

NATURAL RESOURCES TECHNICAL REPORT

**Replace Bridge 245 on SR 2054 (Marshbanks Street) over East Buies Creek
Harnett County, North Carolina**

**TIP B-5711
WBS Element No. 45665.1.1**



**THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Project Development and Environmental Analysis Unit
Natural Environment Section**

June 2016

TABLE OF CONTENTS

1.0 INTRODUCTION.....	1
2.0 METHODOLOGY AND QUALIFICATIONS	1
3.0 PHYSICAL RESOURCES	1
3.1 Soils	2
3.2 Water Resources	2
4.0 BIOTIC RESOURCES.....	2
4.1 Terrestrial Communities.....	2
4.1.1 Maintained/Disturbed.....	3
4.1.2 Pine Plantation	3
4.1.3 Coastal Plain Semipermanent Impoundment	3
4.1.4 Coastal Plain Levee Forest.....	3
4.1.5 Terrestrial Community Impacts	3
4.2 Terrestrial Wildlife	4
4.3 Aquatic Communities.....	4
4.4 Invasive Species.....	4
5.0 JURISDICTIONAL ISSUES	4
5.1 Clean Water Act Waters of the U.S.	4
5.2 Clean Water Act Permits	5
5.3 Coastal Area Management Act Areas of Environmental Concern	5
5.4 Construction Moratoria	6
5.5 N.C. River Basin Buffer Rules.....	6
5.6 Rivers and Harbors Act Section 10 Navigable Waters.....	6
5.7 Wetland and Stream Mitigation.....	6
5.7.1 Avoidance and Minimization of Impacts.....	6
5.7.2 Compensatory Mitigation of Impacts	6
5.8 Endangered Species Act Protected Species	6
5.9 Bald Eagle and Golden Eagle Protection Act.....	8
5.10 Endangered Species Act Candidate Species	9
5.11 Essential Fish Habitat.....	9
6.0 REFERENCES.....	10

Appendix A Figures

- Figure 1. Vicinity Map
- Figure 2. Project Study Area Map
- Figure 3. Jurisdictional Features Map
- Figure 4. Natural Communities Map

Appendix B Scientific Names of Species Identified in Report

Appendix C Stream and Wetland Forms

Appendix D Qualifications of Contributors

LIST OF TABLES

Table 1. Soils in the study area	2
Table 2. Water resources in the study area	2
Table 3. Physical characteristics of water resources in the study area.....	2
Table 4. Coverage of terrestrial communities in the study area.....	4
Table 5. Jurisdictional characteristics of water resources in the study area	5
Table 6. Jurisdictional characteristics of wetlands in the study area	5
Table 7. Federally protected species listed for Harnett County	7

1.0 INTRODUCTION

The North Carolina Department of Transportation (NCDOT) proposes to replace bridge number 245 on SR 2054 (Marshbanks Street) over East Buies Creek (TIP B-5711) in Harnett County (Figure 1). The following Natural Resources Technical Report (NRTR) has been prepared to assist in the preparation of a Categorical Exclusion (CE) for the proposed project.

2.0 METHODOLOGY AND QUALIFICATIONS

All work was conducted in accordance with the NCDOT Natural Environment Section standard operating procedures and July 2012 NRTR template. Field work was conducted on February 17, 2016. Jurisdictional areas were verified by Liz Hair of the U.S. Army Corps of Engineers (USACE) and Mason Herndon of North Carolina Division of Water Resources (NCDWR). The principal personnel contributing to this document were:

Investigator:	Kim Hamlin
Education:	M.S. Natural Resources, 2011
Experience:	Project Scientist, SEPI Engineering, 2012-Present
Responsibilities:	Wetland and stream delineations, natural communities assessment, T&E species assessment, and document preparation

Investigator:	Wendee Smith
Education:	B.S. Natural Resources: Ecosystem Assessment, 1999
Experience:	Environmental Director, SEPI Engineering, 2015-Present Environmental Group Manager, Mulkey, Inc. 2005-2015 Environmental Scientist, HSMM, 2001-2005 Environmental Scientist, LandMark Design Group, 1999-2001 Natural Systems Specialist, NCDOT, 1999
Responsibilities:	Natural communities assessment, T&E species assessment, GIS and document preparation

Additional personnel who contributed to portions of the field work and/or documentation for this project included Susan Westberry and Travis Howell. Appendix D lists the qualifications of these contributors.

3.0 PHYSICAL RESOURCES

The study area lies in the coastal plain physiographic region of North Carolina (Figure 2). Topography in the project vicinity is comprised mostly of uplands and of gently rolling hills into a narrow floodplain along the stream. Elevations in the study area range from approximately 140 to 160 ft. above sea level. Land use in the project vicinity consists of a mix containing agriculture, residential and commercial development, and forestland.

3.1 Soils

The Harnett County Soil Survey identifies three soil types within the study area (Table 1).

Table 1. Soils in the study area

Soil Series	Mapping Unit	Drainage Class	Hydric Status
Altavista fine sandy loam	AtA	Moderately well drained	Nonhydric
Bibb loam	Bb	Poorly drained	Hydric
Nason silt loam	NeE	Well drained	Nonhydric

3.2 Water Resources

Water resources in the study area are part of the Cape Fear River basin [U.S. Geological Survey (USGS) Hydrologic Unit 03030004]. Two streams were identified in the study area (Table 2). The location of each water resource is shown in Figure 3. The physical characteristics of these streams are provided in Table 3.

Table 2. Water resources in the study area

Stream Name	Map ID	NCDWQ Index Number	Best Usage Classification
East Buies Creek	East Buies Creek	18-18-1-(2)	WS-IV
UT to East Buies Creek	SB	18-18-1-(2)	WS-IV

Table 3. Physical characteristics of water resources in the study area

Map ID	Bank Height (ft)	Bankful Width (ft)	Water Depth (in)	Channel Substrate	Velocity	Clarity
East Buies Creek	2-4	20-30	36+	Silt, Sand	Moderate	Slightly turbid
SB	0.5-1	1-2	4-8	Sand, Gravel	Slow	Slightly turbid

There are no designated Outstanding Resource Waters (ORW), High Quality Waters (HQW), or water supply watersheds (WS-I or WS-II) within 1.0 mile downstream of the study area. There are no designated anadromous fish waters or Primary Nursery Areas (PNA) present in the study area. East Buies Creek does not appear on the North Carolina 2014 Final 303(d) list of impaired waters.

4.0 BIOTIC RESOURCES

4.1 Terrestrial Communities

Four terrestrial communities were identified in the study area: maintained/disturbed, pine plantation, coastal plain semipermanent impoundment, and coastal plain levee forest. Figure 4 shows the location and extent of these terrestrial communities in the study area.

A brief description of each community type follows. Scientific names of all species identified are included in Appendix B.

4.1.1 Maintained/Disturbed

Maintained/disturbed areas are scattered throughout the study area in places where the vegetation is periodically mowed, such as roadside shoulders, residential lawns, and sewer easements. The vegetation in this community is comprised of low growing grasses and herbs, including fescue, clover, wild onion, winged sumac, wild geranium, and henbit.

4.1.2 Pine Plantation

The northeast quadrants of the study area is occupied by a small area of pine plantation. This young community's overstory is loblolly pine and its understory is primarily composed of sweetgum, Chinese privet, Eastern red cedar, American holly, black cherry, blackberry and Japanese honeysuckle.

4.1.3 Coastal Plain Semipermanent Impoundment

The eastern quadrants of the study area are mostly inundated due to beaver activity. It appears to be permanently to semipermanently flooded with many downed trees. Some canopy trees located along the edge such as sweetgum and loblolly pines exist but the canopy is very open. Along the margin, understory species include Chinese privet, giant cane, greenbrier, blackberry, and common rush. Floating or submergent species observed include parrot feather. The entirety of Wetland WA is a coastal plain semipermanent impoundment.

4.1.4 Coastal Plain Levee Forest

The coastal plain levee forest is located in all four quadrants of the project study area and is dominated by combinations of bottomland hardwoods such as sycamore, river birch, red maple and sweetgum. The understory is composed of Chinese privet, sweetgum, black cherry, ironwood, loblolly pine, hearts-a-bustin, greenbrier, poison ivy, heartleaf, giant cane, and common rush. The entirety of Wetland WB and WD are within the Coastal Plain Levee Forest.

4.1.5 Terrestrial Community Impacts

Terrestrial communities in the study area may be impacted by project construction as a result of grading and paving of portions of the study area. At this time, decisions regarding the final location and design of the proposed bridge replacement have not been made. Therefore, community data are presented in the context of total coverage of each type within the study area (Table 4). Once a final alignment and preliminary design have been determined, probable impacts to each community type will be calculated.

Table 4. Coverage of terrestrial communities in the study area

Community	Coverage (ac.)
Maintained/ Disturbed	0.48
Pine Plantation	0.08
Coastal Plain Semipermanent Impoundment	0.44
Coastal Plain Levee Forest	0.52
Total	1.52

4.2 Terrestrial Wildlife

Terrestrial communities in the study area are comprised of both natural and disturbed habitats that may support a diversity of wildlife species (those species actually observed are indicated with *). Mammal species that commonly exploit forested habitats and stream corridors found within the study area include species such as eastern cottontail, raccoon, Virginia opossum, and white-tailed deer*. Birds that commonly use forest and forest edge habitats include the American crow*, blue jay, Carolina chickadee, and tufted titmouse. Birds that may use the open habitat or water bodies within the study area include great blue heron*, eastern bluebird, eastern meadowlark, and turkey vulture*. Reptile and amphibian species that may use terrestrial communities located in the study area include the rat snake, eastern box turtle, eastern fence lizard, and five-lined skink.

4.3 Aquatic Communities

Aquatic communities in the study area consist of both perennial and ephemeral coastal plain streams and associated impoundments. Perennial streams in the study area could support Eastern mosquito fish, various darters, and redbreast sunfish. Ephemeral streams in the study area are relatively small in size and would support aquatic communities of spring peeper, crayfish, and various benthic macroinvertebrates.

4.4 Invasive Species

Three species from the NCDOT Invasive Exotic Plant List for North Carolina were found to occur in the study area. The species identified were Chinese privet (Threat), Japanese honeysuckle (Moderate Threat), and parrot feather (Watch List). NCDOT will manage invasive plant species as appropriate.

5.0 JURISDICTIONAL ISSUES

5.1 Clean Water Act Waters of the U.S.

Two jurisdictional streams were identified in the study area (Table 5). The location of these streams is shown on Figure 3. USACE and NCDWR stream delineation forms are included in Appendix C. The physical characteristics and water quality designations of each jurisdictional stream are detailed in Section 3.2. All jurisdictional streams in the study area have been designated as warm water streams for the purposes of stream mitigation.

Table 5. Jurisdictional characteristics of water resources in the study area

Map ID	Length (ft.)	Classification	Compensatory Mitigation Required	River Basin Buffer
East Buies Creek	190	Perennial	Yes	Not Subject
SB	50	Ephemeral	No*	Not Subject
TOTAL	240			

*NCDWR verified as a tributary to waters of the US, thus impacts should be calculated as an open water impact.

Three jurisdictional wetlands were identified within the study area (Figure 3). Wetland classification and quality rating data are presented in Table 6. The study area lies within the Cape Fear River basin (USGS Hydrologic Unit 03030004). USACE wetland delineation forms and NCDWR wetland rating forms for each site are included in Appendix C. Descriptions of the terrestrial communities at each wetland site are presented in Section 4.1. Wetland WA is located within the coastal plain semipermanent impoundment and Wetlands WB and WD are included within the coastal plain levee forest community.

Table 6. Jurisdictional characteristics of wetlands in the study area

Map ID	NCWAM Classification	Hydrologic Classification	NCDWQ Wetland Rating	Area (ac.)
WA	Bottomland Hardwood Forest	Riparian	56	0.44
WB	Bottomland Hardwood Forest	Riparian	56	0.01
WD	Bottomland Hardwood Forest	Riparian	56	0.03
Total				0.48

5.2 Clean Water Act Permits

The proposed project has been designated as a Categorical Exclusion (CE) for the purposes of National Environmental Policy Act (NEPA) documentation. As a result, a Nationwide Permit (NWP) 23 will likely be applicable. A NWP No. 33 may also apply for temporary construction activities such as stream dewatering, work bridges, or temporary causeways that are often used during bridge construction or rehabilitation. The USACE holds the final discretion as to what permit will be required to authorize project construction. If a Section 404 permit is required then a Section 401 Water Quality Certification (WQC) from the NCDWR will be needed.

5.3 Coastal Area Management Act Areas of Environmental Concern

Harnett County is not a designated coastal county in North Carolina, therefore Coastal Area Management Act (CAMA) regulations do not apply.

5.4 Construction Moratoria

In a letter dated February 17, 2016 the North Carolina Wildlife Resources Commission (WRC) states that no moratoria would be required for this project. There are designated anadromous fish spawning areas within the Cape Fear River in Harnett County, however the proposed project would not impact the designated areas.

5.5 N.C. River Basin Buffer Rules

There are no buffer rules in effect in Harnett County for the Cape Fear River Basin.

5.6 Rivers and Harbors Act Section 10 Navigable Waters

East Buies Creek has not been designated by the USACE as a Navigable Water under Section 10 of the Rivers and Harbors Act.

5.7 Wetland and Stream Mitigation

5.7.1 Avoidance and Minimization of Impacts

The NCDOT will attempt to avoid and minimize impacts to streams and wetlands to the greatest extent practicable in choosing a preferred alternative and during project design. At this time, no final decisions have been made with regard to the location or design of the preferred alternative.

5.7.2 Compensatory Mitigation of Impacts

The NCDOT will investigate potential on-site stream and wetland mitigation opportunities once a final decision has been rendered on the location of the preferred alternative. If on-site mitigation is not feasible, mitigation will be provided by North Carolina Department of Environmental Quality (DEQ), Division of Mitigation Services (DMS).

5.8 Endangered Species Act Protected Species

As of September 22, 2010 the United States Fish and Wildlife (USFWS) lists three federally protected species for Harnett County (Table 7). A brief description of each species' habitat requirements follows, along with the Biological Conclusion rendered based on survey results in the study area. Habitat requirements for each species are based on the current best available information from referenced literature and/or USFWS.

Table 7. Federally protected species listed for Harnett County

Scientific Name	Common Name	Federal Status	Habitat Present	Biological Conclusion
<i>Notropis mekistocholas</i>	Cape Fear shiner	E	No	Unresolved
<i>Picoides borealis</i>	Red-cockaded woodpecker	E	N/A	Undetermined
<i>Lysimachia asperulaefolia</i>	Rough-leaved loosestrife	E	No	No Effect

E - Endangered

Cape Fear Shiner

USFWS optimal survey window: April-June (tributaries); year round (large rivers)

Habitat Description: The Cape Fear shiner is known only from the Cape Fear River watershed. In general, habitat occurs in streams with clean gravel, cobble, or boulder substrates. It is most often observed inhabiting slow pools, riffles, and slow runs associated with water willow (*Justicia americana*) beds, which it uses for cover. Juveniles can be found inhabiting slackwater, among large rock outcrops and in flooded side channels and pools. Spawning occurs May through June, when water temperatures reach 66 degrees Fahrenheit.

Biological Conclusion: Unresolved

Habitat assessment and survey results will be provided at a later date. A review of NCNHP records, updated in October 2015, indicates no known Cape Fear shiner occurrence within 1.0 mile of the study area.

Red-cockaded woodpecker

USFWS optimal survey window: year round; November-early March (optimal)

Habitat Description: The red-cockaded woodpecker (RCW) typically occupies open, mature stands of southern pines, particularly longleaf pine, for foraging and nesting/roosting habitat. The RCW excavates cavities for nesting and roosting in living pine trees, aged 60 years or older, and which are contiguous with pine stands at least 30 years of age to provide foraging habitat. The foraging range of the RCW is normally no more than 0.5 miles.

Biological Conclusion: Undetermined

Habitat assessment and survey results will be provided at a later date. A review of NCNHP records, updated in October 2015, indicates no known RCW occurrence within 1.0 mile of the study area.

Rough-leaved loosestrife

USFWS optimal survey window: mid May-June

Habitat Description: Rough-leaved loosestrife, endemic to the Coastal Plain and Sandhills of North and South Carolina, generally occurs in the ecotones or edges between longleaf pine uplands and pond pine pocosins in dense shrub and vine growth on moist to seasonally saturated sands and on shallow organic soils

overlying sand (spodosolic soils). Occurrences are found in such disturbed habitats as roadside depressions, maintained power and utility line rights-of-way, firebreaks, and trails. The species prefers full sunlight, is shade intolerant, and requires areas of disturbance (*e.g.*, clearing, mowing, periodic burning) where the overstory is minimal. It can, however, persist vegetatively for many years in overgrown, fire-suppressed areas. Blaney, Gilead, Johnston, Kalmia, Leon, Mandarin, Murville, Torhunta, and Vacluse are some of the soil series that the plant occurs on.

Biological Conclusion: No Effect

Suitable habitat for the rough-leaved loosestrife in the form of disturbed ecotones does not exist in the study area. A review of NCNHP records, updated in October 2015, indicates no known occurrences.

Northern Long-eared Bat

The USFWS has developed a programmatic biological opinion (PBO) in conjunction with the Federal Highway Administration (FHWA), the USACE, and NCDOT for the northern long-eared bat (NLEB) in eastern North Carolina. The PBO covers the entire NCDOT program in Divisions 1-8, including all NCDOT projects and activities. The programmatic determination for NLEB for the NCDOT program is “May Affect, Likely to Adversely Affect”. The PBO provides incidental take coverage for NLEB and will ensure compliance with Section 7 of the Endangered Species Act for five years for all NCDOT projects with a federal nexus in Divisions 1-8, which includes Harnett County, where TIP B-5711 is located.

5.9 Bald Eagle and Golden Eagle Protection Act

Habitat for the bald eagle primarily consists of mature forest in proximity to large bodies of open water for foraging. Large dominant trees are utilized for nesting sites, typically within 1.0 mile of open water.

A desktop-GIS assessment of the project study area, as well as the area within a 1.13-mile radius (1.0 mile plus 660 feet) of the project limits, was performed on May 2, 2016 using 2014 color aerials. North of East Buies Creek study area is a swamp system of approximately 20 acres with a wide stream channel (30-50 feet) that likely supports fish. This swamp is in the vicinity of several other small ponds and water bodies, totaling more than 20 acres within 1.13 miles of the study area. A field survey was conducted on March 9, 2016. No nest trees were observed within 660 feet of the project study area.

A review of the NCNHP database, updated in October, 2015 revealed no known occurrences of this species within 1.0 mile of the project study area. The project is not expected to have any adverse effects on the bald eagle.

5.10 Endangered Species Act Candidate Species

As of September 22, 2010 there are no Candidate species for Harnett County.

5.11 Essential Fish Habitat

Harnett County is considered an inland county. No Essential Fish Habitat is present in or within 1.0 mile of the study area.

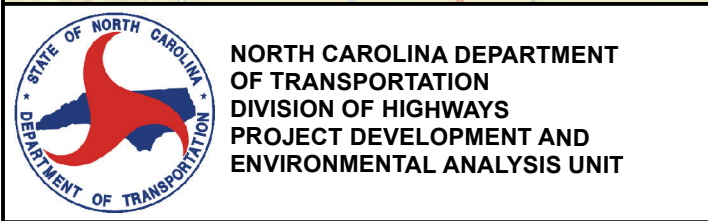
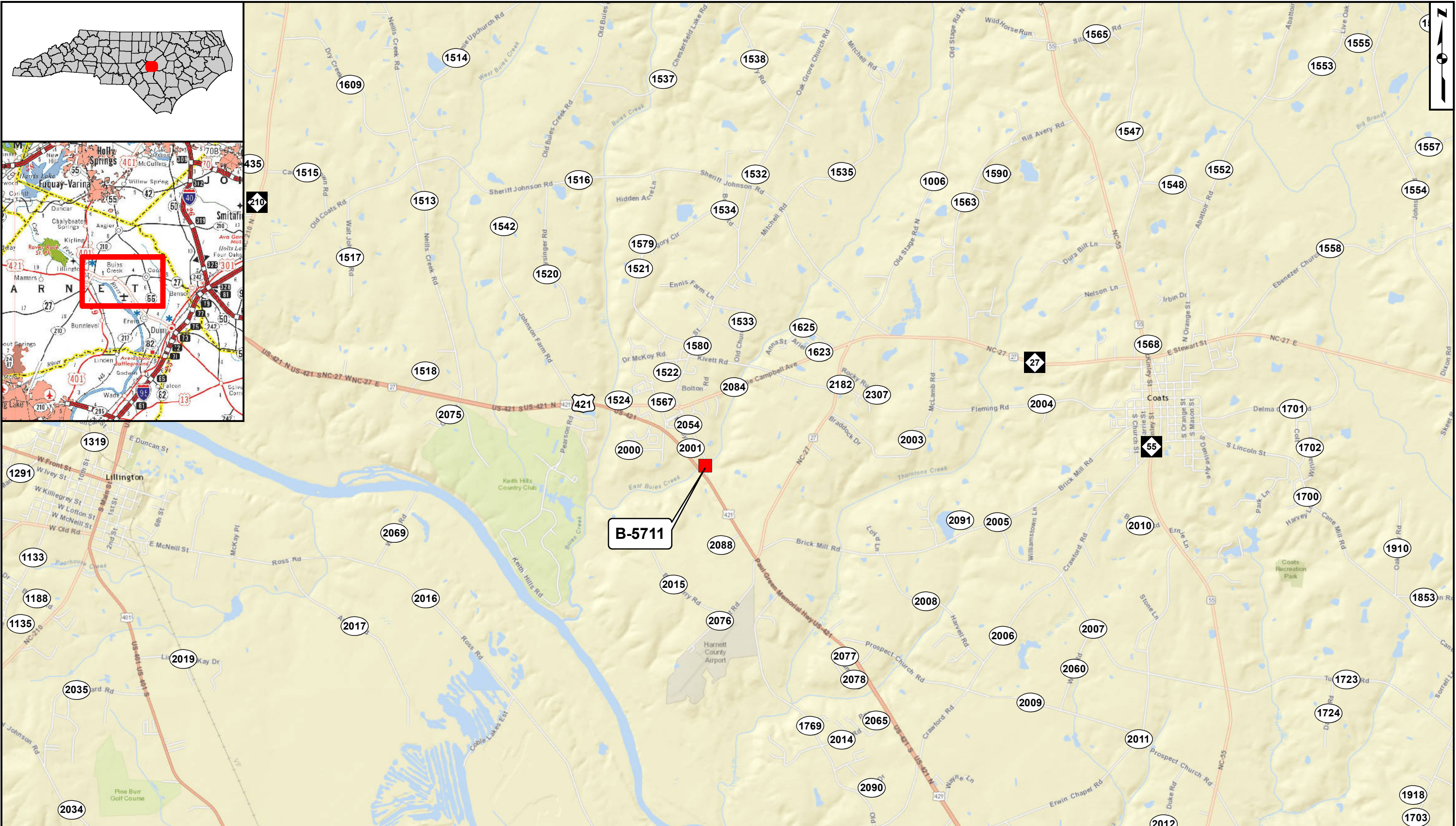
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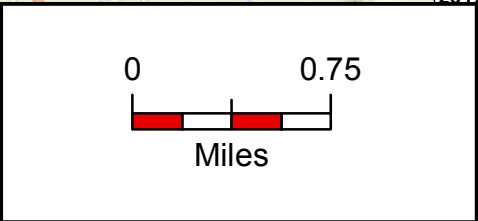
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Appendix A

Figures

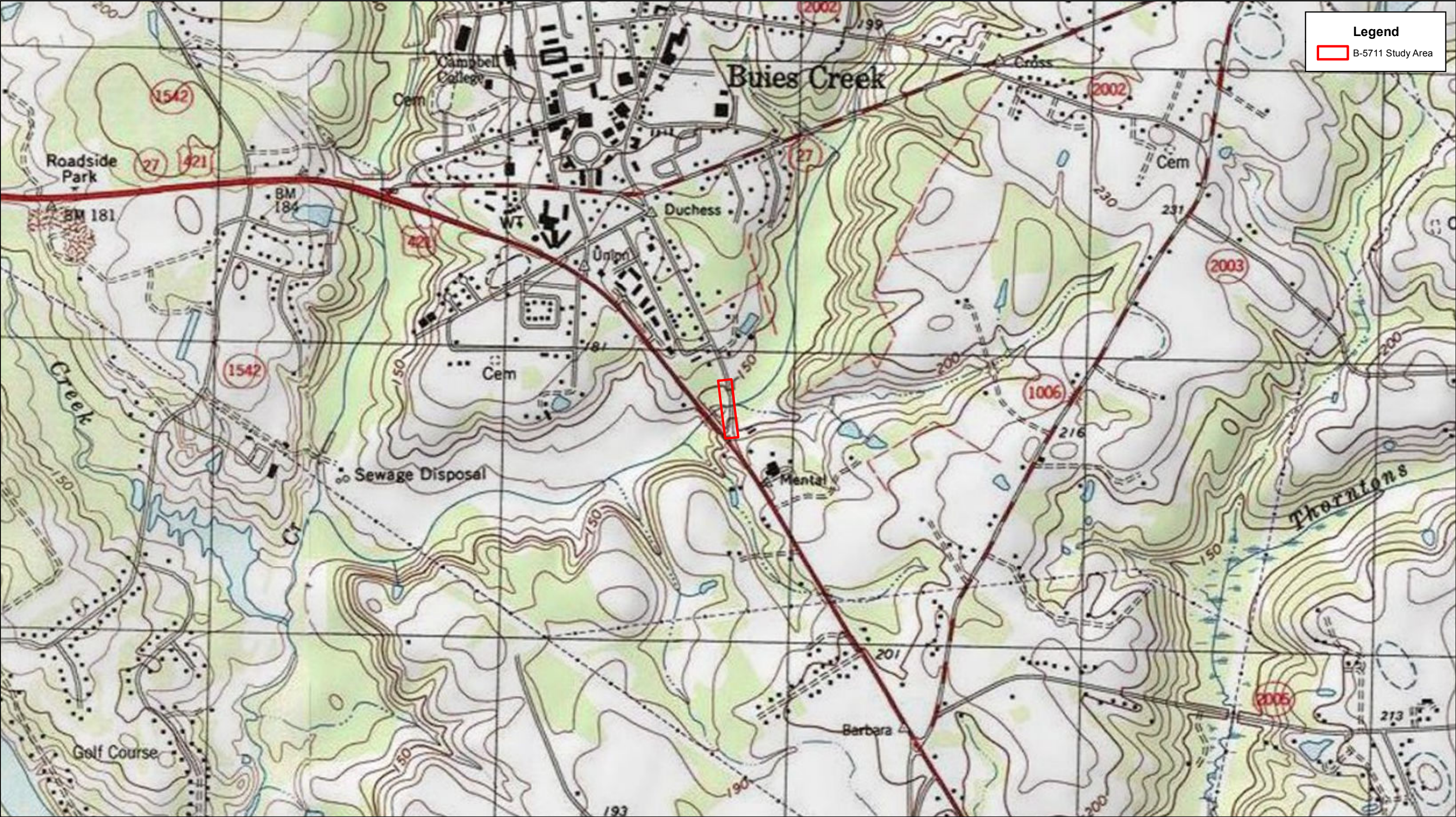


VICINITY MAP
Replace Bridge No. 245 on SR 2054
over East Buies Creek in Harnett County
TIP Project B-5711



Div: 6	TIP# B-5711
Date: DECEMBER 2015	

Figure 1



This Exhibit is for planning purposes only and shown herein does not meet NC 47-30 Requirements and therefore is not for design, construction, or recording or transfer of title. The Exhibit was compiled from available information obtained from the sources listed below. Streams and Wetlands: All features located in the field were recorded using a survey grade TOPCON GRS-1 GPS with Glonass receiver with supposed sub-50 centimeter accuracy.

Sources: ESRI Base Mapping, USGS 7.5 minute Coats, NC Topographic Quadrangle, NCDOT, SEPI

March 2016

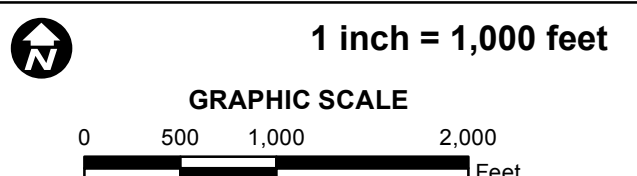
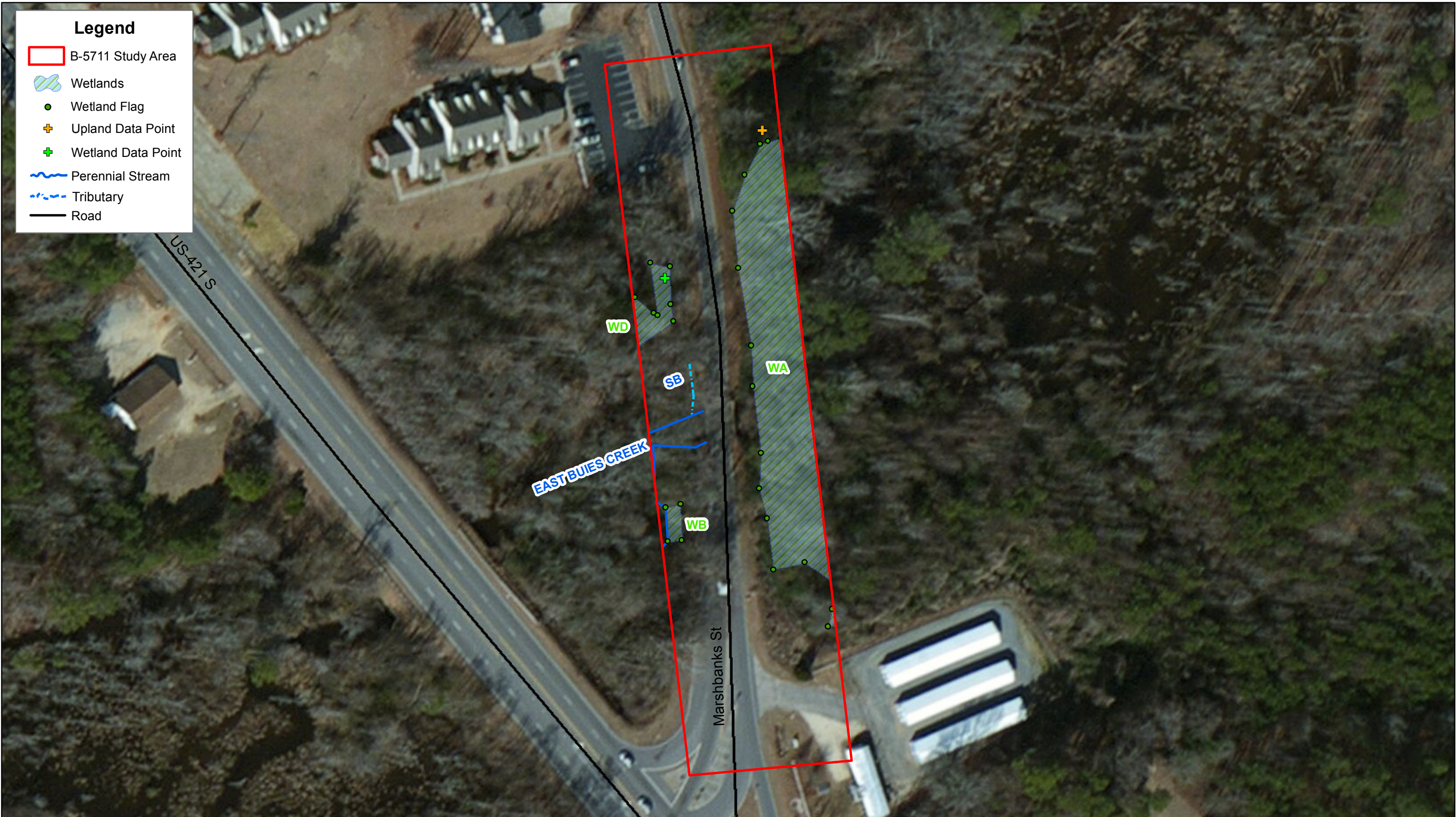


Figure 2: Project Study Area

B-5711, Harnett County





Legend

- B-5711 Study Area
- Wetlands
- Wetland Flag
- + Upland Data Point
- + Wetland Data Point
- ~ Perennial Stream
- - Tributary
- Road

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Sources: ESRI Base Mapping, NCDOT, SEPI

March 2016

1 inch = 100 feet

GRAPHIC SCALE

0
100

0
200

Feet

Figure 3: Jurisdictional Features Map

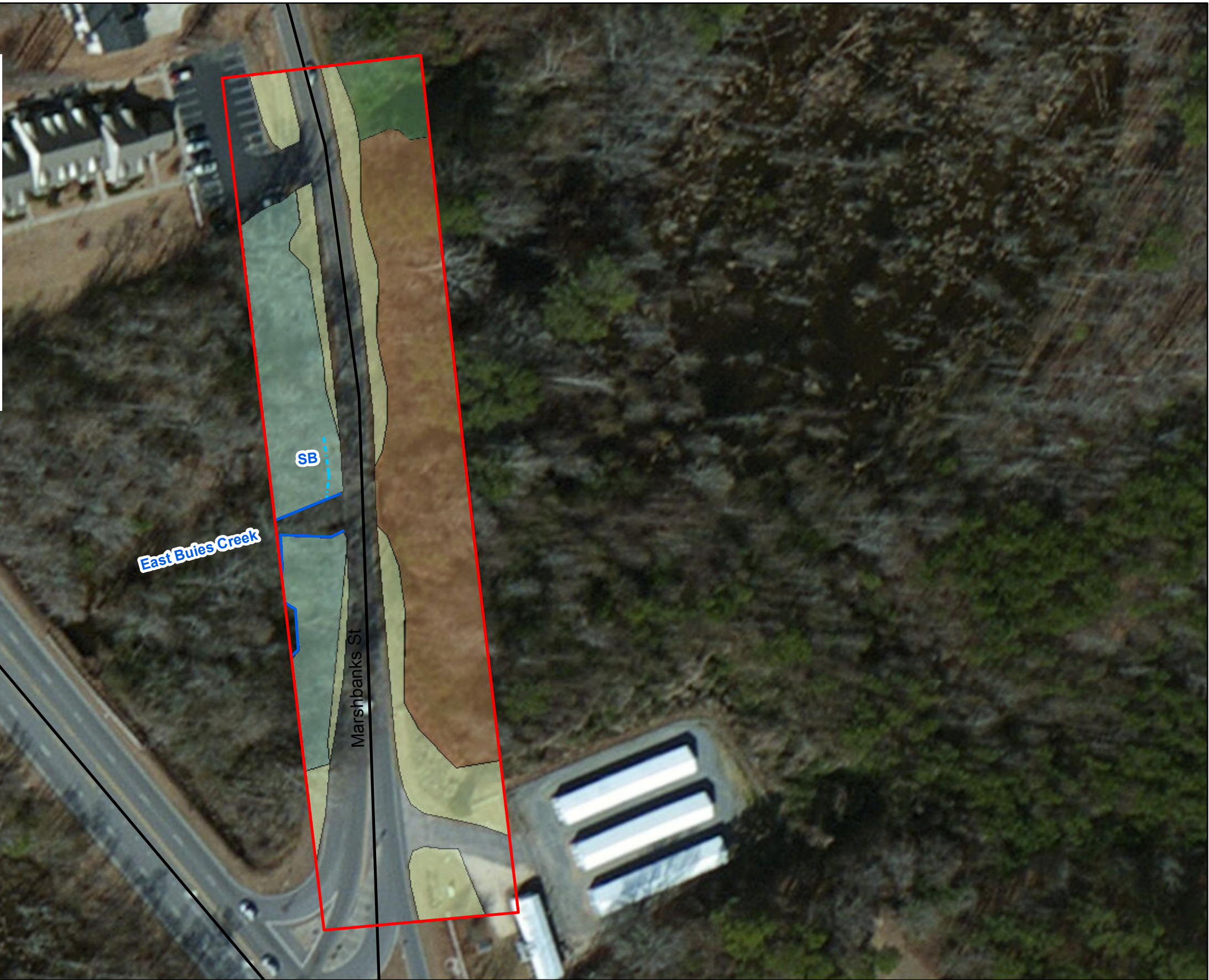
B-5711, Harnett County

SEPI

ENGINEERING &
CONSTRUCTION

Legend

-  Study Area
-  Perennial
-  Tributary
-  Maintained/ Disturbed
-  Pine Plantation
-  Coastal Plain Semipermanent Impoundment
-  Coastal Plain Levee Forest



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Sources: ESRI Base Mapping, NCDOT, SEPI

May 2016



1 inch = 100 feet

GRAPHIC SCALE

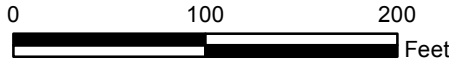


Figure 4: Natural Communities Map

B-5711, Harnett County



SEPI
ENGINEERING &
CONSTRUCTION

Appendix B

Scientific Names of Species Identified in Report

Plants

Common Name

American holly
Blackberry
Black cherry
Chinese privet
Clover
Common rush
Eastern red cedar
Fescue
Giant cane
Greenbrier
Heartleaf
Hearts-a-bustin
Henbit
Ironwood
Japanese honeysuckle
Loblolly pine
Parrot feather
Poison ivy
Red maple
River birch
Sweetgum
Sycamore
Wild geranium
Wild onion
Winged sumac

Scientific Name

Ilex opaca
Rubus sp.
Prunus serotina
Ligustrum sinense
Trifolium sp.
Juncus effusus
Juniperus virginiana
Festuca sp.
Arundinaria gigantea
Smilax sp.
Hexastylis sp.
Euonymus americanus
Lamium sp.
Carpinus caroliniana
Lonicera japonica
Pinus taeda
Myriophyllum aquaticum
Toxicodendron radicans
Acer rubrum
Betula nigra
Liquidambar styraciflua
Platanus occidentalis
Geranium carolinianum
Allium sp.
Rhus copallina

Animals

Common Name

American crow
Blue jay
Carolina chickadee
Crayfish
Darter
Eastern bluebird
Eastern box turtle
Eastern cottontail
Eastern fence lizard
Eastern meadowlark
Eastern mosquito fish
Five-lined skink

Scientific Name

Corvus brachyrhynchos
Cyanocitta cristata
Poecile carolinensis
Cambarus sp.
Percina sp.
Sialia sialis
Terrapene carolina
Sylvilagus floridanus
Sceloporus undulatus
Sturnella magna
Gambusia holbrooki
Eumeces anthracinus

Common Name

Great blue heron

Raccoon

Rat snake

Redbreast sunfish

Spring peeper

Tufted titmouse

Turkey vulture

Virginia opossum

White-tailed deer

Scientific Name*Ardea herodias**Procyon lotor**Elaphe* sp.*Lepomis auritus**Pseudacris crucifer**Parus bicolor**Cathartes aura**Didelphis virginiana**Odocoileus virginianus*

Appendix C

Stream and Wetland Forms

form **WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region**

Project/Site: B5711/Bridge 245 City/County: Harnett Sampling Date: 20160217
 Applicant/Owner: NCDOT State: NC Sampling Point: B-5711 WA WET
 Investigator(s): K. Hamlin, W. Smith Section, Township, Range: Buies Creek
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): concave Slope (%): 0.5
 Subregion (LRR or MLRA): MLRA 133a in LRR P Lat: 35.4007 Long: -78.7341 Datum: NAD83
 Soil Map Unit Name: Bb - Bibb loam, frequently flooded NWI classification: PFO1

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: Data point taken in Wetland WD. Similar characteristics in other wetlands					

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)	
☐ 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)	☐ 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): _____ Saturation Present? Yes ☒ No ☐ Depth (inches): <u>3"</u> (includes capillary fringe)		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: B-5711 WA WET

Tree Stratum (Plot size: <u>50'</u>)	Absolute % Cover	Dominant Species?	Indicator Status															
1. <u>Pinus taeda</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>7</u> (A) Total Number of Dominant Species Across All Strata: <u>8</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>87.5</u> (A/B)														
2. <u>Magnolia virginiana</u>	<u>10</u>	<u>Y</u>	<u>FACW</u>															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
<u>20</u> = Total Cover 50% of total cover: <u>10</u> 20% of total cover: <u>4</u>				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <th>Total % Cover of:</th> <th>Multiply by:</th> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>20</u></td> <td>x 2 = <u>40</u></td> </tr> <tr> <td>FAC species <u>80</u></td> <td>x 3 = <u>240</u></td> </tr> <tr> <td>FACU species <u>5</u></td> <td>x 4 = <u>20</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>105</u> (A)</td> <td><u>300</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>2.85</u>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>20</u>	x 2 = <u>40</u>	FAC species <u>80</u>	x 3 = <u>240</u>	FACU species <u>5</u>	x 4 = <u>20</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>105</u> (A)	<u>300</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>0</u>	x 1 = <u>0</u>																	
FACW species <u>20</u>	x 2 = <u>40</u>																	
FAC species <u>80</u>	x 3 = <u>240</u>																	
FACU species <u>5</u>	x 4 = <u>20</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>105</u> (A)	<u>300</u> (B)																	
Sapling/Shrub Stratum (Plot size: <u>30'</u>)																		
1. <u>Ligustrum sinense</u>	<u>40</u>	<u>Y</u>	<u>FAC</u>															
2. <u>Carpinus caroliniana</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
<u>50</u> = Total Cover 50% of total cover: <u>25</u> 20% of total cover: <u>10</u>																		
Herb Stratum (Plot size: <u>5'</u>)																		
1. <u>Arundinaria gigantea</u>	<u>10</u>	<u>Y</u>	<u>FACW</u>	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)														
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
12. _____	_____	_____	_____															
<u>10</u> = Total Cover 50% of total cover: _____ 20% of total cover: _____																		
Woody Vine Stratum (Plot size: <u>30'</u>)																		
1. <u>Toxicodendron radicans</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>	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.														
2. <u>Smilax rotundifolia</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>															
3. <u>Lonicera japonica</u>	<u>5</u>	<u>Y</u>	<u>FACU</u>															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
<u>15</u> = Total Cover 50% of total cover: <u>7.5</u> 20% of total cover: <u>3</u>																		
Hydrophytic Vegetation Present? Yes ☒ No ☐																		
Remarks: (If observed, list morphological adaptations below).																		

SOIL

Sampling Point: B-5711 WA WET

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12+	10YR 4/1	70	7.5YR 5/8	30	C	PL	Clay loam	

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

²Location: 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 Soils³:

- ☐ 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)

³Indicators 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:

form **WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region**

Project/Site: B5711/Bridge 245 City/County: Harnett Sampling Date: 20160217
 Applicant/Owner: NCDOT State: NC Sampling Point: B-5711 WA UP
 Investigator(s): K. Hamlin, W. Smith Section, Township, Range: Buies Creek
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 133a in LRR P Lat: 35.4011 Long: -78.7338 Datum: NAD83
 Soil Map Unit Name: AtA - Altavista fine sandy loam, 0 to 3 percent slopes, rarely flooded NWI classification: NA

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:					

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ☐ Surface Water (A1) ☐ Aquatic Fauna (B13) ☐ High Water Table (A2) ☐ Marl Deposits (B15) (LRR U) ☐ Saturation (A3) ☐ Hydrogen Sulfide Odor (C1) ☐ Water Marks (B1) ☐ Oxidized Rhizospheres along Living Roots (C3) ☐ Sediment Deposits (B2) ☐ Presence of Reduced Iron (C4) ☐ Drift Deposits (B3) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Algal Mat or Crust (B4) ☐ Thin Muck Surface (C7) ☐ Iron Deposits (B5) ☐ Other (Explain in Remarks) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Water-Stained Leaves (B9)		<u>Secondary Indicators (minimum of two required)</u> ☐ 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): _____ Saturation Present? Yes ☐ No ☐ Depth (inches): _____ (includes capillary fringe)		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: B-5711 WA UP

Tree Stratum (Plot size: <u>50'</u>)	Absolute % Cover	Dominant Species?	Indicator Status															
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>80</u> (A/B)														
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
_____ = Total Cover				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species <u>92</u></td> <td>x 3 = <u>276</u></td> </tr> <tr> <td>FACU species <u>15</u></td> <td>x 4 = <u>60</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>107</u> (A)</td> <td><u>336</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>3.14</u>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>0</u>	x 2 = <u>0</u>	FAC species <u>92</u>	x 3 = <u>276</u>	FACU species <u>15</u>	x 4 = <u>60</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>107</u> (A)	<u>336</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>0</u>	x 1 = <u>0</u>																	
FACW species <u>0</u>	x 2 = <u>0</u>																	
FAC species <u>92</u>	x 3 = <u>276</u>																	
FACU species <u>15</u>	x 4 = <u>60</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>107</u> (A)	<u>336</u> (B)																	
50% of total cover: _____ 20% of total cover: _____																		
Sapling/Shrub Stratum (Plot size: <u>30'</u>)																		
1. <u>Liquidambar styraciflua</u>	<u>30</u>	<u>Y</u>	<u>FAC</u>	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)														
2. <u>Pinus taeda</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>															
3. <u>Ligustrum sinense</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>															
4. <u>Fagus grandifolia</u>	<u>5</u>	<u>N</u>	<u>FACU</u>															
5. <u>Juniperus virginiana</u>	<u>5</u>	<u>N</u>	<u>FACU</u>															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
<u>80</u> = Total Cover				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.														
50% of total cover: <u>40</u> 20% of total cover: <u>16</u>																		
Herb Stratum (Plot size: <u>5'</u>)																		
1. <u>Asplenium platyneuron</u>	<u>2</u>	<u>N</u>	<u>FAC</u>															
2. <u>Allium sp.</u>	<u>2</u>	<u>N</u>	<u>NI</u>															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
12. _____	_____	_____	_____															
<u>4</u> = Total Cover				Hydrophytic Vegetation Present? Yes ☒ No ☐														
50% of total cover: <u>2</u> 20% of total cover: <u>0.8</u>																		
Woody Vine Stratum (Plot size: <u>30'</u>)																		
1. <u>Lonicera japonica</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>															
2. <u>Rosa multiflora</u>	<u>5</u>	<u>Y</u>	<u>FACU</u>															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
<u>25</u> = Total Cover																		
50% of total cover: <u>12.5</u> 20% of total cover: <u>5</u>																		
Remarks: (If observed, list morphological adaptations below).																		

SOIL

Sampling Point: B-5711 WA UP

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12+	10YR 4/4	100					Clay loam	

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

²Location: 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 Soils³:

- ☐ 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)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:

WETLAND RATING WORKSHEET Fourth Version

Project Name B-5711 Nearest Road MARSHBANKS ST.
 County HARNETT Wetland area 0.44 acres Wetland width >100 feet
 Name of evaluator K. HAMLIN, W. SMITH Date 2/17/2016

Wetland location

- ☐ on pond or lake
☒ on perennial stream
☐ on intermittent stream
☐ within interstream divide
☐ other: _____

Adjacent land use

- (within ½ mile upstream, upslope, or radius)
☒ forested/natural vegetation 35 %
☒ agriculture, urban/suburban 50 %
☒ impervious surface 15 %

Soil series: Bb - BIBB LOAM, FREQ. FLOODED

- ☐ predominantly organic - humus, muck, or peat
☒ predominantly mineral - non-sandy
☐ predominantly sandy

Dominant vegetation

- (1) LOBLOLLY PINE
 (2) IRONWOOD
 (3) GIANT CANE

Hydraulic factors

- ☐ steep topography
☐ ditched or channelized
☒ total wetland width ≥ 100 feet

Flooding and wetness

- ☐ semipermanently to permanently flooded or inundated
☒ seasonally flooded or inundated
☐ intermittently flooded or temporary surface water
☐ no evidence of flooding or surface water

Wetland type (select one)*

- ☒ Bottomland hardwood forest
☐ Headwater forest
☐ Swamp forest
☐ Wet flat
☐ Pocosin
☐ Bog forest

- ☐ Pine savanna
☐ Freshwater marsh
☐ Bog/fen
☐ Ephemeral wetland
☐ Carolina bay
☐ Other: _____

* The rating system cannot be applied to salt or brackish marshes or stream channels

R	Water storage	<u>3</u>	x 4.00 =	<u>12</u>
A	Bank/Shoreline stabilization	<u>3</u>	x 4.00 =	<u>12</u>
T	Pollutant removal	<u>3</u>	** x 5.00 =	<u>15</u>
I	Wildlife habitat	<u>2</u>	x 2.00 =	<u>4</u>
N	Aquatic life value	<u>3</u>	x 4.00 =	<u>12</u>
G	Recreation/Education	<u>1</u>	x 1.00 =	<u>1</u>

**Wetland
rating**

56

** Add 1 point if in sensitive watershed and >10% nonpoint source disturbance within ½ mile upstream, upslope, or radius

WETLAND RATING WORKSHEET Fourth Version

Project Name B-5711 Nearest Road MARSHBANKS ST.
 County HARNETT Wetland area 0.01 acres Wetland width 15 feet
 Name of evaluator K. HAMLIN, W. SMITH Date 2/17/2016

Wetland location

- ☐ on pond or lake
☒ on perennial stream
☐ on intermittent stream
☐ within interstream divide
☐ other: _____

Adjacent land use

- (within ½ mile upstream, upslope, or radius)
☒ forested/natural vegetation 35 %
☒ agriculture, urban/suburban 50 %
☒ impervious surface 15 %

Soil series: Bb - BIBB LOAM, FREQ. FLOODED

- ☐ predominantly organic - humus, muck, or peat
☒ predominantly mineral - non-sandy
☐ predominantly sandy

Dominant vegetation

- (1) LOBLOLLY PINE
 (2) IRONWOOD
 (3) GIANT CANE

Hydraulic factors

- ☒ steep topography
☐ ditched or channelized
☐ total wetland width ≥ 100 feet

Flooding and wetness

- ☐ semipermanently to permanently flooded or inundated
☒ seasonally flooded or inundated
☐ intermittently flooded or temporary surface water
☐ no evidence of flooding or surface water

Wetland type (select one)*

- ☒ Bottomland hardwood forest
☐ Headwater forest
☐ Swamp forest
☐ Wet flat
☐ Pocosin
☐ Bog forest

- ☐ Pine savanna
☐ Freshwater marsh
☐ Bog/fen
☐ Ephemeral wetland
☐ Carolina bay
☐ Other: _____

* The rating system cannot be applied to salt or brackish marshes or stream channels

R	Water storage	<u>3</u>	x 4.00 =	<u>12</u>	Wetland rating 56
A	Bank/Shoreline stabilization	<u>3</u>	x 4.00 =	<u>12</u>	
T	Pollutant removal	<u>3</u>	** x 5.00 =	<u>15</u>	
I	Wildlife habitat	<u>2</u>	x 2.00 =	<u>4</u>	
N	Aquatic life value	<u>3</u>	x 4.00 =	<u>12</u>	
G	Recreation/Education	<u>1</u>	x 1.00 =	<u>1</u>	

** Add 1 point if in sensitive watershed and >10% nonpoint source disturbance within ½ mile upstream, upslope, or radius

WETLAND RATING WORKSHEET Fourth Version

Project Name B-5711 Nearest Road MARSHBANKS ST.
 County HARNETT Wetland area 0.03 acres Wetland width 20 feet
 Name of evaluator K. HAMLIN, W. SMITH Date 2/17/2016

Wetland location

- ☐ on pond or lake
☒ on perennial stream
☐ on intermittent stream
☐ within interstream divide
☐ other: _____

Adjacent land use

- (within ½ mile upstream, upslope, or radius)
☒ forested/natural vegetation 35 %
☒ agriculture, urban/suburban 50 %
☒ impervious surface 15 %

Soil series: Bb - BIBB LOAM, FREQ. FLOODED

- ☐ predominantly organic - humus, muck, or peat
☒ predominantly mineral - non-sandy
☐ predominantly sandy

Dominant vegetation

- (1) LOBLOLLY PINE
 (2) IRONWOOD
 (3) GIANT CANE

Hydraulic factors

- ☐ steep topography
☒ ditched or channelized
☐ total wetland width ≥ 100 feet

Flooding and wetness

- ☐ semipermanently to permanently flooded or inundated
☒ seasonally flooded or inundated
☐ intermittently flooded or temporary surface water
☐ no evidence of flooding or surface water

Wetland type (select one)*

- | | |
|---|---|
| ☒ Bottomland hardwood forest | ☐ Pine savanna |
| ☐ Headwater forest | ☐ Freshwater marsh |
| ☐ Swamp forest | ☐ Bog/fen |
| ☐ Wet flat | ☐ Ephemeral wetland |
| ☐ Pocosin | ☐ Carolina bay |
| ☐ Bog forest | ☐ Other: _____ |

* The rating system cannot be applied to salt or brackish marshes or stream channels

R	Water storage	<u>3</u>	x 4.00 =	<u>12</u>	Wetland rating 56
A	Bank/Shoreline stabilization	<u>3</u>	x 4.00 =	<u>12</u>	
T	Pollutant removal	<u>3</u>	** x 5.00 =	<u>15</u>	
I	Wildlife habitat	<u>2</u>	x 2.00 =	<u>4</u>	
N	Aquatic life value	<u>3</u>	x 4.00 =	<u>12</u>	
G	Recreation/Education	<u>1</u>	x 1.00 =	<u>1</u>	

** Add 1 point if in sensitive watershed and >10% nonpoint source disturbance within ½ mile upstream, upslope, or radius

Appendix D
Qualifications of Contributors

Principal

Investigator: Susan Westberry, AICP, PWS, CPESC

Education: M.S. Botany, 2003

Experience: Senior Environmental Planner, SEPI Engineering & Construction, 2015-Present
Environmental Scientist, URS, 2005-2015
Environmental Scientist, Stantec, 2003-2005

Responsibilities: Wetland and stream delineations, natural communities assessment, T&E species assessment, and document preparation

Investigator: Travis Howell

Education: M.S. Forest Management, 2014

Experience: Project Scientist, SEPI Engineering, 2016-Present
Timber Procurement Manager, Timbco, 2013-2015

Responsibilities: GIS and document review