troxler, Commissioner of Agriculture