MITIGATION PLAN

Bowl Basin Wetland Restoration Site
Onslow County, North Carolina
EEP Contract 005012
EEP Project Number 95721

White Oak River Basin
Cataloging Unit 03020106

Prepared for:

NC Department of Environment and Natural Resources
Ecosystem Enhancement Program
1601 Mail Service Center
Raleigh, NC 27699-1601

REVISED FINAL - OCTOBER 2013

MITIGATION PLAN

Bowl Basin Wetland Restoration Site
Onslow County, North Carolina
EEP Contract 005012
EEP Project Number 95721

White Oak River Basin
Cataloging Unit 03020106

Prepared for:

NC Department of Environment and Natural Resources
Ecosystem Enhancement Program
1601 Mail Service Center
Raleigh, NC 27699-1601

Prepared by:

KCI Associates of North Carolina, PC
4601 Six Forks Rd, Suite 220
Raleigh, NC 27609
(919) 783-9214

REVISED FINAL - OCTOBER 2013

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.

The Bowl Basin Wetland Restoration Site (BBWRS) is a full-delivery mitigation project being developed for the North Carolina Ecosystem Enhancement Program (EEP). The BBWRS is a former non-riparian wetland system in the White Oak River Basin (03020106 8-digit HUC) in northeastern Onslow County, North Carolina that has been substantially modified to maximize agricultural production. The site offers the chance to restore impacted agricultural lands to non-riparian wetland habitat.

The White Oak River Basin Restoration Priorities (WORBRP) state that the goals are to protect and improve water quality throughout the Basin by reducing sediment and nutrient inputs into streams and rivers and to support efforts to restore local watersheds (Breeding, 2010). The project goals for BBWRS are in line with the basin priorities and include the following:

- Slow and treat the runoff of upslope agricultural drainage
- Restore a hardwood flats community
- Create additional valuable wetland habitat in the Upper White Oak drainage basin

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

- Fill field ditches to restore surface flow retention and elevate local groundwater levels
- Alleviate surface compaction and furrow drainage by surface roughening throughout the site
- Redevelop longer wetland flow patterns to increase surface flow retention time
- Restore a native forested hardwood wetland community using native trees and seed mixes

The project watershed is located along the upper boundary of the 14-digit watershed, is surrounded by forest on three sides, and is currently used for agriculture. The site will be restored to non-riparian wetland. The ditches across the site will be filled to retain and distribute surface flow across the site. Once site grading is complete, the non-riparian communities will be planted as Hardwood Flats (NCWAM, v. 4.1 2010). The site will be monitored for seven years or until the success criteria are met.

Bowl Basin Wetland Restoration Site, Onslow County									
Mitigation Credits									
	Stream		**Riparian Wetland**		**Non-riparian Wetland**		**Buffer**	**Nitrogen Nutrient Offset**	**Phosphorous Nutrient Offset**
Type	R	RE	R	RE	R	RE			
Acres	-	-	-	-	11.7	-			
Credits	-	-	-	-	11.7	-	-	-	-
TOTAL CREDITS					11.7				

R= Restoration RE= Restoration Equivalent of Creation or Enhancement

TABLE OF CONTENTS

1.0 RESTORATION PROJECT GOALS AND OBJECTIVES

EEP develops River Basin Restoration Priorities to guide its restoration activities within each of the state's 54 cataloging units. RBRPs delineate specific watersheds 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 2010 White Oak River Basin RBRP identified HUC 03020106010010 (Upper White Oak River) as a Targeted Local Watershed (http://portal.ncdenr.org/web/eep/rbrps/white-oak). About 79% of the watershed is forested with impacts to streams including channelization and nonpoint source pollution. The Bowl Basin Wetland Restoration Site (BBWRS) Project was identified as a wetland opportunity to improve habitat within the TLW.

The project goals address stressors identified in the TLW and include the following:

- Slow and treat the runoff of upslope agricultural drainage
- Restore a hardwood flats community
- Create additional valuable wetland habitat in the Upper White Oak drainage basin

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

- Fill field ditches to restore surface flow retention and elevate local groundwater levels
- Alleviate surface compaction and furrow drainage by surface roughening throughout the site
- Redevelop longer wetland flow patterns to increase surface flow retention time
- Restore a native forested hardwood wetland community using natives trees and seed mixes

2.0 SITE SELECTION

2.1 Directions

The BBWRS is on a single parcel located off of White Oak River Road approximately 13.5 miles north-northeast of Jacksonville, North Carolina. To reach the site from Raleigh: proceed east on I-40 for approximately 10 miles. Then travel on US-70 East towards Goldsboro and Kinston for approximately 68 miles. Turn right onto NC-58 South. Travel for 26 miles and then turn right on Country Road 1119. Take the first left onto Country Road 1115. Travel approximately 4 miles and then turn left onto White Oak River Road. After approximately two miles, turn right onto Gibson Bridge Road. Travel another two miles and then turn right onto White Oak River Road. The site will be approximately two miles ahead on the left. Section 2.3 shows the Vicinity Map for the site.

2.2 Site Selection

The site is part of the 03020106 USGS Cataloging Unit (White Oak). The White Oak River Basin as a whole is experiencing a large amount of habitat alteration due to population growth from Jacksonville, Beaufort, Emerald Isle, Morehead City, and Newport. As a result, some of the objectives in this catalog unit include mitigating impacts to water quality from nonpoint source pollution and protecting and restoring existing habitat (NCDENR EEP, 2010).

The project area is bounded by White Oak River Road to the east, a ditch along the property line to the south, agricultural land to the north and the Hoffman Forest (a research forest managed by North Carolina State University) to the west. The site has a long history of hydrologic modification in order to

allow for farming to take place on the property. The existing site conditions are shown in Section 2.6 and seen in site photographs (Section 2.8). Within the White Oak Watershed, the Upper White Oak drainage (03020106010010) remains relatively unaffected by urban development. The nearest named downstream water body is the White Oak River (DWQ Subbasin 20-(1)), which is classified as Class C. This portion of the White Oak River is not listed as impaired under the 2012 303(d) listing. Approximately 79% of the 14-digit HUC is forested and 19% is considered part of a Significant Natural Heritage Area (SNHA) (NCDNER EEP, 2010). The project watershed for the BBWRS is comprised of 76.0 total acres. Current land use in the project watershed consists of agriculture (93.8%/71.3 ac), forest (3.7%/2.8 ac), and low-density residential (2.5%/1.9 ac). Through a series of man-made ditches, the project watershed drains to the project area from the north, south, east and west. These flows eventually combine within the site and flow north through the ditch located along the eastern boundary of the site. The impervious surface within the project watershed is limited to the surface of White Oak River Road and impervious areas within rural residential properties, amounting to approximately 1% of the total area project drainage area.

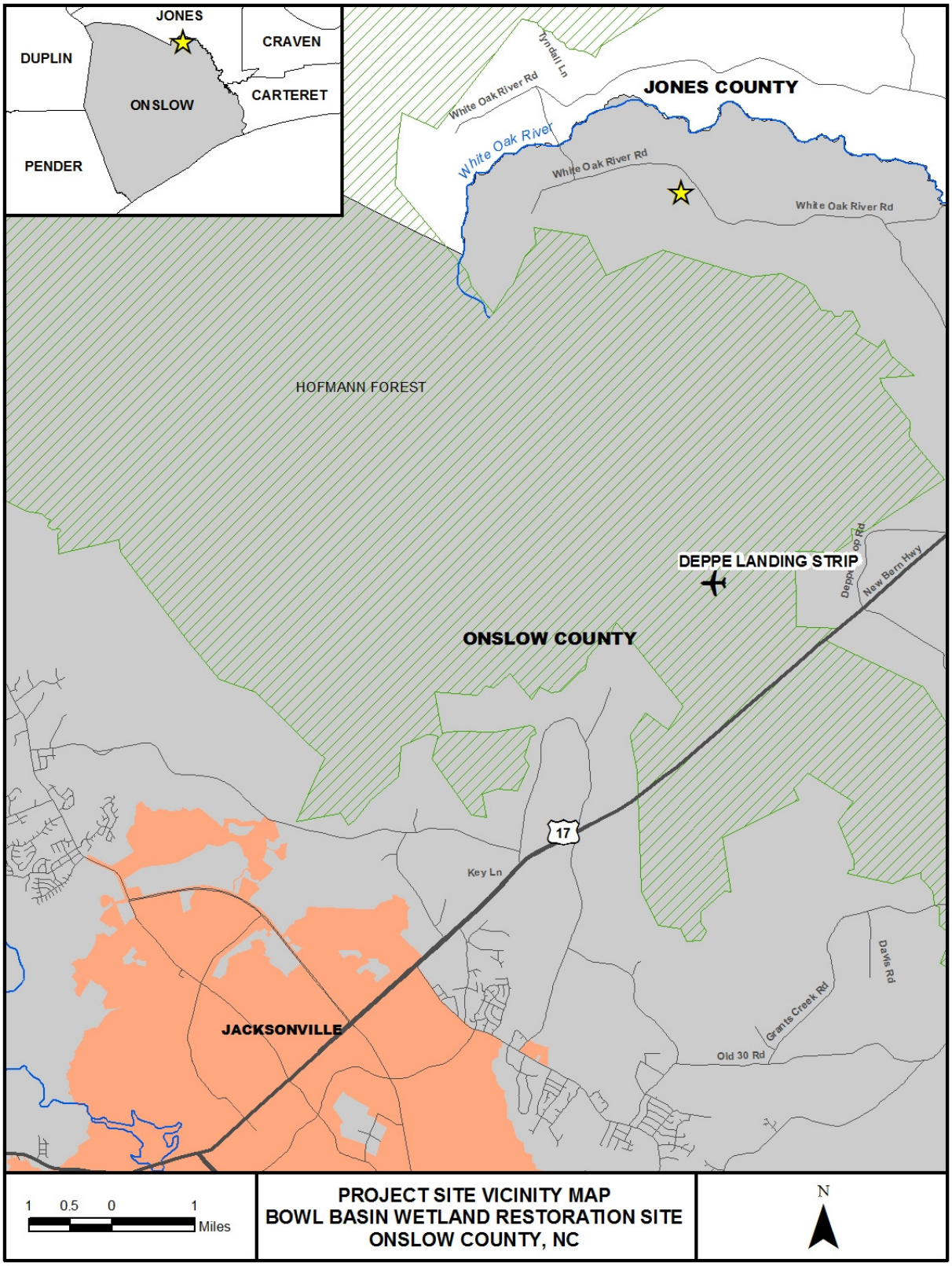
Historic aerials from Onslow County were examined for any information about how the site hydrology and vegetation have changed over the last century. They were obtained from the USGS EarthExplorer, USGS DOQQs, and NC OneMap for 1950, 1958, 1964, 1977, 1982, 1993, 1998, and 2008. The reviewed aerials are found in Section 2.7. Throughout this historic record, the site has remained relatively unchanged. The earliest available aerial photo from 1950 shows that the existing ditch network was already in place by that time. The remaining photos until the present show that the same ditch network and agricultural land have been maintained at the site. Similar to the site itself, the surrounding project watershed has changed little over the last 60 years. The surrounding area is rural with low development pressure at this time. These land use trends indicate that restoring this property back to a forested wetland will provide an important habitat enhancement in the watershed.

The site lies within the Carolina Flatwoods (Level IV 63h) ecoregion of the Coastal Plain physiographic province. This low-gradient region generally has fine-loamy and coarse-loamy soils with high water tables. The geology at the site is classified as part of the River Bend formation, which is comprised of limestone and calcarenite mixed with sand.

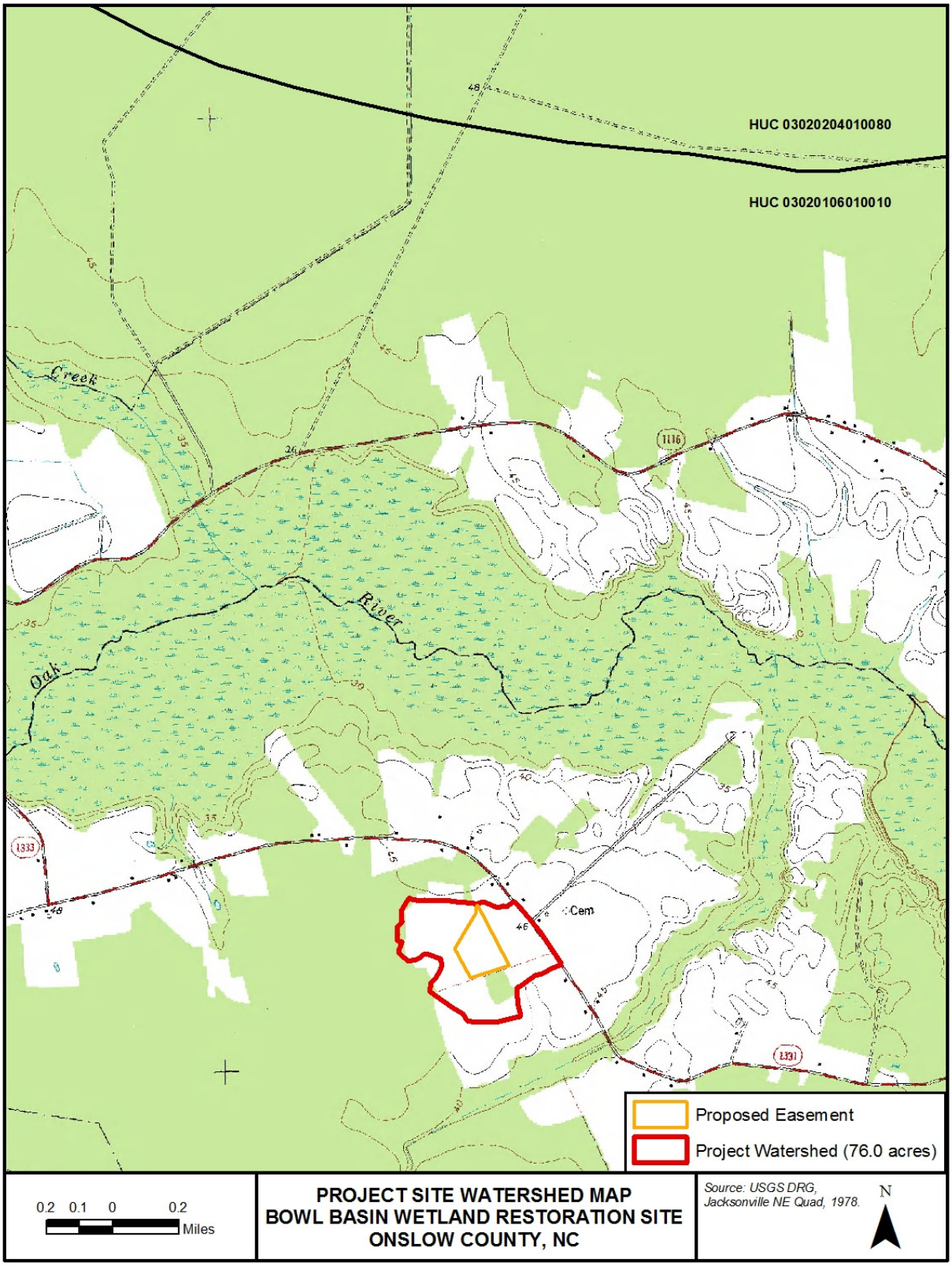
The soils at the site were also examined for their wetland potential. The Soil Survey of Onslow County has the BBWRS mapped as the Rains fine sandy loam soils series. However, detailed soils mapping performed by a KCI licensed soil scientist confirmed that the primary soil at the site is Pantego loam. The Pantego loam series is described as a very poorly drained soil located on broad, smooth flats on uplands. Pantego is a hydric soil that has been drained through on-site ditching. The soil data sheets and a map of the soil borings are included in Appendix C.

Based on these watershed and site-specific attributes, the BBWRS was selected as a candidate for wetland mitigation. The restored site will create forested wetland habitat in an area that has been actively used for agriculture since at least 1950.

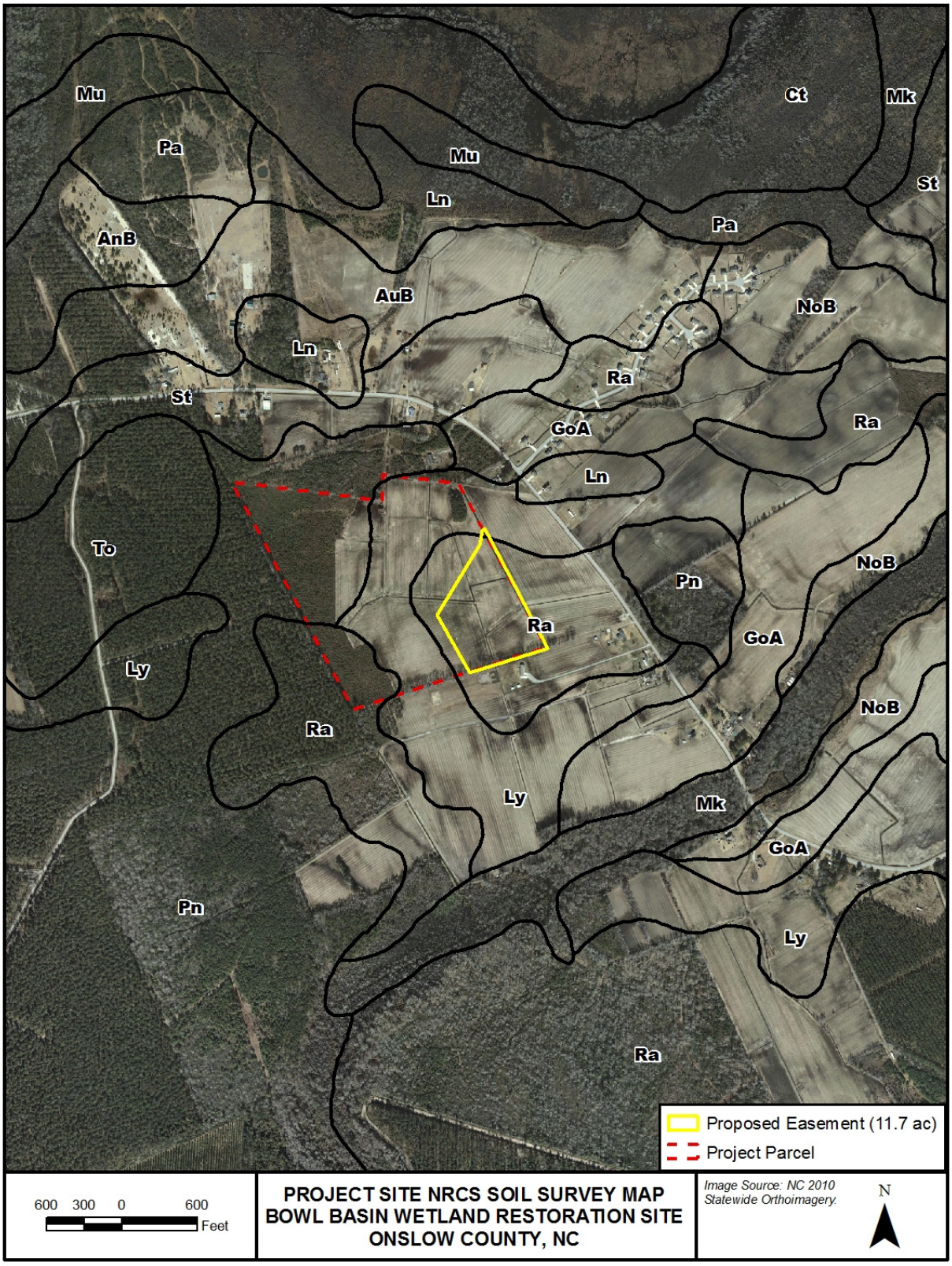
2.3 Vicinity Map



2.4 Watershed Map

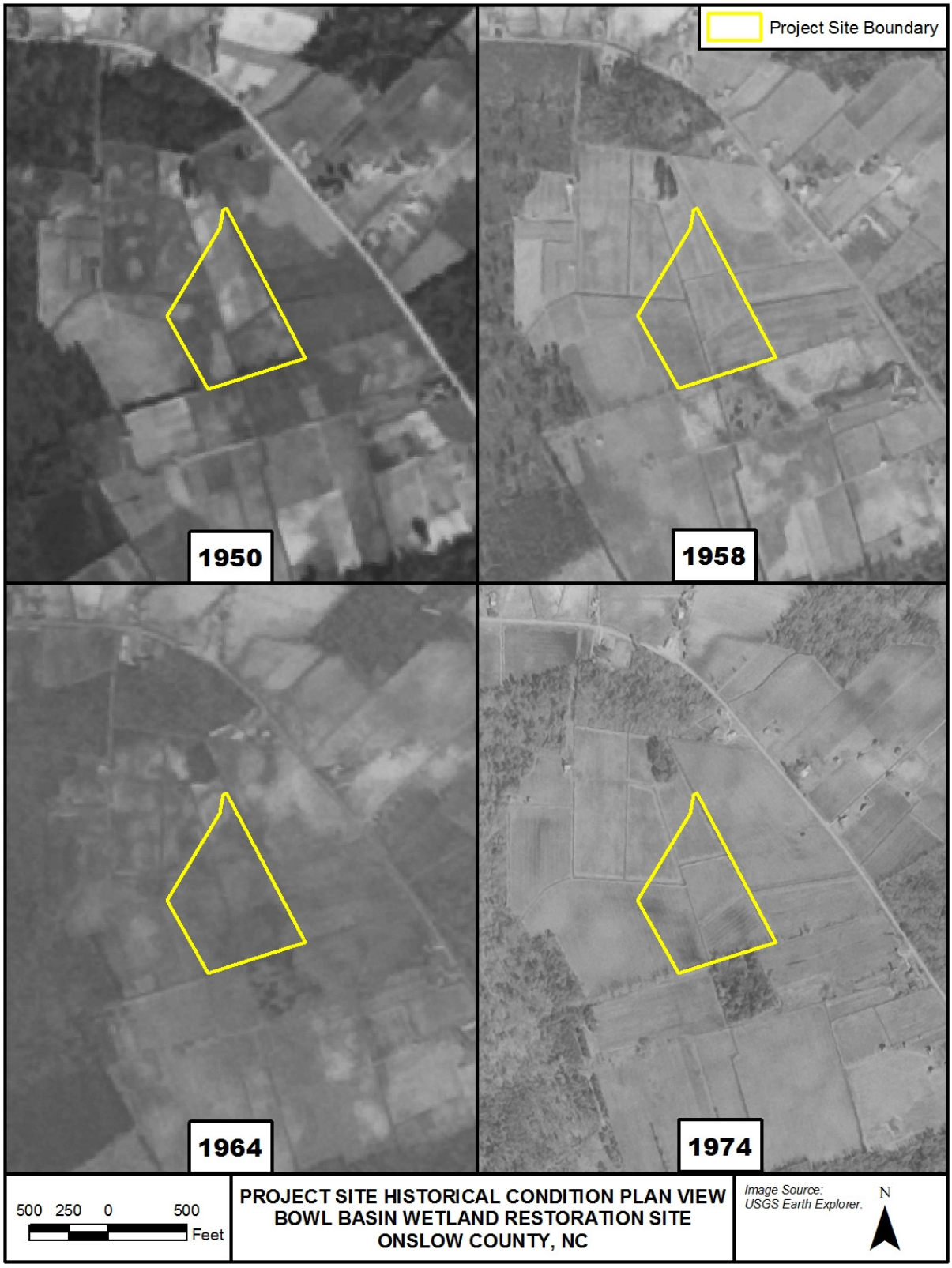


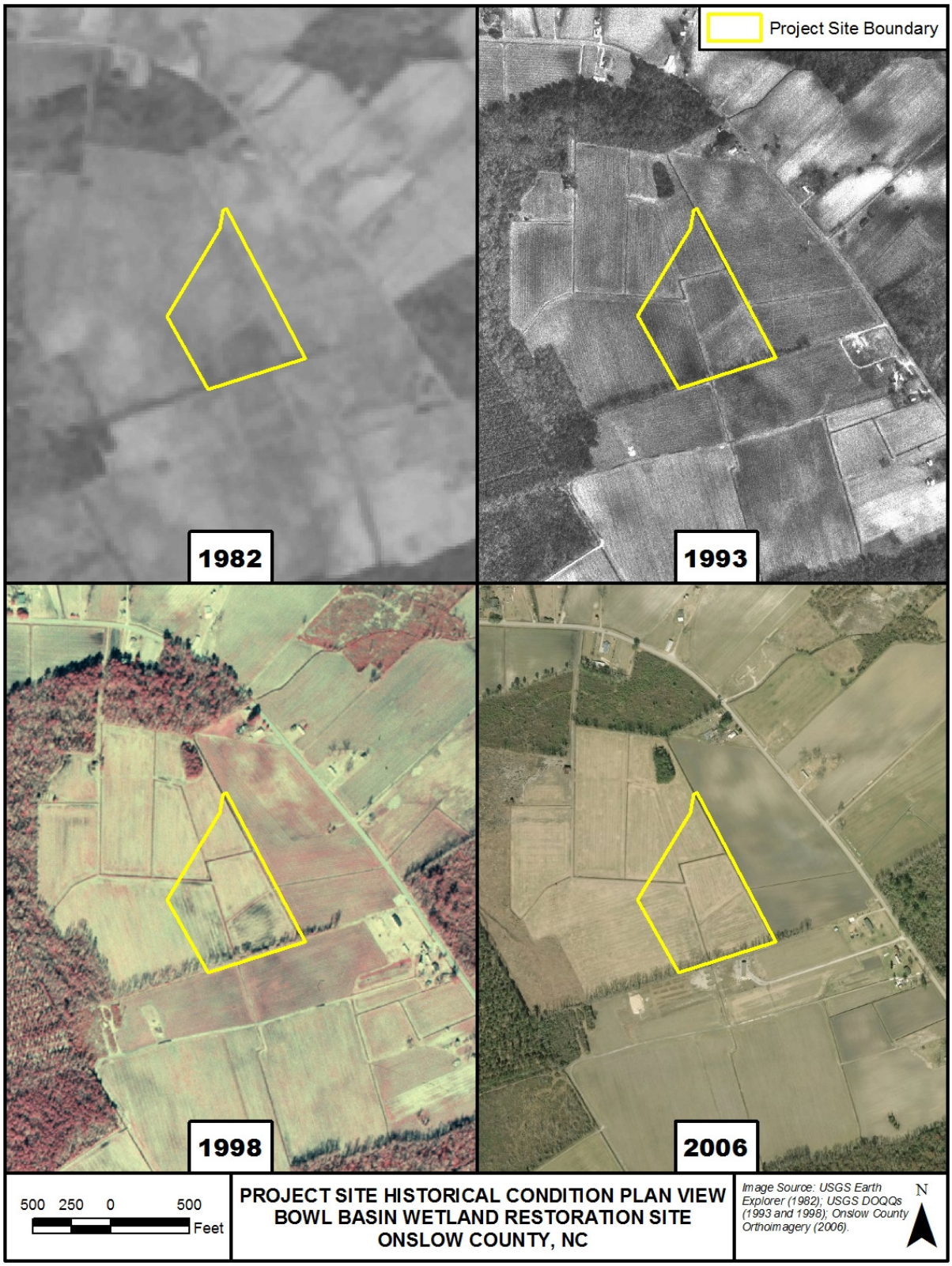
2.5 Soil Survey



2.6 Current Condition Plan View

2.7 Historical Condition Plan View




Project Site Boundary
1982
1993
1998
2006
500 250 0 500
Feet
PROJECT SITE HISTORICAL CONDITION PLAN VIEW
BOWL BASIN WETLAND RESTORATION SITE
ONSLOW COUNTY, NC
Image Source: USGS Earth Explorer (1982); USGS DOQQs (1993 and 1998); Onslow County Orthoimagery (2006).
N

2.8 Site Photographs

View to the north from the center of the restoration area. 2/29/2012

View to the north from the southern easement line. 2/29/2012

View to the east from the center of the restoration area. 2/29/2012

View to the north of a ditch running through the site. 2/29/2012

View looking south through the restoration area towards the tree line on the easement boundary. 2/29/2012

View looking south at the point that the main ditch enters the site. 2/29/2012

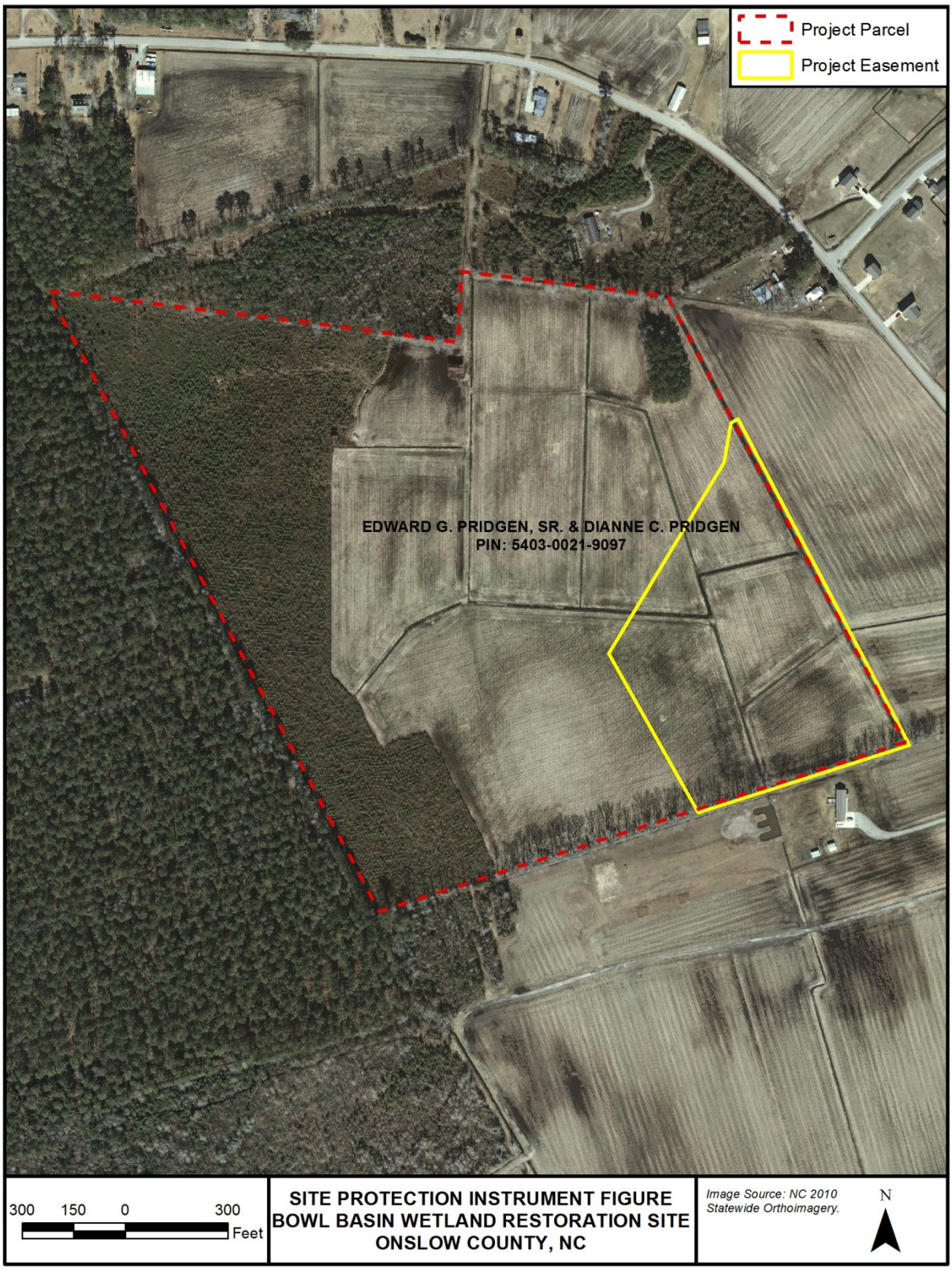
3.0 SITE PROTECTION INSTRUMENT

3.1 Site Protection Instrument Summary Information

The land required for the construction, management, and stewardship of this mitigation project includes portions of the following parcel. The draft conservation easement plat is included in Appendix A.

	Landowners	PIN	County	Site Protection Instrument	Deed Book and Page Number	Acreage protected
Parcel A	Edward G. Pridgen, Sr. Dianne C. Pridgen	5403-0021-9097	Onslow	Conservation Easement	DB 1673 PG 121	11.7 acres

3.2 Site Protection Instrument Figure



4.0 BASELINE INFORMATION

Project Information			
Project Name	Bowl Basin Wetland Restoration Site		
County	Onslow County		
Project Area (acres)	11.7 acres		
Project Coordinates (lat. and long.)	34.922569 N , -77.319871 W		
Project Watershed Summary Information			
Physiographic Province	Coastal Plain		
River Basin	White Oak		
USGS Hydrologic Unit 8-digit	03020106	**USGS Hydrologic Unit 14-digit**	03020106010010
DWQ Sub-basin	03-05-01		
Project Drainage Area (acres)	76.0 acres		
Project Drainage Area Percentage of Impervious Area	1%		
CGIA Land Use Classification	94% Cultivated, 4% Forest, and 2% Low-Intensity Development		
Wetland Summary Information			
Parameters	**Wetland Area 1**		
Size of Wetland (acres)	11.7 acres		
Wetland Type (non-riparian, riparian riverine or riparian non-riverine)	Non-riparian		
Mapped Soil Series	Pantego loam by detailed soil investigation		
Drainage class	Poorly drained		
Soil Hydric Status	Drained Hydric		
Source of Hydrology	Groundwater / precipitation		
Hydrologic Impairment	Ditching and Crops		
Native vegetation community	Crops		
Percent composition of exotic invasive vegetation	0%		
Regulatory Considerations			
Regulation	**Applicable?**	**Resolved?**	**Supporting Documentation**
Waters of the United States – Section 404	Yes	Applying for NWP 27	Jurisdictional Determination
Waters of the United States – Section 401	Yes	Applying for NWP 27	Jurisdictional Determination
Endangered Species Act*	No	N/A	N/A
Historic Preservation Act*	No	N/A	N/A
Coastal Zone Management Act * (CZMA)/ Coastal Area Management Act (CAMA)	No	N/A	N/A
FEMA Floodplain Compliance	No	N/A	FEMA Floodplain Checklist
Essential Fisheries Habitat*	No	N/A	N/A

* Items addressed in the Categorical Exclusion in Appendix B.

4.1 Watershed Summary Information

The site is within the 03020106 USGS Cataloging Unit (White Oak Basin). The White Oak River Basin as a whole is experiencing a large amount of habitat alteration due to population growth from Jacksonville, Beaufort, Emerald Isle, Morehead City, and Newport. Onslow County experienced a population growth of 21% from 2000 to 2010, and additional growth of 14% is expected in the next decade (Office of State Budget and Management, 2010).

The project watershed for the BBWRS is comprised of 76.0 total acres. Current land use in the project watershed consists of agriculture (93.8%/71.3 ac), forest (3.7%/2.8 ac), and low-density residential (2.5%/1.9 ac). The project watershed drains to the west, south, and east into the project site. The impervious surface within the project watershed is limited to the surface of White Oak River Road and impervious areas within rural residential properties, amounting to approximately 1% of the total area project drainage area. The nearest named downstream water body is the White Oak River. The project area is located in the United States Geological Survey (USGS) Jacksonville NE, NC Quadrangle (2010).

4.2 Reach Summary Information

Not applicable for this project.

4.3 Wetland Summary Information

Currently, there are no existing wetlands present. The wetland data forms are included in Appendix B.

Based on field topographic survey data and LIDAR elevation data, the contours at the site range from 38 – 43 feet. The topography of the site begins with the highest elevations at the southern edge of the site, and extending from there to the southeastern most corner and up towards the northwestern most corner. The elevation decreases slowly as one moves towards the northeastern corner of the site, with depressions occurring where ditches have been installed across the site. The drained hydric soils at the site experience approximately a 2 foot change in elevation as the slope grades down slightly from the center towards the northeastern corner of the site and along the main ditch out of the southern edge of the site.

A jurisdictional determination delineation was completed in which the ditch network installed at the site was identified as jurisdictional tributaries (see Appendix B for jurisdictional determination plat). The ditch network consists of channels that generally drain the site from the south to the north. Two primary ditches at the center of the project carry water from the western edge towards the eastern main ditch. The eastern main ditch then carries flow north of the project area. A third ditch is essentially flat and holds water rather than carrying flow across the site.

4.4 Regulatory Considerations

A jurisdictional determination was approved by the US Army Corps of Engineers on April 16, 2013. Following the completion of the mitigation plan, a pre-construction notification (PCN) will be completed to apply for a Nationwide 27 Permit (NWP) to comply with Sections 401 and 404 of the Clean Water Act with the Wilmington District of the US Army Corps of Engineers and the NCDENR Division of Water Quality.

BBWRS is not located within the FEMA 100-year floodplain and therefore a flood study is not anticipated for this project.

5.0 DETERMINATION OF CREDITS

Bowl Basin Restoration Site, Onslow County									
Mitigation Credits									
	Stream		**Riparian Wetland**		**Non-riparian Wetland**		**Buffer**	**Nitrogen Nutrient Offset**	**Phosphorous Nutrient Offset**
Type	R	RE	R	RE	R	RE			
Acres	-	-	-	-	11.7	-	-	-	-
Credits	-	-	-	-	11.7	-	-	-	-
TOTAL CREDITS					11.7				

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**
Wetland Area 1	Southeastern portion of project parcel	11.7 acres	-	Restoration	11.7 acres	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	-	-	-	11.7 acres	-	-
Enhancement		-	-	-	-	-
Enhancement I	-					
Enhancement II	-					
Creation		-	-	-		-
Preservation	-	-	-	-		-
High Quality Preservation	-	-	-	-		-
TOTAL				11.7 acres		-

R= Restoration RE= Restoration Equivalent of Creation or Enhancement

6.0 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:

Forested Wetlands 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%

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:

- Approval of the final Mitigation Plan
- Recordation of the preservation mechanism, as well as a title opinion acceptable to the USACE covering the property
- 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.

- Receipt of necessary DA permit authorization or written DA approval for projects where DA permit issuance is not required.

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.

7.0 MITIGATION WORK PLAN

7.1 Target Wetland Types and Plant Communities

Wetland plantings shall consist of native species commonly found in the Hardwood Flats Community (NCWAM, v. 4.1 2010). Trees and shrubs will be planted at a density of 968 stems per acre (9 feet x 5 feet spacing) to achieve a mature survivability of 210 stems per acre after seven years. Woody vegetation planting will be conducted during dormancy. Species to be planted may consist of the following consistent with a hardwood flat (NCWAM, v. 4.1 2010):

Common Name	**Scientific Name**	**Wetland Indicator**
Tag alder	*Alnus serrulata*	FACW
River birch	*Betula nigra*	FACW
American hornbeam	*Carpinus caroliniana*	FAC
Buttonbush	*Cephalanthus occidentalis*	OBL
Pepperbush	*Clethra alnifolia*	FACW
Green ash	*Fraxinus pennsylvanica*	FACW
Water tupelo	*Nyssa aquatic*	OBL
Swamp tupelo	*Nyssa biflora*	OBL
American sycamore	*Platanus occidentalis*	FACW
Laurel oak	*Quercus laurifolia*	FACW
Swamp chestnut oak	*Quercus michauxii*	FACW
Cherrybark oak	*Quercus pagoda*	FACW
Willow oak	*Quercus phellos*	FACW
Bald cypress	*Taxodium distichum*	OBL
American elm	*Ulmus americana*	FAC
Red maple	*Acer rubrum*	FAC
Possumhaw	*Viburnum nudum*	FACW

An herbaceous seed mix composed of appropriate native species will also be developed and used to further stabilize and restore the wetland.

All of the above options will be marked and surveyed per EEP's requirements contained within http://portal.ncdenr.org/web/eep/fd-forms-templates. In addition, the easement boundaries will be marked with salt-treated wooden posts placed approximately 100 feet apart. Each line post will be marked with a conservation easement placard. Corner posts will be marked with signs stating "Conservation Easement Corner."

7.2 Design Parameters

The mitigation approach for the BBWRS will aim to restore the hydrology and vegetation components to this non-riparian wetland system. The available historic data, detailed soils mapping, and topographic and geographic positions suggest that a hardwood flat used to exist at the BBWRS (NCWAM, v. 4.1 2010). The site will be restored to a condition that resembles the former wetland community. A local comparable reference wetland system was identified approximately 16 miles west of the restoration site. This reference site will be used as a hydrology reference only. A suitable vegetative community reference could not be found within the properties that granted access. Please see the mitigation

overview in Section 7.4 and the wetland plans included in Appendix D. The following elements of functional uplift are expected from this project:

1. Increase in groundwater recharge
2. Increase in sediment trapping and filtration
3. Increase in carbon storage
4. Increase in biochemical cycling of nutrients and other pollutants
5. Increase in habitat utilization by wildlife (migrants and residents)
6. Increase in landscape patch structure

Non-Riparian Wetland Restoration – 11.7 acres
This site offers the potential to develop 11.7 acres of non-riparian wetlands within the Upper White Oak Watershed. Restoration actions would include filling approximately 3,300 linear feet of drainage ditches throughout the site. Since the entire site is currently used for row crop cultivation, the restoration would eliminate field crowning and furrow drainage and alleviate the existing soil compaction through surface roughening. The ditch running located about 160' to the west of the project site will remain open; however, the ditch will be re-routed to carry water north rather than south. A clay ditch plug will be installed at the northern edge of the site to prevent seepage at the connection to the remaining off-site ditch. Following the completion of site grading, the non-riparian wetland will be planted as Hardwood Flats Community as described in Section 7.1. Proposed project conditions are shown in Section 7.4.

Reference Wetland
A suitable reference wetland was found approximately 16 miles west of the BBWRS adjacent to Jesse Williams Road. A groundwater monitoring well has been installed to document the reference wetland hydrology during the course of monitoring.

7.3 Data Analysis

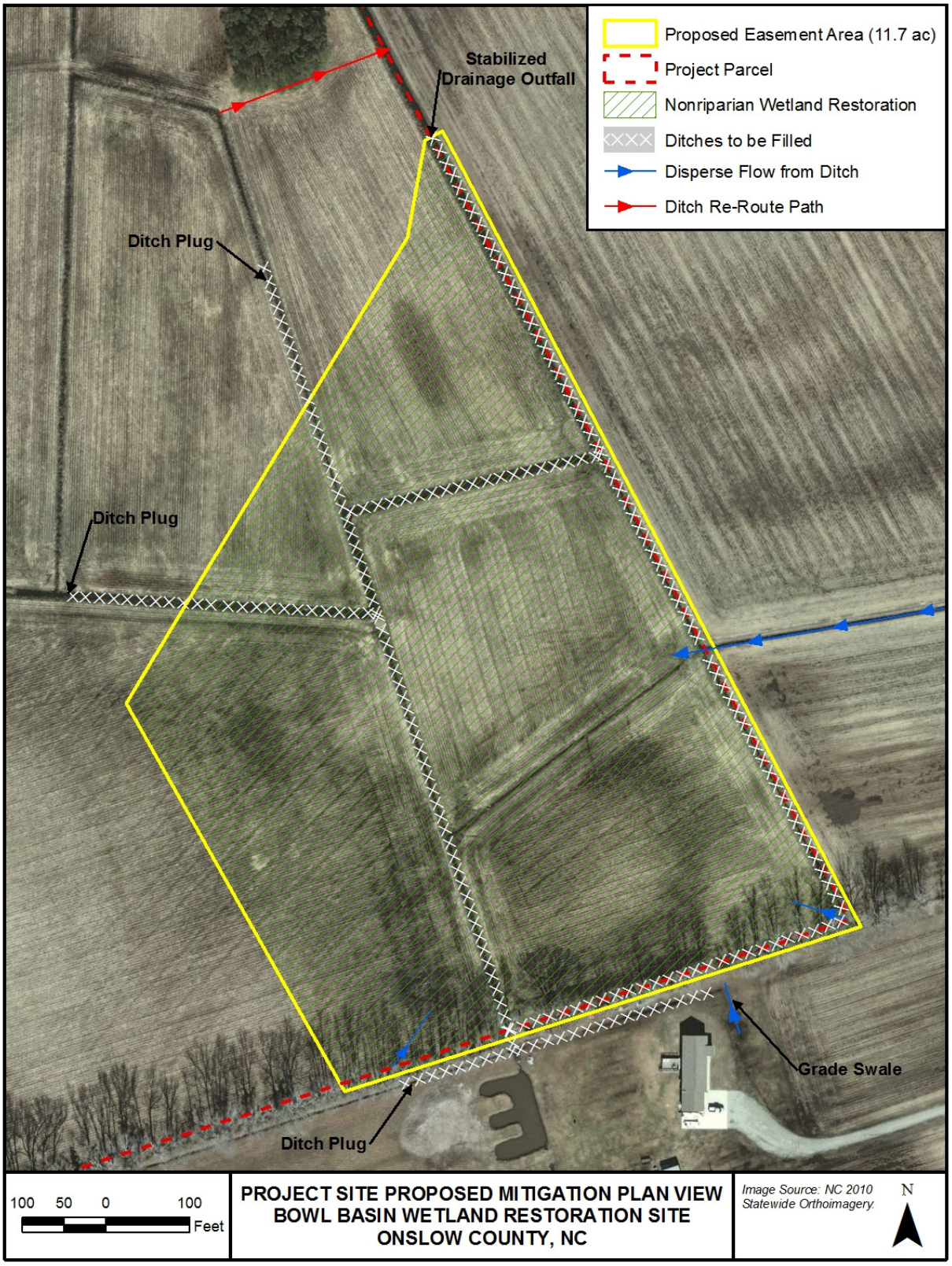
In order to model the effect of filling the onsite ditches and grading the wetland restoration areas of BBWRS, DRAINMOD was used to simulate the before and after conditions. DRAINMOD is a computer simulation water balance model that follows the groundwater elevation in the surface profile using soil inputs, climatic data, and drainage conditions (NCSU 2013). It was originally developed for agricultural drainage design, but has been adapted for evaluating wetland hydrology due to its modeling of poorly drained soils over a time step.

A DRAINMOD model was developed for the BBWRS using the Pantego soils at the site. Climatic data (daily rainfall and maximum and minimum daily temperatures) were obtained from the New Bern, North Carolina COOP Station (316108), approximately 18.5 miles from the site and the closest station with at least 50 years of data. For the model simulation, 64 years of available data were used (1949-2012). The daily rainfall was distributed to an hourly increment within the computer program. The temperatures were used in the Thornthwaite potential evapotranspiration calculations. The soils data were obtained from the NRCS parameters and from onsite observations. The wetland criteria were set to evaluate the saturation over the growing period of March 18 – November 16 (243 days) at 9% continuous saturation (22 days) (NRCS, 2002).

For the existing conditions model, the average drain spacing for this area is approximately 300 feet between the existing field ditches and the average drain depth is 2.0 feet. The proposed conditions

model has the same drain spacing, but with a drain depth of 0.5 feet to show minor losses to drainage during the immediate post-restoration period. The surface storage was also increased to 2.0 inches to account for increased surface roughness in the restored wetland. Based on these conditions, the existing conditions model showed that wetland hydrology was achieved 15 out of 64 years, or 23% of modeled years. For the proposed conditions, the site achieved wetland hydrology for 55 out of 64 years, or 86%. See Appendix C for model output.

7.4 Proposed Mitigation Plan View



8.0 MAINTENANCE PLAN

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

Component/Feature	Maintenance Through Project Close-Out
Wetland	Routine wetland maintenance and repair activities may include securing of loose coir matting and supplemental installations of live stakes and other target vegetation within the wetland. Areas where stormwater and floodplain flows intercept the wetland may also require maintenance to prevent scour. If these flows impact the installed ditch plugs, they will be reinforced with stone and select material to prevent future failures.
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. If vegetation survival is affected by abnormally long periods of surface inundation, the vegetation may be replanted with species more tolerant of those conditions.
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.

9.0 PERFORMANCE STANDARDS

The BBWRS will be monitored to determine if the development of the wetland indicators on site meet the standards for mitigation credit production as presented in Section 5.0. The credits will be validated upon confirmation that the success criteria described below are met. The site will be monitored for performance standards for seven years after completion of construction.

Hydrologic Performance

Wetland hydrology monitoring will be conducted to determine if the restored wetland areas meet the proposed performance criteria for wetland hydrology. The site will present continuous saturated or inundated hydrologic conditions for at least 9.0% of the growing season for the non-riparian mitigation areas (11.7 acres) during normal weather conditions based on a conservative estimate. The site has been designed to be a forested wetland, with limited periods of inundation in portions of the site. It is not expected, and the site is not designed for, large portions of it to be continually inundated. A "normal" year is based on NRCS climatological data for Onslow County, and using the 30th to 70th percentile thresholds as the range of normal, as documented in the USACE Technical Report "Accessing and Using Meteorological Data to Evaluate Wetland Hydrology, April 2000." According to the Natural Resources Conservation Service National Water and Climate Center WETS table for Onslow County at the Hoffman Forest Station, the growing season for Onslow County, based on the median dates of 28 °F air temperatures in spring and fall from historic records, extends from March 18th to November 16th, comprising 243 days (NRCS, 2002).

Section 10 describes the monitoring requirements for the site. Monitoring will comply with guidance included in "Monitoring Requirements and Performance Standards for Stream and/or Wetland Mitigation" (NCDENR EEP, 2011). Hydrologic performance will be determined through evaluation of automatic recording gauge data supplemented by documentation of wetland hydrology indicators as defined in the 1987 US ACOE Wetland Delineation Manual. Daily data will be collected from automatic wells over the 7-year monitoring period following implementation. These data will determine if the wetland meets the hydrology success criterion of the water table being within 12 inches of the ground surface continuously for 9.0% or more of the growing season. Visual monitoring will also be conducted two times per year in each monitoring year as per the NC EEP guidance referenced above.

Vegetation Success

The vegetation success criteria will comply with guidance included in "Monitoring Requirements and Performance Standards for Stream and/or Wetland Mitigation" (NCDENR EEP, 2011), which states that the plots must achieve a stem density of 320 stems/acre after three years, 260 stems/acre after five years, and 210 live, planted stems/acre after seven years to be considered successful. In addition to density requirements, plant height will be monitored within the monitoring plots to ensure that trees average 10 feet in height after seven years.

10.0 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.

Required	Parameter	Quantity	Frequency	Notes
Yes	Groundwater Hydrology	7-8 gauges distributed throughout the restored wetland	Annual	Groundwater monitoring gauges with data recording devices will be installed on site; the data will be downloaded on a monthly basis during the growing season
Yes	Vegetation	10 permanent vegetation monitoring plots	During monitoring years 1, 2, 3, 5, and 7.	Vegetation will be monitored using the Carolina Vegetation Survey (CVS) protocols
Yes	Exotic and nuisance vegetation		Annual	Locations of exotic and nuisance vegetation will be mapped
Yes	Project boundary		Semi-annual	Locations of vegetation damage, boundary encroachments, etc. will be mapped

The first scheduled monitoring will be conducted during the first full growing season following project completion. Monitoring shall subsequently be conducted annually for a total period of seven years or until the project meets its success criteria.

Groundwater elevations will be monitored to evaluate the attainment of jurisdictional wetland hydrology. Verification of wetland hydrology will be determined by automatic recording well data collected within the project area and reference wetland. Seven to eight automatic recording gauges will be established within the mitigation areas (see Appendix C for potential gauge locations). Daily data will be collected from the automatic gauges for a minimum of a 7-year monitoring period following wetland construction. A nearby reference wetland will also be monitored using the same procedures for comparative analysis (see Appendix B for reference wetland data sheet and location map).

Beginning at the end of the first growing season, KCI will monitor the planted vegetation in monitoring years 1, 2, 3, 5, and 7 or until the success criterion is met. The survivability of the vegetation plantings will be evaluated using ten 100 m^2 vegetative sampling plots randomly placed throughout the restored wetland. Permanent monuments will be established at the corners of each monitoring plot and documented by either conventional survey or GPS. These plots will be monitored according to the current CVS/EEP monitoring protocol. The vegetation monitoring will follow the Level 2 method of the current CVS-EEP protocol (http://cvs.bio.unc.edu/methods.htm).

Photograph reference points (PRPs) will be established to assist in characterizing the site and to allow qualitative evaluation of the site conditions. The location of each photo point will be marked in the monitoring plan and the bearing/orientation of the photograph will be documented.

Annual monitoring reports will be prepared and submitted after all monitoring tasks for each year are completed. The report will document the monitored components and include all collected data, analyses, and photographs. Each report will provide the new monitoring data and compare the most

recent results against previous findings. The monitoring report format will be similar to that set out in the most recent EEP monitoring protocol.

11.0 LONG-TERM MANAGEMENT PLAN

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

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

12.0 ADAPTIVE MANAGEMENT PLAN

Upon completion of site construction KCI 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, KCI will notify the EEP and the USACE of the need to develop a Plan of Corrective Action. The Plan of Corrective Action may be prepared using in-house technical staff or may require engineering and consulting services. Once the Corrective Action Plan is prepared and finalized KCI will:

1. Notify the EEP and USACE 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
3. Obtain other permits as necessary
4. Implement the Corrective Action Plan
5. Provide the USACE a Record Drawing of Corrective Actions. This document shall depict the extent and nature of the work performed

13.0 FINANCIAL ASSURANCES

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

14.0 OTHER INFORMATION

14.1 Definitions

8-digit Catalog Unit (CU) – The USGS developed a hydrologic coding system to delineate the country into uniquely identified watersheds that can be commonly referenced and mapped. North Carolina has 54 of these watersheds uniquely defined by an 8-digit number. EEP typically addresses watershed – based planning and restoration in the context of the 17 river basins (each has a unique 6-digit number), 54 catalog units and 1,601 14-digit hydrologic units.

14–digit Hydrologic Unit (HU) – In order to address watershed management issues at a smaller scale, the U.S. Natural Resources Conservation Service (NRCS) developed methodology to delineate and uniquely identify watersheds at a scale smaller than the 8-digit catalog unit. A hydrologic unit is a drainage area delineated to nest in a multilevel, hierarchical drainage system. Its boundaries are defined by hydrographic and topographic criteria that delineate an area of land upstream from a specific point on a river, stream or similar surface waters. North Carolina has 1,601 14-digit hydrologic units.

DWQ – North Carolina Division of Water Quality

EEP – The North Carolina Ecosystem Enhancement combines existing wetlands restoration initiatives (formerly the Wetlands Restoration Program or NCWRP) of the N.C. Department of Environment and Natural Resources with ongoing efforts by the N.C. Department of Transportation (NCDOT) to offset unavoidable environmental impacts from transportation-infrastructure improvements.

Native vegetation community – a distinct and reoccurring assemblage of 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.

Project Area - includes all protected lands associated with the mitigation project.

RBRP - The River Basin Restoration Priorities are documents that delineate specific watersheds (Targeted Local Watersheds) within a River Basin that exhibit both the need and opportunity for wetland, stream and riparian buffer restoration.

TLW - Targeted Local Watershed, are 14-digit hydrologic units which receive priority for EEP planning and restoration project funds.

USGS – United States Geological Survey

14.2 References

Breeding, Rob. 2010. White Oak River Basin Restoration Priorities 2010. Raleigh, NC. NCDENR, Ecosystem Enhancement Program. Last accessed 02/2013 at: http://portal.ncdenr.org/c/document_library/get_file?uuid=1c0b7e5a-9617-4a44-a5f8-df017873496b&groupId=60329

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

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. NatureServe, Arlington, Virginia.

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

NCDENR, Division of Water Quality. 2012a. Surface Water Classification. Last accessed 11/2012 at: http://portal.ncdenr.org/web/wq/ps/csu

NCDENR, Division of Water Quality. 2012b. 2012 Final 303(d) list. Raleigh, NC. Last accessed 11/2012 at: http://portal.ncdenr.org/web/wq/ps/mtu/assessment

NCDENR, Ecosystem Enhancement Program. 2011. Monitoring Requirements and Performance Standards for Stream and/or Wetland Mitigation. Last accessed 11/2012 at: http://portal.ncdenr.org/c/document_library/get_file?p_l_id=1169848&folderId=2288101&name=DLFE-39234.pdf

North Carolina State University, Soil & Water Management Group. DRAINMOD Computer Simulation Program. Last accessed 4/2013 at http://www.bae.ncsu.edu/soil_water/drainmod/index.html

NC Wetland Functional Assessment Team. 2010. NC Wetland Assessment Method (NC WAM) User Manual, version 4.1. Last accessed 11/2012 at: http://portal.ncdenr.org/c/document_library/get_file?uuid=76f3c58b-dab8-4960-ba43-45b7faf06f4c&groupId=38364

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 Weakley, A. S. 1990. Classification of the Natural Communities of North Carolina, Third Approximation, NC Natural Heritage Program, Raleigh, NC

Stream Mitigation Guidelines, April 2003. US Army Corps of Engineers Wilmington District

USDA, Natural Resources Conservation Service. 2010. Field Indicators of Hydric Soils in the United States: a Guide for Identifying and Delineating Hydric Soils, Version 7.0.

USDA, Natural Resources Conservation Service, Water and Climate Center. 2012. RUSLE2 Related

Attributes Table for Onslow, North Carolina. Last accessed 11/2012 at: http://soildatamart.nrcs.usda.gov/Survey.aspx?County=NC133

USDA, Natural Resources Conservation Service, National Water and Climate Center. 2002. WETS table for Onslow County at Hoffman Forest. Last accessed 10/2013 at: http://www.wcc.nrcs.usda.gov/ftpref/support/climate/wetlands/nc/37133.txt

USDA. 1992. Soil Survey of Onslow County, North Carolina. United States Department of Agriculture.

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 Science Advisory Board. Washington, DC.

14.3 Appendix A. Site Protection Instrument

STATE OF NORTH CAROLINA

CONSERVATION EASEMENT PROVIDED PURSUANT TO FULL DELIVERY MITIGATION CONTRACT

ONSLOW COUNTY
SPO File Number 67-BB
EEP Site Number 95721
Prepared by: Office of the Attorney General
Property Control Section
Return to: NC Department of Administration
State Property Office
1321 Mail Service Center
Raleigh, NC 27699-1321

THIS CONSERVATION EASEMENT DEED, made this _____day of _____, 20__, by Edward G. Pridgen and Dianne C. Pridgen, ("**Grantor**"), whose mailing address is Post Office Box 233, Maysville, NC 28555, to the State of North Carolina, ("**Grantee**"), whose mailing address is State of North Carolina, Department of Administration, State Property Office, 1321 Mail Service Center, Raleigh, NC 27699-1321. The designations of Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine, or neuter as required by context.

WITNESSETH:

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

WHEREAS, this Conservation Easement from Grantor to Grantee has been negotiated, arranged and provided for as a condition of a full delivery contract between **KCI Technologies, Inc.** and the North Carolina Department of Environment and Natural Resources, to provide stream, wetland and/or buffer mitigation pursuant to the North Carolina Department of Environment and Natural Resources Purchase and Services Contract Number **5012.**

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

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

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

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

WHEREAS, Grantor owns in fee simple certain real property situated, lying, and being in **White Oak** Township, **Onslow** County, North Carolina (the "**Property**"), and being more particularly described as that certain parcel of land containing approximately **63.03** acres and being conveyed to the Grantor by deed as recorded in **Deed Book 1673 at Page 121** of the **Onslow** County Registry, North Carolina; and

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

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

The Easement Area consists of the following:

Conservation Easement containing a total of **11.74 acres** as shown on the plat of survey entitled "Final Plat, Conservation Easement for North Carolina Ecosystem Enhancement Program, Project Name: **Bowl Basin Non-Riparian Wetland Restoration Site**, EEP Project #: **95721**, SPO#: **67-BB**," dated **December 20, 2012** by **James M. Gellenthin**, PLS Number **L-3860** and recorded in the **Onslow County**, North Carolina Register of Deeds at **Map Book _____ Page _____.**

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

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

I. DURATION OF EASEMENT

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

II. GRANTOR RESERVED USES AND RESTRICTED ACTIVITES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

III. GRANTEE RESERVED USES

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

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

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

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

IV. ENFORCEMENT AND REMEDIES

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

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

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

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

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

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

V. MISCELLANEOUS

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

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

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

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

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

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

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

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

VI. QUIET ENJOYMENT

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

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

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

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

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

_____ (SEAL)
Edward G. Pridgen

_____ (SEAL)
Dianne C. Pridgen

NORTH CAROLINA
COUNTY OF ONSLOW

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

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the _____ day of _____, 2011.

_____
Notary Public

My commission expires:

_____

Exhibit A

BOWL BASIN
CONSERVATION EASEMENT

A parcel of land to be used for Conservation Easement purposes located on lands now or formerly owned by Edward G. Pridgen Sr. (Deed Book 1673 Page 121) located in White Oak Township, Onslow County, North Carolina and being more particularly described as follows:

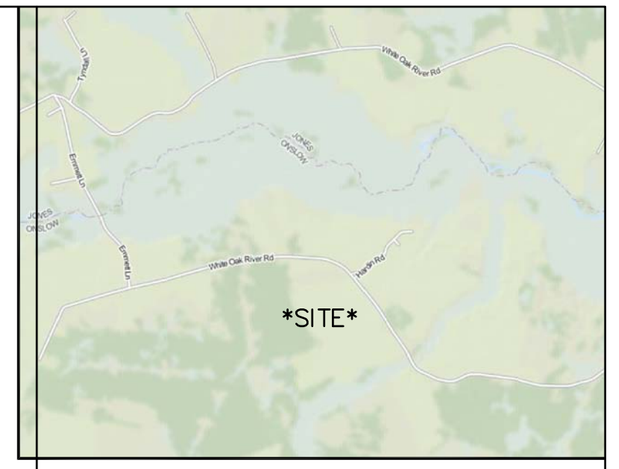
Beginning at the Southeastern corner of said lands owned by Edward G. Pridgen Sr., also being the Southwestern corner of lands now or formerly owned by Charles Clay Beasley (Deed Book 3674 Page 303), said point having North Carolina State Plane Coordinates of N:430513.29, E:2504208.74;
Thence S 72°15'40" W on the south line of said Edward G Pridgen Sr. land a distance of 647.72 feet to a 5/8 inch rebar set with aluminum cap;
Thence N 29°23'38" W a distance of 532.88 feet to a 5/8 inch rebar set with aluminum cap;
Thence N 31°08'13" E a distance of 650.22 feet to a 5/8 inch rebar set with aluminum cap;
Thence N 10°03'52" E a distance of 118.34 feet to a 5/8 inch rebar set with aluminum cap;
Thence N 62°14'57" E a distance of 23.89 feet to a 5/8 inch rebar set with aluminum cap on the East line of said lands owned by Edward G. Pridgen Sr.;
Thence S 27°45'03" E on the said East line of lands owned by Edward G. Pridgen Sr. a distance of 1074.74 feet to the Point of Beginning.

Containing 511,300 square feet or 11.74 acres.

ONSLOW COUNTY REGISTER OF DEEDS

NOTES:

1. THIS PLAT DOES NOT REPRESENT A BOUNDARY SURVEY OF THE PARENT TRACTS. THE PARENT TRACT BOUNDARIES ADJACENT TO THIS EASEMENT ARE NOT CHANGED BY THIS PLAT. BOUNDARY INFORMATION SHOWN HEREON WAS DERIVED FROM DEEDS AND MAPS OF RECORD IN ONSLOW COUNTY ALONG WITH MONUMENTATION FOUND IN THE FIELD.
2. DISTANCES SHOWN ARE HORIZONTAL GROUND DISTANCES IN U.S. SURVEY FEET UNLESS OTHERWISE NOTED.
3. AREA COMPUTED BY COORDINATE METHOD.
4. THE BASIS OF THE MERIDIANS AND COORDINATES FOR THIS PLAT IS THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM 1983 (NAD 83), BASED ON DIFFERENTIAL GPS OBSERVATIONS PERFORMED IN DECEMBER 2012. ALL DISTANCES ARE GROUND UNLESS OTHERWISE NOTED.
5. DEED REFERENCES: AS SHOWN HEREON.
6. SUBJECT PROPERTIES KNOWN AS TAX NUMBER: AS SHOWN HEREON.
7. SUBJECT PROPERTY LIES WITHIN THE AREA DESIGNATED AS ZONE "X", BASED ON FEDERAL FLOOD INSURANCE RATE MAP 3720540200K EFFECTIVE NOV. 3, 2005.
8. NO UNDERGROUND UTILITY LOCATING PERFORMED DURING THE COURSE OF THIS SURVEY.
9. THE STATE PLANE COORDINATES FOR THIS PROJECT WERE PRODUCED WITH RTK GPS OBSERVATIONS. THE NETWORK POSITIONAL ACCURACY OF THE RTK DERIVED POSITIONAL INFORMATION IS 0.02 METER. HORIZONTAL POSITIONS ARE REFERENCED TO NAD 83 (NSRS2007). VERTICAL POSITIONS ARE REFERENCED TO NAVD88 (GEOID09).



VICINITY MAP
(NOT TO SCALE)

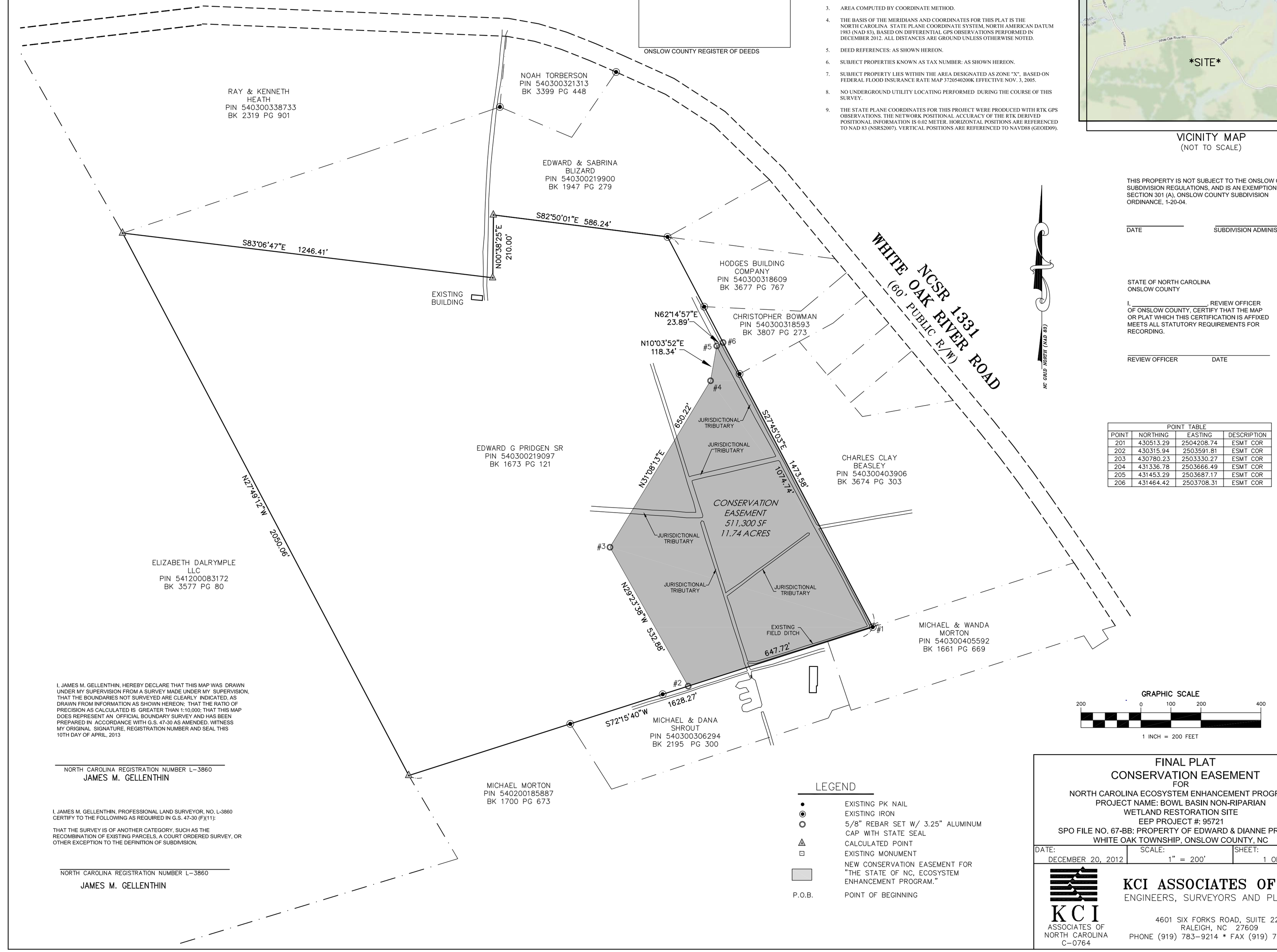
THIS PROPERTY IS NOT SUBJECT TO THE ONSLOW COUNTY SUBDIVISION REGULATIONS, AND IS AN EXEMPTION PER SECTION 301 (A), ONSLOW COUNTY SUBDIVISION ORDINANCE, 1-20-04.

_____ _____
DATE SUBDIVISION ADMINISTRATOR

STATE OF NORTH CAROLINA
ONSLOW COUNTY

I, _____, REVIEW OFFICER OF ONSLOW COUNTY, CERTIFY THAT THE MAP OR PLAT WHICH THIS CERTIFICATION IS AFFIXED MEETS ALL STATUTORY REQUIREMENTS FOR RECORDING.

_____
REVIEW OFFICER DATE



POINT TABLE			
POINT	NORTHING	EASTING	DESCRIPTION
201	430513.29	2504208.74	ESMT COR
202	430315.94	2503591.81	ESMT COR
203	430780.23	2503330.27	ESMT COR
204	431336.78	2503666.49	ESMT COR
205	431453.29	2503687.17	ESMT COR
206	431464.42	2503708.31	ESMT COR

GRAPHIC SCALE
200 0 100 200 400
1 INCH = 200 FEET

LEGEND

- EXISTING PK NAIL
- EXISTING IRON
- 5/8" REBAR SET W/ 3.25" ALUMINUM CAP WITH STATE SEAL
- CALCULATED POINT
- EXISTING MONUMENT
- NEW CONSERVATION EASEMENT FOR "THE STATE OF NC, ECOSYSTEM ENHANCEMENT PROGRAM."
- P.O.B. POINT OF BEGINNING

I, JAMES M. GELLENTHIN, HEREBY DECLARE THAT THIS MAP WAS DRAWN UNDER MY SUPERVISION FROM A SURVEY MADE UNDER MY SUPERVISION, THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED, AS DRAWN FROM INFORMATION AS SHOWN HEREON; THAT THE RATIO OF PRECISION AS CALCULATED IS GREATER THAN 1:10,000; THAT THIS MAP DOES REPRESENT AN OFFICIAL BOUNDARY SURVEY AND HAS BEEN PREPARED IN ACCORDANCE WITH G.S. 47-30 AS AMENDED. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER AND SEAL THIS 10TH DAY OF APRIL, 2013

NORTH CAROLINA REGISTRATION NUMBER L-3860
JAMES M. GELLENTHIN

I, JAMES M. GELLENTHIN, PROFESSIONAL LAND SURVEYOR, NO. L-3860 CERTIFY TO THE FOLLOWING AS REQUIRED IN G.S. 47-30 (F)(11):

THAT THE SURVEY IS OF ANOTHER CATEGORY, SUCH AS THE RECOMBINATION OF EXISTING PARCELS, A COURT ORDERED SURVEY, OR OTHER EXCEPTION TO THE DEFINITION OF SUBDIVISION.

NORTH CAROLINA REGISTRATION NUMBER L-3860
JAMES M. GELLENTHIN

FINAL PLAT
CONSERVATION EASEMENT
FOR
NORTH CAROLINA ECOSYSTEM ENHANCEMENT PROGRAM
PROJECT NAME: BOWL BASIN NON-RIPARIAN
WETLAND RESTORATION SITE
EEP PROJECT #: 95721
SPO FILE NO. 67-BB: PROPERTY OF EDWARD & DIANNE PRIDGEN
WHITE OAK TOWNSHIP, ONSLOW COUNTY, NC

DATE:	SCALE:	SHEET:
DECEMBER 20, 2012	1" = 200'	1 OF 1

KCI ASSOCIATES OF NORTH CAROLINA C-0764

KCI ASSOCIATES OF N.C.
ENGINEERS, SURVEYORS AND PLANNERS
4601 SIX FORKS ROAD, SUITE 220
RALEIGH, NC 27609
PHONE (919) 783-9214 * FAX (919) 783-9266

14.4 Appendix B. Baseline Information Data

USACE Wetland Determination Forms

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Bowl Basin City/County: Maysville / Onslow Sampling Date: 2-28-13

Applicant/Owner: KCI Associates of NC State: NC Sampling Point: DP#1

Investigator(s): S. Stokes Section, Township, Range:

Landform (hillslope, terrace, etc.): FLAT Local relief (concave, convex, none): FLAT Slope (%): 0-1

Subregion (LRR or MLRA): LRRT Lat: 34°55'21"N Long: -77°19'14" W Datum: 1983

Soil Map Unit Name: Rains NWI classification: None

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

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

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

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

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

Remarks:

Farmland is drained and planted in Soybeans.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No ____	Depth (inches): ____	
Water Table Present?	Yes ____	No ✓	Depth (inches): 22	
Saturation Present? (includes capillary fringe)	Yes ____	No ____	Depth (inches): ____	**Wetland Hydrology Present?** Yes ____ No ✓

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

Remarks:

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

Sampling Point: DP#1

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: 1m)			
1. Soybeans	100	yes	NI
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		

50% of total cover: 50 20% of total cover: 20

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP#1

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100					fSL	
12-24	10YR 3/1	99	10YR 4/6 c2f	1	C	PL	sl. scl	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ✓ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

Soils mapped by NRCS as Reins. I mapped them as Pantego due to umbric epipedon.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Bowl Basin City/County: Maysville / Onslow Sampling Date: 2-28-13

Applicant/Owner: KCI Associates of NC State: NC Sampling Point: DP#2

Investigator(s): S. Stokes Section, Township, Range:

Landform (hillslope, terrace, etc.): FLAT Local relief (concave, convex, none): FLAT Slope (%): 0-1

Subregion (LRR or MLRA): LRR T Lat: 34°55' 17.21"N Long: 77°19' 13" W Datum: 1983

Soil Map Unit Name: RAINS NWI classification: NONE

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

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

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

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

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

Remarks:

Farmland is drained and planted in Soybeans.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No _____	Depth (inches): _____	
Water Table Present?	Yes _____	No ✓	Depth (inches): 21	
Saturation Present? (includes capillary fringe)	Yes _____	No _____	Depth (inches): _____	**Wetland Hydrology Present?** Yes _____ No ✓

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

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP# 2

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: 1M)			
1. Soybeans	100	yes	NI
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		

50% of total cover: 50 20% of total cover: 20

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP# 2

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10yr 2/1	100					fsl	
10-24	10yr 3/1	100					sl	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ✓ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

Soils mapped by NRCS as Ravino, I mapped them as Panoche due to umbric epipedon.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Bowl Basin City/County: Mapsville / Onslow Sampling Date: 2-28-13

Applicant/Owner: KCI Associates of NC State: NC Sampling Point: DP # 3

Investigator(s): S. Stokes Section, Township, Range:

Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): Concave Slope (%): 0-1

Subregion (LRR or MLRA): LRR T Lat: 34°55'20" N Long: 77°19'08"W Datum: 1983

Soil Map Unit Name: Rains NWI classification: None

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

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

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

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

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

Remarks:

Farmland is drained and planted in Soybeans.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No ____	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): 19
Saturation Present? (includes capillary fringe)	Yes ____	No ____	Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✓

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

Remarks:

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

Sampling Point: DP#3

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: 1M)			
1. Soybeans	100	yes	NI
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		

50% of total cover: 50 20% of total cover: 20

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP# 3

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10yr 2/1	100					fsl	
10-14	10yr 2/1	100					sl	
14-26	10yr 4/1	98	10yr 5/6 c1d	2	C	PL	scl	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ✓ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

Soils mapped by NRCS as Pains. I mapped them as Parrago due to umbric epipedon.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Bowl Basin City/County: Maysville / Onslow Sampling Date: 2-28-13

Applicant/Owner: KCI Associates of NC State: NC Sampling Point: DP#4

Investigator(s): S. Stokes Section, Township, Range:

Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): Concave Slope (%): 0-1

Subregion (LRR or MLRA): LRR T Lat: 34°55'17" N Long: 77°19'08" W Datum: 1983

Soil Map Unit Name: Rains NWI classification: None

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

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

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

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

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

Remarks:

Farmland is drained and is planted in Soybeans

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No ____	Depth (inches): ____	
Water Table Present?	Yes ____	No ✓	Depth (inches): > 23	**Wetland Hydrology Present?** Yes ____ No ✓
Saturation Present? (includes capillary fringe)	Yes ____	No ____	Depth (inches): ____	

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

Remarks:

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

Sampling Point: DP#4

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		
Herb Stratum (Plot size: 1m)			
1. Soybeans	100	yes	NI
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
50% of total cover: 50	20% of total cover: 20		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP# 4

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9	10yr 2/1	100					fsL	
9-15	10yr 4/1	98	10yr 5/8 c2f	2	C	PL	scl	
15-20	10yr 4/2	95	10yr 5/4 c2d	5	C	PL	scl	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

Soils mapped by NRCS as Rains. I mapped as Pantego due to umbric epipedon.

Reference Wetland

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Bear Basin Reference Wetland City/County: Richlands / Onslow Sampling Date: 11-5-2012

Applicant/Owner: KCI / EEP State: NC Sampling Point: DP#1

Investigator(s): S. Stokes, K. O'Briant Section, Township, Range:

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 0-1

Subregion (LRR or MLRA): LRR T Lat: N 34° 55' 46.4" Long: W 077° 36' 25.9" Datum:

Soil Map Unit Name: Pantego NWI classification: PFO1B

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

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

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

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

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

Remarks:

Reference site is composed of >50% areal coverage from deciduous hardwoods over shrub layer with >60% broad leaved evergreens.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ✓ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No ____	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): 25"
Saturation Present? (includes capillary fringe)	Yes ____	No ____	Depth (inches): ____

Wetland Hydrology Present? Yes ✓ No ____

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

Remarks:

Water table @ 39" on 11-5-12. Then came up to 25" overnight without rain event.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP#1

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Water Oak - Quercus nigra	50	✓	FAC
2. Loblolly Pine - Pinus taeda	15	✓	FAC
3. Sweetgum - Liquidambar styraciflua	5		FAC
4.			
5.			
6.			
7.			
8.			
	70 = Total Cover		
50% of total cover: 35	20% of total cover: 14		
Sapling/Shrub Stratum (Plot size: 30')			
1. Swamp Bay - Persea palustris	60	✓	FACW
2. Swamp Tupelo - Nyssa Biflora	20	✓	OBL
3. Southern Highbush Blueberry - Vaccinium formosum	15		FACW
4. Red Maple - Acer rubrum	10		FAC
5. Sweetgum - Liquidambar Styraciflua	10		FAC
6. Titi - Cyrilla Racemiflora	10		FACW
7. Common Sweetleaf - Symplocus tinctoria	5		FACW
8.			
	130 = Total Cover		
50% of total cover: 65	20% of total cover: 26		
Herb Stratum (Plot size: 1m)			
1. Swamp Red Bay - Persea palustris	5	✓	FACW
2. Sweet pepper Bush - Clethra alnifolia	5	✓	FACW
3. Highbush Blueberry - Vaccinium formosum	5	✓	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	15 = Total Cover		
50% of total cover: 7.5	20% of total cover: 3		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

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

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (If observed, list morphological adaptations below).

Virginia Chain Fern - Woodwardia virginica 5%

Giant Cane - Arundinaria gigantea 10%

SOIL

Sampling Point: DP#1

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10yr 3/1	100					mucky l	
7-10	10yr 3/1	90	10yr 4/1	10	C	m	l	
10-14	10yr 4/1	100					sl	
14-20	10yr 6/1	80	10yr 5/6	20	C	m	scl	
20-44	10yr 6/1		10yr 5/6	20	C	m	scl	
			7.5yr 5/6	5	C	pl		
44-56	10yr 5/2		7.5yr 5/6	5	C	PL/m	scl	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ✓ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

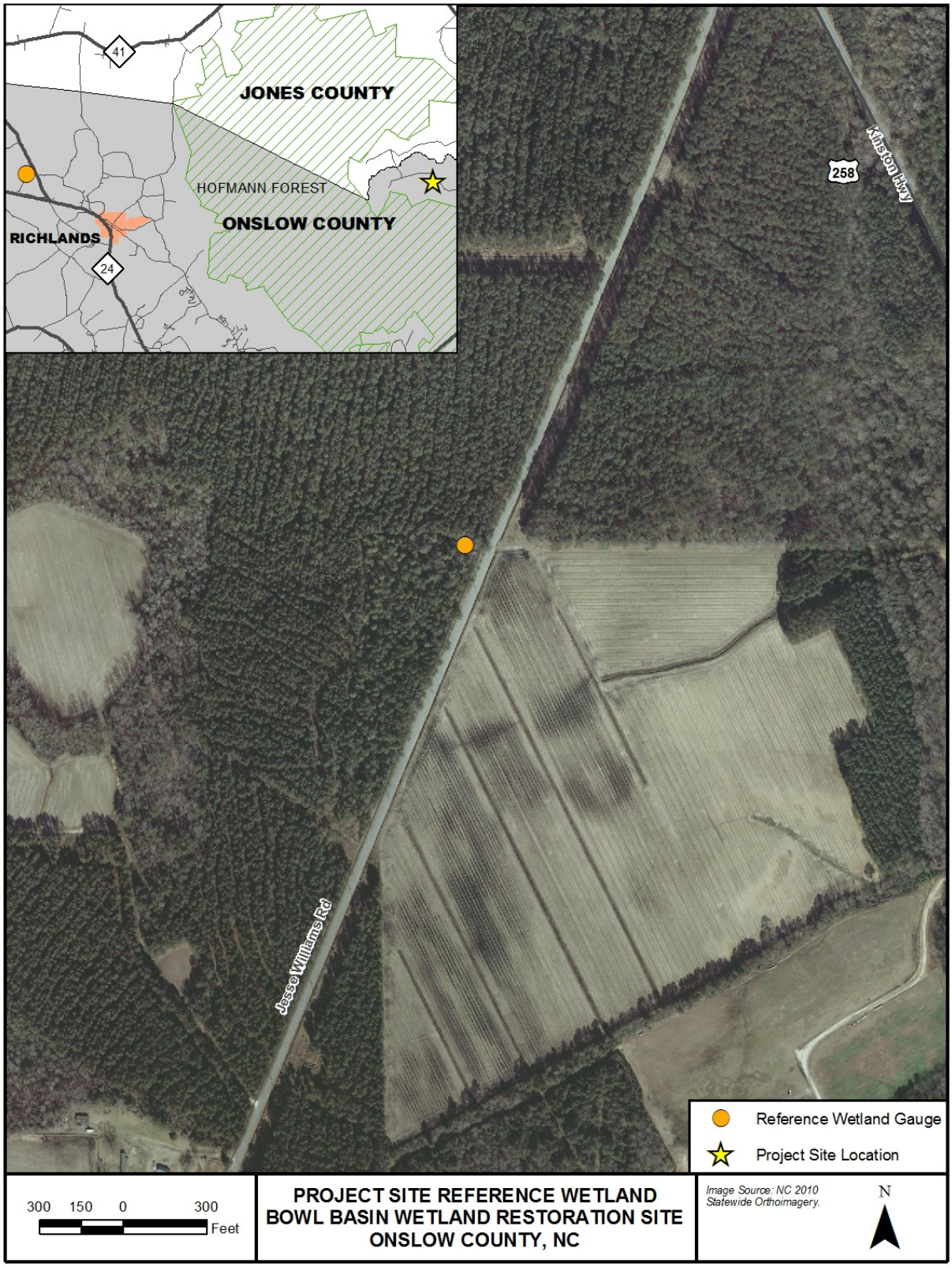
Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:



Note: This reference site will serve as a hydrology reference only. A suitable vegetative community reference could not be found in properties that granted access.

Jurisdictional Determination

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action Id. SAW-2013-00393 County: Onslow U.S.G.S. Quad: Jacksonville NE

NOTIFICATION OF JURISDICTIONAL DETERMINATION

Property Owner: Edward G. Pridgen, Sr.
Address: P.O. Box 233
Maysville, NC 28555

Agent: KCI Associates of NC
attn: Steven F. Stokes
Address: Landmark Center II, Suite 220
4601 Six Forks Road
Raleigh, NC 27609

Property description:
Size (acres) ~17
Nearest Waterway UT to White Oak River
USGS HUC 03020106
Nearest Town Maysville
River Basin White Oak
Coordinates 34.922105 N -77.319408 W
Location description: The property is located approximately 0.1 mi. to the east of White Oak River Road, approximately 1.5 mi. southeast of its intersection with Emmett Lane, near Maysville, Onslow County, North Carolina. The Project Area is located in the southeast corner of Parcel #: 1108-15.

Indicate Which of the Following Apply:

A. Preliminary Determination

_ Based on preliminary information, there may be wetlands on the above described property. We strongly suggest you have this property inspected to determine the extent of Department of the Army (DA) jurisdiction. To be considered final, a jurisdictional determination must be verified by the Corps. This preliminary determination is not an appealable action under the Regulatory Program Administrative Appeal Process (Reference 33 CFR Part 331).

B. Approved Determination

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

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

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

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

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

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

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

Placement of dredged or fill material within waters of the US and/or wetlands without a Department of the Army permit may constitute a violation of Section 301 of the Clean Water Act (33 USC § 1311). If you have any questions regarding this determination and/or the Corps regulatory program, please contact Mr. David E. Bailey at (910) 251-4469 / David.E.Bailey2@usace.army.mil.

C. Basis For Determination

The site exhibits features with Ordinary High Water. The waters on-site include 5 unnamed tributaries (UTs) to White Oak River - all Relatively Permanent Waters (RPWs) which flow via another UT to White Oak River (RPW) to the White Oak River, a Traditionally Navigable Water. This determination is based on a site visit and verification by David E. Bailey of the US Army Corps of Engineers on 2/20/2013.

D. Remarks

The Waters of the US were delineated by Steve Stokes (KCI), and are approximated as the linear shaded areas on the attached figure entitled "Jurisdictional Tributary Delineation Map for Bowl Basin Wetland Restoration", dated 3/1/2013.

E. Attention USDA Program Participants

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

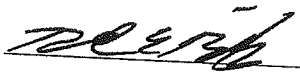
F. Appeals Information (This information applies only to approved jurisdictional determinations as indicated in B. above)

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

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

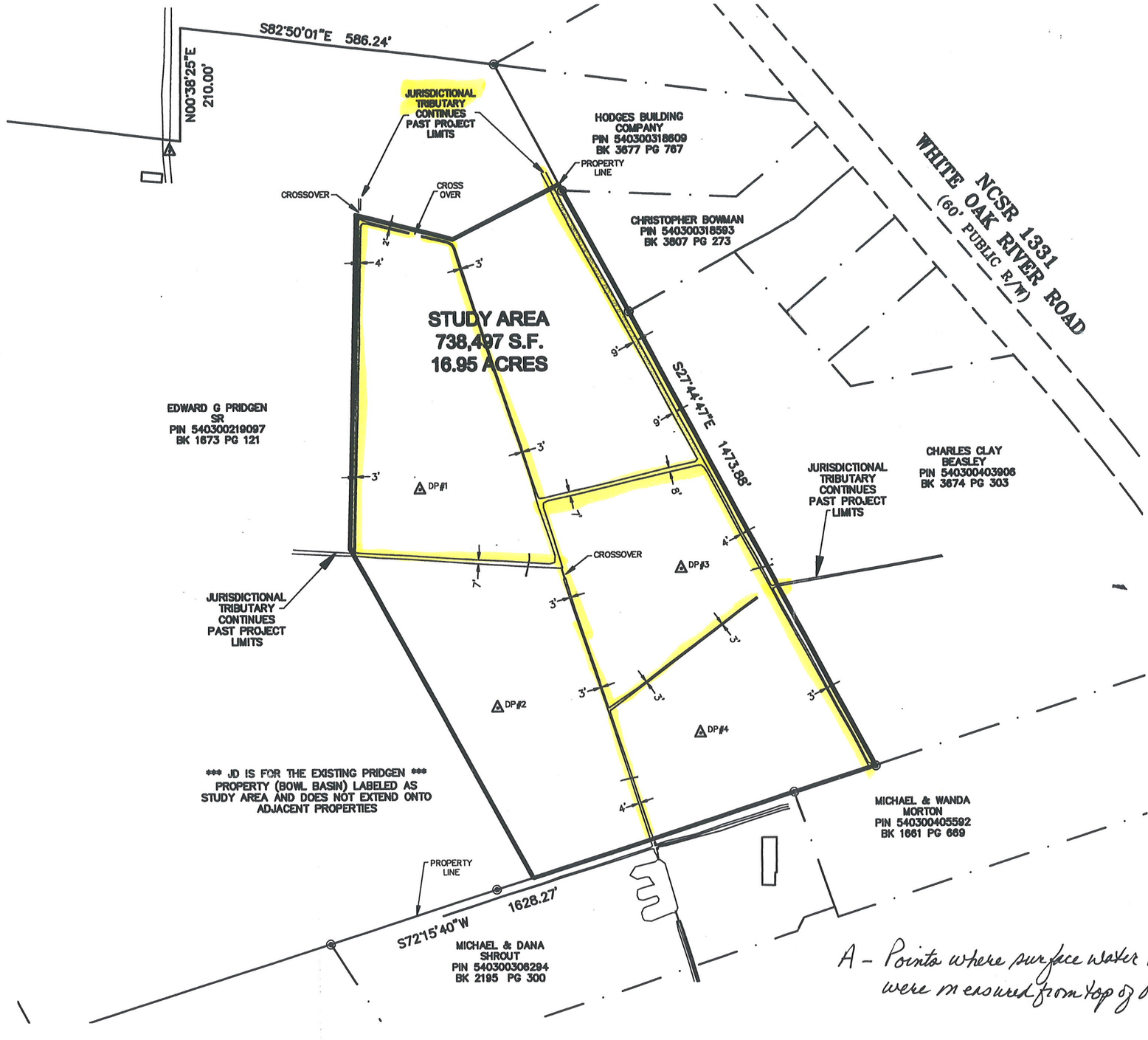
In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR part 331.5, and that it has been received by the District Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by June 15, 2013.

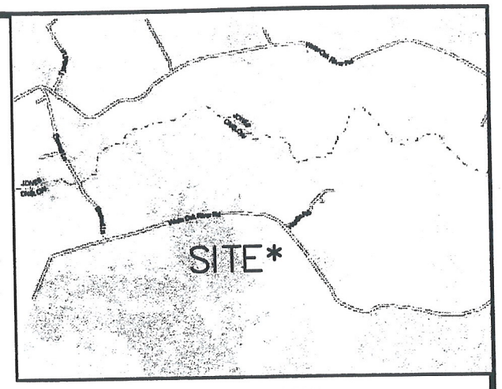
It is not necessary to submit an RFA form to the District Office if you do not object to the determination in this correspondence.

Corps Regulatory Official: 

Date April 16, 2013 Expiration Date April 16, 2018

Copy furnished:
Joanne Steenhuis , NCDENR-DWQ, 127 Cardinal Drive Extension, Wilmington, NC 28405





VICINITY MAP
NOT TO SCALE

N
W E
S

RECEIVED
APR 08 2013
REG. WLM. FLD. OFC.

LINEAR FEET OF JURISDICTIONAL TRIBUTARY – 4,192'

JURISDICTIONAL TRIBUTARY – 20,711 S.F. (0.48 ACRES)

GRAPHIC SCALE
0 100 200 400
1 INCH = 200 FEET

JURISDICTIONAL TRIBUTARY DELINEATION MAP
FOR
BOWL BASIN WETLAND RESTORATION
WHITE OAK TWP, ONSLOW COUNTY
NORTH CAROLINA

DATE:	SCALE:	SHEET:
MARCH 1, 2013	1" = 200'	1 OF 1

KCI ASSOCIATES OF N.C.
ENGINEERS, SURVEYORS AND PLANNERS
4601 SIX FORKS ROAD, SUITE 220
RALEIGH, NC 27609
PHONE (919) 783-9214 * FAX (919) 783-9266
KCI ASSOCIATES OF NORTH CAROLINA C-0764

20122265

FHWA Categorical Exclusion Form

Ecosystem Enhancement PROGRAM

March 20, 2013

Mr. Tim Morris
KCI Associates of NC, PA
Landmark Center II, Suite 220
4601 Six Forks Road
Raleigh NC 27609

Subject: Categorical Exclusion Form for
Bowl Basin Non-riparian Wetland Mitigation Site
White Oak River Basin – CU# 03020106
Onslow County, North Carolina
Contract No. 005012

Dear Mr. Morris:

Attached please find the approved Categorical Exclusion Form for the subject full delivery project. At this time you may submit your invoice for 5% of your 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 Kristin Miguez or me at any time. Kristin can be reached at (910) 796-7475, or email at kristin.miguez@ncdenr.gov while I can be reached at (919) 707-8308, or email me at jeff.schaffer@ncdenr.gov.

Sincerely,

Jeff Schaffer
EEP Eastern Regional Supervisor

cc: file
Kristin Miguez – Project Manager

Categorical Exclusion Form for Ecosystem Enhancement Program Projects
Version 1.4

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

Part 1: General Project Information	
Project Name:	Bowl Basin Non-riparian Wetland Mitigation Site
County Name:	Onslow County, NC
EEP Number:	95721
Project Sponsor:	KCI Technologies, Inc.
Project Contact Name:	Tim Morris
Project Contact Address:	4601 Six Forks Rd, Suite 220, Raleigh, NC 27609
Project Contact E-mail:	tim.morris@kci.com
EEP Project Manager:	Kristin Miguez

Project Description

For Official Use Only

Reviewed By:

3/20/13
Date

EEP Project Manager

Conditional Approved By:

Date

For Division Administrator
FHWA

☐ **Check this box if there are outstanding issues**

Final Approval By:

3-15-13
Date

For Division Administrator
FHWA

Part 2: All Projects Regulation/Question	Response
Coastal Zone Management Act (CZMA)	
1. Is the project located in a CAMA county?	☒ Yes ☐ No
2. Does the project involve ground-disturbing activities within a CAMA Area of Environmental Concern (AEC)?	☐ Yes ☒ No ☐ N/A
3. Has a CAMA permit been secured?	☐ Yes ☐ No ☒ N/A
4. Has NCDCM agreed that the project is consistent with the NC Coastal Management Program?	☐ Yes ☐ No ☒ N/A
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)	
1. Is this a "full-delivery" project?	☒ Yes ☐ No
2. Has the zoning/land use of the subject property and adjacent properties ever been designated as commercial or industrial?	☐ Yes ☒ No ☐ N/A
3. As a result of a limited Phase I Site Assessment, are there known or potential hazardous waste sites within or adjacent to the project area?	☐ Yes ☒ No ☐ N/A
4. As a result of a Phase I Site Assessment, are there known or potential hazardous waste sites within or adjacent to the project area?	☐ Yes ☐ No ☒ N/A
5. As a result of a Phase II Site Assessment, are there known or potential hazardous waste sites within the project area?	☐ Yes ☐ No ☒ N/A
6. Is there an approved hazardous mitigation plan?	☐ Yes ☐ No ☒ N/A
National Historic Preservation Act (Section 106)	
1. Are there properties listed on, or eligible for listing on, the National Register of Historic Places in the project area?	☐ Yes ☒ No
2. Does the project affect such properties and does the SHPO/THPO concur?	☐ Yes ☐ No ☒ N/A
3. If the effects are adverse, have they been resolved?	☐ Yes ☐ No ☒ N/A
Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act)	
1. Is this a "full-delivery" project?	☒ Yes ☐ No
2. Does the project require the acquisition of real estate?	☒ Yes ☐ No ☐ N/A
3. Was the property acquisition completed prior to the intent to use federal funds?	☐ Yes ☐ No ☐ N/A
4. Has the owner of the property been informed: * prior to making an offer that the agency does not have condemnation authority; and * what the fair market value is believed to be?	☒ Yes ☐ No ☐ N/A

Part 3: Ground-Disturbing Activities Regulation/Question	Response
American Indian Religious Freedom Act (AIRFA)	
1. Is the project located in a county claimed as "territory" by the Eastern Band of Cherokee Indians?	☐ Yes ☒ No
2. Is the site of religious importance to American Indians?	☐ Yes ☐ No ☒ N/A
3. Is the project listed on, or eligible for listing on, the National Register of Historic Places?	☐ Yes ☐ No ☒ N/A
4. Have the effects of the project on this site been considered?	☐ Yes ☐ No ☒ N/A
Antiquities Act (AA)	
1. Is the project located on Federal lands?	☐ Yes ☒ No
2. Will there be loss or destruction of historic or prehistoric ruins, monuments or objects of antiquity?	☐ Yes ☐ No ☒ N/A
3. Will a permit from the appropriate Federal agency be required?	☐ Yes ☐ No ☒ N/A
4. Has a permit been obtained?	☐ Yes ☐ No ☒ N/A
Archaeological Resources Protection Act (ARPA)	
1. Is the project located on federal or Indian lands (reservation)?	☐ Yes ☒ No
2. Will there be a loss or destruction of archaeological resources?	☐ Yes ☐ No ☒ N/A
3. Will a permit from the appropriate Federal agency be required?	☐ Yes ☐ No ☒ N/A
4. Has a permit been obtained?	☐ Yes ☐ No ☒ N/A
Endangered Species Act (ESA)	
1. Are federal Threatened and Endangered species and/or Designated Critical Habitat listed for the county?	☒ Yes ☐ No
2. Is Designated Critical Habitat or suitable habitat present for listed species?	☐ Yes ☒ No ☐ N/A
3. Are T&E species present or is the project being conducted in Designated Critical Habitat?	☐ Yes ☐ No ☒ N/A
4. Is the project "likely to adversely affect" the specie and/or "likely to adversely modify" Designated Critical Habitat?	☐ Yes ☐ No ☒ N/A
5. Does the USFWS/NOAA-Fisheries concur in the effects determination? (By virtue of no-response)	☐ Yes ☐ No ☒ N/A
6. Has the USFWS/NOAA-Fisheries rendered a "jeopardy" determination?	☐ Yes ☐ No ☒ N/A

Executive Order 13007 (Indian Sacred Sites)	
1. Is the project located on Federal lands that are within a county claimed as "territory" by the EBCI?	☐ Yes ☒ No
2. Has the EBCI indicated that Indian sacred sites may be impacted by the proposed project?	☐ Yes ☐ No ☒ N/A
3. Have accommodations been made for access to and ceremonial use of Indian sacred sites?	☐ Yes ☐ No ☒ N/A
Farmland Protection Policy Act (FPPA)	
1. Will real estate be acquired?	☒ Yes ☐ No
2. Has NRCS determined that the project contains prime, unique, statewide or local important farmland?	☒ Yes ☐ No ☐ N/A
3. Has the completed Form AD-1006 been submitted to NRCS?	☒ Yes ☐ No ☐ N/A
Fish and Wildlife Coordination Act (FWCA)	
1. Will the project impound, divert, channel deepen, or otherwise control/modify any water body?	☐ Yes ☒ No
2. Have the USFWS and the NCWRC been consulted?	☒ Yes ☐ No ☐ N/A
Land and Water Conservation Fund Act (Section 6(f))	
1. Will the project require the conversion of such property to a use other than public, outdoor recreation?	☐ Yes ☒ No
2. Has the NPS approved of the conversion?	☐ Yes ☐ No ☒ N/A
Magnuson-Stevens Fishery Conservation and Management Act (Essential Fish Habitat)	
1. Is the project located in an estuarine system?	☐ Yes ☒ No
2. Is suitable habitat present for EFH-protected species?	☐ Yes ☐ No ☒ N/A
3. Is sufficient design information available to make a determination of the effect of the project on EFH?	☐ Yes ☐ No ☒ N/A
4. Will the project adversely affect EFH?	☐ Yes ☐ No ☒ N/A
5. Has consultation with NOAA-Fisheries occurred?	☐ Yes ☐ No ☒ N/A
Migratory Bird Treaty Act (MBTA)	
1. Does the USFWS have any recommendations with the project relative to the MBTA?	☐ Yes ☒ No
2. Have the USFWS recommendations been incorporated?	☐ Yes ☐ No ☒ N/A
Wilderness Act	
1. Is the project in a Wilderness area?	☐ Yes ☒ No
2. Has a special use permit and/or easement been obtained from the maintaining federal agency?	☐ Yes ☐ No ☒ N/A

FEMA Floodplain Checklist

EEP Floodplain Requirements Checklist

This form was developed by the National Flood Insurance program, NC Floodplain Mapping program and Ecosystem Enhancement Program to be filled for all EEP projects. The form is intended to summarize the floodplain requirements during the design phase of the projects. The form should be submitted to the Local Floodplain Administrator with three copies submitted to NFIP (attn. State NFIP Engineer), NC Floodplain Mapping Unit (attn. State NFIP Coordinator) and NC Ecosystem Enhancement Program.

Project Location

Name of project:	Bowl Basin Wetland Restoration Project
Name if stream or feature:	N/A
County:	Onslow
Name of river basin:	White Oak
Is project urban or rural?	Rural
Name of Jurisdictional municipality/county:	Onslow County
DFIRM panel number for entire site:	5402
Consultant name:	KCI Technologies, Inc.
Phone number:	919-783-9214
Address:	4601 Six Forks Rd. Raleigh, NC 27609

Design Information

Provide a general description of project (one paragraph). Include project limits on a reference orthophotograph at a scale of 1" = 500".

Summarize stream reaches or wetland areas according to their restoration priority.

Example

Reach	Length	Priority
Wetland 1	*11.7 acres*	*N/A*

Floodplain Information

Is project located in a Special Flood Hazard Area (SFHA)?

☐ Yes ☉ No

If project is located in a SFHA, check how it was determined:

☐ Redelineation

☐ Detailed Study

☐ Limited Detail Study

☐ Approximate Study

☐ Don't know

List flood zone designation:

Check if applies:

☐ AE Zone

- ☐ Floodway
- ☐ Non-Encroachment
- ☉ None

☐ A Zone

- ☐ Local Setbacks Required
- ☐ No Local Setbacks Required

If local setbacks are required, list how many feet:

Does proposed channel boundary encroach outside floodway/non-encroachment/setbacks?

☐ Yes ☒ No

Land Acquisition (Check)

☐ State owned (fee simple)

☐ Conservation easment (Design Bid Build)

☑ Conservation Easement (Full Delivery Project)

Note: if the project property is state-owned, then all requirements should be addressed to the Department of Administration, State Construction Office (attn: Herbert Neily, (919) 807-4101)

Is community/county participating in the NFIP program?

☒ Yes ☐ No

Note: if community is not participating, then all requirements should be addressed to NFIP (attn: State NFIP Engineer, (919) 715-8000)

Name of Local Floodplain Administrator:
Phone Number:

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:

Project is not located in a jurisdictional floodplain.

Name: _____ Signature: _____

Title: _____ Date: _____

14.5 Appendix C. Mitigation Work Plan Data and Analyses

DRAINMOD Modeling

Bowl_Basin_Existing.WET

```
-------------------------------------------------------
*              DRAINMOD version 6.1                   *
* Copyright 1980-2011 North Carolina State University *
-------------------------------------------------------
```

1949-2012 Bowl Basin Existing
New Bern, NORTH CAROLINA WEATHER DATA
****

```
 ----------RUN STATISTICS ----------          time:  4/29/2013  @ 10:21
 input file:   C:\DrainMod\inputs\Bowl_Basin_Existing.prj
 parameters:    free drainage              and yields not calculated
               drain spacing =    9144. cm   drain depth =   61.0 cm
-----------------------------------------------------------------------
```

DRAINMOD --- WET PERIOD EVALUATION
****** Version 6.1 ******

Number of periods with water table closer than 30.00 cm
for at least 22 days. Counting starts on day
77 and ends on day 320 of each year

YEAR	Number of Periods of 22 days or more with WTD < 30.00 cm	Longest Consecutive Period in Days
1949	1.	31.
1950	0.	15.
1951	0.	11.
1952	0.	10.
1953	0.	7.
1954	0.	7.
1955	0.	19.
1956	0.	20.
1957	0.	14.
1958	0.	18.
1959	1.	22.
1960	0.	11.
1961	0.	20.
1962	1.	22.
1963	0.	15.
1964	0.	14.
1965	0.	19.
1966	1.	23.
1967	0.	16.
1968	0.	9.
1969	0.	15.
1970	0.	18.
1971	0.	16.
1972	0.	8.
1973	0.	14.
1974	1.	24.
1975	0.	17.
1976	1.	27.
1977	0.	12.
1978	1.	22.

Bowl_Basin_Existing.WET

1979	0.	15.
1980	0.	18.
1981	0.	11.
1982	1.	24.
1983	0.	20.
1984	1.	33.
1985	1.	25.
1986	0.	9.
1987	0.	11.
1988	0.	10.
1989	1.	22.
1990	0.	12.
1991	1.	32.
1992	0.	13.
1993	0.	20.
1994	0.	6.
1995	0.	0.
1996	0.	0.
1997	0.	0.
1998	0.	12.
1999	1.	39.
2000	0.	20.
2001	0.	18.
2002	0.	12.
2003	1.	23.
2004	0.	16.
2005	1.	25.
2006	0.	10.
2007	0.	6.
2008	0.	13.
2009	0.	7.
2010	0.	11.
2011	0.	6.
2012	0.	21.

Number of Years with at least one period = 15. out of 64 years.

Bowl_Basin_Proposed.WET

```
-----------------------------------------------------
*              DRAINMOD version 6.1                 *
* Copyright 1980-2011 North Carolina State University *
-----------------------------------------------------
```

1949-2012 Bowl Basin Proposed
New Bern, NORTH CAROLINA WEATHER DATA
****

```
 ----------RUN STATISTICS ----------          time:  4/29/2013  @ 10:19
input file:   C:\DrainMod\inputs\Bowl_Basin_Proposed.prj
parameters:    free drainage              and yields not calculated
              drain spacing =    9144. cm   drain depth =   15.2 cm
```

DRAINMOD --- WET PERIOD EVALUATION
****** Version 6.1 ******

Number of periods with water table closer than 30.00 cm
for at least 22 days. Counting starts on day
77 and ends on day 320 of each year

YEAR	Number of Periods of 22 days or more with WTD < 30.00 cm	Longest Consecutive Period in Days
1949	1.	71.
1950	3.	73.
1951	2.	37.
1952	2.	40.
1953	0.	19.
1954	1.	35.
1955	1.	53.
1956	2.	52.
1957	2.	49.
1958	2.	51.
1959	3.	37.
1960	1.	31.
1961	3.	40.
1962	4.	39.
1963	3.	46.
1964	2.	69.
1965	2.	60.
1966	3.	53.
1967	1.	91.
1968	1.	28.
1969	3.	34.
1970	3.	34.
1971	2.	92.
1972	2.	41.
1973	1.	22.
1974	2.	63.
1975	4.	31.
1976	3.	67.
1977	2.	36.
1978	1.	35.

1979	3.	52.
1980	2.	35.
1981	3.	37.
1982	1.	24.
1983	1.	52.
1984	3.	51.
1985	2.	56.
1986	0.	17.
1987	2.	53.
1988	2.	33.
1989	4.	58.
1990	4.	43.
1991	1.	98.
1992	2.	25.
1993	2.	53.
1994	0.	19.
1995	0.	0.
1996	0.	0.
1997	0.	0.
1998	0.	20.
1999	2.	79.
2000	2.	83.
2001	2.	59.
2002	3.	39.
2003	4.	60.
2004	2.	55.
2005	4.	42.
2006	2.	87.
2007	0.	12.
2008	2.	52.
2009	3.	34.
2010	2.	24.
2011	0.	21.
2012	1.	85.

Number of Years with at least one period = 55. out of 64 years.

Soil Delineation and Characterization

A detailed soils investigation at the BBWRS was conducted by a licensed soil scientist (# 187) to determine the extent and distribution of the hydric soils and to classify the predominate soils to the soil series level. The investigation consisted of delineating the hydric soil boundaries with pink flagging and wooden survey stakes in accordance with the US Army Corps of Engineers, Wetland Delineation Manual (1987) and the USDA Field Indicators of Hydric Soils in the United States: A Guide for Identifying and Delineating Hydric Soils, Version 7.0 (2010). Areas that were identified as possible hydric soil mapping units were surveyed at a higher intensity until the edge of the mapping unit was identified. The boundary of the hydric and non-hydric soil mapping units were then followed by continual sampling and observations as the boundary line was identified and delineated. In those areas where the boundary was found to be a broad gradient rather than a distinct break, microtopography, landscape position, soil textural changes, redoximorphic features, and depleted matrices were additionally considered to identify the extent of the hydric soils.

In developing a detailed soils map, several soil borings were advanced on the site in the general hydric soil areas identified by landscape position, vegetation and slope. Once the hydric soil borings were identified, the soil scientist marked the points and established a visual line to the next auger boring where again hydric soil conditions were confirmed by additional borings. The soil scientist moved along the edges of the mapping unit and marked each point along the line. To confirm the hydric soil mapping unit and taxonomic classification, soil borings were advanced to a depth of 50 inches. The soil profile descriptions identified the individual horizons in the topsoil and upper subsoil as well as the depth, color, texture, structure, boundary, and evidence of restrictive horizons and redoximorphic features. Delineated hydric soils boundaries were in contrast to those mapped in the Soil Survey of Onslow County, North Carolina. The delineated hydric soil boundaries are shown in the following figure, Detailed Soils Map.

Taxonomic Classification

The predominant soils identified on the site were of the Pantego (Fine-loamy, siliceous, semiactive, thermic Umbric Paleaquults) soil series. The Pantego series is listed as a hydric soil in Onslow County, North Carolina. They are defined as hydric due to saturation for a significant period during the growing season. This soil is listed as hydric on the federal, state and local lists. The Pantego series is also listed by the Natural Resources Conservation Service (NRCS) as a hydric soil.

Profile Description

The Pantego series is described as very deep, very poorly drained, moderately permeable soils that formed in thick loamy sediments on the Southern Coastal Plain and Atlantic Coast Flatwoods. Slopes are less than 2 percent.

Typical Pedon Description of the Pantego mapping unit:

PANTEGO SERIES

TAXONOMIC CLASS: Fine-loamy, siliceous, semiactive, thermic Umbric Paleaquults

TYPICAL PEDON: Pantego loam--cultivated field. (Colors are for moist soil, unless otherwise indicated.)

Ap--0 to 10 inches; black (10YR 2/1) loam; weak fine granular structure; very friable; many fine roots; very strongly acid; gradual wavy boundary. (0 to 12 inches thick)

A--10 to 18 inches; very dark gray (10YR 3/1) loam; weak fine granular structure; friable; very strongly acid; clear smooth boundary. (4 to 14 inches thick)

Bt--18 to 27 inches; very dark gray (10YR 3/1) sandy clay loam; weak fine subangular blocky structure; friable; few faint clay films on faces of peds and in pores; very strongly acid; gradual wavy boundary. (0 to 18 inches thick)

Btg1--27 to 42 inches; gray (10YR 5/1) sandy clay loam; few fine and medium distinct mottles of brownish yellow (10YR 6/6); weak fine and medium subangular blocky structure; friable; slightly sticky; few faint clay films on faces of peds; very strongly acid; gradual smooth boundary.

Btg2--42 to 55 inches; gray (10YR 6/1) sandy clay loam; few medium and coarse distinct mottles of yellowish brown (10YR 5/6); weak fine subangular blocky structure; friable, slightly sticky; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg3--55 to 65 inches; gray (10YR 6/1) sandy clay loam; weak coarse subangular blocky structure; friable; few faint clay films on faces of peds; very strongly acid. (Combined thickness of the Btg horizons is 30 to more than 60 inches.)

TYPE LOCATION: Pitt County, North Carolina; 1/2 mile south of Winterville, North Carolina, on Highway 11, 100 feet west from road.

RANGE IN CHARACTERISTICS: Solum thickness is greater than 60 inches. The soil is strongly acid, very strongly acid, or extremely acid except where the surface has been limed.

Some pedons have an Oa horizon that has hue of 10YR, value of 2 or 3, and chroma of 1; or it is neutral and has value of 2. It is less than 8 inches thick.

The A or Ap horizon has hue of 10YR or 2.5Y or is neutral, value of 2 or 3, and chroma of 0 to 2. It is loamy fine sand, loamy sand, fine sandy loam, sandy loam, loam, or mucky analogues of these textures.

Some pedons have an Eg horizon that has hue of 10YR or 2.5Y or is neutral, value of 4 to 6, and chroma of 0 to 2. It is loamy sand, loamy fine sand, sandy loam, fine sandy loam, or loam.

Some pedons have a BEg horizon that has hue of 10YR or 2.5Y, value of 4 or 6, and chroma of 1 or 2. It is loam, sandy loam, fine sandy loam, or sandy clay loam.

The Bt horizon, where present, has hue of 10YR or 2.5Y, value of 3, and chroma of 1 or 2. It has the same textures as the Btg horizon.

The Btg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2 with few to common mottles of higher chroma. The Btg horizon is sandy clay loam, sandy loam, sandy clay, or clay loam, fine sandy loam, or sandy loam.

Some pedons have a BCg horizon that has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It is sandy clay loam, clay loam, sandy clay, sandy loam, or fine sandy loam.

The Cg horizon, where present, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2 with higher chroma mottles. It is sandy clay loam, clay loam, sandy loam, fine sandy loam, loamy fine sand, fine sand, loamy sand, or sand.

KCI ASSOCIATES OF NORTH CAROLINA, PA

SOIL PROFILE DESCRIPTION

Client: KCI Associates of North Carolina, P.A. **Date:** February 28, 2012
Project: Bowl Basin **Project #:** 20111232P-WO_06
County: Onslow **State:** NC
Location: White Oak River Road **Site/Lot:** Boring # 1
Soil Series: Pantego
Soil Classification: Fine-loamy, siliceous, semiactive, thermic Umbric Paleaquults
AWT: 22" **SHWT:** 0-12" **Slope:** 0-1% **Aspect:**
Elevation: **Drainage:** Very Poorly Drained **Permeability:** Moderate
Vegetation: Corn
Borings terminated at 60 **Inches**

HORIZON	DEPTH (IN)	MATRIX	MOTTLES	TEXTURE	STRUCTURE	CONSISTENCE	BOUNDARY	NOTES
Ap	0-12	10YR 3/1		fsl	1fgr	mfr	gw	
A1	12-24	10YR 3/1	10YR 4/1c2f	sl	1fgr	mfr	cs	
Btg1	24-36	10YR 3/1	10YR 4/2c2d	sl-scl	2fsbk	mfr	gw	
Btg2	36-48	10YR 5/2		scl	2msbk	mfr	gs	scl with sc lenses
Bgt3	48-60	10YR 5/2		sc	massive	mfi		

COMMENTS:

The Pantego series is a very poorly drained soil found on nearly level and slightly depressional areas of the Southern Coastal Plain and Atlantic Coast Flatwoods.
This Pantego series is a drained hydric soil by ditching.
This Pantego soil has very slow runoff and moderate permeability.

DESCRIBED BY: SFS DATE: 2/28/2012

LICENSED SOIL SCIENTIST
STEVEN F. STOKES
1087
STATE OF NORTH CAROLINA

KCI ASSOCIATES OF NORTH CAROLINA, PA

SOIL PROFILE DESCRIPTION

Client: KCI Associates of North Carolina, P.A. **Date:** February 28, 2012
Project: Bowl Basin **Project #:** 20111232P-WO_06
County: Onslow **State:** NC
Location: White Oak River Road **Site/Lot:** Boring # 2
Soil Series: Pantego
Soil Classification: Fine-loamy, siliceous, semiactive, thermic Umbric Paleaquults
AWT: 21" **SHWT:** 0-12" **Slope:** 0-1% **Aspect:**
Elevation: **Drainage:** Very Poorly Drained **Permeability:** Moderate
Vegetation: Corn
Borings terminated at 60 **Inches**

HORIZON	DEPTH (IN)	MATRIX	MOTTLES	TEXTURE	STRUCTURE	CONSISTENCE	BOUNDARY	NOTES
Ap	0-10	10YR 2/1		fsl	1fgr	mfr	gw	
A1	10-24	10YR 3/1		sl	1fgr	mfr	cs	
Btg1	24-48	10YR 4/1	10YR 5/2c1d	scl	2fsbk	mfr	gw	
Btg2	48-60	10YR 5/2	7.5YR 5/6c1d	sc	1csbk	mfi	gs	
			10YR 3/1c2d					

COMMENTS:

The Pantego series is a very poorly drained soil found on nearly level and slightly depressional areas of the Southern Coastal Plain and Atlantic Coast Flatwoods.
This Pantego series is a drained hydric soil by ditching.
This Pantego soil has very slow runoff and moderate permeability.

DESCRIBED BY: SFS DATE: 2/28/2012

LICENSED SOIL SCIENTIST
STEVEN F. STOKES
1087
STATE OF NORTH CAROLINA

KCI ASSOCIATES OF NORTH CAROLINA, PA

SOIL PROFILE DESCRIPTION

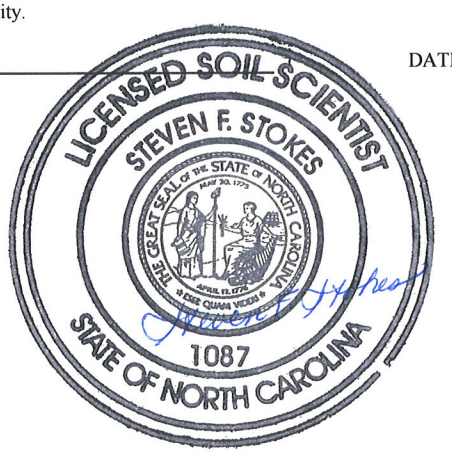
Client: KCI Associates of North Carolina, P.A. **Date:** February 28, 2012
Project: Bowl Basin **Project #:** 20111232P-WO_06
County: Onslow **State:** NC
Location: White Oak River Road **Site/Lot:** Boring # 3
Soil Series: Pantego
Soil Classification: Fine-loamy, siliceous, semiactive, thermic Umbric Paleaquults
AWT: 50" **SHWT:** 0-12" **Slope:** 0-1% **Aspect:**
Elevation: **Drainage:** Very Poorly Drained **Permeability:** Moderate
Vegetation: Corn
Borings terminated at 60 **Inches**

HORIZON	DEPTH (IN)	MATRIX	MOTTLES	TEXTURE	STRUCTURE	CONSISTENCE	BOUNDARY	NOTES
Ap	0-10	10YR 2/1		fsl	1fgr	mfr	gw	
A1	10-14	10YR 2/1		sl	1fgr	mfr	cs	
Btg1	14-26	10YR 4/1	10YR 5/6c1d	scl	2fsbk	mfr	gw	
Btg2	26-42	10YR 5/2	10YR 5/6f1d	scl	1csbk	mfr	gs	
Btg3	42-48	10YR 5/2	7.5YR 5/8c2d	sc	2msbk	mfi	gs	
Cg1	48-53	10YR 5/1	7.5YR 5/8c2d	c	massive	mfi	gw	
Cg2	53-60	10YR 5/1		sc	massive	mfi		

COMMENTS:

The Pantego series is a very poorly drained soil found on nearly level and slightly depressional areas of the Southern Coastal Plain and Atlantic Coast Flatwoods.
This Pantego series is a drained hydric soil by ditching.
This Pantego soil has very slow runoff and moderate permeability.

DESCRIBED BY: SFS DATE: 2/28/2012



KCI ASSOCIATES OF NORTH CAROLINA, PA

SOIL PROFILE DESCRIPTION

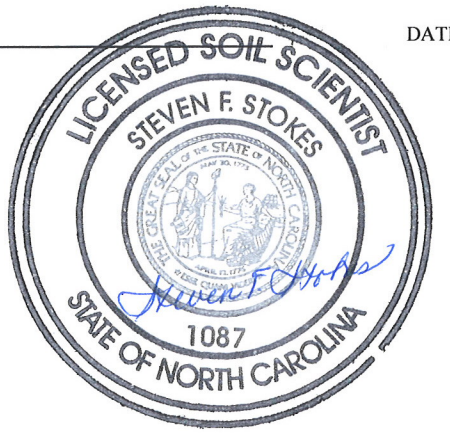
Client: KCI Associates of North Carolina, P.A. **Date:** February 28, 2012
Project: Bowl Basin **Project #:** 20111232P-WO_06
County: Onslow **State:** NC
Location: White Oak River Road **Site/Lot:** Boring # 4
Soil Series: Pantego
Soil Classification: Fine-loamy, siliceous, semiactive, thermic Umbric Paleaquults
AWT: 23" **SHWT:** 0-12" **Slope:** 0-1% **Aspect:**
Elevation: **Drainage:** Very Poorly Drained **Permeability:** Moderate
Vegetation: Corn
Borings terminated at 50 **Inches**

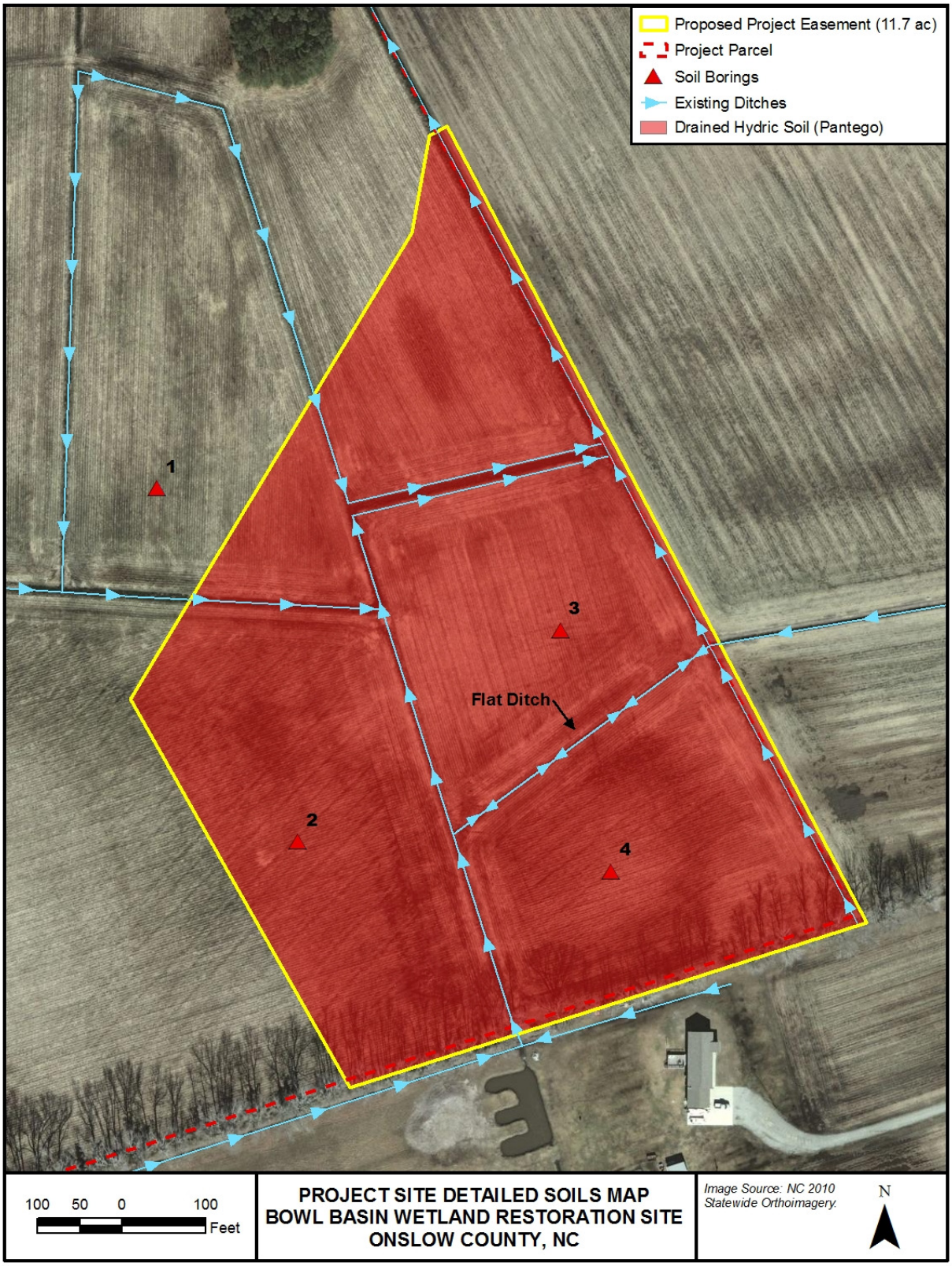
HORIZON	DEPTH (IN)	MATRIX	MOTTLES	TEXTURE	STRUCTURE	CONSISTENCE	BOUNDARY	NOTES
Ap	0-9	10YR 2/1		fsl	1fgr	mfr	gw	
A1	9-15	10YR 4/1	10YR 5/8c2f	scl	1fsbk	mfr	cs	
Btg1	15-30	10YR 4/2	10YR 5/4c2d	scl	2fsbk	mfr	gw	
Btg2	30-39	10YR 5/2		scl	1csbk	mfr	gs	
Btg3	39-42	10YR 5/1	10YR 6/6c2d	sc	1csbk	mfi	gs	
Cg	42-50	6/10Y	10YR 5/6c2d	sc	massive	mfi		

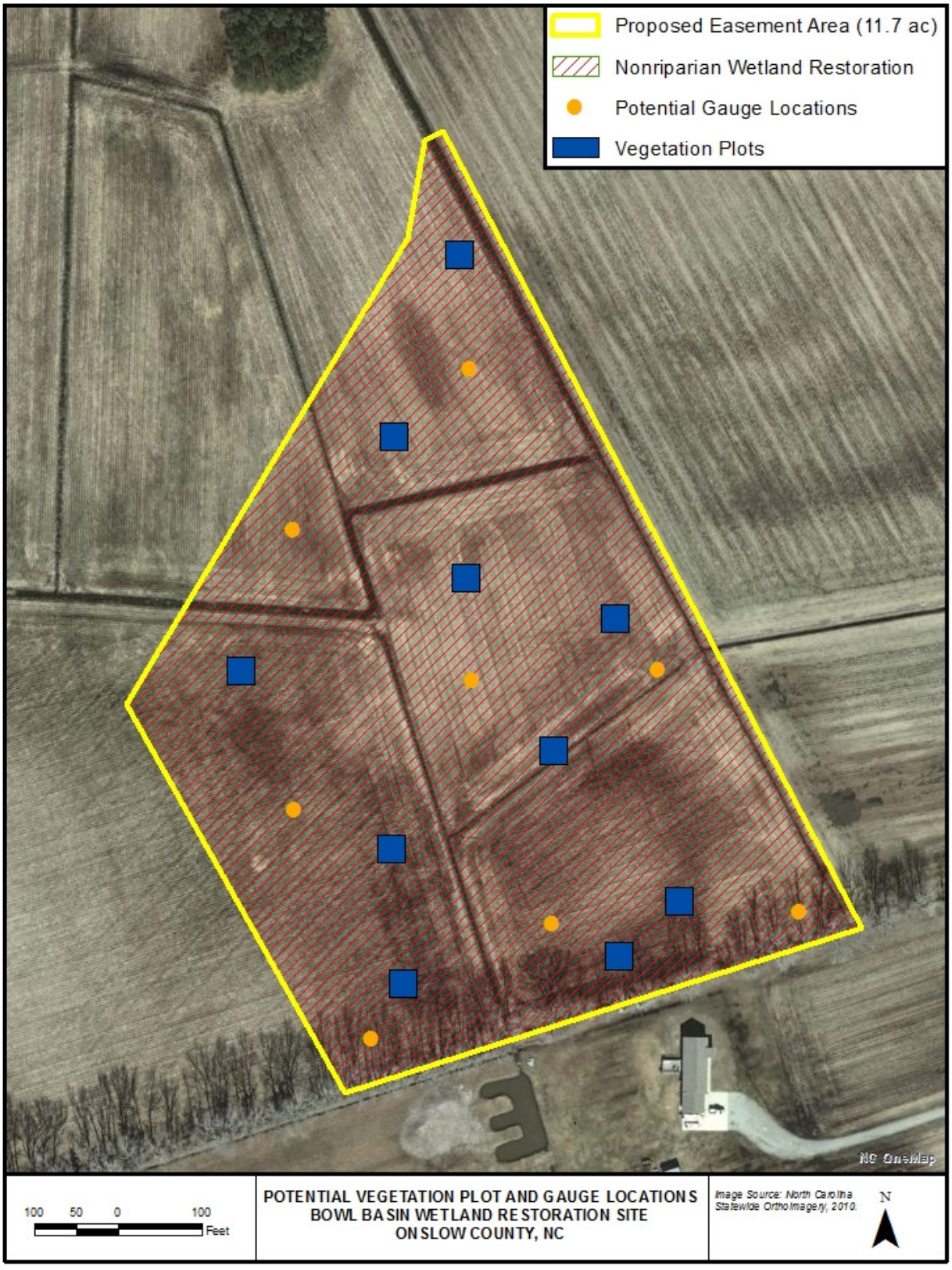
COMMENTS:

The Pantego series is a very poorly drained soil found on nearly level and slightly depressional areas of the Southern Coastal Plain and Atlantic Coast Flatwoods.
This Pantego series is a drained hydric soil by ditching.
This Pantego soil has very slow runoff and moderate permeability.

DESCRIBED BY: SFS DATE: 2/28/2012




Proposed Project Easement (11.7 ac)
Project Parcel
Soil Borings
Existing Ditches
Drained Hydric Soil (Pantego)
1
2
3
4
Flat Ditch
100 50 0 100
Feet
PROJECT SITE DETAILED SOILS MAP
BOWL BASIN WETLAND RESTORATION SITE
ONSLOW COUNTY, NC
Image Source: NC 2010 Statewide Orthoimagery
N


Proposed Easement Area (11.7 ac)
Nonriparian Wetland Restoration
Potential Gauge Locations
Vegetation Plots
NC OneMap
100 50 0 100
Feet
POTENTIAL VEGETATION PLOT AND GAUGE LOCATIONS
BOWL BASIN WETLAND RESTORATION SITE
ONSLOW COUNTY, NC
Image Source: North Carolina Statewide Orthoimagery, 2010.
N

14.6 Appendix D. Project Plan Sheets

KCI JOB# : 20122939

CONTRACT #: 005012

STATE OF NORTH CAROLINA
ECOSYSTEM ENHANCEMENT PROGRAM

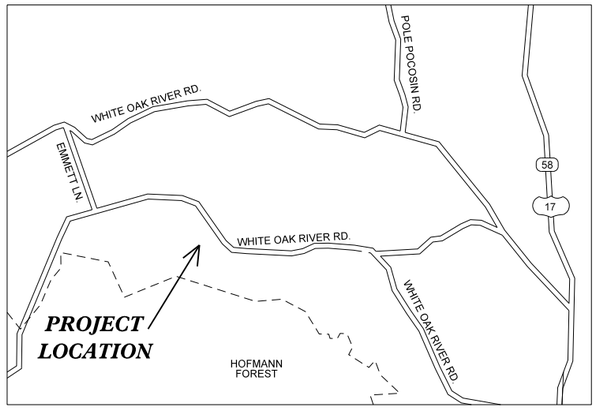
STATE	CONTRACT NUMBER	SHEET NO.	TOTAL SHEETS
N.C.	005012	1	10

SYM.	DESCRIPTION	DATE	APPROVED
A	SUBMITTED WITH MITIGATION PLAN	MAY 2013	
REVISIONS			

BOWL BASIN RESTORATION SITE

ONSLOW COUNTY, NORTH CAROLINA
WHITE OAK RIVER BASIN

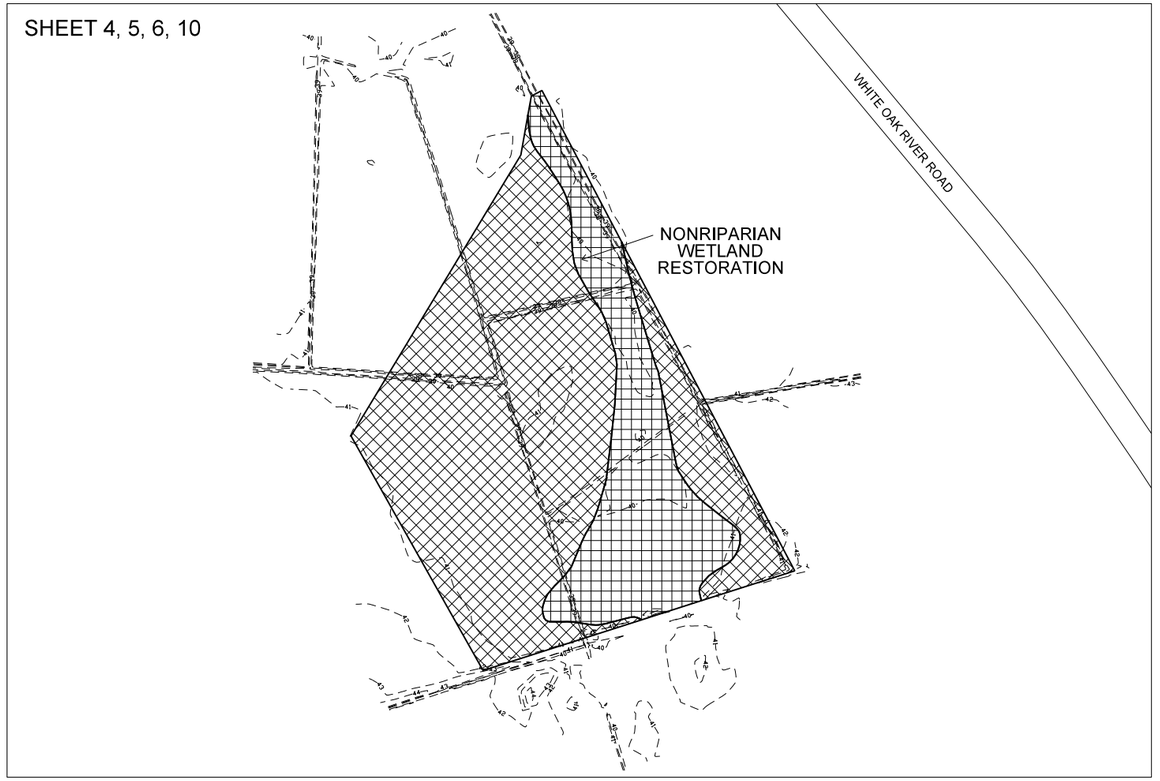
UPPER WHITE OAK RIVER WATERSHED
03020106010010



VICINITY MAP
NOT TO SCALE

FROM RALEIGH TAKE I-40 EAST. TAKE EXIT 309 TO MERGE ONTO US-70 EAST. FOLLOW US-70 EAST TO KINSTON. AT KINSTON TAKE A RIGHT ONTO NORTH CAROLINA 58 SOUTH AND FOLLOW FOR APPOX. 30 MILES. TURN RIGHT ONTO COUNTRY ROAD 1119 / DAVIS FIELD ROAD. TAKE THE FIRST LEFT ONTO STATE COUNTRY ROAD 1115/POLE POCOSIN ROAD AND FOLLOW FOR 4 MILES. TURN LEFT ONTO STATE ROUTE 1116 / WHITE OAK RIVER ROAD AND FOLLOW FOR 2 MILES. TURN RIGHT ONTO COUNTRY ROAD 1118 / GIBSON BRIDGE ROAD AND FOLLOW FOR 1.8 MILES. TURN RIGHT ONTO WHITE OAK RIVER ROAD. ACCESS TO THE SITE WILL BE 3 MILES DOWN ON THE LEFT, JUST PAST THE DRIVEWAY AT 2457 WHITE OAK RIVER ROAD

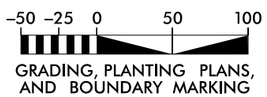
SHEET 4, 5, 6, 10



NC GRID NAD 83

INDEX OF SHEETS

GRAPHIC SCALES



GRADING, PLANTING PLANS, AND BOUNDARY MARKING

PROJECT DATA

NONRIPARIAN WETLAND RESTORATION = 11.74 ACRES

Prepared in the Office of:

KCI Associates of North Carolina, P.A.
SUITE 220 LANDMARK CENTER II, 4601 SIX FORKS RD., RALEIGH, NC 27609
ENGINEERS • PLANNERS • ECOLOGISTS

GARY M. MRYNCZA, P.E.
PROJECT ENGINEER

JOE PFEIFFER
WETLAND DESIGN

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 32733 ENGINEER GARY MICHAEL MRYNCZA

P.E.
SIGNATURE:

Prepared for:

Ecosystem Enhancement PROGRAM

JEFF JUREK
CONTRACT ADMINISTRATOR

GENERAL NOTES

BEARING AND DISTANCES:
ALL BEARINGS ARE NAD 1983 GRID BEARINGS.
ALL DISTANCES AND COORDINATES SHOWN ARE HORIZONTAL (GROUND) VALUES.
ALL INFORMATION IS BASED ON THE FOLLOWING KCI CONTROL POINTS.

	NORTHING	EASTING	ELEVATION
KCI#1	431663.37	2502919.11	40.71
KCI#2	431132.74	2504613.14	44.41
KCI#3	430815.65	2504045.12	42.00
KCI#4	432506.51	2502946.29	39.20

GRADING:
-PROPOSED GRADE LINES IN THE PLANS ARE A GENERAL GUIDE FOR GRADING. EXACT TIE OUTS FROM THE DITCH TO THE RESTORED WETLAND SHALL BE GRADED UNDER THE DIRECTION OF THE ENGINEER.

UTILITY/SUBSURFACE PLANS:
-NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. EXISTING UNDERGROUND UTILITIES HAVE NOT BEEN VERIFIED. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING A UTILITY LOCATOR AND ESTABLISHING THE EXACT LOCATION OF ANY AND ALL EXISTING UTILITIES IN THE PROJECT REACH.

NORTH CAROLINA PROFESSIONAL SEAL 32733 ENGINEER GARY MICHAEL MARYNCZA

PROJECT LEGEND

WETLAND MITIGATION

Proposed Filled Ditches .....

Proposed Ditch Plug .....

Proposed Stabilized Drainage Outfall .....

TOPOGRAPHY

Minor Contour Line .....

Major Contour Line 720

Proposed Contour .....

MISCELLANEOUS

Existing Woods Line .....

A	SUBMITTED WITH MITIGATION PLAN		MAY 2013
		DESCRIPTION	DATE
SYM.	REVISIONS		APPROVED

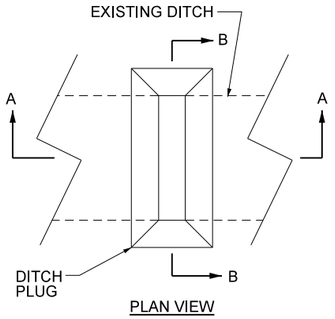
Ecosystem Enhancement Program

KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4601 SIX FORKS ROAD, SUITE 220
RALEIGH, NORTH CAROLINA 27609

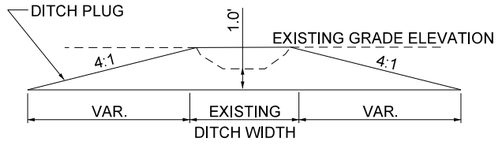
BOWL BASIN
RESTORATION SITE
ONSLOW COUNTY, NORTH CAROLINA

DATE: MAY 2013
SCALE: N.T.S.

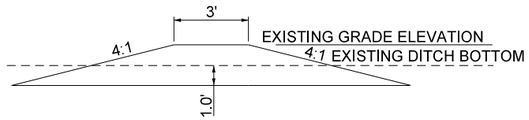
GENERAL NOTES & PROJECT LEGEND



PLAN VIEW



SECTION B-B

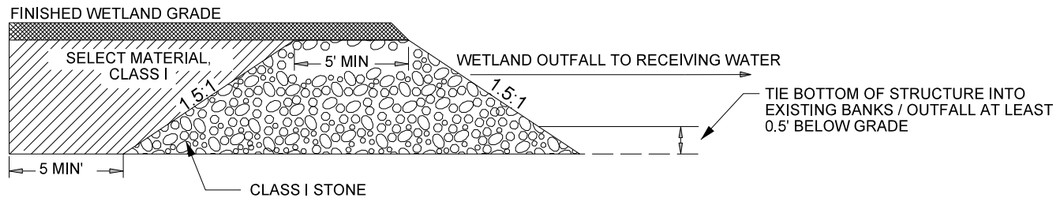


SECTION A-A

DITCH PLUG DETAIL

SCALE: NTS

NOTE:
SEE PLAN SHEETS FOR LOCATIONS OF DITCH PLUGS.
USE SELECT MATERIAL, CLASS I OR SUITABLE
SALVAGED MATERIAL, IF AVAILABLE FOR DITCH PLUGS.



PROFILE VIEW

STABILIZED DRAINAGE OUTFALL

SCALE: NTS

NOTE:
IF AVAILABLE SUITABLE SALVAGED MATERIAL
MAY BE SUBSTITUTED FOR SELECT MATERIAL, CLASS I.

NORTH CAROLINA PROFESSIONAL SEAL 32733 ENGINEER GARY MICHAEL MARYNCZA

A	SUBMITTED WITH MITIGATION PLAN	SWL	DESCRIPTION	MAY 2013
			DATE	APPROVED

REVISIONS

Ecosystem Enhancement Program

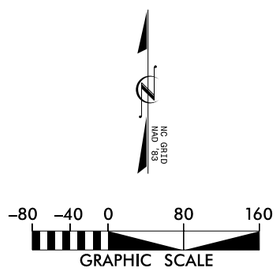
KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4601 SIX FORKS ROAD, SUITE 220
RALEIGH, NORTH CAROLINA 27609

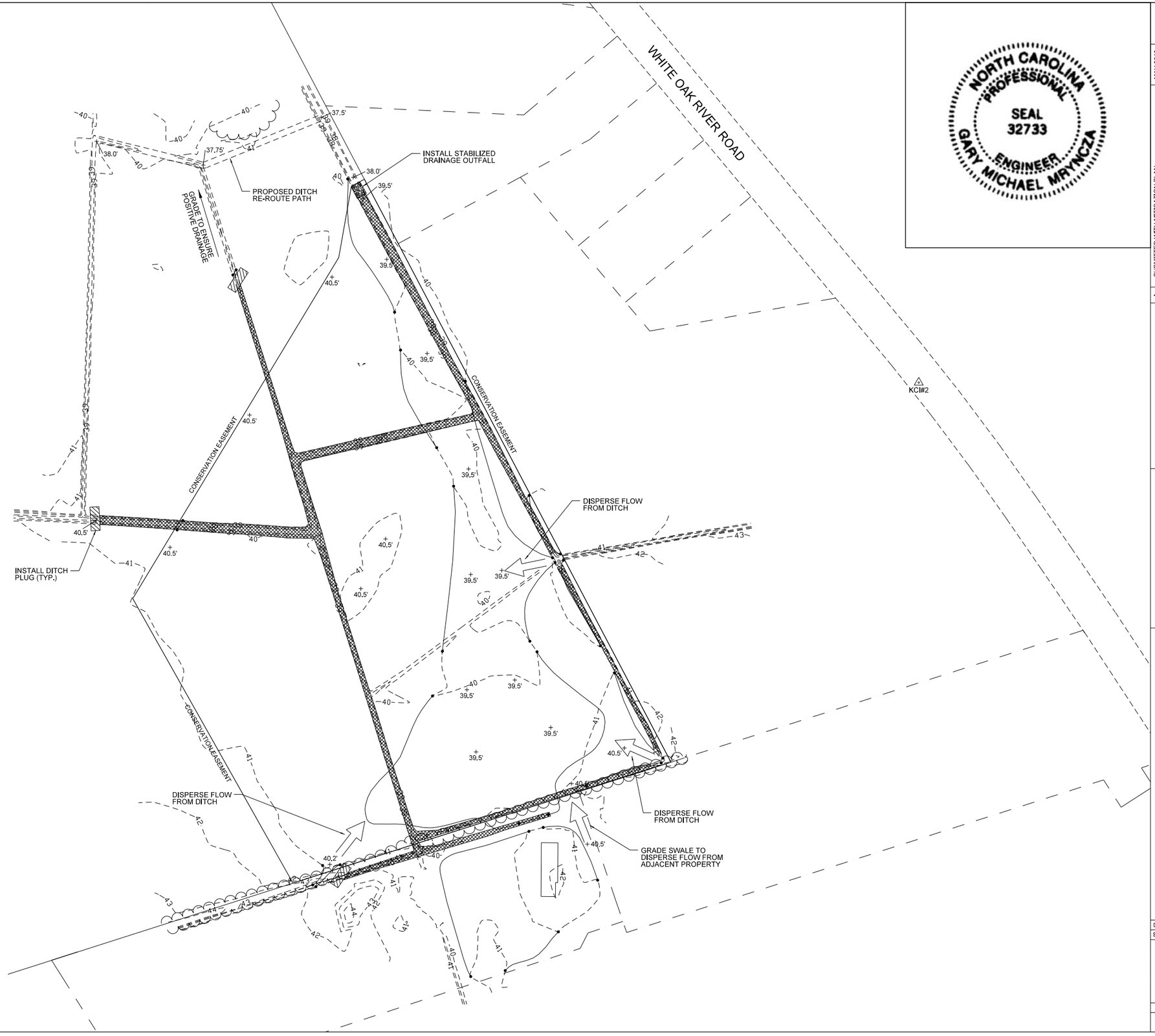
BOWL BASIN
RESTORATION SITE
ONSLOW COUNTY, NORTH CAROLINA

DATE: MAY 2013
SCALE: N.T.S.

DETAILS

SHEET 3 OF 10





NOTE: SURFACE ROUGHENING WILL OCCUR THROUGHOUT THE EASEMENT TO ALLEVIATE SOIL COMPACTION AND TO ENHANCE SURFACE WATER STORAGE.

NORTH CAROLINA PROFESSIONAL SEAL 32733 ENGINEER GARY MICHAEL MARYNCZA

REVISIONS

	DESCRIPTION	DATE	APPROVED
A	SUBMITTED WITH MITIGATION PLAN	MAY 2013	

Ecosystem Enhancement Program

KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4601 SIX FORKS ROAD, SUITE 220
RALEIGH, NORTH CAROLINA 27609

BOWL BASIN
RESTORATION SITE
ONSLOW COUNTY, NORTH CAROLINA

DATE: MAY 2013
SCALE: GRAPHIC

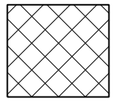
GRADING PLAN

SHEET 4 OF 10

NC GRID
NAD 83

–80 –40 0 80 160

GRAPHIC SCALE



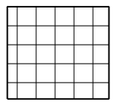
WETLAND PLANTING PLAN

NON-RIPARIAN WETLAND RESTORATION
HARDWOOD FLATS VEGETATIVE COMMUNITY (SEASONALLY SATURATED)
8.53 AC

18" - 24" BARE ROOT MATERIAL
968 STEMS/ACRE (9' X 5' SPACING), RANDOM SPECIES PLACEMENT

COMMON NAME	SCIENTIFIC NAME	WETLAND INDICATOR	% OF TOTAL	# OF PLANTS
SWAMP CHESTNUT OAK	QUERCUS MICHAUXII	FACW-	20	1,700
GREEN ASH	FRAXINUS PENNSYLNAVICA	FACW	20	1,700
WILLOW OAK	QUERCUS PHELLOS	FACW-	15	1,300
RIVER BIRCH	BETULA NIGRA	FACW	20	1,700
BALD CYPRESS	TAXODIUM DISTICHUM	OBL	10	900
RED MAPLE	ACER RUBRUM	FAC	5	400
LAUREL OAK	QUERCUS LAURIFOLIA	FACW	5	400
PEPPERBUSH	CLETHRA ALNIFOLIA	FACW	5	400
			100	8,300

NOTE: THE DISTRIBUTION OF THE STEMS MAY BE CHANGED AT THE ENGINEER'S DISCRETION. HOWEVER, ONE SPECIES MAY OCCUPY NO MORE THAN 25% OF THE TOTAL STEMS AND AT LEAST FIVE SPECIES MUST BE USED.



WETLAND PLANTING PLAN

NON-RIPARIAN WETLAND RESTORATION
HARDWOOD FLATS VEGETATIVE COMMUNITY (SEASONALLY INUNDATED)
3.21 AC

18" - 24" BARE ROOT MATERIAL
968 STEMS/ACRE (9' X 5' SPACING), RANDOM SPECIES PLACEMENT

COMMON NAME	SCIENTIFIC NAME	WETLAND INDICATOR	% OF TOTAL	# OF PLANTS
SWAMP CHESTNUT OAK	QUERCUS MICHAUXII	FACW-	15	500
GREEN ASH	FRAXINUS PENNSYLNAVICA	FACW	10	400
RIVER BIRCH	BETULA NIGRA	FACW	10	400
-BUTTONBUSH	-CEPHALANTHUS OCCIDENTALIS	-OBL	10	400
-SWAMP TUPELO	-NYSSA BIFLORA	-OBL	10	400
WATER TUPELO	NYSSA AQUATICA	OBL	15	500
BALD CYPRESS	TAXODIUM DISTICHUM	OBL	20	700
RED MAPLE	ACER RUBRUM	FAC	5	200
PEPPERBUSH	CLETHRA ALNIFOLIA	FACW	5	200
			100	3,200

NOTE: THE DISTRIBUTION OF THE STEMS MAY BE CHANGED AT THE ENGINEER'S DISCRETION. HOWEVER, ONE SPECIES MAY OCCUPY NO MORE THAN 25% OF THE TOTAL STEMS AND AT LEAST FIVE SPECIES MUST BE USED.

CONSERVATION EASEMENT

CONSERVATION EASEMENT

CONSERVATION EASEMENT

WHITE OAK RIVER ROAD

KC#2

NORTH CAROLINA PROFESSIONAL SEAL 32733 ENGINEER GARY MICHAEL MRYNCZA

REVISIONS

A	SUBMITTED WITH MITIGATION PLAN	SWL	MAY 2013
	DESCRIPTION	DATE	APPROVED

Ecosystem Enhancement Program

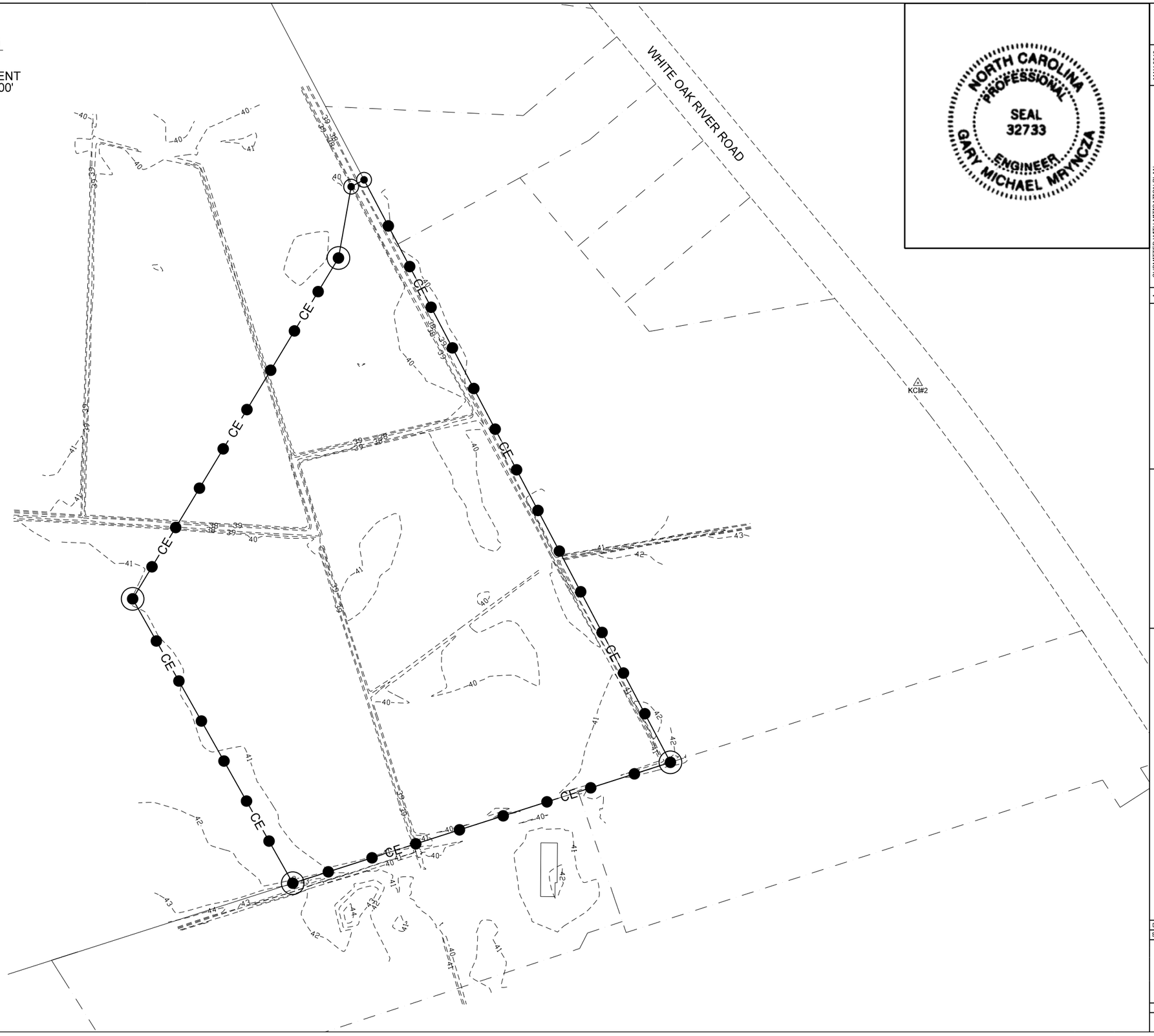
KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4901 SIX FORKS ROAD, SUITE 220
RALEIGH, NORTH CAROLINA 27609

BOWL BASIN
RESTORATION SITE
ONSLOW COUNTY, NORTH CAROLINA

DATE: MAY 2013
SCALE: GRAPHIC

PLANTING PLAN

SHEET 5 OF 10



EASEMENT BOUNDARY MARKING

THE EASEMENT BOUNDARY WILL BE MARKED
WITH METAL POSTS AND CONSERVATION EASEMENT
SIGNS AT THE CORNERS AND AT A MINIMUM OF 200'
INTERVALS ALONG THE BOUNDARY.

◉	5/8" REBAR 30" IN LENGTH WITH 3-1/4" ALUMINUM CAPS ON ALL EASEMENT CORNERS. CAPS SHALL MEET EEP SPECIFICATIONS (BERNSTEN RBD5325 IMPRINTED WITH NC STATE LOGO #B9087 OR EQUIVALENT). AFTER INSTALLATION, CAPS SHALL BE STAMPED WITH THE CORRESPONDING NUMBER.
●	6-FOOT TALL DURABLE WITNESS POST ALONG BOUNDARY OF CONSERVATION EASEMENT. POSTS SHALL BE MADE OF MATERIAL THAT WILL LAST A MINIMUM OF 20 YEARS. THE PROVIDER SHALL ATTACH A CONSERVATION EASEMENT SIGN TO EACH WITNESS POST AND PLACE ADDITIONAL SIGNS AT NO MORE THAN 75-FOOT INTERVALS ON BOUNDARY LINES.

NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 32733
GARY MICHAEL MRYNCZA

SYM.	DESCRIPTION	DATE	APPROVED
A	SUBMITTED WITH MITIGATION PLAN	MAY 2013	

REVISIONS

Ecosystem Enhancement PROGRAM

KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4601 SIX FORKS ROAD, SUITE 220
RALEIGH, NORTH CAROLINA 27609

BOWL BASIN
RESTORATION SITE
ONSLOW COUNTY, NORTH CAROLINA

DATE: MAY 2013
SCALE: GRAPHIC

BOUNDARY
MARKING
PLAN

SHEET 6 OF 10

NOTES:

1. IT IS THE INTENT OF THESE PLANS THAT AS SOON AS AN AREA OF GRADING IS COMPLETE IT SHALL BE STABILIZED IN ACCORDANCE WITH THE EROSION CONTROL PRACTICES DESCRIBED IN THESE PLANS.DUE TO THE ANTICIPATED DURATION AND SEQUENCE OF THE CONSTRUCTION ACTIVITIES, THE CONTRACTOR IS REQUIRED TO MINIMIZE, AS MUCH AS POSSIBLE, THE AMOUNT 0F THE AREA THAT IS DISTURBED AT ONE TIME.

2. THE CONTRACTOR SHALL EXERCISE EVERY REASONABLE PRECAUTION THROUGHOUT THE CONSTRUCTION OF THE PROJECT TO PREVENT EROSION AND SEDIMENTATION. EROSION CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE PROJECT PLANS, NORTH CAROLINA SEDIMENT AND EROSION CONTROL GUIDELINES AND AS DIRECTED BY THE DESIGNER.

3. ALL EXCAVATED MATERIAL SHALL BE STOCKPILED WITHIN THE LIMITS OF DISTURBANCE FOR LATER USE AS EMBANKMENT MATERIAL. THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING APPROPRIATE STABILIZATION MEASURES AROUND THE STOCKPILE AREA(S) AND ANY TEMPORARY OR PERMANENT SPOIL AND TOPSOIL PILES TO PREVENT EROSION AND SEDIMENTATION.

4. IN THE EVENT OF A STORM, THE CONTRACTOR WILL BE RESPONSIBLE FOR REMOVAL OR PROTECTION OF ANY EQUIPMENT, TOOLS, MATERIALS OR OTHER ITEMS NEEDED TO COMPLETE THE WORK THAT COULD BE AFFECTED BY STORMWATER.

5. AFTER THE WETLAND GRADING CALLED FOR IN THE PLANS IS COMPLETED, THE CONTRACTOR SHALL IMMEDIATELY INSTALL APPROPRIATE STABILIZATION MATERIALS AS CALLED FOR IN THE PLANS TO STABILIZE THE SOIL AND PROVIDE IMMEDIATE SEDIMENT/EROSION CONTROL.

6. EACH SEDIMENT CONTROL DEVICE WILL BE REMOVED AFTER ALL WORK IN THE CORRESPONDING CONSTRUCTION PHASE HAS BEEN COMPLETED AND THE AREAS HAVE BEEN STABILIZED.

7. THE CONSTRUCTION ENTRANCE AND STAGING AREA IDENTIFIED ON THE PLANS PROVIDE THE ONLY ACCESS POINTS INTO THE LIMITS OF DISTURBANCE. NO ADDITIONAL ACCESS POINTS SHALL BE USED WITHOUT APPROVAL OF THE DESIGNER.

8. SILT FENCE SHALL BE INSTALLED ON THE LOW SIDE OF ANY TEMPORARY OR PERMANENT SPOIL AND TOPSOIL PILES. ALL SPOIL MATERIAL SHALL STAY ON THE SITE AND SHALL NOT BE REMOVED FROM THE SUBJECT PROPERTY.

9. ALL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE CHECKED FOR STABILITY AND FUNCTIONAL OPERATION FOLLOWING EVERY RUNOFF PRODUCING RAIN EVENT AND/OR AT LEAST ONCE PER WEEK. ANY NEEDED MAINTENANCE OR REPAIRS SHALL BE MADE IMMEDIATELY TO MAINTAIN ALL MEASURES AS DESIGNED. ACCUMULATED SEDIMENT SHALL BE REMOVED FROM CONTROL MEASURES WHEN THEY REACH APPROXIMATELY 50% OF THEIR FUNCTIONAL CAPACITY. THESE MEASURES SHALL BE REPAIRED IF DISTURBED DURING MAINTENANCE. ALL SEEDED AREAS SHALL BE FERTILIZED, RESEEDED AND MULCHED, AS NECESSARY, TO PROMOTE THE ESTABLISHMENT OF VEGETATION COVER.

10. THE CONSTRUCTION MANAGER AND EROSION CONTROL CONTACT FOR THIS SITE IS TIM MORRIS. OFFICE PHONE - 919-783-9214 CELL PHONE - 919-793-6886

SEQUENCE OF CONSTRUCTION:

THE CONTRACTOR IS RESPONSIBLE FOR FOLLOWING THE SEQUENCE OF CONSTRUCTION IN ACCORDANCE WITH THE PLANS AND THE FOLLOWING PROVISIONS, AS DIRECTED BY THE DESIGNER. CONSTRUCTION SHALL PROCEED IN THE SPECIFIED MANNER UNLESS OTHERWISE DIRECTED OR APPROVED BY THE DESIGNER. THE FOLLOWING PROVISIONS, ALONG WITH THE INSTRUCTIONS CONTAINED IN THE PLANS, CONSTITUTE THE SEQUENCE OF CONSTRUCTION.

PHASE 1: INITIAL SITE PREPARATION
- A. IDENTIFY PROJECT BOUNDARY, LIMITS OF DISTURBANCE, SENSITIVE AREAS, STAGING AREAS, STABILIZED ENTRANCES, AND ACCESS POINTS WITH THE DESIGNER.
- B. CONSTRUCT ENTRANCE AND STAGING AREAS AND THEIR ASSOCIATED SEDIMENT AND EROSION CONTROL DEVICES IN A MANNER TO SUPPORT EXECUTION OF THE WETLAND RESTORATION IN PHASES AS INDICATED IN THE PLANS AND AS DIRECTED BY THE DESIGNER.

PHASE 2: RE-ROUTE DITCH
- A. GRADE NEW DITCH DIVERSION LOCATED AT NORTH SIDE OF PROJECT:
  - i. CLEAR VEGETATION AS NEEDED TO INSTALL SEDIMENT AND EROSION CONTROL MEASURES.
  - ii. COMPLETE DITCH GRADING AS DIRECTED IN THE PLANS.
  - iii. SEED AND MULCH COMPLETED WORK AREAS.
- B. INSTALL DITCH PLUG LOCATED AT WEST SIDE OF PROJECT TO COMPLETE WATER DIVERSION TOWARDS NEW RE-ROUTED DITCH. ENSURE NEW DITCH IS STABILIZED PRIOR TO INTRODUCING WATER.

PHASE 3: WETLAND RESTORATION GRADING (EAST AND SOUTH SIDES)
- A. FILL EXISTING DITCH AND COMPLETE GRADING (EAST SIDE)
  - i. INSTALL SEDIMENT AND EROSION CONTROL MEASURES AS DEPICTED ON THE PLANS.
  - ii. FILL DITCH 'B' AND 'C' AND GRADE AS INDICATED IN THE PLANS USING ADJACENT SPOIL MATERIAL, MAKING SURE TO DEWATER THE EXISTING DITCHES PRIOR TO FILLING.
  - iii. SEED AND MULCH COMPLETED WORK AREAS. THIS SHALL BE DONE WITHIN 72 HOURS OF REACHING FINAL GRADE WHEN FILLING DITCHES/DEPRESSIONS.
- B. PROPERTY GRADING AND FILLING EXISTING DITCH (SOUTH SIDE)
  - i. INSTALL SEDIMENT AND EROSION CONTROL MEASURES AS DEPICTED ON THE PLANS.
  - ii. GRADE SOUTHERN PROPERTY AS SHOWN ON PLANS.
  - iii. USING SPOIL FROM B-ii, FILL DITCH 'D' AS INDICATED IN THE PLANS, AND INSTALL ASSOCIATED DITCH PLUGS; MAKING SURE TO DEWATER THE EXISTING DITCHES PRIOR TO FILLING.
  - iv. SEED AND MULCH COMPLETED WORK AREAS. THIS SHALL BE DONE WITHIN 72 HOURS OF REACHING FINAL GRADE WHEN FILLING DITCHES/DEPRESSIONS.
- C. FILL EASTERN MOST DITCH
  - i. ONCE PHASE 3 - SECTION A AND B HAVE BEEN COMPLETED AND STABILIZED, REMOVE THE SILT FENCE ALONG DITCH 'A' AND FILL IT AS INDICATED IN THE PLANS USING PRIOR STOCKPILED SPOIL MATERIAL, MAKING SURE TO DEWATER THE EXISTING DITCHES PRIOR TO FILLING.
  - ii. INSTALL PROPOSED STABILIZED DRAINAGE OUTFALL STRUCTURE LOCATED AT THE END OF DITCH 'A'.
  - iii. SEED AND MULCH COMPLETED WORK AREAS. THIS SHALL BE DONE WITHIN 72 HOURS OF REACHING FINAL GRADE WHEN FILLING DITCHES/DEPRESSIONS.
- D. FILL EXISTING DITCH AND GRADING (WEST SIDE)
  - i. ONCE PHASE 3 - SECTION A, B AND C HAVE BEEN COMPLETED AND STABILIZED, REMOVE THE SILT FENCE ALONG DITCH 'E' AND FILL DITCHES 'E' AND 'F' AS INDICATED IN THE PLANS USING SPOIL MATERIAL; MAKING SURE TO DEWATER THE EXISTING DITCHES PRIOR TO FILLING.
  - ii. SEED AND MULCH COMPLETED WORK AREAS. THIS SHALL BE DONE WITHIN 72 HOURS OF REACHING FINAL GRADE WHEN FILLING DITCHES/DEPRESSIONS.
- E. SURFACE ROUGHENING
  - i. BEGINNING ON THE NORTH SIDE OF THE WETLAND RESTORATION AREA AND PROGRESSING TOWARDS THE SOUTHERN SIDE OF THE SITE, ROUGHEN THE SOIL TO AN APPROXIMATE DEPTH OF 8" TO ALLEVIATE COMPACTION AND MIMIC NATURAL WETLAND MICROTOPOGRAPHY. THIS WILL INCREASE THE STORAGE OF SURFACE WATER IN THE WETLAND AND PROMOTE VEGETATION ESTABLISHMENT.
  - ii. SEED AND MULCH COMPLETED WORK AREAS. THIS SHALL BE DONE WITHIN 72 HOURS OF SURFACE ROUGHENING.

PHASE 4: TREE PLANTING
- A. PLANTS SHOULD BE PLANTED DURING THE DORMANT SEASON (NOVEMBER 17 - MARCH 17).
- B. PREPARE AND PLANT TREES IN ACCORDANCE WITH PLAN SHEETS 7-10 AND AS DIRECTED BY THE DESIGNER.

PHASE 5: COMPLETION OF PROJECT SITE
- A. PHASE 5 CAN BE INITIATED AFTER THE WETLAND GRADING WORK IS COMPLETED, AFTER THE SITE IS STABLIZED WITH REQUIRED VEGETATIVE COVER, AND PRIOR TO PHASE 4.
- B. REMOVE ALL REMAINING WASTE MATERIALS, AND THE EROSION CONTROL MEASURES AND RESTORE THE REMAINING STAGING AND STOCKPILING AREAS AND CONSTRUCTION ENTRANCES TO THEIR PRIOR CONDITION. SEED AND MULCH ALL DISTURBED AREAS UTILIZING THE SEED/MULCH MIXES SPECIFIED IN THE PLANS.

GROUND STABILIZATION	
SITE AREA DESCRIPTION	STABILIZATION TIME FRAME
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS
HIGH QUALITY WATER (HQW) ZONES	7 DAYS
SLOPES STEEPER THAN 3:1	7 DAYS
SLOPES 3:1 OR FLATTER	7 DAYS
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	7 DAYS

INSPECTIONS

WEEKLY INSPECTIONS REQUIRED.

RAIN GAUGE MUST BE PRESENT AT SITE. INSPECTIONS REQUIRED AFTER 0.5" RAIN EVENTS.

INSPECTIONS ARE ONLY REQUIRED DURING "NORMAL BUSINESS HOURS".

INSPECTION REPORTS MUST BE AVAILABLE ON-SITE DURING BUSINESS HOURS UNLESS A SITE SPECIFIC EXEMPTION IS APPROVED.

RECORD MUST BE KEPT FOR 3 YEARS AND AVAILABLE UPON REQUEST.

ELECTRONICALLY-AVAILABLE RECORDS MAY BE SUBSTITUTED UNDER CERTAIN CONDITIONS.

SEDIMENTATION & EROSION CONTROL PLAN LEGEND

- DITCHES TO BE FILLED
- STABILIZED CONSTRUCTION ENTRANCE
- SILT FENCE — SF
- LIMITS OF DISTURBANCE — LOD
- BRIDGE MAT STREAM CROSSING
- ROCK SILT SCREEN (STD. DRAWING 1636.01)
- DITCH PLUG
- STABILIZED DRAINAGE OUTFALL

NORTH CAROLINA PROFESSIONAL SEAL 32733 ENGINEER GARY MICHAEL MRYNCZA

TEMPORARY SEED MIX

THE CONTRACTOR SHALL UTILIZE THE FOLLOWING SEED/FERTILIZER MIX IN SEEDING ALL DISTURBED AREAS WITHIN THE PROJECT LIMITS:

SUMMER MIX (MAY 15 - AUGUST 15)
- GERMAN MILLET. . . . . SETARIA ITALICA . . . . . 20 LBS / ACRE
- BROWNTOP MILLET. . . . UROCHLOA RAMOSA. . . . 20 LBS / ACRE

WINTER MIX (AUGUST 15 - MAY 15)
- RYE GRAIN. . . . . SECALE CEREALE. . . . . 120 LBS / ACRE

PERMANENT SEED MIX

SUMMER MIX (MAY 15 -- AUGUST 15)
WINTER MIX (AUGUST 15 -- MAY 15)

SPECIES	APPLICATION RATE (IN MIX) % OF MIX	LBS / ACRE
REDTOP PANICGRASS - PANICUM RIGIDULUM	28	5.6
BEAKED PANICGRASS - PANICUM ANCEPS	20	4.0
RIVER OATS - CHASMANTHIUM LATIFOLIUM	20	4.0
VIRGINIA WILDRYE - ELYMUS VIRGINICUS	20	4.0
SWITCHGRASS - PANICUM VIRGANTUM	10	2.0
LEATHERY RUSH - JUNCUS CORIACEUS	2	0.4
	100	20

FERTILIZER. . . . . 750 LBS / ACRE
LIMESTONE. . . . . 2000 LBS / ACRE

FERTILIZER SHALL BE 10-10-10 ANALYSIS. UPON SOIL ANALYSIS A DIFFERENT RATIO OF FERTILIZER MAY BE USED.

SEEDBED PREPARATION
THE SEEDBED SHALL BE COMPRISED OF LOOSE SOIL AND NOT COMPACTED. THIS MAY REQUIRE MECHANICAL LOOSENING OF THE SOIL. SOIL AMENDMENTS SHOULD FOLLOW THE FERTILIZER AND LIMING DESCRIPTION IN THE ABOVE SECTIONS. FOLLOWING SEEDING, MULCHING SHALL FOLLOW THE BELOW APPLICATION METHODS AND AMOUNTS. AREAS CONTAINING SEVERE SOIL COMPACTION WILL BE SCARIFIED TO A DEPTH OF 8 INCHES.

MULCHING

SEEDED AREAS ARE TO BE PROTECTED BY SPREADING STRAW MULCH UNIFORMLY TO FORM A CONTINUOUS BLANKET (75% COVERAGE = 2 TONS/ACRE).

NOTE: FERTILIZER IS ONLY TO BE APPLIED ONCE. IF TEMPORARY SEED AND FERTILIZER IS APPLIED PRIOR TO PERMANENT SEED, THEN FERTILIZER SHALL NOT BE APPLIED WITH THE PERMANENT SEED.

REVISIONS

SYM.	DESCRIPTION	DATE	APPROVED
	SUBMITTED WITH MITIGATION PLAN	MAY 2013	

Ecosystem Enhancement Program

KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4601 SIX FORKS ROAD, SUITE 220
RALEIGH, NORTH CAROLINA 27609

BOWL BASIN RESTORATION SITE
ONSLOW COUNTY, NORTH CAROLINA

DATE: MAY 2013
SCALE: N.T.S.

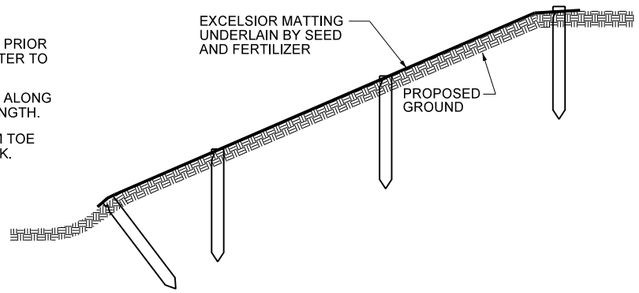
EROSION CONTROL PLAN

NOTES:

-MATTING SHALL BE INSTALLED PRIOR TO THE INTRODUCTION OF WATER TO RE-ROUTED DITCH SECTION.

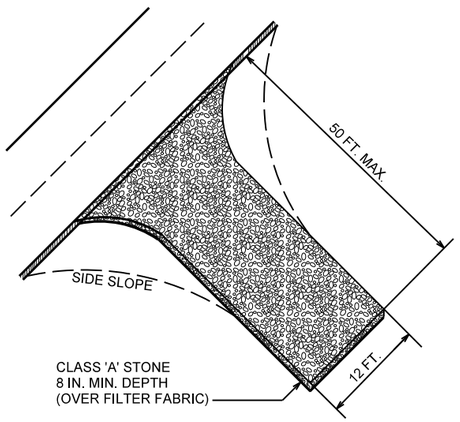
-MATTING SHALL BE INSTALLED ALONG BOTH SIDES OF NEW DITCH LENGTH.

-MATTING SHALL EXTEND FROM TOE OF SLOPE TO THE TOP OF BANK.



EXCELSIOR MATTING FOR RE-ROUTED DITCH

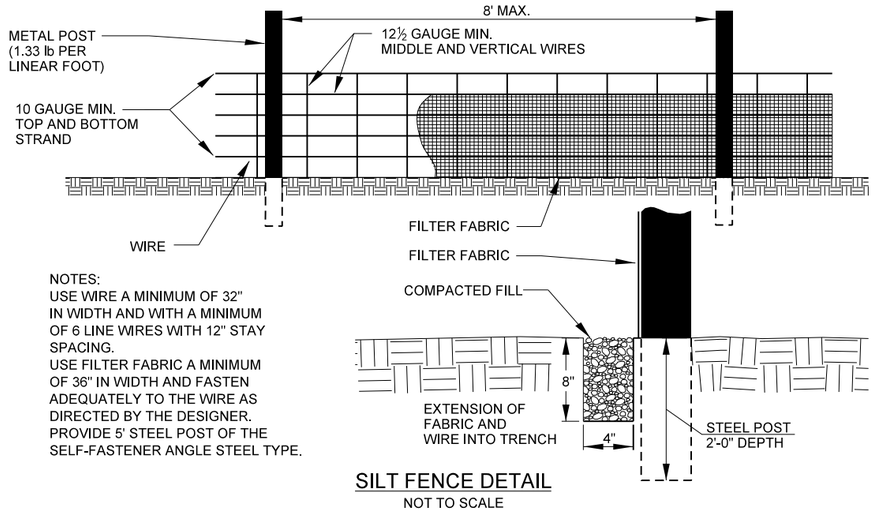
SCALE: NTS



NOTES:
1. TURNING RADIUS SUFFICIENT TO ACCOMODATE LARGE TRUCKS SHALL BE PROVIDED.
2. ENTRANCE(S) SHOULD BE LOCATED TO PROVIDE FOR UTILIZATION BY ALL CONSTRUCTION VEHICLES.
3. MUST BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR DIRECT FLOW OF MUD ONTO STREETS. PERIODIC TOPDRESSING WITH STONE WILL BE NECESSARY.
4. ANY MATERIAL TRACKED ONTO THE ROADWAY MUST BE CLEANED UP IMMEDIATELY.
5. GRAVEL CONSTRUCTION ENTRANCE SHALL BE LOCATED AT ALL POINTS OF INGRESS AND EGRESS UNTIL SITE IS STABILIZED. FREQUENT CHECKS OF THE DEVICE AND TIMELY MAINTENANCE MUST BE PROVIDED.
6. INSTALL A CULVERT IF NECESSARY TO ACCOMODATE ROADWAY DRAINAGE.
7. SIDE SLOPES FOR ENTRANCE MUST BE AT LEAST 2:1 SLOPE.

STABILIZED CONSTRUCTION ENTRANCE

SCALE: NTS



NOTES:
USE WIRE A MINIMUM OF 32" IN WIDTH AND WITH A MINIMUM OF 6 LINE WIRES WITH 12" STAY SPACING.
USE FILTER FABRIC A MINIMUM OF 36" IN WIDTH AND FASTEN ADEQUATELY TO THE WIRE AS DIRECTED BY THE DESIGNER. PROVIDE 5' STEEL POST OF THE SELF-FASTENER ANGLE STEEL TYPE.

SILT FENCE DETAIL

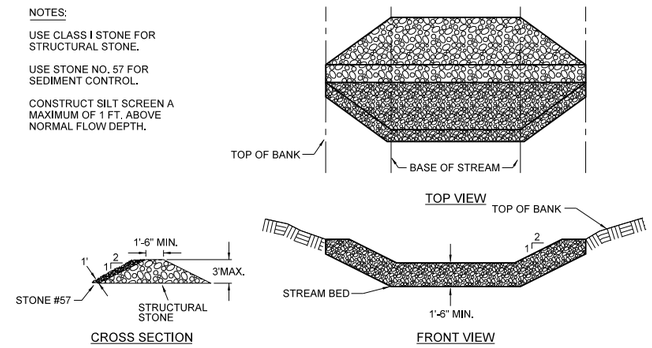
NOT TO SCALE

NOTES:

USE CLASS I STONE FOR STRUCTURAL STONE.

USE STONE NO. 57 FOR SEDIMENT CONTROL.

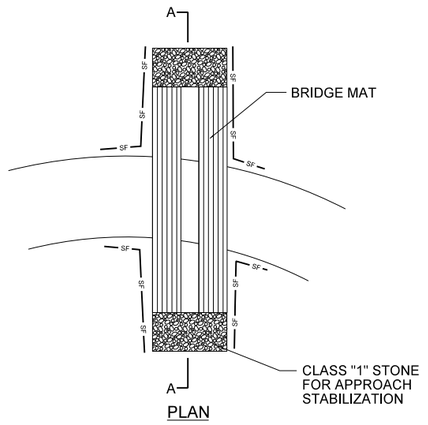
CONSTRUCT SILT SCREEN A MAXIMUM OF 1 FT. ABOVE NORMAL FLOW DEPTH.



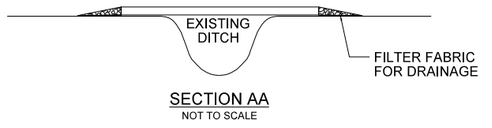
TEMPORARY ROCK SILT SCREEN

SCALE: NTS

DITCH CROSSING MAINTENANCE:
1. INSPECT TEMPORARY CROSSING AFTER EACH RAINFALL EVENT FOR ACCUMULATION OF DEBRIS, BLOCKAGE, EROSION OF ABUTMENTS AND OVERFLOW AREAS, DITCH SCOUR, RIPRAP DISPLACEMENT, OR PIPING ALONG CULVERTS.
2. REMOVE DEBRIS, REPAIR AND REINFORCE DAMAGED AREAS IMMEDIATELY TO PREVENT FURTHER DAMAGE TO THE INSTALLATION.



PLAN



SECTION AA
NOT TO SCALE

1. BRIDGE LOCATIONS DEPICTED ON SITE PLANS ARE APPROXIMATE AND ARE SUBJECT TO CHANGE DEPENDING ON THE AREA THAT IS BEING WORKED UPON.
2. WIDTH OF EACH MAT IS DEPENDENT ON THE SIZE OF THE EQUIPMENT MEANT TO CROSS IT.
3. DISTANCE BETWEEN MATS IS DEPENDENT ON THE DISTANCE BETWEEN TRACKS ON THE EQUIPMENT MEANT TO CROSS IT.
4. APPROACH STABILIZATION, COMPOSED OF CLASS 1 STONE, WILL BE REQUIRED FOR EACH SECTION OF THE BRIDGE.

BRIDGE MAT CROSSING

PLACE AS SPECIFIED IN THE PLANS AND APPROVED BY THE DESIGNER

NORTH CAROLINA PROFESSIONAL SEAL 32733 ENGINEER GARY MICHAEL MRYNCZA

REVISIONS

	DESCRIPTION	DATE	APPROVED
A	SUBMITTED WITH MITIGATION PLAN	MAY 2013	
	SVM.		

Ecosystem Enhancement Program

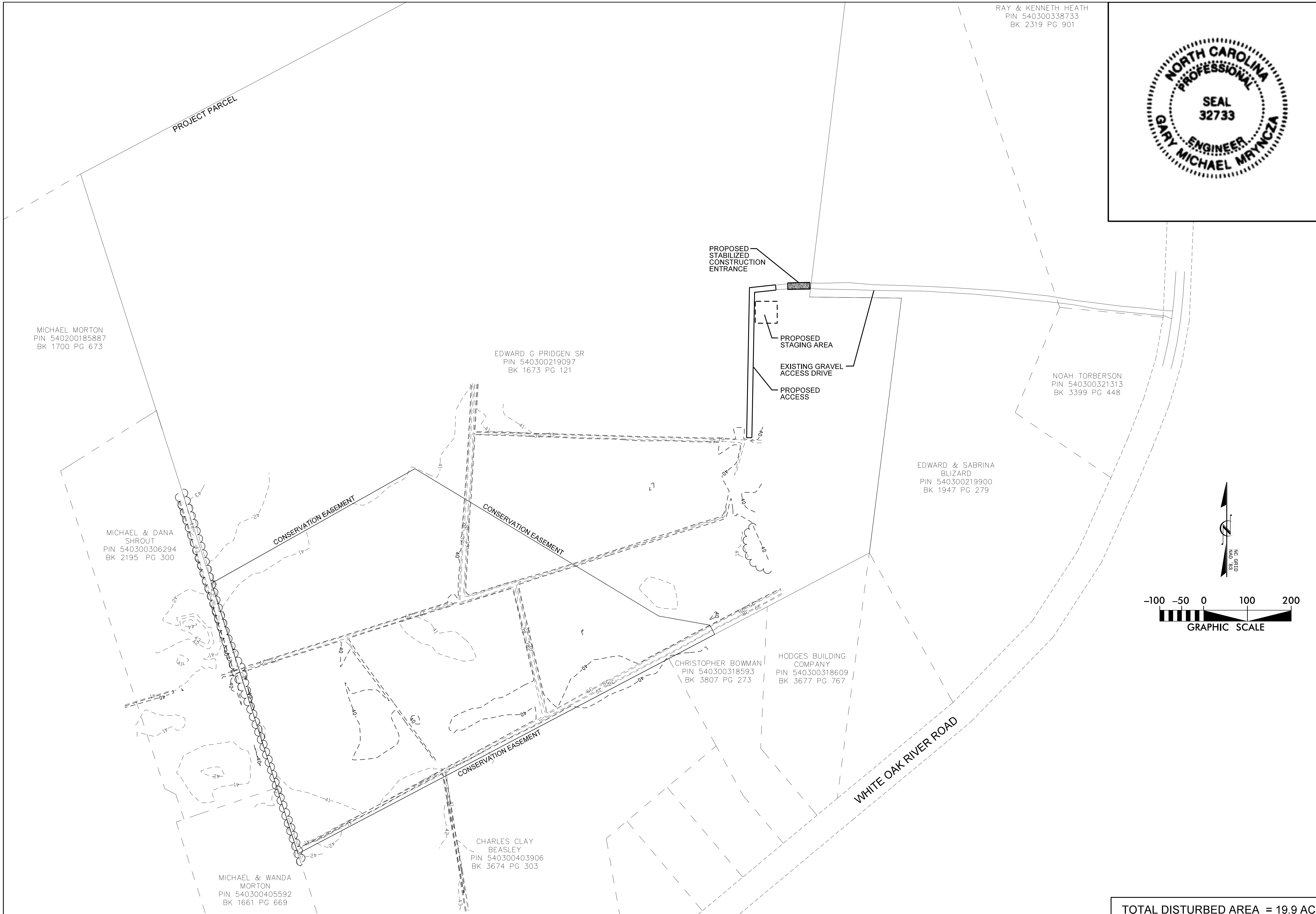
KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4601 SIX FORKS ROAD, SUITE 220
RALEIGH, NORTH CAROLINA 27609

BOWL BASIN
RESTORATION SITE
ONSLOW COUNTY, NORTH CAROLINA

DATE: MAY 2013
SCALE: N.T.S.

EROSION CONTROL PLAN

SHEET 8 OF 10


PROJECT PARCEL
RAY & KENNETH HEATH
PIN 540300338733
BK 2319 PG 901
NORTH CAROLINA PROFESSIONAL SEAL 32733 ENGINEER GARY MICHAEL MRYNCZA
PROPOSED STABILIZED CONSTRUCTION ENTRANCE
PROPOSED STAGING AREA
EXISTING GRAVEL ACCESS DRIVE
PROPOSED ACCESS
MICHAEL MORTON
PIN 540200185887
BK 1700 PG 673
EDWARD G PRIDGEN SR
PIN 540300219097
BK 1673 PG 121
NOAH TORBERSON
PIN 540300321313
BK 3399 PG 448
EDWARD & SABRINA BLIZARD
PIN 540300219900
BK 1947 PG 279
MICHAEL & DANA SHROUT
PIN 540300306294
BK 2195 PG 300
CONSERVATION EASEMENT
CONSERVATION EASEMENT
CONSERVATION EASEMENT
NC GRID NAD 83
−100 −50 0 100 200
GRAPHIC SCALE
CHRISTOPHER BOWMAN
PIN 540300318593
BK 3807 PG 273
HODGES BUILDING COMPANY
PIN 540300318609
BK 3677 PG 767
WHITE OAK RIVER ROAD
CHARLES CLAY BEASLEY
PIN 540300403906
BK 3674 PG 303
MICHAEL & WANDA MORTON
PIN 540300405592
BK 1661 PG 669

TOTAL DISTURBED AREA = 19.9 AC

SYM.	DESCRIPTION	DATE	APPROVED
A	SUBMITTED WITH MITIGATION PLAN	MAY 2013	

REVISIONS

Ecosystem Enhancement PROGRAM

KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4601 SIX FORKS ROAD, SUITE 220
RALEIGH, NORTH CAROLINA 27609

BOWL BASIN RESTORATION SITE
ONSLOW COUNTY, NORTH CAROLINA

DATE: MAY 2013
SCALE: GRAPHIC

EROSION CONTROL PLAN

SHEET 9 OF 10

EXISTING GRAVEL ACCESS DRIVE
PROPOSED STABILIZED CONSTRUCTION ENTRANCE
PROPOSED ACCESS
PROPOSED STAGING AREA
LOD
SF
TO WHITE OAK RIVER
WHITE OAK RIVER ROAD
PROPOSED DITCH RE-ROUTE PATH
INSTALL STABILIZED DRAINAGE OUTFALL
INSTALL TEMPORARY BRIDGE MAT CROSSING
PROPOSED SPOIL PILE (TYP.)
INSTALL ROCK SILT SCREEN (TYP)
INSTALL DITCH PLUG (TYP.)
DITCH 'A'
DITCH 'B'
DITCH 'C'
DITCH 'D'
DITCH 'E'
DITCH 'F'
CONSERVATION EASEMENT
KCI#2

NOTE: TEMPORARY BRIDGE MAT CROSSING MAY BE MOVED AS NECESSARY AND AS APPROVED BY THE DESIGNER.

NC GRID NAD 83

–80 –40 0 80 160
GRAPHIC SCALE

NORTH CAROLINA PROFESSIONAL SEAL 32733 ENGINEER GARY MICHAEL MRYNCZA

REVISIONS

	DESCRIPTION	DATE	APPROVED
A	SUBMITTED WITH MITIGATION PLAN	MAY 2013	

Ecosystem Enhancement Program

KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4601 SIX FORKS ROAD, SUITE 220
RALEIGH, NORTH CAROLINA 27609

BOWL BASIN RESTORATION SITE

ONSLOW COUNTY, NORTH CAROLINA

DATE: MAY 2013
SCALE: GRAPHIC

EROSION CONTROL PLAN

SHEET 10 OF 10