

MITIGATION PLAN

SLIVER MOON NON-RIPARIAN WETLAND MITIGATION SITE

CRAVEN COUNTY, NORTH CAROLINA
EEP PROJECT ID: 95017

IN THE NEUSE RIVER BASIN
CATALOGING UNIT 03020202



PREPARED FOR:



NC DEPARTMENT OF ENVIRONMENT & NATURAL RESOURCES
ECOSYSTEM ENHANCEMENT PROGRAM
1652 MAIL SERVICE CENTER
RALEIGH, NC 27699-1652

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PREPARED BY:



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FEBRUARY 2012

EXECUTIVE SUMMARY

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 NCEEP operations and procedures for the delivery of compensatory mitigation.

This mitigation report describes the **Sliver Moon Non-Riparian Wetland Mitigation Site** (Site) and is designed specifically to assist in fulfilling North Carolina Ecosystem Enhancement Program wetland restoration goals. The Site is located approximately 4 miles east of Dover in western Craven County (Figures 1 and 2) and within the Targeted Local Watershed 03020202080010 of the Neuse River Basin (8-digit HUC 03020202). The Site encompasses approximately 17.1 acres of land currently used for row crop production. Within the Site, 17.1 acres of non-riparian hydric soils have been cleared and ditched. A total of 14 non-riparian wetland mitigation units (WMUs) are being offered, as depicted in the following table.

	Acres	Percentage of WMUs	Non-riparian WMUs
Nonriparian Wetland Restoration	14	100	14
Total	14	Total Non-riparian WMUs	14

The Site is contained within one parcel owned by Mr. H.L. Mitchell. Located within an interstream flat north of Core Creek, which has been assigned a Best Usage Classification of **C; NSW, Sw** and is considered biologically impaired. Adjacent to the rim of a Carolina bay the Site has been cleared of native forest vegetation, ditched to remove groundwater hydrology, and is currently utilized for row crop production. Based on preliminary analyses, the primary goals of this non-riparian wetland restoration project focus on improving water quality, enhancing flood attenuation, and restoring wildlife habitat and will be accomplished by the following:

1. Remove nonpoint sources of pollution associated with vegetation maintenance including a) the cessation of broadcasting fertilizer, pesticides, and other agricultural chemicals into and adjacent to Site drainage ditches and b) providing a vegetated wetland to aid in the treatment of runoff.
2. Restore wetland hydroperiods that satisfy wetland jurisdictional requirements and approximate the Site's natural range of variation.
3. Promote floodwater attenuation by filling ditches and enhancing groundwater storage capacity.
4. Restore and reestablish natural community structure, habitat diversity, and functional continuity.
5. Enhance and protect the Site's full potential of wetland functions and values in perpetuity.

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RESTORATION PROJECT GOALS & OBJECTIVES

The EEP develops River Basin Restoration Priorities (RBRP) to guide its restoration activities within each of the state's 54 cataloging units. RBRPs delineate specific watershed that exhibit both the need and opportunity for wetland, stream and riparian buffer restoration. These watersheds are called Targeted Local watersheds (TLWs) and receive priority for EEP planning and restoration project funds. The 2002 Neuse River Basin RBRP identified 03020202080010 as a Targeted Local Watershed (Online: <http://www.nceep.net/services/restplans/FINAL%20RBRP%20Neuse%2020110523.pdf>). The Watershed is characterized by 67.3% Forest / Wetland (Final Neuse River Basinwide Water Quality Plan, 2009). Located within an interstream flat north of Core Creek, Stream Index Number 27-90, has been assigned a Best Usage Classification of **C; NSW, Sw** (NCDWQ 2010a) .

According to the *Final Neuse River Basinwide Water Quality Plan* (NCDWQ 2009), the upper portion of Core Creek watershed has a severe bioclassification due to biological impairment. The periodic toxic inputs from agricultural activities, inadequate macro-invertebrate habitat due to channelization and lack for hydrologic flow are listed as the mostly likely stressors to the Core Creek system. The Sliver Moon Non-Riparian Wetland Mitigation Project was identified as a non-riparian wetland opportunity to improve water quality, flood attenuation and non-riparian habitat within the TLW.

1.1 Project Goals

- Improving Water Quality
 - Removing nonpoint sources of pollution associated with agricultural activities, including a) eliminating the application of fertilizer, pesticides, and other agricultural materials into ditches that flow to adjacent streams and wetlands; and b) providing a vegetated wetland to aid in the treatment of pollutants such as sediment and/or agricultural pollutants from the adjacent landscape.
 - Reducing sedimentation onsite and in adjacent ditches by a) reducing ditch erosion associated with tillage and b) planting a diverse woody vegetative to reduce runoff.
- Enhancing Flood Attenuation
 - Promoting floodwater attenuation by a) removing ditches to reduce the amount of runoff that occurs during high precipitation; b) restoring wetland hydroperiods that satisfy wetland jurisdictional requirements and approximate the Site's natural range of variation; c) restoring non-riparian wetlands, resulting in increased storage capacity during precipitation events within the Site d) re-vegetating the Site to reduce sheet flow off the Site.
- Restoring Non-riparian Habitat
 - Restore and reestablish natural community structure, habitat diversity, and functional continuity.
 - Enhance and protect the Site's full potential of wetland functions and values in perpetuity.

1.2 Project Objectives

- The project goals will be addressed through the following project objectives:
- Providing 14 non-riparian Wetland Mitigation Units, as calculated in accordance with the requirements stipulated in RFP #16-003571. This will be accomplished by restoring 14 acres of non-riparian wetland by eliminating row crop production, filling agricultural ditches, restoring water table elevations to its previous depth, redirecting ditches located near the Site to avoid possible draw down of groundwater on the Site, and planting with native nonriparian forest vegetation.
 - Protecting the Site in perpetuity with a conservation easement.

SITE SELECTION

2.1 Directions to Site

Situated approximately 4 miles east of Dover, NC in western Craven County the Site is within the Targeted Local Watershed 03020202080010 of the Neuse River Basin. From Kinston, NC head East on US 70 By-Pass for 7.2 miles and turn left at SR 1005, Dover Rd, to the town of Dover. Continue onto Old US Hwy. 70 for approximately 5 miles. At which point take a left onto Daisy Ln. Site lies approximately ¾ mile down Daisy Ln.

2.2 Physiography and Land Use

The Site is located in the Carolina Flatwoods section of the Middle Atlantic Coastal Plain physiographic province of North Carolina in United State Geological Survey (USGS) HUC 03020202 (North Carolina Division of Water Quality [NCDWQ] Subbasin Number 03-04-08) of the Neuse River Basin. Regional physiography is characterized by flat plains on lightly dissected marine terraces; swamps, low gradient streams with sandy and silty substrates; and Carolina bays (Griffith et al. 2002). Elevations within the Site are nearly level averaging approximately 59 feet National Geodetic Vertical Datum (USGS Cove City, NC 7.5-minute topographic quadrangle). Topography within the Site is depicted on Figure 3.

The Site is located in a 1,065-square mile headwater watershed of Core Creek that has been ditched and cleared to promote drainage. The watershed is dominated by agricultural land, forest, pasture, and sparse residential property. Impervious surfaces account for less than 5 percent of the watershed land surface.

Surrounding area land use is primarily agricultural, with some sparse, low-density residential housing. Onsite land use is characterized by agricultural land (row crop production). Vegetation at the Site has been removed in support of agriculture practices.

2.3 Water Quality

The Site is located within the Neuse River Basin in 14-digit USGS Cataloging Unit and **Targeted Local Watershed 03020202080010** of the South Atlantic/Gulf Region (NCDWQ sub-basin number 03-04-08). The Site is located within an inter-stream flat adjacent to the rim of a Carolina bay. The inter-stream flat lies between two stream systems, Core Creek to the south which has been assigned Stream Index Number 27-90 and Mill Branch to the North which has been assigned Stream Index Number 27-90-2. Both stream systems have been assigned a Best Usage Classification of **C; NSW, Sw** (NCDWQ 2010a). Streams classified as **C** are suitable for aquatic life propagation and survival, fishing, wildlife, secondary recreation, and agriculture. Secondary recreation includes wading, boating, and other uses not involving human body contact with waters on an organized or frequent basis. **Sw** is intended to recognize those waters which are topographically located so as to generally have low velocities and other natural characteristics which are different from adjacent streams draining land with steeper topography. **NSW** is intended for waters needing additional nutrient management due to their being subject to excessive growth of microscopic or macroscopic vegetation. Local programs to control nonpoint sources and stormwater discharges of pollution are required.

NCDWQ has assembled a list of impaired waterbodies according to the Clean Water Act Section 303(d) and 40 CFR 130.7, which is a comprehensive public accounting of all impaired waterbodies in the state. An impaired waterbody is one that does not meet water quality standards including designated uses, numeric and narrative criteria, and anti-degradation requirements defined in 40 CFR 131. Core Creek between SR 1239 and Grape Creek is listed on the NCDWQ final 2010 303(d) list for a severe bioclassification due to reduced aquatic life integrity (NCDWQ 2010b).

2.4 Soils and Land Form

Based on county soil survey mapping (USDA 1989), the Site contains two soil series: Torhunta fine sandy loam (*Typic humaquepts*) and Pantego fine sandy loam (*Umbric Paleaquults*). Site soils are depicted on Figure 4 (Appendix A) and described in Table 1.

Restorable portions of the Site are predominantly underlain by soils of the Torhunta series. Torhunta soils are 80 percent hydric soils that are characterized by a dark gray matrix. Soils have been impacted by land clearing, ditching, and till from row plant production.

Table 1. NRCS Soils Mapped within the Site

Soil Series	Hydric %	Family	Description
Torhunta	80	<i>Typic Humaquepts</i>	This series consists of nearly level stream terraces and upland bays in the Coastal Plain. Torhunta soils are very poorly drained, have moderately rapid permeability, and a seasonal high water table at the surface for 2 to 6 months annually.
Pantego	85	<i>Umbric Paleaquults</i>	This series consists of very poorly drained, moderately permeable soils that formed in thick loamy sediments on the Southern Coastal Plain and Atlantic Coast Flatwoods. The water table is at or near the surface during the wet season.

Detailed soil mapping conducted by licensed soil scientists in January 2011 indicate that the entire 17-acre Site is currently underlain by nonriparian hydric soils of the Torhunta and Pantego Series (Figures 4 and 5, Appendix A). A detailed soil profile includes the following.

Soil Profile 1

- 0 to 3 inches; black (10YR 2/1) sandy loam
- 3 to 6 inches; black (5YR 2.5/1) sandy loam
- 6 to 15 inches; gray (10YR 5/1) sandy loam
- 15 to 16+ inches; light gray (10YR 7/2) sandy loam



Soil Profile 2

- 0 to 10 inches; black (10YR 2/1) sandy loam
- 10+ inches; black (10YR 2/1) sandy loam; common medium distinct brown (10YR 4/3) mottles



2.5 Hydrology

As stated in the USDA Soil Survey of Craven County, NC groundwater levels for the Site and surrounding area are at or near the surface during the dormant and early growing season, and is fed explicitly by rain events. Torhunta and Pantego are both nearly level, slowly permeating soil types which drain poorly. The current ditching of the Site has capped surface and sub-surface hydrology.

2.6 Protected Species

Based on the most recently updated county-by-county database of federally listed species in North Carolina as posted by the United States Fish and Wildlife Service (USFWS) at <http://nc-es.fws.gov/es/countyfr.html>, seven federally protected species are listed for Craven County (accessed Tuesday, November 1, 2011). Table 2 lists the federally protected species and indicates if potential habitat exists within the Site for each species. For additional communication between Restoration Systems and regulatory agencies regarding federally protected species please refer to the Categorical Exclusion, Appendix B.

Table 2. Federally Protected Species for Craven County

Common Name	Scientific Name	Status*	Habitat Present Within Site
Vertebrates			
American alligator	<i>Alligator mississippiensis</i>	T(S/A)	Yes
Bald eagle	<i>Haliaeetus leucocephalus</i>	BGPA	No
Leatherback sea turtle	<i>Dermochelys coriacea</i>	E	No
Red-cockaded woodpecker	<i>Picoides borealis</i>	E	No
West Indian manatee	<i>Trichechus manatus</i>	E	No
Plants			
Rough-leaved loosestrife	<i>Lysimachia asperulaefolia</i>	E	No
Sensitive joint-vetch	<i>Aeschynomene virginica</i>	T	No

*Endangered (E) = a taxon "in danger of extinction throughout all or a significant portion of its range"; Threatened (T) = a taxon "likely to become endangered within the foreseeable future throughout all or a significant portion of its range"; Threatened [T(S/A)] = a species that is threatened due to similarity of appearance with other rare species and is listed for its protection; these species are not biologically endangered or threatened and are not subject to Section 7 consultation. Bald and Golden Eagle Protection Act (BGPA) = prohibits take of bald and golden eagles and provides a statutory definition of "take" that includes "disturb".

American Alligator

Habitat for the American alligator is present in ditches throughout the Site; however, this species is threatened due to similarity of appearance with other rare species and is not subject to Section 7 consultation. Therefore, the project will have **No Effect** on this species.

Bald Eagle

Habitat is present adjacent to the Site for bald eagle and in open water areas due north of the Site. Open water and forested areas that the bald eagle may inhabit do not have any proposed impacts. Therefore, it is reasonable to conclude the project will have **No Effect** on this species.

Leatherback Sea Turtle & West Indian Manatee

Habitat for the leatherback sea turtle and West Indian manatee does not exist at the Site. Based on the absence of suitable habitat, it is reasonable to conclude the project will have **No Effect** on these species.

Red-Cockaded Woodpecker

Habitat is present adjacent to the Site for the red-cockaded woodpecker. Mature longleaf pines are present in wooded areas that surround the site. Forested areas the red-cockaded woodpecker may inhabit do not have any proposed impacts. Therefore, it is reasonable to conclude the project will have **No Effect** on this species.

Rough-Leaved Loosestrife

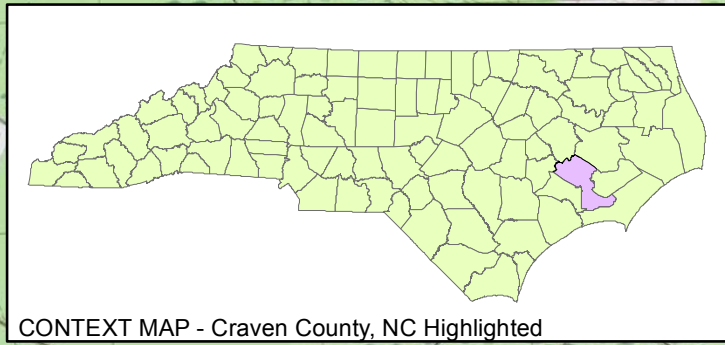
Habitat is present around and in mature forests adjacent to the Site. However the area of impact will be limited to post agricultural areas, where farming activities have removed any chance establishment for the Rough-leaved loosestrife. Based on the absence of suitable habitat for the species, it is reasonable to conclude the project will have **No Effect** on the species.

Sensitive Joint-Vetch

Habitat for the sensitive joint-vetch does not exist at the Site. Habitat for the sensitive joint-vetch is that of intertidal zones where plants are flooded twice daily. Based on the absence of suitable habitat for the species, it is reasonable to conclude the project will have **No Effect** on sensitive joint-vetch.

2.7 Summary of Anticipated Effects

We anticipate that the immediate effects of this project (construction phase) will cause ground disturbance within the project area due to the use of heavy machinery to complete construction. Again, the Site has historically received extensive ground disturbance due to agricultural operations. The long term effects of this project (post construction) will result in an overall enhancement to the integrity of the immediate ecosystems and result in long term beneficial effects to fish or wildlife. This site will be protected in perpetuity with a conservation easement.



Easement Area
(Access from Daisy Lane)
Latitude: 35.204817
Longitude: -77.360605
(NAD 83/WGS 84)

Daisy Lane

From the City of Kinston

- Head southeast on US 70 Byp for 7.2 miles
- Turn left at SR 1005/Dover Road
- Continue onto Old US Hwy 70 for 0.3 miles
- Continue onto W Korngay St for 1.3 miles
- Continue onto Old US Hwy 70 for 3.7 miles
- Turn left at Daisy Ln



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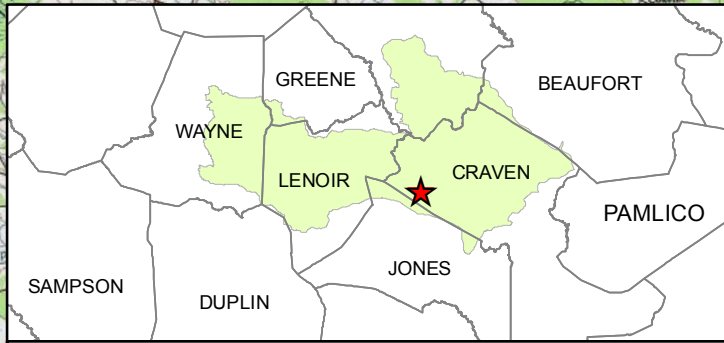
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SCALE: 1 inch = 3,000 feet
DATE: OCTOBER - 2011
PROJECT: SM

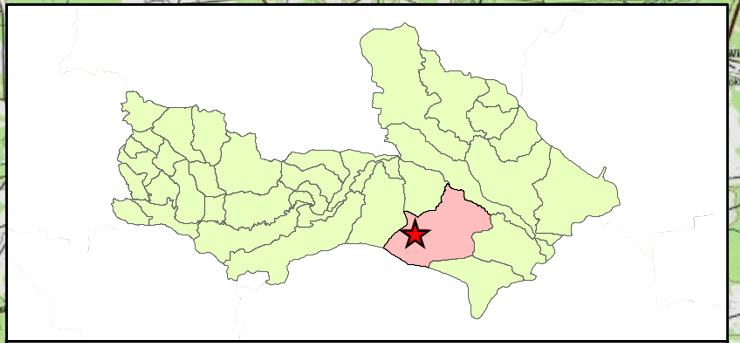
**FIGURE 1:
SITE CONTEXT**

Figure indicates where the Site physical location is along with directions to the Site

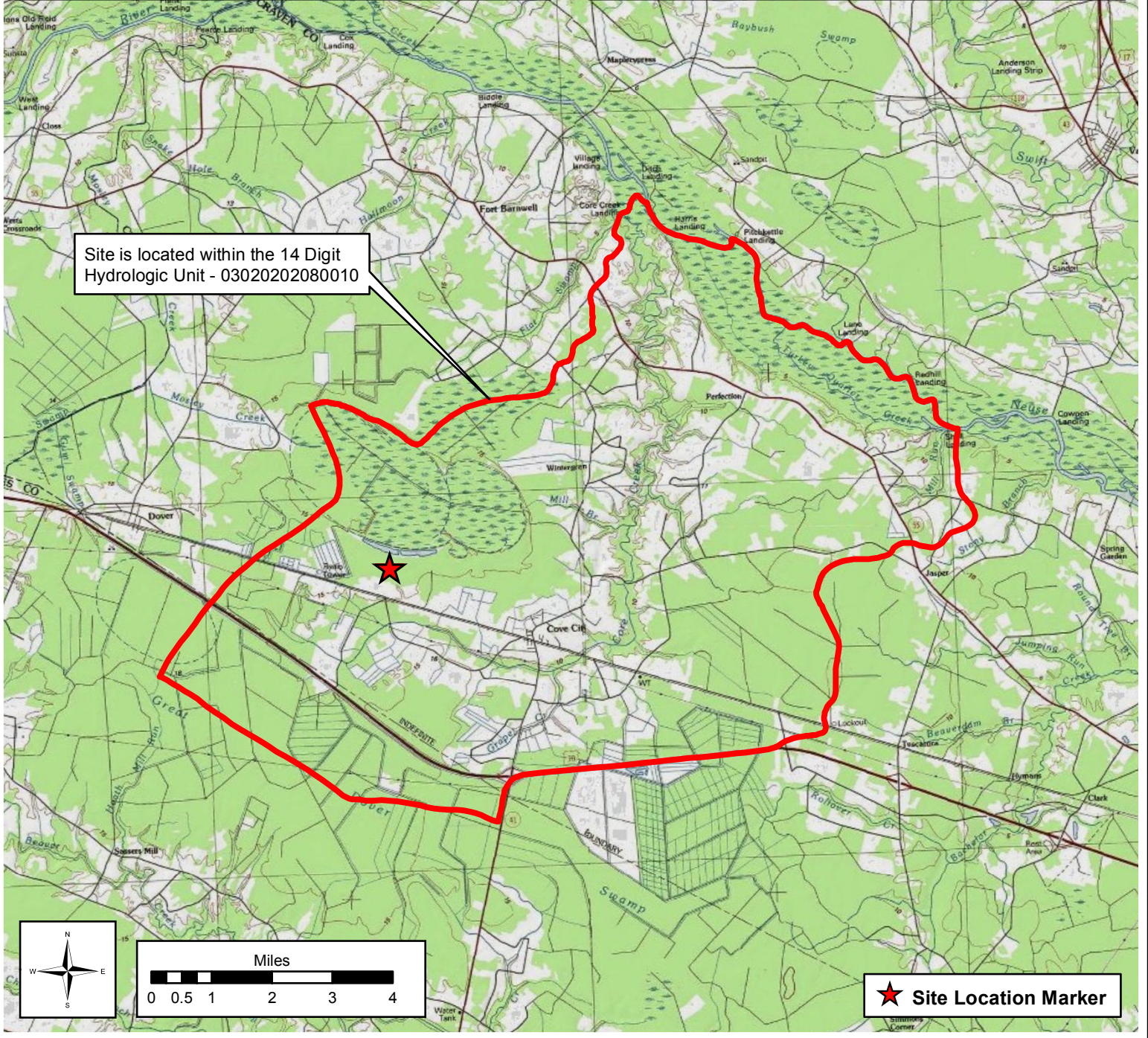
Aerial Imagery USGS Topographical Map
COORDINATE SYSTEM: NAD 1983 NC FEET



CONTEXT MAP - Neuse 02 Watershed Highlighted



CONTEXT MAP - 14 Digit HUC 03020202080010 Highlighted



Site is located within the 14 Digit Hydrologic Unit - 03020202080010

★ Site Location Marker



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SCALE: 1 in equals 2 mi
 DATE: OCTOBER - 2011
 PROJECT: SM

**FIGURE 2:
 USGS HYDROLOGICAL UNIT MAP**

Figure shows a breakdown of where the Site is situated within the hydrological unit cataloging system

Aerial Imagery USGS Topographical Map
 COORDINATE SYSTEM: NAD 1983 NC FEET



Legend

Site Easement

Map Symbol	Hydric Status	Hydric %	Soil Name	Soil Taxonomy
To	Class A	80	Torhunta Silt Loam	<i>Typic Humaquepts</i>
Pa	Class A	85	Pantego Silt Loam	<i>Umbric Paleaquults</i>



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SCALE: 1 in = 417 ft
 DATE: OCTOBER - 2011
 PROJECT: SM

**FIGURE 3:
 NRCS SOIL SURVEY**

Figure indicates soils present within the Site's boundaries.

Aerial Imagery (c) 2010 Microsoft Corporation
 COORDINATE SYSTEM: NAD 1983 NC FEET



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SCALE: 1 in equals 417 ft
DATE: OCTOBER - 2011
PROJECT: SM

**FIGURE 4:
 EXISTING CONDITIONS**

Figure shows existing site conditions,
 - existing ditches

Aerial Imagery (c) 2010 Microsoft Corporation
 COORDINATE SYSTEM: NAD 1983 NC FEET

Figure 5. Site Photographs



Site view from SE corner looking due west



Site view from SW corner looking due North



Looking N down the existing center ditch of the Site



Looking N at the existing SE corner of the site

SITE PROTECTION INSTRUMENT

3.1 Site Protection Instrument Summary Information

The land required for the construction, management, and stewardship of this mitigation project is within one parcel. The Site is currently not protected, but will be done so by the purchase and subsequent transfer of a conservation easement to the NCEEP during Task 2. Restoration Systems will await approval of Task 3 before this purchase and transfer is conducted.

Table 3. Site Parcel Information

	Landowner	PIN	County	Site Protection Instrument	Deed Book and Page Number	Acreage protected
Parcel A	Mitchell, Horace Lee	03-044-011	Craven		Book 2229 Pg. 1011	17.00

When available, the recorded document will be provided. The template document associated with the contract, (outlined in RFP # 16-003571), will be used and is attached within Appendix A.

The conservation easement will 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.

A site protection instrument figure will be completed once a final survey of the Site has been completed, after the conservation easement is purchased

BASELINE INFORMATION

Table 4. Baseline Project Information

Project Information			
Project Name	Sliver Moon		
County	Craven		
Project Area (acres)	17.02		
Project Coordinates (latitude and longitude)	35.204817, -77.360605 (NAD 83/WGS 84)		
Project Watershed Summary Information			
Physiographic Province	Carolina Flatwoods section of the Middle Atlantic Coastal Plain		
River Basin	Neuse		
USGS Hydrologic Unit 8-digit	03020202	USGS Hydrologic Unit 14-digit	03020202080010
DWQ Sub-basin	03-04-08		
Project Drainage Area, Total Outfall (acres)	+/- 130		
Groundwater Treated by Site (acres)	+/- 20		
Project Drainage Area Percentage of Impervious Area	< 1%		
CGIA Land Use Classification	Cropland and Pasture		
Wetland Summary Information			
Parameters	Wetland 1		
Size of Wetland (acres)	14.00		
Wetland Type (non-riparian, riparian riverine or riparian non riverine)	Non-riparian		
Mapped Soil Series	Torhunta & Pantego		
Drainage class	Poorly Drained		
Soil Hydric Status	Class A		
Source of Hydrology	Rain Events		
Hydrologic Impairment	Ditches		
Native vegetation community	Non-Riverine Wet Harwood Flat		
Percent composition of exotic invasive vegetation	0%		
Regulatory Considerations			
Regulation	Applicable?	Resolved?	Supporting Documentation
Waters of the United States – Section 404	Yes	No	E-mail correspondence Appendix B
Waters of the United States – Section 401	Yes	No	E-mail correspondence Appendix B
Endangered Species Act	No		Categorical Exclusion Appendix B
Historic Preservation Act	No		Categorical Exclusion Appendix B
Coastal Zone Management Act [CZMA/Coastal Area Management Act (CAMA)]	No		Categorical Exclusion Appendix B
FEMA Floodplain Compliance	No		Categorical Exclusion Appendix B
Essential Fisheries Habitat	No		Categorical Exclusion Appendix B
Sediment & Erosion Control Plan (S&EC)	Yes	No	

DETERMINATION OF CREDITS

Mitigation credits presented in these tables 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 5. Site Credit Determination

Summit Seep Wetland Mitigation Site, Davidson County, Contract # 003244									
Mitigation Credits									
	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals					14				
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	
Non-riparian restoration	NA		17.02		NA	Restoration	14	1:1	
Component Summation									
Restoration Level	Stream (linear feet)	Riparian Wetland (acres)		Non-riparian Wetland (acres)	Buffer (square feet)	Upland (acres)			
		Riverine	Non-Riverine						
Restoration	0	0	0	14	0	0			
Enhancement		0	0	0	0	0			
Enhancement I	0								
Enhancement II	0								
Creation		0	0	0					
Preservation	0	0	0	0		0			
High Quality Preservation	0	0	0	0		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 6. Forested Wetland Credits

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%

6.1 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.

6.2 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 15% 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.

MITIGATION WORK PLAN

7.1 Target Wetland Type & Plant Communities

The EPA classification of a wetland is based on soil, hydrology, and vegetation characteristics. The Sliver Moon project contains of Torhunta and Pantego fine sandy loam hydric soils. Regional ground level water is at or near the surface, specifically during winter and spring months (USDA Soil Conservation Service 1994). Restoration efforts aim to reproduce characteristic pre-disturbed vegetation and hydrology.

Soils

Hydric A, fine sandy loam Torhunta and Pantego soils are the primary types present within project. Torhunta fine sandy loam is 80% hydric and is located on Nearly level stream terraces and upland bays within the Coastal Plain. Torhunta soils are very poorly drained, have moderately rapid permeability, and a seasonal high water table at the surface for 2 to 6 months annually. Characteristically Torhunta fine sandy loam is defined at the surface by a black fine sandy loam to a depth of 12 inches. From 12 to 37 inches the subsoil turns to a dark brown sandy loam.

Pantego fine sandy loam consists of very poorly drained, moderately permeable soils that formed in thick loamy sediments on the Southern Coastal Plain and Atlantic Coast Flatwoods. The water table is at or near the surface during the wet season. As described in the Craven County USDA Soil Survey, Pantego fine sandy loam is typically black fine sandy loam to a depth of 15 inches. Subsoil extends to 62 inches and is characterized by dark gray sandy clay loam in upper layers to gray sandy clay in lower layers.

Hydrology

As stated in the USDA Soil Survey of Craven County, NC groundwater levels are at or near the surface during the dormant and early growing season, and is fed explicitly by rain events. Torhunta and Pantego are both nearly level, slowly permeating soil types which drain poorly. The current ditching of the Site has capped surface and sub-surface hydrology. Filling ditches will restore hydrology to characteristic levels.

Vegetation

Native, non-riparian forest species will be restored within the entire Site. Planting vegetation is proposed to reestablish vegetation community patterns, to provide soil stability, habitat for wildlife and filter pollutants prior to entering the groundwater table. Planted species composition will mimic Schafale and Weakley's *Classification of the Natural Communities of North Carolina* (1990) description of a Non-Riverine Wet Hardwood Flat, supplemented by reference forest and onsite observations (Table 7).

Table 7. Reference Vegetation Species

Canopy Species	Understory Species
cherrybark oak (<i>Quercus pagoda</i>)	wax myrtle (<i>Myrica cerifera</i>)
laurel oak (<i>Quercus laurifolia</i>)	sweet bay (<i>Magnolia virginiana</i>)
loblolly pine (<i>Pinus taeda</i>)	red bay (<i>Persea borbonia</i>)
water oak (<i>Quercus nigra</i>)	
tulip poplar (<i>Liriodendron tulipifera</i>)	
swamp chestnut oak (<i>Quercus michauxii</i>)	
willow oak (<i>Quercus phellos</i>)	
black gum (<i>Nyssa sylvatica</i>)	

7.2 Design Parameters

The Site was evaluated for the presence of conditions or characteristics that have the potential to hinder restoration activities. The evaluation focused primarily on the presence of hazardous materials, utilities and restrictive easements, rare/threatened/endangered species or critical habitats, and the potential for

hydrologic trespass. Existing information regarding Site constraints was acquired and reviewed. In addition, any Site conditions that have the potential to restrict the restoration design and implementation were documented during the field investigation.

No evidence of natural and/or man-made conditions was identified that has the potential to impede proposed restoration activities.

Please refer to Appendix B e-mail correspondence between Todd Tugwell (USACE) and Guy Pearce (NC EEP), indicating that no jurisdictional wetland delineation is need for the Site. The primary goals of this restoration concept include:

- (1) Enhancement of water quality functions (reduce non-point source nutrient inputs and sedimentation);
- (2) Establishment of a natural non-riparian wetland community;
- (3) Restoration of jurisdictional wetland hydrology by filling ditches; and
- (4) Placement of a conservation easement over the site that will encompass and protect all restoration activities in perpetuity.

Primary activities, designed to restore 14.0 acres of non-riparian wetland, include filling ditches and planting native, deep rooted forest species (Appendix D). Wetland restoration is designed to restore a fully functioning non-riparian wetland system that will provide water storage, nutrient cycling, removal of imported elements and compounds, and will create a variety and abundance of wildlife habitat.

The entire Site is underlain by non-riparian hydric soils have been impacted by vegetation clearing, ditch excavation and agricultural practices. Wetland restoration will focus on the restoration of non-riparian hydric soils, forest communities, elevation of groundwater tables, and the reestablishment of soil structure and micro-topographic variations.

Restoration of wetland hydrology and wetland soil attributes will involve 1) ditch cleaning prior to backfill, 2) ditch plug installation, and 3) ditch backfill. These activities will restore 14 acres of non-riparian wetland at the Site (Figure C, Appendix D).

Ditch Cleaning

Ditches identified for backfilling will be cleaned, as needed, to remove unconsolidated sediments. Removal of unconsolidated sediments is particularly critical in areas where ditch plugs are proposed. Accumulated sediment within the ditches provides a relatively high permeability material that may act as a conduit for drainage after restoration. The unconsolidated sediments will be lifted from the channel to expose the underlying, relatively undisturbed soil material beneath the ditch invert. The unconsolidated sediment will be incorporated into top soils and spread evenly throughout the Site.

Ditch Plugs

Impermeable ditch plugs will be installed within ditches at critical locations throughout the Site. The plugs will consist of low density earthen material. Each plug will be backfilled in 2-foot lifts of vegetation-free material and compacted into the bottom of the ditch. The earthen material may be obtained from upland areas within the easement. The plugs will consist of a core of impervious material and shall be of sufficient width and depth to form an imbedded overlap in the existing ditch banks and ditch bed (Figure C, Appendix D).

Ditch Backfilling

Ditches will be backfilled using onsite material excavated from spoil piles adjacent to ditches and borrow material from upland areas within the easement. Where vegetation has colonized fields or spoil areas, rooting debris will be removed to the maximum extent feasible before insertion of earthen material into the ditch. The ditches will be filled, compacted, and graded to the approximate elevation of the adjacent wetland surface (Figure C, Appendix D).

Figure C, Appendix D details the redirecting of an existing ditch while perimeter ditches are filled. The filling of perimeter ditches will not result in hydrological trespassing, as the Site itself is situated below surrounding elevations, a sand berm along the northern boundary of the site and a compacted elevated road along the eastern boundary will prevent hydrological trespassing in those directions. Additionally, hydrology for the Site is primarily rain driven and surface runoff will not be obstructed, the piping and reworking of the existing ditch will insure unobstructed surface runoff from rain events.

Vegetation Planting

Bare-root seedlings of native region-specific tree and shrub species will be planted within the Site at a density up to 1000 stems per acre (6.6-foot centers). Planting will be performed between December 1st and March 15th to allow plants to stabilize during the dormant period and set root during the spring season. Bare-root seedlings will be hand planted to minimize Site soil disturbance, thus minimizing potential for sedimentation / siltation runoff from the Site. A total of 14,000 native, region-specific, tree and shrub seedlings will be planted in support of Site wetland restoration (Table 8). The 14-acre restoration area will be re-vegetated during the implementation of this plan (Figure D, Appendix D).

Table 8. Planting Plan

Species	Spec'd	%	Ordered	%	Nursery
Overstory					
Black gum	1,600	11%	1,600	11%	ArborGen
Cherrybark oak	1,600	11%	1,600	11%	ArborGen
Laurel oak	1,300	9%	1,300	9%	ArborGen
Swamp chestnut oak	1,300	9%	1,300	9%	ArborGen
Swamp red bay	1,300	9%	1,300	9%	Superior Trees
Sweet bay magnolia	1,300	9%	1,300	9%	ArborGen
Water oak	1,500	10%	1,500	10%	ArborGen
Willow oak	1,300	9%	1,300	9%	ArborGen
Yellow-poplar	1,300	9%	1,300	9%	ArborGen
Midstory					
Wax myrtle	1,200	9%	1,200	9%	ArborGen
	14,000	100%	14,000	100%	

7.3 Data Analysis

Groundwater modeling was conducted in January of 2011 by a licensed soil scientist from Axiom Environmental, Inc. For this study, the Boussinesq equation was utilized to predict groundwater impacts associated with ditching. The Boussinesq equation represents a two-dimensional general flow equation for unconfined aquifers. The equation has been applied in the past to predict the decline in elevation of the water table near a pumping well as time progresses.

The Boussinesq equation was applied to Site ditches to predict the linear distance of groundwater drawdown that exceeds 1 foot for 7.5 percent of the growing season. The percentage of the growing season (7.5 percent) was selected based upon guidance from the Corps of Engineers Wetland Delineation Manual (Environmental Laboratory 1987). The equation is solved for wetland impacts with data for the following variables: 1) equivalent hydraulic conductivity, 2) drainable porosity, 3) and estimated depth to the impermeable layer or aquiclude, 4) the time duration of the drawdown, 5) target water depth (1 foot below the soil surface), and 6) minimum ditch depth.

Results from the Boussinesq equation predicted lateral drainage effects to the groundwater table from agricultural ditches. Results of the Boussinesq equation are summarized in Table 9. Ditch impacts at the Site range from 179 feet to 315 feet, measuring horizontally from the ditch edge. Using existing ditch depths and applying the Boussinesq equation, it has been determined that 17 acres have been effectively drained (Figure 4) by the ditches that are currently in place. Rerouting the southern drainage ditch will result in post restoration drainage within approximately three acres of the southeastern corner of the Site. Therefore, 14 acres of restoration will be available as depicted in Figure C.

Table 9. Boussinesq Equation Results

Soil	Ditch Depth (ft)	Depth to Aquaclude (cm)	Ksat (cm/hr)	Growing Season (hrs)	Drainable Porosity (cm)	Ditch Impact (ft)
Torhunta/Pantego (Craven County)	2	61.0	10.2	675*	0.033	174
	3	91.4	10.2	675*	0.033	243
	4	121.9	10.2	675*	0.033	281
	6	182.9	10.2	675*	0.033	305

*Based on 7.5% growing season

MAINTENANCE PLAN

Restoration Systems will monitor the site on a regular basis and will conduct a physical inspection of the site 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 10. Site Maintenance Plan

Component/Feature	Maintenance through project close-out
Wetland	Routine wetland maintenance and repair activities will occur. Areas where stormwater and floodplain flows intercept the wetland may require maintenance to prevent scour.
Vegetation	Vegetation shall be maintained to ensure the health and vigor of the targeted plant 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.
Utility Right-of-Way	Utility right-of-way within the site may be maintained only as allowed by Conservation Easement or existing easement, deed restriction, rights of way, or corridor agreements.

PERFORMANCE STANDARDS

Monitoring of Site restoration efforts will be performed until success criteria are fulfilled. Monitoring for wetland components include hydrology and vegetation.

Hydrology Monitoring

A total of nine (9) groundwater monitoring gauges will be installed to take measurements after hydrological modifications are performed at the Site. Hydrological sampling will continue throughout the growing season at intervals necessary to satisfy jurisdictional hydrology success criteria (EPA 1990).

Hydrology Success Criteria

Located within an interstream-flat, the Site's hydrology is precipitation driven and thus, subject to drought periods during the growing season. Based on the Site's location and hydrology source, target hydrological characteristics include saturation or inundation for 7.5 percent of the growing season, during average climatic conditions. During growing seasons with atypical climatic conditions, groundwater gauges in reference wetlands may be used by the USACE/NCIRT to evaluate hydrology success.

Vegetation Monitoring

After planting has been completed in winter or early spring, an initial evaluation will be performed to verify planting methods and to determine initial species composition and density. Supplemental planting and additional Site modifications will be implemented, if necessary.

During quantitative vegetation sampling, fourteen (14) sample plots (10-meter by 10-meter) will be installed within the Site as per guidelines established in *CVS-EEP Protocol for Recording Vegetation, Version 4.0* (Lee et al. 2006). Each sample plot monitoring will follow CVS Level II protocol, parameters to be monitored include species composition and density. Visual observations of the percent cover of shrub and herbaceous species will be documented by photograph.

Vegetation Success Criteria

Success criteria have been established to verify that the vegetation component supports community elements necessary for forest development. Success of vegetation criteria at the Site indicates successful restoration of non-riparian habitat within and adjacent to aquatic wetland resources as well as improvement of overall water quality resulting from the treatment of runoff from agriculture fields.

Success criteria are dependent upon the density and growth of living, planted stems throughout the planted areas of the Site including Non-riverine Wet Hardwood Flat community. The presence of desirable volunteer species will also be considered by the USACE/NCIRT in making a determination whether the Site has successfully met the stated goals and objectives.

An average density of 320 stems per acre of living, planted stems must be surviving in the first three monitoring years. Subsequently, 260 living, planted stems per acre must be surviving in year 5 and 210 living, planted stems per acre in year 7.

Hydrologic Contingency

The Site is bound by culvert that runs under Daisy Ln. (Figure 4), if hydrologic success criteria is not achieved adjustments to the outfall level would raise the Site’s groundwater table. Recommendations for contingency to establish wetland hydrology may be implemented and monitored until Hydrology Success Criteria is achieved.

Vegetation Contingency

If vegetation success criteria are not achieved based on average density calculations from combined plots over the entire restoration area, supplemental planting may be performed with tree species approved by regulatory agencies. Supplemental planting may be performed as needed until achievement of vegetation success criteria. If, within the first 3 years, any species exhibits greater than 50 percent mortality, the species will either be replanted or an acceptable replacement species will be planted in its place as specified in the contingency plan.

MONITORING REQUIREMENTS

Annual monitoring data will be reported using the EEP monitoring template. The monitoring report shall provide a 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 project close-out.

Table 11. Site Monitoring Requirements

<u>Required</u>	<u>Parameter</u>	<u>Quantity</u>	<u>Frequency</u>	<u>Notes</u>
No	Pattern	As per April 2003 USACE Wilmington District Stream Mitigation Guidelines	annual	
No	Dimension	As per April 2003 USACE Wilmington District Stream Mitigation Guidelines	annual	
No	Profile	As per April 2003 USACE Wilmington District Stream Mitigation Guidelines	annual	
No	Substrate	As per April 2003 USACE Wilmington District Stream Mitigation Guidelines	annual	
No	Surface Water Hydrology	As per April 2003 USACE Wilmington District Stream Mitigation Guidelines	annual	
Yes	Groundwater Hydrology	As per April 2003 USACE Wilmington District Stream Mitigation Guidelines	annual	Groundwater monitoring gauges with data recording devices will be installed on site; the data will be downloaded at least every 30 days during the growing season
Yes	Vegetation	As per April 2003 USACE Wilmington District Stream Mitigation Guidelines	annual	*Vegetation will be monitored using the Carolina Vegetation Survey (CVS) Level II protocols. 14 Vegetation survey plots will be installed and monitored.
Yes	Exotic and nuisance vegetation		annual	Location of exotic and nuisance vegetation will be mapped

Table 11. Site Monitoring Requirements Continued

<u>Required</u>	<u>Parameter</u>	<u>Quantity</u>	<u>Frequency</u>	<u>Notes</u>
Yes	Project boundary		Semi-annual	Locations of fence damage, vegetation damage, boundary encroachments, etc. will be mapped

* “The Carolina Vegetation Survey is a collaborative, multi-institutional research program designed to document the composition and status of the natural vegetation of the Carolinas for purposes of inventory, monitoring of environmental impacts, and assessment of conservation status.” (<http://cvs.bio.unc.edu/>)

LONG-TERM MANAGEMENT PLAN

Upon approval for close-out by the Interagency Review Team (IRT), responsibility for long-term stewardship of the Site will be transferred to the EEP. 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.

ADAPTIVE MANAGEMENT PLAN

Upon completion of site construction Restoration Systems 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, Restoration Systems will notify the EEP 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 RS will:

1. Notify the EEP as required by the Nationwide 27 permit general conditions.
2. Revise performance standards, maintenance requirements, and monitoring requirements as necessary and/or required by the USACE / EEP.
3. Obtain other permits as necessary.
4. Implement the Corrective Action Plan.
5. Provide the EEP a Record Drawing of Corrective Actions. This document shall depict the extent and nature of the work performed.

FINANCIAL ASSURANCES

As required by RFP # 16-002835, Restoration Systems will provide a performance bond for 55% of the total value of the contract to be submitted with this document. This bond will remain in effect until the successful completion of Task 6. See Appendix E.

OTHER INFORMATION

14.1 Definitions

Cataloging Unit (“CU”) – A geographic area representing part or all of a River Basin and identified by an 8-digit number as depicted on the “Hydrologic Unit Map – 1974, State of North Carolina, published by the U.S. Department of Interior, Geological Survey”.

Categorical Exclusion – Categories of actions that do not individually or cumulatively have a significant effect on the human or natural environment and for which, therefore, neither an Environmental Assessment nor an Environmental Impact Statement is required.

Categorical Exclusion Action Form and Document – An abbreviated environmental document, prefaced by an Action Form, that briefly describes the mitigation site, the plan for its implementation, and documents that it will have minimal or no impact on the environment.

Conservation Easement – A restriction landowners voluntarily place on specified uses of their property to protect its natural, productive, or cultural features. It is recorded as a written legal agreement between the landowner and the “holder” of the easement. *The State of North Carolina must receive directly from the landowner a conservation easement as prepared and facilitated by the full delivery provider for all Ecosystem Enhancement Program full delivery projects.*

EEP – The North Carolina Ecosystem Enhancement Program.

Hydrologic Unit (“HU”) – A geographic area representing a portion of a Cataloging Unit as depicted on the “Hydrologic Unit Map – 1974, State of North Carolina, published by the U.S. Department of Interior, Geological Survey,” and identified by a 14-digit number.

Jurisdictional Wetland - A wetland as defined in the 1987 Corps of Engineers Wetlands Delineation Manual.

Mitigation – The term **mitigation**, when used throughout this RFP and any subsequent contracts that may be executed is **Compensatory Mitigation**. **Compensatory Mitigation** is defined as those mitigation activities implemented after all practicable measures to **Avoid** and **Minimize** adverse impacts to waters of the United States have been carried out.

Mitigation Plan – A written document, supplemented with graphics, which describes: the existing site conditions, the goals and objectives of the project and other pertinent information. The Mitigation Plan is developed and submitted prior to the implementation of the project.

Morphological description – The stream type; stream type is determined by quantifying channel entrenchment, dimension, pattern, profile, and boundary materials; as described in Rosgen, D. (1996), *Applied River Morphology*, 2nd edition.

Native Vegetation Community – A distinct and reoccurring assemblage a populations of plants, animals, bacteria and fungi naturally associated with each other and their population; as described in Schafale, M.P. and Weakley, A.S. (1990), *Classification of the Natural Communities of North Carolina, Third Approximation*.

Non-Riparian Wetland – an area underlain with hydric soils that has developed and is located in interstream divide physiographic areas. The hydrology of non-riverine wetlands is driven by precipitation and is characterized by groundwater being at or near the surface for much of the year. Must meet US Army Corps of Engineers wetlands definition (33 CFR 328.3(b)).

Project Area – Includes all protected lands associated with the mitigation project.

RFP – Request For Proposals; the document issued by the **Department** to solicit **Proposals** from interested **Offerors**.

River Basin – The largest category of surface water drainage; there are seventeen (17) river basins in North Carolina.

Site – Property or properties identified by an **Offeror** in a **Proposal** as having potential to provide either wetland, stream, or buffer mitigation.

USACE – United States Army Corps of Engineers, Regulatory Branch, Wilmington District

USGS – United States Geological Survey.

Wetland Mitigation Unit (“WMU”) – The unit of measurement of the extent of wetland mitigation being offered in a **Proposal**. The WMU value for a **Site** is the sum of the **Restoration** acres, one-third of the **Creation** acres, one-half of the **Enhancement** acres, and one-fifth of the **Preservation** acres.

14.2 References

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

Environmental Protection Agency (EPA). 1990. Mitigation Site Type Classification (MiST). EPA Workshop, August 13-15, 1989. EPA Region IV and Hardwood Research Cooperative, NCSU, Raleigh, North Carolina.

Faber-Langendoen, D., Rocchio, J., Schafale, M., Nordman, C., Pyne, M., Teague, J., Foti, T., Comer, P. (2006), *Ecological Integrity Assessment and Performance Measures for Wetland Mitigation*.

Griffith, G.E., J.M. Omernik, J.A. Comstock, M.P. Schafale, W.H. McNab, D.R. Lenat, T.F. MacPherson, J.B. Glover, and V.B. Shelbourne. 2002. Ecoregions of North Carolina and South Carolina. U.S. Geological Survey, Reston, Virginia.

Lee, M.T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2006. CVS-EEP Protocol for Recording Vegetation. Version 4.0. North Carolina Department of Environment and Natural Resources, Ecosystem Enhancement Program. Raleigh, North Carolina.

Lindenmayer, D.B., and J.F. Franklin. (2002), *Conserving forest biodiversity: A comprehensive multiscaled approach*. Island Press, Washington, DC.

NatureServe, Arlington, Virginia.

- North Carolina Division of Water Quality (NCDWQ). 2007. Final North Carolina Water Quality Assessment and Impaired Waters List (2006 Integrated 305(b) and 303(d) Report) (online). Available: http://h2o.enr.state.nc.us/tmdl/documents/303d_Report.pdf [February 19, 2010]. North Carolina Department of Environment and Natural Resources, Raleigh, North Carolina.
- North Carolina Division of Water Quality (NCDWQ). 2008. Draft North Carolina Water Quality Assessment and Impaired Waters List (2008 Integrated 305(b) and 303(d) Report) (online). Available: <http://h2o.enr.state.nc.us/tmdl/documents/2008Cat4and520100215.pdf> [February 19, 2010]. North Carolina Department of Environment and Natural Resources, Raleigh, North Carolina.
- North Carolina Division of Water Quality (NCDWQ). 2010 a. Draft North Carolina Water Quality Assessment and Impaired Waters List (2010 Integrated 305(b) and 303(d) Report) (online). Available: http://h2o.enr.state.nc.us/tmdl/documents/draft_2010_Cat_5.pdf [February 19, 2010]. North Carolina Department of Environment and Natural Resources, Raleigh, North Carolina.
- North Carolina Division of Water Quality (NCDWQ). 2010 b. North Carolina Water Bodies Report (online). Available: <http://h2o.enr.state.nc.us/bims/reports/basinsandwaterbodies/03-07-04.pdf> [February 19, 2010]. North Carolina Department of Environment and Natural Resources, Raleigh.
- North Carolina Ecosystem Enhancement Program (NCEEP). 2010. Neuse River Basin Restoration Priorities (online). Available: <http://www.nceep.net/services/restplans/FINAL%20RBRP%20Neuse%2020110523.pdf> [October 31, 2011]. North Carolina Department of Environment and Natural Resources, Raleigh, North Carolina.
- Peet, R.K., Wentworth, T.S., and White, P.S. (1998), *A flexible, multipurpose method for recording vegetation composition and structure*. *Castanea* 63:262-274.
- Rosgen, D. (1996), *Applied River Morphology, 2nd edition*, Wildland Hydrology, Pagosa Springs, CO.
- Schafale, M.P. and A.S. Weakley. 1990. Classification of the Natural Communities of North Carolina: Third Approximation. North Carolina Natural Heritage Program, Division of Parks and Recreation, N.C. Department of Environment, Health, and Natural Resources. Raleigh, North Carolina.
- Stream Mitigation Guidelines, April 2003*, US Army Corps of Engineers Wilmington District.
- United States Department of Agriculture (USDA). 1994. *Soil Survey of Davidson County, North Carolina*. United States Department of Agriculture, Natural Resource Conservation Service. Fort Worth, Texas.
- Young, T.F. and Sanzone, S. (editors). (2002), *A framework for assessing and reporting on ecological condition*. Ecological Reporting Panel, Ecological Processes and Effects Committee. EPA.

APPENDIX A
SITE PROTECTION INSTRUMENT(S)

When available, the recorded document will be provided. The template document associated with the contract, (outlined in RFP # 16-003571), will be used and is below, also available online at http://www.nceep.net/business/landowner/10-13/Template_Full_Delivery_EEP_Conservation_Easement_Final_1.23.06-1.pdf

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. A site protection instrument figure will be completed once a final survey of the Site has been completed, after the conservation easement is purchased.

APPENDIX B
BASELINE INFORMATION DATA

USACE & NC EPP Correspondence Regarding a Jurisdictional Determination
FHWA Categorical Exclusion Form
FEMA Compliance -EEP Floodplain Requirements Checklist NCEEP Mitigation Plan

Raymond Holz

From: Pearce, Guy <guy.pearce@ncdenr.gov>
Sent: Thursday, September 01, 2011 10:35 AM
To: Worth Creech
Subject: FW: Wetland Determination/Delineation at Sliver Moon Non-Riparian Wetland Project (UNCLASSIFIED)

I have saved an electronic copy and placed a hard copy of this correspondence in the EEP files for future reference. Please retain for your records.

Thanks, Guy

-----Original Message-----

From: Pearce, Guy
Sent: Thursday, September 01, 2011 10:14 AM
To: 'Steffens, Thomas A SAW'
Cc: Tugwell, Todd SAW
Subject: RE: Wetland Determination/Delineation at Sliver Moon Non-Riparian Wetland Project (UNCLASSIFIED)

Thanks Thomas and Todd,

Guy

-----Original Message-----

From: Steffens, Thomas A SAW [mailto:Thomas.A.Steffens@usace.army.mil]
Sent: Thursday, September 01, 2011 8:35 AM
To: Tugwell, Todd SAW; Pearce, Guy
Cc: Steffens, Thomas A SAW
Subject: RE: Wetland Determination/Delineation at Sliver Moon Non-Riparian Wetland Project (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Todd,

Your recollections are correct and descriptions accurate concerning the jurisdictional aspects.

Thanks
toms

-----Original Message-----

From: Tugwell, Todd SAW
Sent: Monday, August 29, 2011 4:35 PM
To: Pearce, Guy
Cc: Steffens, Thomas A SAW
Subject: RE: Wetland Determination/Delineation at Sliver Moon Non-Riparian Wetland Project (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Guy, I did speak with Tom after the meeting and he agreed that the site was drained and that no delineation needed to be conducted. This does not mean that the prior converted determination is why the site has no jurisdiction. Also, the actual ditches themselves would still be considered tributaries, so a permit is still required - we are only talking about any wetlands.

Tom, let me know if this doesn't go along with your recollections.

Thanks,
Todd

-----Original Message-----

From: Pearce, Guy [mailto:guy.pearce@ncdenr.gov]

Sent: Tuesday, August 16, 2011 11:41 AM

To: Tugwell, Todd SAW

Subject: Wetland Determination/Delineation at Sliver Moon Non-Riparian Wetland Project

Good morning Todd.

As, you know, a site visit to the subject property was conducted on July 25, 2011. At the conclusion of that meeting, there was discussion about whether or not a wetland determination/delineation would be required. The site is row crop (corn) ag land that has been extensively ditched/drained. If I recall correctly, Thom Steffans of the Washington USACE Office wanted to talk it over with his folks before making a decision. I got a call from Restoration Systems this morning and they were asking if a decision had been made. As you would expect, they would prefer that the land be deemed prior converted wetland and not have to do the wetland delineation, but will do whatever is required. Could you check with the Washington USACE and let me know what you guys decide.

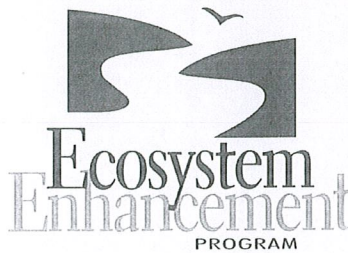
Thanks, Guy

Classification: UNCLASSIFIED

Caveats: NONE

Classification: UNCLASSIFIED

Caveats: NONE



October 19, 2011

Raymond Holz – Project Manager
Restoration Systems LLC
1101 Haynes Street, Suite 211
Raleigh, NC 27604

Subject: Categorical Exclusion Form for
Sliver Moon Non-Riparian Wetland Mitigation Site
Neuse River Basin – CU# 03020202
Craven County, North Carolina
Contract No. 003985, RFP No. 16-003571

Dear Mr Holz:

Attached please find the approved Categorical Exclusion Form for the subject full delivery project. I have approved your invoice, in the amount of \$21,000.00 (5% of contract) for completion of the Task 1 deliverable. Please include a copy of the form in your Mitigation Plan.

If you have any questions, or wish to discuss this matter further, please contact me at any time. I can be reached at (919) 715-1954, or email me at kristie.corson@ncmail.net.

Sincerely,

Kristie Y. Corson

Kristie Corson
EEP Project Manager

Attachments

cc: file

Appendix A

**Categorical Exclusion Form for Ecosystem Enhancement
Program Projects
Version 1.4**

Note: Only Appendix A should be submitted (along with any supporting documentation) as the environmental document.

Part 1: General Project Information	
Project Name:	Sliver Moon Non-Riparian Wetland Mitigation Site
County Name:	Craven
EEP Number:	ID #: 95017 Contract #: 003985
Project Sponsor:	Restoration Systems, LLC
Project Contact Name:	Raymond Holz
Project Contact Address:	1101 Haynes Street, Suite 211, Raleigh, NC 27604
Project Contact E-mail:	rholz@restorationsystems.com
EEP Project Manager:	Kristie Corson
Project Description	
<p>The Site is located approximately three miles east of Dover, NC and with a Latitude of 35.204817 Longitude -77.360605 (NAD 83/WGS 84). Regional physiography is characterized by flat plains on lightly dissected marine terraces; swamps, low gradient streams with sandy and silty substrates; and Carolina bays (Griffith et al. 2002).</p> <p>Restoration of wetland hydrology and wetland soil attributes will involve 1) ditch cleaning prior to backfill, 2) ditch plug installation, 3) diverting water from springs across the Site, 4) ditch backfill, and 5) scarification of soils prior to planting. These activities will restore 14 acres of non-riparian wetland at the Site.</p>	
For Official Use Only	
Reviewed By:	
<u>10-19-11</u>	<u>Kristie F. Corson</u>
Date	EEP Project Manager
Conditional Approved By:	
Date	For Division Administrator FHWA
<input type="checkbox"/> Check this box if there are outstanding issues	
Final Approval By:	
<u>10-18-11</u>	<u>[Signature]</u>
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?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2. Does the project involve ground-disturbing activities within a CAMA Area of Environmental Concern (AEC)?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. Has a CAMA permit been secured?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
4. Has NCDQM agreed that the project is consistent with the NC Coastal Management Program?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)		
1. Is this a "full-delivery" project?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2. Has the zoning/land use of the subject property and adjacent properties ever been designated as commercial or industrial?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> 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?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> 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?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
5. As a result of a Phase II Site Assessment, are there known or potential hazardous waste sites within the project area?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
6. Is there an approved hazardous mitigation plan?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> 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?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Does the project affect such properties and does the SHPO/THPO concur?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. If the effects are adverse, have they been resolved?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act)		
1. Is this a "full-delivery" project?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2. Does the project require the acquisition of real estate?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. Was the property acquisition completed prior to the intent to use federal funds?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> 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?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> 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?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Is the site of religious importance to American Indians?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. Is the project listed on, or eligible for listing on, the National Register of Historic Places?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
4. Have the effects of the project on this site been considered?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Antiquities Act (AA)	
1. Is the project located on Federal lands?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Will there be loss or destruction of historic or prehistoric ruins, monuments or objects of antiquity?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. Will a permit from the appropriate Federal agency be required?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
4. Has a permit been obtained?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Archaeological Resources Protection Act (ARPA)	
1. Is the project located on federal or Indian lands (reservation)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Will there be a loss or destruction of archaeological resources?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. Will a permit from the appropriate Federal agency be required?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
4. Has a permit been obtained?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Endangered Species Act (ESA)	
1. Are federal Threatened and Endangered species and/or Designated Critical Habitat listed for the county?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2. Is Designated Critical Habitat or suitable habitat present for listed species?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. Are T&E species present or is the project being conducted in Designated Critical Habitat?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
4. Is the project "likely to adversely affect" the species and/or "likely to adversely modify" Designated Critical Habitat?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
5. Does the USFWS/NOAA-Fisheries concur in the effects determination?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
6. Has the USFWS/NOAA-Fisheries rendered a "jeopardy" determination?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> 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?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Has the EBCI indicated that Indian sacred sites may be impacted by the proposed project?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. Have accommodations been made for access to and ceremonial use of Indian sacred sites?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Farmland Protection Policy Act (FPPA)	
1. Will real estate be acquired?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2. Has NRCS determined that the project contains prime, unique, statewide or locally important farmland?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. Has the completed Form AD-1006 been submitted to NRCS?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Fish and Wildlife Coordination Act (FWCA)	
1. Will the project impound, divert, channel deepen, or otherwise control/modify any water body?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2. Have the USFWS and the NCWRC been consulted?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> 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?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Has the NPS approved of the conversion?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Magnuson-Stevens Fishery Conservation and Management Act (Essential Fish Habitat)	
1. Is the project located in an estuarine system?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Is suitable habitat present for EFH-protected species?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. Is sufficient design information available to make a determination of the effect of the project on EFH?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
4. Will the project adversely affect EFH?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
5. Has consultation with NOAA-Fisheries occurred?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Migratory Bird Treaty Act (MBTA)	
1. Does the USFWS have any recommendations with the project relative to the MBTA?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Have the USFWS recommendations been incorporated?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Wilderness Act	
1. Is the project in a Wilderness area?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Has a special use permit and/or easement been obtained from the maintaining federal agency?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A



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. Edward Curtis), NC Floodplain Mapping Unit (attn. John Gerber) and NC Ecosystem Enhancement Program.

Project Location

Name of project:	Sliver Moon Non-riparian Wetland Mitigation Site
Name of stream or feature:	n/a
County:	Craven
Name of river basin:	Neuse 02
Is project urban or rural?	Rural
Name of Jurisdictional municipality/county:	Craven County
DFIRM panel number for entire site:	4582
Consultant name:	Raymond Holz
Phone number:	919-755-9490
Address:	Restoration Systems 1101 Haynes Street, Suite 211 Raleigh, NC 27604

Design Information

Restoration Systems, L.L.C. has contracted with EEP through the full Delivery Process (RFP #16-003571) to provide 14 Non-riparian Wetland Mitigation Units through the completion of the **Sliver Moon Non-riparian Wetland Mitigation Site** (Site) located approximately 4 miles east of Dover in western Craven County (Figure 1 - attached). Located within an interstream flat north of Core Creek, which has been assigned a Best Usage Classification of **C; NSW, Sw** and is considered biologically impaired. The Site is adjacent to the rim of a Carolina bay and encompasses approximately 17.1 acres. The Site has been cleared of native forest vegetation, ditched to remove groundwater hydrology, and is currently utilized for row crop production. Based on preliminary analyses, the primary goals of this non-riparian wetland

mitigation project focus on improving water quality, enhancing flood attenuation, and restoring wildlife habitat and will be accomplished by the following:

1. Remove nonpoint sources of pollution associated with vegetation maintenance including a) the cessation of broadcasting fertilizer, pesticides, and other agricultural chemicals into and adjacent to Site drainage ditches and b) providing a vegetated wetland to aid in the treatment of runoff.
2. Restore wetland hydroperiods that satisfy wetland jurisdictional requirements and approximate the Site's natural range of variation.
3. Promote floodwater attenuation by filling ditches and enhancing groundwater storage capacity.
4. Restore and reestablish natural community structure, habitat diversity, and functional continuity.
5. Enhance and protect the Site's full potential of wetland functions and values in perpetuity.

Reach	Length	Priority
Wetland Area 1	14 ac.	Non-riparian restoration

Floodplain Information

<p>Is project located in a Special Flood Hazard Area (SFHA)?</p> <p><input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>
<p>If project is located in a SFHA, check how it was determined:</p> <p><input type="checkbox"/> Redelineation</p> <p><input type="checkbox"/> Detailed Study</p> <p><input type="checkbox"/> Limited Detail Study</p> <p><input type="checkbox"/> Approximate Study</p> <p><input type="checkbox"/> Don't know</p>
<p>List flood zone designation:</p> <p>Check if applies:</p> <p><input checked="" type="checkbox"/> AE Zone</p> <p style="padding-left: 20px;"><input type="checkbox"/> Floodway</p> <p style="padding-left: 20px;"><input type="checkbox"/> Non-Encroachment</p> <p style="padding-left: 20px;"><input checked="" type="checkbox"/> None</p> <p><input type="checkbox"/> A Zone</p> <p style="padding-left: 20px;"><input type="checkbox"/> Local Setbacks Required</p> <p style="padding-left: 20px;"><input type="checkbox"/> No Local Setbacks Required</p>

If local setbacks are required, list how many feet:	
Does proposed channel boundary encroach outside floodway/non-encroachment/setbacks?	
<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Land Acquisition (Check)	
<input type="checkbox"/> State owned (fee simple)	
<input type="checkbox"/> Conservation easment (Design Bid Build)	
<input checked="" type="checkbox"/> 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?	
<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Note: if community is not participating, then all requirements should be addressed to NFIP (attn: Edward Curtis, (919) 715-8000 x369)	
Name of Local Floodplain Administrator:	Chad Strawn
Phone Number:	252.636.6618


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: Chad Strawn Signature: 

Title: Asst. Planning and CD Director Date: 10/25/11

**APPENDIX C
MITIGATION WORK PLAN DATA and ANALYSES**

Groundwater Modeling/Hydrologic Budget

Groundwater modeling was conducted in January of 2011 by a licensed soil scientist, from Axiom Environmental, Inc. For this study, the Boussinesq equation was utilized to predict groundwater impacts associated with ditching. The Boussinesq equation represents a two-dimensional general flow equation for unconfined aquifers. The equation has been applied in the past to predict the decline in elevation of the water table near a pumping well as time progresses.

The Boussinesq equation was applied to Site ditches to predict the linear distance of groundwater drawdown that exceeds 1 foot for 7.5 percent of the growing season. The percentage of the growing season (7.5 percent) was selected based upon guidance from the Corps of Engineers Wetland Delineation Manual (Environmental Laboratory 1987). The equation is solved for wetland impacts with data for the following variables: 1) equivalent hydraulic conductivity, 2) drainable porosity, 3) and estimated depth to the impermeable layer or aquiclude, 4) the time duration of the drawdown, 5) target water depth (1 foot below the soil surface), and 6) minimum ditch depth.

Results from the Boussinesq equation predicted lateral drainage effects to the groundwater table from agricultural ditches. Results of the Boussinesq equation are summarized in Table 3. Ditch impacts at the Site range from 179 feet to 315 feet. Using existing ditch depths, 17 acres have been effectively drained (Figure 4). Rerouting the southern drainage ditch will result in post restoration drainage within approximately three acres of the southeastern corner of the Site. Therefore, 14 acres of restoration will be available as depicted in Figure C.

Table 9. Boussinesq Equation Results

Soil	Ditch Depth (ft)	Depth to Aquaclude (cm)	Ksat (cm/hr)	Growing Season (hrs)	Drainable Porosity (cm)	Ditch Impact (ft)
Torhunta/Pantego (Craven County)	2	61.0	10.2	675*	0.033	174
	3	91.4	10.2	675*	0.033	243
	4	121.9	10.2	675*	0.033	281
	6	182.9	10.2	675*	0.033	305

*Based on 7.5% growing season

CVS Vegetation Assessment

Vegetation surveys will begin after construction, and be monitored just before, during and just after the growing season. Based on the *Microsoft Access CVS* template the Site will hold fourteen (14) vegetation plots. Nine (9) groundwater modeling wells will also be installed during construction. These wells and plots will be marked and referenced in the Sites as built documents. Planned vegetation distribution is detailed in Figure D, Appendix D.

APPENDIX D
PROJECT PLAN SHEETS

Figure A.	Title Page
Figure B.	Boundary Plan
Figure C.	Mitigation Plan
Figure D.	Planting Plan

SLIVER MOON NON-RIPARIAN WETLAND MITIGATION SITE PROJECT PLAN SHEETS

CRAVEN COUNTY, NORTH CAROLINA



PROJECT DESCRIPTION

The Sliver Moon Non-Riparian Wetland Mitigation Site (Site) is designed specifically to assist in fulfilling North Carolina Ecosystem Enhancement Program wetland restoration goals. The Site is located approximately 4 miles east of Dover in western Craven County and within the Targeted Local Watershed 03020202080010. The Site encompasses approximately 17.1 acres of land used for row crop production. Within the Site, 17.1 acres of non-riparian hydric soils have been cleared and ditched. A total of 14 non-riparian wetland mitigation units (WMUs) are being offered. Located within an interstream flat north of Core Creek and adjacent to the rim of a Carolina bay the Site has been cleared of native forest vegetation, ditched to remove groundwater hydrology, and is currently utilized for row crop production.

Construction activities at the site will re-elevate the groundwater table to historic conditions prior to the ditching of the site. Construction methods were based primarily on carbon copy method for wetland restoration, mimicking reference (relatively undisturbed) wetland in the region. The project is designed to maximize groundwater re-charge and water quality benefits in the Yadkin River Basin.

PROJECT LOCATION

Directions From the City of Kinston

- Head southeast on US 70 Byp for 7.2 miles
- Turn left at SR 1005/Dover Road
- Continue onto Old US Hwy 70 for 0.3 miles
- Continue onto W Konegay St for 1.3 miles
- Continue onto Old US Hwy 70 for 3.7 miles
- Turn left at Daisy Ln

Type of Work: Wetland Restoration

- Ditch Clearing
- Ditch Filling
- Site Grading
- Site Planting

Index of Sheets

- A: Title Page
- B: Boundary Marking
- C: Mitigation Plan
- D: Planting Plan



RESTORATION SYSTEMS, LLC

1101 HAYNES ST, SUITE 211
RALEIGH, NC 27604
PHONE : 919.755.9490
FAX : 919.755.9492

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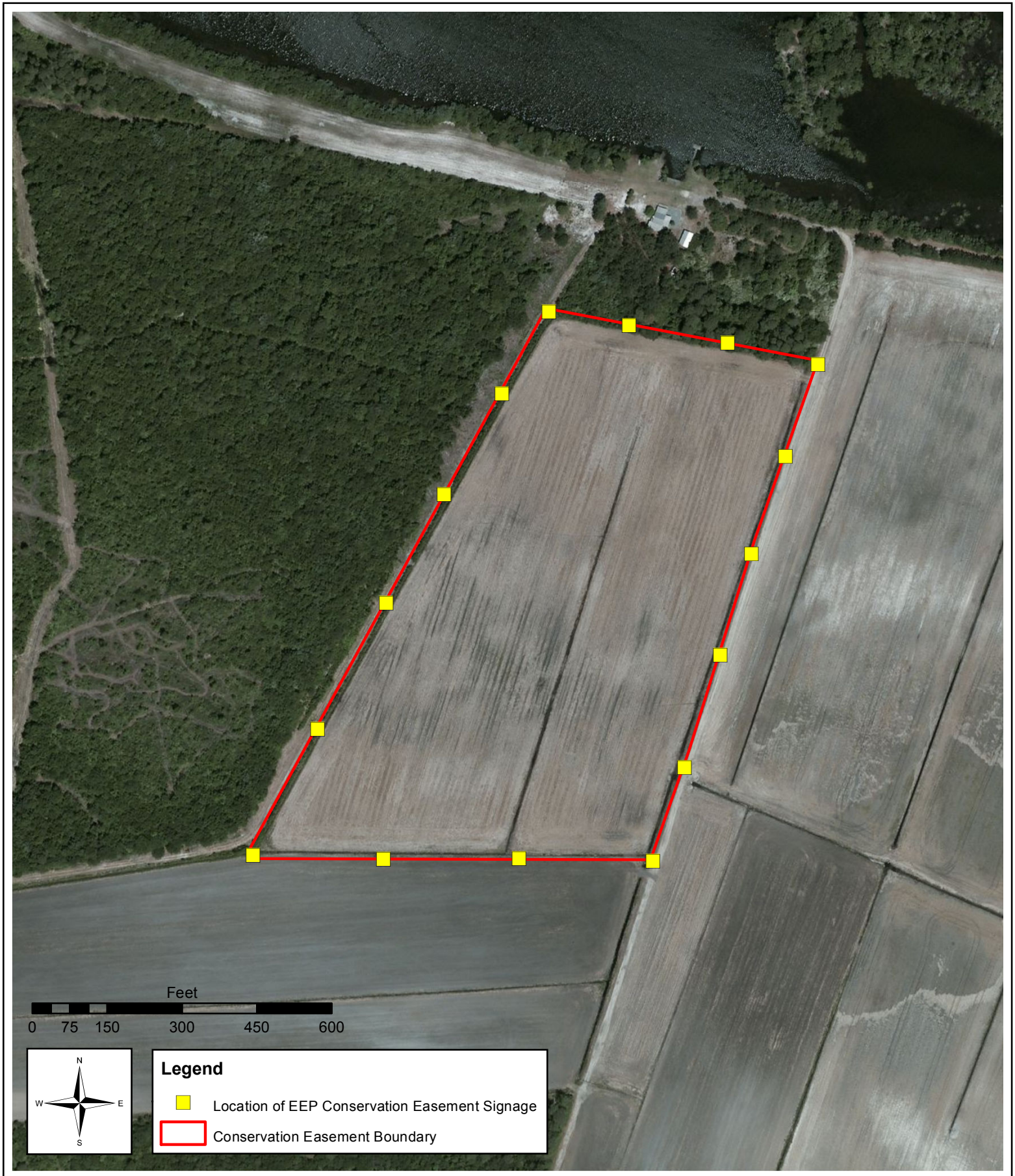
SCALE:

DATE: OCTOBER - 2011

PROJECT: SM

FIGURE A: TITLE PAGE

Aerial Imagery USGS Topographical Map
COORDINATE SYSTEM: NAD 1983 NC FEET



RESTORATION SYSTEMS, LLC

1101 HAYNES ST, SUITE 211
RALEIGH, NC 27604

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SCALE: 1 in equals 250 ft
DATE: OCTOBER - 2011
PROJECT: SM

FIGURE B: BOUNDARY PLAN

Figure shows existing site conditions, with approximate location of where t-post & EEP conservation signs will be installed.


Aerial Imagery (c) 2010 Microsoft Corporation
COORDINATE SYSTEM: NAD 1983 NC FEET

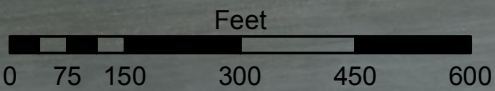


Legend

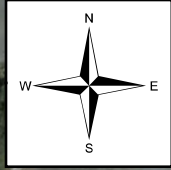
- Ditch Plugs
- Existing Ditches
- Existing Ditches to be Filled
- Wetland Restoration 14ac.
- Underground Pipe



	RESTORATION SYSTEMS, LLC 1101 HAYNES ST, SUITE 211 RALEIGH, NC 27604 PHONE : 919.755.9490 FAX : 919.755.9492	SCALE: 1 in equals 250 ft DATE: OCTOBER - 2011 PROJECT: SM	<h2>FIGURE C: MITIGATION PLAN</h2>	
	<small>This map and all data contained within are supplied as is with no warranty. Restoration Systems, LLC expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map is compatible with the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.</small>			Figure depicts proposed mitigation plan
				<small>Aerial Imagery (c) 2010 Microsoft Corporation COORDINATE SYSTEM: NAD 1983 NC FEET</small>



Plant List					
Species	Spec'd	%	Ordered	%	Nursery
Overstory					
Black gum	1,600	11%	1,600	11%	ArborGen
Cherrybark oak	1,600	11%	1,600	11%	ArborGen
Laurel oak	1,300	9%	1,300	9%	ArborGen
Swamp chestnut oak	1,300	9%	1,300	9%	ArborGen
Swamp red bay	1,300	9%	1,300	9%	Superior Trees
Sweet bay magnolia	1,300	9%	1,300	9%	ArborGen
Water oak	1,500	10%	1,500	10%	ArborGen
Willow oak	1,300	9%	1,300	9%	ArborGen
Yellow-poplar	1,300	9%	1,300	9%	ArborGen
Midstory					
Wax myrtle	1,200	9%	1,200	9%	ArborGen
	14,000	100%	14,000	100%	



Legend

- Planting Area 17 ac.
- Conservation Easement Boundary



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 FAX : 919.755.9492

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SCALE: 1 in equals 250 ft
 DATE: OCTOBER - 2011
 PROJECT: SM

FIGURE D: PLANTING PLAN

Figure depicts proposed plant species and planting area

Aerial Imagery (c) 2010 Microsoft Corporation
 COORDINATE SYSTEM: NAD 1983 NC FEET

APPENDIX E
PERFORMANCE BOND

The Hartford

Bond, T-4
One Hartford Plaza
Hartford, Connecticut 06155

Performance Bond

Bond No. 22BSBCN8016

KNOW ALL MEN BY THESE PRESENTS, that we, Restoration Systems, LLC, as Principal, and Hartford Fire Insurance Company, licensed to do business in the State of, NC as Surety, are held and firmly bound unto North Carolina Department of Environment and Natural Resources (Obligee), in the penal sum of **Two Hundred and Thirty One Thousand Dollars (\$231,000.00)**, lawful money of the United States of America, for the payment of which sum, well and truly to be made, the Principal and Surety do bind themselves, their heirs, executors, administrators, and successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the above bounden Principal has entered into certain written Contract with the above named Obligee, effective the 27th day of June 2011 for LSliver Moon Non-Riparian Wetland Mitigation Site, in the Neuse River Basin, Cataloging Unit 03020202 – Contract # 003985 and more fully described in said Contract, a copy of which is attached, which Agreement is made a part hereof and incorporated herein by reference, except that nothing said therein shall alter, enlarge, expand or otherwise modify the term of the bond as set out below.

NOW, THEREFORE, if Principal, its executors, administrators, successors and assigns shall promptly and faithfully perform the Contract, according to the terms, stipulations or conditions thereof, then this obligation shall become null and void, otherwise to remain in full force and effect subject to the following:

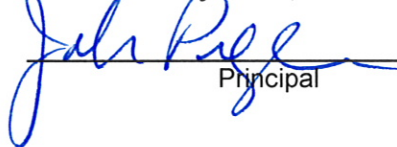
Notwithstanding the provisions of the Contract, this bond will commence on the date of the submittal of Task 3 (submittal of Restoration Plan) and will terminate the earlier of two years from the submittal of the Restoration Plan or receipt of written notification from EEP that the requirements of Task 6 (Submittal of Mitigation Plan) have been met.

Sealed with our seals and dated this 3rd day of February, 2012

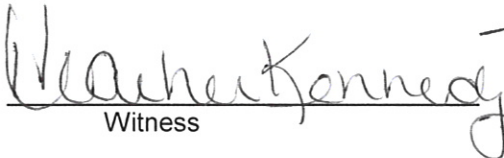


Witness

Restoration Systems, LLC

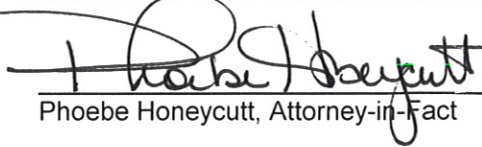


Principal



Witness

HARTFORD FIRE INSURANCE COMPANY



Phoebe Honeycutt, Attorney-in-Fact

Agreed and acknowledged this ___ day of _____, 2010

By: _____
Obligee

POWER OF ATTORNEY

Direct Inquiries/Claims to:

THE HARTFORD

BOND, T-4

One Hartford Plaza

Hartford, Connecticut 06155

call: 888-266-3488 or fax: 860-757-5835

KNOW ALL PERSONS BY THESE PRESENTS THAT:

Agency Code: 22-270197

- Hartford Fire Insurance Company, a corporation duly organized under the laws of the State of Connecticut
- Hartford Casualty Insurance Company, a corporation duly organized under the laws of the State of Indiana
- Hartford Accident and Indemnity Company, a corporation duly organized under the laws of the State of Connecticut
- Hartford Underwriters Insurance Company, a corporation duly organized under the laws of the State of Connecticut
- Twin City Fire Insurance Company, a corporation duly organized under the laws of the State of Indiana
- Hartford Insurance Company of Illinois, a corporation duly organized under the laws of the State of Illinois
- Hartford Insurance Company of the Midwest, a corporation duly organized under the laws of the State of Indiana
- Hartford Insurance Company of the Southeast, a corporation duly organized under the laws of the State of Florida

having their home office in Hartford, Connecticut, (hereinafter collectively referred to as the "Companies") do hereby make, constitute and appoint, **up to the amount of unlimited:**

Laura Krosky, Sandra B. Byrum, Southgate Jones III, Angela B. Britt, James P. Carter II, Phoebe Honeycutt, Kenneth J. Peebles, Kitara A. Smith, Heather L. Kennedy, Neil B. Biller, Bobbi D. Pendleton
of
Durham, NC

their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign its name as surety(ies) only as delineated above by , and to execute, seal and acknowledge any and all bonds, undertakings, contracts and other written instruments in the nature thereof, on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

In Witness Whereof, and as authorized by a Resolution of the Board of Directors of the Companies on January 22, 2004 the Companies have caused these presents to be signed by its Assistant Vice President and its corporate seals to be hereto affixed, duly attested by its Assistant Secretary. Further, pursuant to Resolution of the Board of Directors of the Companies, the Companies hereby unambiguously affirm that they are and will be bound by any mechanically applied signatures applied to this Power of Attorney.



Wesley W. Cowling

Wesley W. Cowling, Assistant Secretary

M. Ross Fisher

M. Ross Fisher, Assistant Vice President

STATE OF CONNECTICUT }
COUNTY OF HARTFORD } ss. Hartford

On this 3rd day of March, 2008, before me personally came M. Ross Fisher, to me known, who being by me duly sworn, did depose and say: that he resides in the County of Hartford, State of Connecticut; that he is the Assistant Vice President of the Companies, the corporations described in and which executed the above instrument; that he knows the seals of the said corporations; that the seals affixed to the said instrument are such corporate seals; that they were so affixed by authority of the Boards of Directors of said corporations and that he signed his name thereto by like authority.



CERTIFICATE

Scott E. Paseka

Scott E. Paseka
Notary Public

My Commission Expires October 31, 2012

I, the undersigned, Assistant Vice President of the Companies, DO HEREBY CERTIFY that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is still in full force effective as of **February 3, 2012**
Signed and sealed at the City of Hartford.



Gary W. Stumper

Gary W. Stumper, Assistant Vice President

APPENDIX F
NCIRT APPROVAL LETTER



REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

February 9, 2012

Regulatory Division

Re: NCIRT Review and USACE Approval of the Sliver Moon Mitigation Plan (SAW-2012-00096)

Mr. Michael Ellison
North Carolina Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

Dear Mr. Ellison:

The purpose of this letter is to provide the North Carolina Ecosystem Enhancement Program (NCEEP) with all comments generated by the North Carolina Interagency Review Team (NCIRT) during the 30-day comment period for the Sliver Moon Mitigation Plan, which closed on January 15, 2012. These comments are attached for your review.

Based on our review of these comments, we have determined that no major concerns have been identified with the Draft Mitigation Plan. However, several minor issues were identified, as shown below, that must be addressed in the Final Mitigation Plan.

1. The mitigation plan indicates that "Characteristic Tree Species" based on Schafale and Weakley's *Classification of the Natural Communities of North Carolina (1990)* will be used to determine if the site successfully meets the vegetation performance standards. Depending on the community, typical Characteristic Tree Species include volunteer species such as loblolly pine and sweetgum that are not desirable and will not be counted toward vegetation success. The vegetation performance standards must be changed to reflect a minimum requirement of 210 living, planted stems per acre. The presence of desirable volunteer species will be considered by the USACE/NCIRT in making the determination whether a mitigation project has successfully met the stated goals and objectives.

2. The hydrology performance standards must be change to reflect that groundwater gauges in reference may be used by the USACE/NCIRT to evaluate hydrology success, but not that they will "dictate threshold hydrology success criteria". Additionally, if wetland parameters are marginal as indicated by vegetation and/or hydrology monitoring, the mitigation plan must not indicate that a jurisdictional determination (JD) will be used to determine success. A JD may indicate whether an area is a jurisdictional wetland that meets only the minimal standards, which is not the intent of a wetland restoration project, and accordingly, a JD will not indicate success where vegetation and/or hydrology monitoring indicate otherwise. The USACE may choose to conduct a JD to provide additional information, but this will be a site-by-site decision made by the USACE in consultation with the NCIRT.

The Final Mitigation Plan is to be submitted with the Preconstruction Notification (PCN) Application for Nationwide permit approval of the project along with a copy of this letter. Issues identified above must be addressed in the Final Mitigation Plan. If it is determined that the project does not require a Department of the Army permit, you must still provide a copy of the Final Mitigation Plan, along with a copy of this letter, to the appropriate USACE field office at least 30 days in advance of beginning construction of the project. Please note that this approval does not preclude the inclusion of permit conditions in the permit authorization for the project, particularly if issues mentioned above are not satisfactorily addressed. Additionally, this letter provides initial approval for the Mitigation Plan, but this does not guarantee that the project will generate the requested amount of mitigation credit. As you are aware, unforeseen issues may arise during construction or monitoring of the project that may require maintenance or reconstruction and may lead to reduced credit.

Thank you for your prompt attention to this matter, and if you have any questions regarding this letter, the mitigation plan review process, or the requirements of the Mitigation Rule, please call me at 919-846-2564.

Sincerely,

Todd Tugwell
Special Projects Manager

Enclosures

Electronic Copies Furnished:

NCIRT Distribution List
CESAW-RG/McLendon
CESAW-RG-W/Steffens
Jeff Jurek, NCEEP
Kristie Corson, NCEEP



REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

CESAW-RG/Tugwell

January 17, 2012

MEMORANDUM FOR RECORD

SUBJECT: NCIRT Comments During 30-day Mitigation Plan Review

Purpose: The comments and responses listed below were posted to the NCEEP Mitigation Plan Review Portal during the 30-day comment period in accordance with Section 332.8(g) of the 2008 Mitigation Rule.

NCEEP Project Name: Sliver Moon Mitigation Project, Craven County, NC

USACE AID#: SAW-2012-00096

30-Day Comment Deadline: January 15, 2012

1. Travis Wilson, NCWRC, January 13, 2012: No significant concerns with this site.

NCEEP Response: None.

2. Steve Sollod, NCDCEM, December 19, 2011: Based on the project location and the worked described in the mitigation plan, it appears the proposed project will not require a CAMA development permit. In North Carolina, federal consistency under the Coastal Zone Management Act (CZMA) is conveyed to non-federal projects when the USACE issues Nationwide or Regional General permits. As a point of clarification, non-federal projects that require a USACE Individual Permit require the applicant to evaluate the project's impact on the coastal zone and certify that the project is consistent with the state's Coastal Management Program, in accordance with 15 CFR 930.

NCEEP Response: None.