DIN 01557

Natural Resources Technical Report

Durham-Orange Light Rail Transit Project



July 24, 2015

The NEPA Preferred Alternative for the D-O LRT Project would generally follow NC 54, I-40, US 15-501, and the North Carolina Railroad (NCRR) Corridor in downtown Durham and east Durham. The alignment would begin at UNC Hospitals, parallel Fordham Boulevard, proceed east on NC 54, travel north on I-40, parallel US 15-501 before it turns east toward the Duke University campus along Erwin Road, and then follow the NCRR Corridor parallel to NC 147 through downtown Durham, before reaching its eastern terminus near Alston Avenue. The alignment would consist of at-grade alignment, fill and cut sections, and elevated structures. In two sections of the alignment, Little Creek and New Hope Creek, multiple Light Rail Alternatives are evaluated in the DEIS.

This technical report contains information for all alternatives analyzed in the DEIS. However, pursuant to MAP 21, the Moving Ahead for Progress in the 21st Century Act (P.L. 112-141), a NEPA Preferred Alternative has been developed, which recommends C2A in the Little Creek section of the alignment, NHC 2 in the New Hope Creek section of the alignment, the Trent/Flowers Drive station, and the Farrington Road Rail Operations and Maintenance Facility.



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List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
AA	Alternatives Analysis
CAMA	Coastal Area Management Act
DEIS	Draft Environmental Impact Statement
D-O	Durham-Orange
D-O LRT	Durham-Orange Light Rail Transit
DTCC	Durham Technical Community College
DUMC	Duke University Medical Center
EFH	essential fish habitat
ESA	Endangered Species Act of 1973
FPPA	Farmland Protection Policy Act
HQW	high quality water
I-40	Interstate 40
JD	Jurisdictional Determination
LPA	Locally Preferred Alternative
LRT	light rail transit
MSL	mean sea level
NC	North Carolina
NCCU	North Carolina Central University
NCDA	North Carolina Department of Agriculture
NCDENR	North Carolina Department of Environment and Natural Resources
NCDWR	North Carolina Division of Water Resources
NCDWQ	North Carolina Division of Water Quality
NCEEP	North Carolina Ecosystem Enhancement Program
N.C.G.S.	North Carolina General Statutes
NCNHP	North Carolina Natural Heritage Program
NCRR	North Carolina Railroad
NCWAM	North Carolina Wetland Assessment Method
NCWFAT	North Carolina Wetland Functional Assessment Team
NCWRC	North Carolina Wildlife Resources Commission
NHC	New Hope Creek
NMFS	National Marine Fisheries Service



Natural Heritage Program Natural Area
National Oceanic and Atmospheric Administration
Natural Resources Conservation Service
Natural Resources Technical Report
nutrient sensitive water
outstanding resource water
Rail Operations Maintenance Facility
significant natural heritage areas
Transportation System Management
University of North Carolina
United States
United State Army Corps of Engineers
United States Code
United States Department of Agriculture
United States Fish and Wildlife Service
United States Geologic Survey
unnamed tributary
Veterans Affairs
water supply



1. Introduction

Triangle Transit, in cooperation with the Federal Transit Administration (FTA), has prepared a Draft Environmental Impact Statement (DEIS) to evaluate a potential high-capacity transit improvement in the Triangle region, within the Durham-Orange (D-O) Corridor, between Chapel Hill and Durham. This technical Appendix focuses on the potential effects of the alternatives to natural resources, including soils, farmlands, water resources, terrestrial communities and wildlife, aquatic communities and wildlife, and threatened and endangered species, and was prepared in consideration of the Scoping comments received from the stakeholder agencies.

Through the Alternatives Analysis (AA) process, which included extensive public outreach, a Locally Preferred Alternative (LPA) was selected to address the purpose and need of the (D-O Corridor. The proposed project is an approximately 17 mile double-track light rail transit (LRT) line with 17 proposed stations that will greatly expand transit service in Durham and Orange counties. The proposed Durham-Orange Light Rail Transit (D-O LRT) Project extends from the western terminus of the proposed UNC Hospitals Station, at the University of North Carolina at Chapel Hill (UNC), to the eastern terminus in Durham at the Alston Avenue Station. The proposed D-O LRT Project connects a range of educational, medical, employment, and other important activity centers, including UNC; UNC Hospitals; the William and Ida Friday Center for Continuing Education (Friday Center); Duke University; Durham Veterans Affairs (VA) Medical Center and Duke University Medical Center (DUMC); downtown and east Durham; North Carolina Central University (NCCU); and Durham Technical Community College (DTCC).

1.1 Description of the Study Corridor

The D-O Corridor is located within the Triangle region. It extends roughly 17 miles from southwest Chapel Hill to east Durham, and includes several educational, medical, and other key activity centers which generate a large number of trips each day. The land uses in the D-O Corridor are supported by a network of major highways including NC 54, I-40, US 15-501, Erwin Road, and NC 147. Additional detail regarding the study corridor is included in the *Durham-Orange Light Rail Transit Project DEIS*, chapters 1 and 2.

1.2 Alternatives Considered

- No-Build Alternative
- Light Rail Alternatives

In addition to the Light Rail Alternatives, the DEIS considers a No-Build Alternative comprised of the existing and programmed transportation network improvements without the planned rail improvements and associated bus network modifications. Additional detail regarding the alternatives considered is included in the *Durham-Orange Light Rail Transit Project DEIS*, chapter 2.

1.2.1 No-Build Alternative

The No-Build Alternative includes the existing and planned transportation programs and projects scheduled to be built and implemented before forecast year 2040 and contained in the 2040 MTP, excluding only the proposed Light Rail Alternatives, rail transit improvements and related bus transit modifications that would be associated with the proposed D-O LRT Project.

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1.2.2 Light Rail Alternatives

Through the Alternatives Analysis and Scoping process, a majority of the proposed D-O LRT Project alignment was identified. However, there are a few areas where different alternatives were retained for further evaluation. As a result, multiple alignments crossing Little Creek and New Hope Creek are evaluated in the DEIS.

- Four potential crossings of Little Creek between Hamilton Road and the proposed Leigh Village Station (Alternatives C1, C1A, C2, and C2A)
- Three potential crossings of New Hope Creek and Sandy Creek between Patterson Place and South Square (Alternatives NHC LPA, NHC 1, and NHC 2)
- Station alternatives at Duke/VA Medical Centers (i.e., Duke Eye Center and Trent/Flowers Drive)
- Five proposed locations for the rail operations and maintenance facility (ROMF) (i.e., Leigh Village ROMF, Farrington Road ROMF, Patterson Place ROMF, Cornwallis Road ROMF, and Alston Avenue ROMF)

The Light Rail Alternatives would generally follow North Carolina (NC) Highway 54 (NC 54), Interstate 40 (I-40), United States (US) 15-501, and the North Carolina Railroad (NCRR) Corridor in downtown Durham and east Durham. The alignment would begin in Chapel Hill at UNC Hospitals, parallel Fordham Boulevard, proceed eastward adjacent to NC 54, travel north along I-40, parallel US 15-501 before it would turn east toward Duke University and run within Erwin Road, and then follow the NCRR Corridor that parallels NC Highway 147 (NC 147) through downtown Durham, before reaching its eastern terminus in Durham near Alston Avenue. The alignment would consist of at-grade alignment, fill and cut sections, and elevated structures. A total of 17 stations are planned, and up to 5,100 parking spaces would be provided along the Light Rail Alternatives. In addition, a ROMF would be constructed to accommodate the D-O LRT fleet (initially 17 vehicles, with the ability to accommodate up to 26 vehicles without needing expansion).

Bus routes would be modified to feed into the D-O LRT stations, and headways would be adjusted to provide more frequent bus service and minimize transfer waiting times. These services would also connect light rail passengers with other area transportation hubs, including park-and-ride lots and transfer centers.

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2. Legal and Regulatory Framework

The Endangered Species Act (ESA) of 1973 (16 U.S.C. § 1531 et seq.), is the federal statute that regulates endangered and threatened species through administering permits, implementing recovery plans, and monitoring listed endangered and threatened species. The U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) administer the ESA. Certain species fall under the protection of other legislation besides the ESA. Bald Eagles are protected under the Bald Eagle and Golden Eagle Protection Act (16 U.S.C. § 668). Many other species of bird are protected under the Migratory Bird Treaty Act of 1918 (16 U.S.C. § 703-712).

North Carolina protects locally or regionally rare species in addition to federally listed species. Protection for animals and plants in North Carolina is recognized under two separate laws. The protection of animals is addressed by the North Carolina Endangered Species Act (North Carolina General Statutes [N.C.G.S.] § 113-331 et seq.), which is administered by the North Carolina Wildlife Resources Commission. Endangered, threatened, and rare plants are protected by the North Carolina Plant Protection and Conservation Act (N.C.G.S. § 106-202.12 et seq.). This law is administered by the Plant Conservation Program in the North Carolina Department of Agriculture (NCDA). North Carolina also regulates Essential Fish Habitat under the Magnuson-Stevens Fishery Conservation and Management Act (P.L. 94-265).

The Farmland Protection Policy Act (FPPA) states that federal agencies must "minimize the extent to which federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses...." (7 USC § 73).

The Rivers and Harbors Act (33 U.S.C. § 403) limits construction that would obstruct navigable waters within the United States.

The Jordan Lake buffer rule (15A NCAC 02B.0267) applies to all perennial and intermittent streams, lakes, ponds, and estuaries in the Jordan Lake water basin and establishes a protected 50-foot wide riparian buffer around these waterbodies.

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3. Methodology and Qualifications

All work in support of this Natural Resources Technical Report (NRTR) was conducted in accordance with the Triangle Transit August 2013 *Environmental Methodology Report* prepared for this project. Field investigations of the project study area were conducted in August, 2013, through August, 2014. Field verification meetings with representatives of the US Army Corps of Engineers (USACE) and the North Carolina Division of Water Resources (NCDWR) [formerly named the North Carolina Division of Water Quality (NCDWQ)] for jurisdictional determinations were conducted and USACE issued their notice of jurisdiction determination on May 12, 2014. An updated notice of jurisdiction determination was issued on November 7, 2014 for additional study area resources. The principal environmental scientists contributing to this document were Charles Benton - URS, and William B. Fulton and Brandon J. Phillips – STV Group.

Data was collected throughout the D-O Corridor. However, the assessment of effects was limited to a study area, which is defined as the limits of construction for the proposed Light Rail Alternatives. This included the Light Rail Alternatives alignments, stations, park-and-ride facilities, and ROMF.

Information regarding the relevant resource areas was collected from a review of USFWS Threatened and Endangered Species databases, the North Carolina Natural Heritage Program's (NCNHP) databases, Durham and Orange counties soil surveys, aerial photography, topographic maps, and technical staff field investigations. The most current available data from local sources and recent aerial photography, supplemented by field work, were used in the analysis.

The environmental evaluation for this study began with a broad review of environmental factors to identify notable issues and constraints. Some of these factors and considerations were documented during project Scoping. Agency Scoping comments are located in Appendix E. Where relevant, this information provided the starting point for the environmental analysis.

The natural resources evaluation primarily assessed site-specific effects, the significance of these effects, and what potential mitigation measures may be required as a result of these effects. Habitat connections were also addressed, including the New Hope Creek and Sandy Creek corridors and the Piedmont swamp forest ecological corridor connecting Duke Forest and Jordan Lake Game Lands.

The principal environmental scientists contributing to this document were Charles Benton – URS and Brandon J. Phillips – STV Group. Other contributors to this document are listed in Appendix F.

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assurance



4. Affected Environment

The following subsections describe the affected environment.

4.1 Physical Resources

The majority of the project study area is located in the easternmost of the four Triassic Basin Eco-regions of the Piedmont physiographic province of North Carolina (Griffith et al., 2002). A small portion of the western tip of the LPA alignment is located within the Carolina Slate Belt of the Piedmont physiographic province of North Carolina (Griffith et al., 2002). The topography of the project study area is characterized as gently rolling with some steep areas. Gently rolling areas are found within interstream areas, with steeper slopes found along the edges of some stream floodplains. Elevations range from approximately 420 feet above mean sea level (MSL) along the LPA Alignment in the City of Durham (United States Geological Survey [USGS] – Northwest Durham {1987}), to approximately 235 feet above MSL along NC 54 where Little Creek exits the southern portion of the C2 and C2A alignment alternatives (USGS - Southwest Durham, NC [1981]). Topographic mapping is presented in Appendix A (Figures 2 through 16). Land use within the project vicinity includes a mixture of urban, residential, and forested areas. The western end of the LPA alignment is located within the Chapel Hill, NC USGS quadrangle (1981).

4.1.1 Soils

Natural Resources Conservation Service (NRCS) data for Orange and Durham counties identifies 41 soil types within the study area (Table 1). Soils were determined based on a one-quarter mile search range from the potential alignments. Soils mapping is presented in Appendix A (Figures 17 through 31).

Table 1: Soils in the Study Area

Soil Series	Mapping Unit	Drainage Class	Hydric Status	Bedrock Depth
Altavista silt loam; 2-6% slope	AlB	Moderately Well Drained	Non-hydric	>60"
Appling sandy loam, 2-6% slope	АрВ	Well Drained	Non-hydric	>60"
Appling sandy loam; 6-10% slope	ApC	Well Drained	Non-hydric	>60"
Appling-Urban land complex, 2-10% slope	AuC	Well Drained	Non-hydric	>60"
Cartecay and Chewada soils; 0-2% slope	Сс	Somewhat Poorly Drained	Hydric*	>60"
Cecil fine sandy loam; 2-6% slope	CfB	Well Drained	Non-hydric	>60"
Cecil fine sandy loam; 6-10% slope	CfC	Well Drained	Non-hydric	>60"
Pacolet find sandy loam; 10-25% slope	CfE	Well Drained	Non-hydric	>60"
Chewada and Wehadkee soils; 0-2% slope	Ch	Somewhat Poorly Drained	Hydric	>60"
Creedmoor-Green Level complex; 2-6% slope	CrB	Moderately Well Drained	Non-hydric	>60"
Creedmoor-Green Level complex;	CrC	Moderately Well Drained	Non-hydric	60"



Soil Series	Mapping Unit	Drainage Class	Hydric Status	Bedrock Depth
6-10% slope				
Enon loam, 2-6% slope	EnB	Well Drained	Non-hydric	>60"
Enon loam, 6-12% slope	EnC	Well Drained	Non-hydric	>60"
Georgeville-Urban land complex, 2-10% slope	GhC	Well Drained	Non-hydric	>60"
Goldston channery silt loam, 15-45% slope	GIF	Well drained	Non-hydric	20-40"
Granville sandy loam; 2-6% slope	GrB	Well drained	Non-hydric	>60"
Granville sandy loam; 6-10% slope	GrC	Well drained	Non-hydric	>60"
Iredell loam; 2-6% slope	IrB	Moderately well drained	Non-hydric	20-40"
Iredell loam; 6-10% slope	IrC	Moderately well drained	Non-hydric	>42"
Louisburg (Wateree) sandy loam, 6-15% slope	LoC	Well drained	Non-hydric	48-120"
Mayodan sandy loam, 2-6% slope	MfB	Well drained	Non-hydric	>60"
Mayodan sandy loam, 6-10% slope	MfC	Well drained	Non-hydric	>60"
Mayodan sandy loam, 10-15% slope	MfD	Well drained	Non-hydric	>60"
Mayodan sandy loam, 15-25% slope	MfE	Well drained	Non-hydric	>60"
Mayodan-Urban land complex, 0- 10% slope	MrC	Well drained	Non-hydric	>60"
Mayodan-Urban land complex, 10- 15% slope	MrD	Well drained	Non-hydric	>60"
Pinkston fine sandy loam, 10-25% slope	PfE	Well drained	Non-hydric	>30"
Tarrus silt loam, 8-15% slope	TaD	Well drained	Non-hydric	>42"
Tarrus silt loam, 15-25% slope	TaE	Well drained	Non-hydric	>42"
Hornsboro silt loam, 0-2% slope, rarely flooded	Wh	Somewhat poorly drained	Hydric*	>60"
Wedowee sandy loam, 8-15% slope	WmD	Well drained	Non-hydric	48-60"
Wedowee sandy loam, 15-25% slope	WmE	Well drained	Non-hydric	48-60"
White Store loam, 2-6% slope	WsB	Moderately well drained	Non-hydric	48-72"
White Store sandy loam, 6-10% slope	WsC	Moderately well drained	Non-hydric	>48"
White Store sandy loam, 10-25% slope	WsE	Moderately well drained	Non-hydric	>48"
White Store clay loam, 6-15% slope, moderately eroded	WtC2	Moderately well drained	Non-hydric	48-72"
White Store clay loam, 2-10% slopes, moderately eroded	WvC2	Moderately well drained	Non-hydric	>48"



Soil Series	Mapping Unit	Drainage Class	Hydric Status	Bedrock Depth
White Store clay loam, 10-25% slopes, moderately eroded	WvE2	Moderately well drained	Non-hydric	>48"
White Store-Urban land complex, 2-8% slope	WwC	Moderately well drained	Non-hydric	48-72"
White Store-Urban land complex, 10-25% slope	WwE	Moderately well drained	Non-hydric	>48"
Wilkes gravelly loam, 8 to 15 percent slope	WxD	Well drained	Non-hydric	40-80"

4.1.2 Farmlands

The Farmland Protection Policy Act (FPPA) states that federal agencies must "minimize the extent to which federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses..." The FPPA is administered by the U. S. Department of Agriculture Natural Resource Conservation Service (USDA NRCS). The North Carolina office of the USDA NRCS was contacted regarding whether the proposed project is subject to FPPA requirements. Responses from the USDA NRCS dated July 31, 2014 and March 24, 2015 (Appendix E) state the project area meets one or more of the criteria for non-farmland. Therefore, no farmland area will be affected or converted, directly or indirectly.

4.1.3 Water Resources

4.1.3.1 Streams

Water resources in the study area are part of the Cape Fear River Basin (USGS Hydrologic Unit 03030002). Fifty-seven streams were identified in the study area (Table 2). The location of each water resource is shown on Figures 47 through 68 in Appendix A. The physical characteristics of these streams are provided in Table 3.

Best Usage Classifications are ranks assigned for each surface water body by the NCDWR in accordance with Procedures for Assignment of Water Quality Standards (15A NCAC 2B .0100) and Classifications and Water Quality Standards Applicable to the Surface Waters of North Carolina (15A NCAC 2B .0200). These classifications serve to protect water quality by governing the uses of the water resource (NCDWQ, 2004). Water supply (WS) watersheds listed as IV and V are waters protected as water supplies that are generally located in watersheds that are moderately to highly developed. Nutrient Sensitive Waters (NSW) are waters that require limitations on nutrient inputs. All of the named streams within the study area are classified either as WS-IV; nutrient sensitive waters (NSW) or WS-V; NSW. All unnamed tributaries (UT) share the same designation as the body of water to which they flow.

There are no designated North Carolina Wildlife Resource Commission (NCWRC) trout waters, water supply watersheds (WS-I or WS-II), High Quality Waters (HQW), or Outstanding Resource Waters (ORW) within 1.0 mile downstream of the study area. The North Carolina 2012 Final 303(d) list of impaired waters identifies New Hope Creek and Little Creek as waters within the study area as impaired. The impairments for New Hope Creek include turbidity (water clarity), low dissolved oxygen levels, ecological/biological integrity benthos (community of small aquatic organisms that live in streams) and fecal coliform (an anaerobic bacterium that lives in the intestines of warm-blooded animals, and can cause illness in humans when found in high concentrations within waterbodies). The impairment for Little Creek is ecological/biological integrity benthos.



Table 2: Water Resources in the Study Area

			NCDWR Index	Best Usage
Stream Name	Map ID	Figure Number	Number	Classification
UT to Sandy Creek	Α	4M	_	WS-V; NSW
UT to Little Creek	AA	4D		WS-IV; NSW
UT to Sandy Creek	В	4M	_	WS-V; NSW
UT to Sandy Creek	С	4M	_	WS-V; NSW
UT to Little Creek	СС	4D	_	WS-IV; NSW
UT to Sandy Creek	D	4M	_	WS-V; NSW
UT Chapel Branch	DD	4D	_	WS-IV; NSW
UT to Sandy Creek	E	4M	_	WS-V; NSW
UT Chapel Branch	EE	4D	_	WS-IV; NSW
UT Chapel Branch	EEE	4C	_	WS-IV; NSW
UT to Sandy Creek	F	4L	_	WS-V; NSW
UT to Sandy Creek	G	4L	_	WS-V; NSW
UT to Sandy Creek	GG	4N	_	WS-V; NSW
UT to Little Creek	GGG	4F	_	WS-IV; NSW
UT to Sandy Creek	Н	4L	_	WS-V; NSW
UT to Sandy Creek	НН	4N	_	WS-V; NSW
UT to Sandy Creek	1	4K		WS-V; NSW
UT to Sandy Creek	II	40		WS-V; NSW
Sandy Creek	J	4J, 4K, 4N, 4O, 4P	16-41-1-11	WS-V; NSW
UT to Sandy Creek	IJ	40	ı	WS-V; NSW
UT Chapel Branch	JJJ	4D		WS-IV; NSW
UT to Sandy Creek	K	4J, 4K	ı	WS-V; NSW
UT to Sandy Creek	KK	4P	1	WS-V; NSW
UT Chapel Branch	KKK	4C		WS-IV; NSW
UT to New Hope Creek	L	4K	_	WS-IV; NSW
UT to Little Creek	LL	4H	ı	WS-IV; NSW
UT Chapel Branch	LLL	4C		WS-IV; NSW
UT to Little Creek	М	4G		WS-IV; NSW
UT to Little Creek	MM	4H	_	WS-IV; NSW
UT Chapel Branch	MMM	4C		WS-IV; NSW
UT to Little Creek	N	4G	_	WS-IV; NSW
UT to Little Creek	NN	4G	_	WS-IV; NSW



Stream Name	Map ID	Figure Number	NCDWR Index Number	Best Usage Classification
UT to Little Creek	0	4J	_	WS-IV; NSW
UT to Little Creek	00	4D	_	WS-IV; NSW
UT to Little Creek	000	4J	_	WS-IV; NSW
UT to Little Creek	Р	4J	_	WS-IV; NSW
UT to Little Creek	PP	4G	_	WS-IV; NSW
UT to Little Creek	Q	4J	_	WS-IV; NSW
UT Chapel Branch	QQ	4C	_	WS-IV; NSW
UT to Little Creek	QQQ	4J	_	WS-IV; NSW
UT to Little Creek	R	41	_	WS-IV; NSW
UT Chapel Branch	RR	4C	_	WS-IV; NSW
UT to New Hope Creek	S	4K	_	WS-IV; NSW
UT Chapel Branch	SS	4C	_	WS-IV; NSW
New Hope Creek	Т	4J, 4K	16-41-1	WS-IV; NSW
UT Chapel Branch	TT	4B	_	WS-IV; NSW
UT to Meeting of the waters	UU	4B	_	WS-IV; NSW
UT to Sandy Creek	UUU	4J	_	WS-V; NSW
UT to Little Creek	V	4F	_	WS-IV; NSW
UT to Little Creek	W	4E, 4F	_	WS-IV; NSW
Chapel Branch	WW	4B	16-41-2-8	WS-IV; NSW
UT to Little Creek	Х	4E	_	WS-IV; NSW
UT to Meeting of the waters	XX	4B	_	WS-IV; NSW
UT to Little Creek	XXX	4J	_	WS-IV; NSW
Little Creek	Υ	4D, 4E	16-41-1-15	WS-IV; NSW
Meeting of the Waters	YY	4B	16-41-2-7	WS-IV; NSW
UT to Little Creek	Z	4D	_	WS-IV; NSW

⁻⁻ Unnamed tributaries do not have NCDWR Index Numbers.

Table 3: Water Resources Physical Characteristics

Map ID	Figure Number	Average Bank Height (ft)	Average Bankful Width (ft)	Variable Water Depth (in)	Average Channel Substrate	Average Velocity	Average Clarity
Α	4M	4	11.8	6	Moderate	Low	Fair
AA	4D	1	6.3	3	Weak	Low	Poor
В	4M	0.5	3	4	Moderate	Low	Fair
С	4M	0.5	4	3	Weak	Low	Fair



Map ID	Figure Number	Average Bank Height (ft)	Average Bankful Width (ft)	Variable Water Depth (in)	Average Channel Substrate	Average Velocity	Average Clarity
CC	4D	4	21.2	36	Moderate	Low	Poor
D	4M	0.5	4	1	Moderate	Medium	Fair
DD	4D	0.5	8.2	2	Weak	Medium	Good
Е	4M	0.5	4	2	Moderate	Low	Poor
EE	4D	0.5	12.6	3	Moderate	Medium	Good
EEE	4C	1	3.8	2	Moderate	Low	Poor
F	4L	6	22	5	Moderate	Medium	Fair
G	4L	2-3	3	2	Weak	Low	Poor
GG	4N	2-3	5.1	2	Weak	Medium	Good
GGG	4F	1	3.7	4	Weak	Low	Poor
Н	4L	1	5.5	2	Weak	Medium	Poor
НН	4N	4-5	28.5	2	Moderate	High	Good
1	4K	2	9.4	4	Weak	Medium	Poor
II	40	1-2	3.7	1	Weak	Medium	Fair
J	4J,K,N,O,P	4	31.1	8	Moderate	Medium	Poor
IJ	40	3	11.3	1	Weak	High	Fair
JJJ	4D	1	4.2	4	Weak	Low	Fair
К	4J	2	16.5	3	Moderate	Medium	Good
KK	4P	4	12.3	3	Moderate	Medium	Good
KKK	4C	1	3.4	3	Weak	Low	Poor
L	4K	2	3	4	Weak	Low	Fair
LL	4H	2	13.8	8	Moderate	Low	Fair
LLL	4C	1	2	3	Moderate	Low	Good
М	4G	2	3.1	2	Weak	Low	Fair
MM	4H	3	12.2	4	Strong	Medium	Good
MMM	4C	1-3	5.2	2	Moderate	Medium	Fair
N	4G	2	4.5	2	Weak	Low	Fair
NN	4G	2	3.8	4	Moderate	Low	Good
0	4J	2	24.6	2	Weak	High	Good
00	4D	2	6.1	2	Weak	Medium	Fair
000	4J	1	3.5	2	Moderate	Low	Fair
Р	4J	1	3	1	Weak	Medium	Fair
PP	4G	2	3.2	2	Moderate	Low	Fair
Q	4J	1	5.2	3	Weak	Low	Fair
QQ	4C	2	5.6	4	Moderate	Low	Fair
QQQ	4J	1	3.3	2	Moderate	Low	Fair
R	41	2	4	1	Moderate	Medium	Fair



Map ID	Figure Number	Average Bank Height (ft)	Average Bankful Width (ft)	Variable Water Depth (in)	Average Channel Substrate	Average Velocity	Average Clarity
RR	4C	1	4.4	3	Moderate	Low	Fair
S	4K	5	17.9	10	Moderate	Low	Fair
SS	4C	1	4	2	Weak	Low	Fair
Т	4J,4K	6	46.1	24	Moderate	Medium	Poor
TT	4B	8	10.5	6	Moderate	Low	Fair
UU	4B	4	4.3	4	Weak	Low	Poor
UUU	4J	3	20	2	Moderate	Medium	Good
V	4F	0.5	3.9	2	Weak	Low	Good
W	4E,4F	1	4.3	2	Weak	Low	Fair
WW	4B	3	8.1	4	Strong	Low	Good
Χ	4E	2	39.4	8	Weak	Medium	Poor
XX	4B	3	3.6	1	Moderate	Medium	Fair
XXX	4J	2	9.25	12	Weak	Low	Fair
Υ	4D, 4E	4	47.7	36	Weak	Low	Poor
YY	4B	3	23.4	6	Strong	Medium	Excellent
Z	4D	1	6	4	Weak	Low	Poor

4.1.3.2 Ponds

In addition to the streams listed above, eight open water features were identified within the study area (Table 4). These open waters are characterized as ponds in the text and mapping (Figures 47 through 68 in Appendix A). A description of each pond is provided as follows:

Pond A is unnamed open water that is located northwest of University Drive and west of Martin Luther King Jr. Parkway. Pond A has a fountain to help maintain water quality and has a shoreline that is partially maintained by the adjacent apartment complex.

Pond B is unnamed open water that is located west of Farrington Road and south of Wendell Road. Pond B serves as the headwaters for Stream V.

Pond C is unnamed open water that is located north of Prestwick Road and south of NC 54. Pond C is lined with a masonry retaining wall and is well maintained.

Pond D is unnamed open water that is located east of Finley Golf Course Road and south of NC 54. Pond D has a fountain to help maintain water quality and has a fringe of emergent wetland vegetation.

Pond E is unnamed open water that is located east of Finley Golf Course Road and south of NC 54 within the Finley Golf Course.

Pond F is unnamed open water that is located east of Finley Golf Course Road and south of NC 54 north of the Finley Golf Course. Pond F has a fountain to help maintain water quality and has a fringe of emergent wetland vegetation. Pond F serves as the headwaters for Stream QQ.

Pond H is unnamed open water that is located east of Friday Center Drive and south of NC 54. Pond H serves as the headwaters for Stream MMM.



Pond G is unnamed open water that is located east of Friday Center Drive and south of NC 54. Pond G is unmaintained which has resulted in a shoreline fringe of palustrine scrub-shrub/emergent wetlands in addition to being covered by a thick layer of duckweed.

Table 4 summarizes the area of ponds that are located within the alignment alternative study areas.

Table 4: Jurisdictional Ponds in the Study Area

Pond Designation	Figure Number	Alignment(s)	Area (acre)
С	4B	C1, C1A, C2, C2A	0.107
D	4C	C1, C1A, C2, C2A	0.185
E	4C	C1, C1A, C2	0.016
F	4C	C1, C1A, C2	0.173
Н	4C	C2	0.129
G	4C	C2	0.146
В	4F	C1, C1A, C2, C2A	0.335
А	4L	NHC 2, LPA	0.264

4.2 Biotic Resources

4.2.1 Terrestrial Communities

Four terrestrial communities were identified in the study area as shown in Appendix A (Figures 32 through 46): maintained/disturbed, mesic mixed forest, alluvial hardwood forest, and bottomland hardwood forest. A brief description of each community type follows. Scientific names of all species identified are included in Appendix B.

The NCNHP has identified select unique habitat areas throughout North Carolina as NHP Natural Areas (NHPNA), formerly called Significant Natural Heritage Areas (SNHA). These areas are considered especially valuable because they contain special habitats, rare species, ecologically significant natural communities, and are considered reservoirs of biological diversity. NHPNA designation does not confer legally mandated protections; however, this status does imply that these areas will be given special consideration during an environmental review process. An overview of the NHPNAs present within the project area is provided in Figure 68 of Appendix A. The two NHPNAs that would be impacted by the project alternative are the New Hope Creek Bottomland Forest and the Little Creek Bottomlands and Slopes. The other NHPNAs that are shown in Figure 68 are outside of the areas that would be impacted by the project.

4.2.1.1 Maintained/Disturbed

This community incorporates several land cover types, including residential, commercial, industrial, recreational, and cleared/maintained transportation corridors. The majority of the study corridor is designated maintained/disturbed land.

Plant communities in residential areas often contain relict species from before the area was cleared or disturbed, usually canopy trees that reflect their historic assemblages. Usually, introduced species predominate in maintained areas, and weedy species are opportunistic in recently disturbed areas. Canopy trees include red maple, hickory, white ash, sweetgum, tulip poplar, loblolly pine, black cherry, and oaks including white oak, southern red oak, willow oak, northern red oak, and black oak. Shrubs



include flowering dogwood, winged sumac, sourwood, wax myrtle, maple-leaf viburnum, and weedy species including mimosa, princess tree, blackberry, multiflora rose, tree-of-heaven, Japanese knotweed, autumn olive, bamboo, bush honeysuckle, poison ivy, and Chinese privet. Vines include Japanese honeysuckle, trumpet creeper, kudzu, oriental bittersweet, English ivy, catbrier, and muscadine. The herb layer includes ragweed, broomsedge, crabgrass, horseweed, beggar ticks, fireweed, dog fennel, St. Peter's cross, horse nettle, goldenrod, Japanese grass, and Queen Anne's lace.

4.2.1.2 Mesic Mixed Forest

This community, if left undisturbed, would most closely resemble Schafale and Weakley's (1990) mesic mixed hardwood forest. Mature, stable forests in this region are usually characterized by a hardwood canopy. However, this community is characterized by a mixture of pine and hardwood species, with pines occasionally comprising greater than 30 percent of canopy stems. The community in the study area occurs primarily as a buffer around roads, residential and other developed areas, and as secondary growth forest on previously timbered or otherwise disturbed land. Mesic mixed forest contains American beech, tulip poplar, red oak, black walnut, white oak, sourwood, Virginia pine, and loblolly pine in the canopy. The shrub layer supports American holly, flowering dogwood, blackberry, Chinese privet, multiflora rose, autumn olive, bamboo, Japanese barberry, and bush honeysuckle. The herb layer includes Christmas fern, lespedeza, heartleaf, and Japanese grass. Vines include oriental bittersweet, Japanese honeysuckle, poison ivy, and English ivy.

4.2.1.3 Alluvial Hardwood Forest

This plant community supports many species in common with Piedmont/low mountain alluvial forest as described by Schafale and Weakley (1990), but the extent of disturbance by diverted storm water flow and by invasive species along roadside edges cause this community to deviate noticeably from the natural community described. Alluvial hardwood forest occurs throughout the study area along small streams. This community has a significant component of wetland species, particularly in the herb layer. These areas are intermittently flooded, and may contain standing water for extended periods in the winter and spring. The forest canopy is characterized by sweetgum, tulip poplar, American elm, American sycamore, river birch, green ash, box elder, and red maple. American holly, slippery elm, American hornbeam, willow oak, ironwood, and common pawpaw occur most often as understory trees. Chinese privet, silky dogwood, multiflora rose, Japanese knotweed, spicebush, blackberry, poison ivy, Japanese honeysuckle, oriental bittersweet, and catbrier are found in the shrub layer. Herbaceous species include Japanese grass, smartweed, jewelweed, false nettle, soft rush, watercress, and sedges.

4.2.1.4 Bottomland Hardwood Forest

Bottomland hardwood forests distinguished from the alluvial hardwood forests by the presence of larger streams and the depositional fluvial landforms, or changes in the landscape resulting from the movement of sediment by the stream, that occur within the larger floodplain areas. Bottomland hardwood forests typically contain dominant canopy trees such as tulip poplar, sweetgum, American elm, green ash, loblolly pine. Understory trees include American hornbeam, flowering dogwood, red maple, and American holly. Chinese privet, silky dogwood, multiflora rose, Japanese knotweed, spicebush, blackberry, poison ivy, Japanese honeysuckle, oriental bittersweet, and catbrier are found in the shrub layer. Herbaceous species include Japanese grass, smartweed, jewelweed, false nettle, soft rush, watercress, and sedges. The New Hope Creek Corridor bottomland hardwood forest is located within the project study area.

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New Hope Creek Corridor Bottomland Hardwood Forest

The broad bottomlands along New Hope Creek and its tributaries support some of the largest and oldest stands of hardwoods remaining in this part of the Piedmont, more than 4,480 acres (NCNHP, 1999). The New Hope Creek floodplain is an integral part of a much larger system of natural areas, extending from Duke Forest in the headwater area down to the Jordan Lake Game Lands, and farther downstream the Cape Fear all the way to the Coastal Plain. The project study area bisects the New Hope Creek Corridor bottomland hardwood forest in two locations: the US 15-501 bottomlands (wetlands E, G, H, I, J, K, N, O, OOO, P, Q, U, UUU, V, VV, VVV, W, WWW, X, XX, XXX, YYY, ZZZ) and the Little Creek bottomlands (wetlands Y, Z, AA, BB, CC, CCC, BBB, DD, DDD, EE, HHH, III, and FF). The text within the following two sections on the US 15-501 bottomlands and the Little Creek bottomlands are extracted from the 1999 Durham County *Inventory of Important Natural Areas, Plants and Wildlife* (NCNHP, 1999). A copy of the selected portions of this report can be found in Appendix C.

US 15-501 Bottomlands

The US 15-501 bottomlands are part of the New Hope Creek Bottomland Forest NHPNA and are located between US 15-501 and Old Chapel Hill Road. This part of the New Hope floodplain covers approximately 250 acres and supports a fairly mature stand of bottomland hardwood forest. Most trees range between 10 inches and 15 inches in diameter, but occasional specimens were observed that were over three feet in diameter. Canopy species observed include box elder, red maple, sugar maple, river birch, shagbark hickory, big shellbark hickory, mockernut hickory, southern hackberry, sweetgum, tulip poplar, loblolly pine, swamp chestnut oak, willow oak, and American elm. The plant list includes the large-flowered trout lily, yellow lady's slipper, and southern rein orchids, which are found in some of the low areas. The rarest plant is big shellbark hickory, a species listed by NCNHP as a candidate for the endangered and threatened list due to the small numbers found in North Carolina. There is a thriving population of small trees and one much larger and older tree present. In addition, according to the Durham County *Inventory of Important Natural Areas, Plants and Wildlife* (NCNHP, 1999), this whole area has been seriously affected by the increased run-off from development along US 15-501.

Little Creek Bottomlands and Slopes

Little Creek is one of the larger tributaries of New Hope Creek. The portion of Little Creek within the project study area is within the 100-year floodplain of Jordan Lake, and is part of the Jordan Lake Watershed Management Area. Little Creek Bottomlands are underwater when Jordan Lake is at flood level. This area contains a large tract of bottomland hardwood forest that provides habitat for many species of forest-interior and other disturbance-sensitive animals. Canopy species observed include shagbark hickory, American beech, swamp white oak, red oak, hop hornbeam, and elm. Little Creek Bottomlands and Slopes are designated as an NHPNA by the NCNHP.

4.2.1.5 Terrestrial Wildlife

The project study area was visually surveyed for signs of terrestrial wildlife between August 2013 and August 2014. Due to the disturbed nature of the project study area, all of the faunal species observed are opportunistic species that would inhabit any and all of the terrestrial communities discussed above. Faunal species observed within the project study area are discussed following the community descriptions. Wildlife expected within and around the project study area was determined through review of supporting literature (Burt, 1976; Martof et al., 1980; Sather et al., 2004; Sibley, 2003; Duke University, 2015). Wildlife directly observed or determined to be present through evidence (tracks, scat) during field investigations are indicated with an asterisk (*).



Bird species that utilize this community are those typical of developed areas in the Piedmont region of North Carolina. These species are tolerant of habitat fragmentation and regular disturbance. Typical birds of this community include the following: turkey vulture*, red-shouldered hawk, red-tailed hawk* American robin*, northern cardinal*, eastern towhee, American crow*, eastern bluebird, northern mockingbird*, Carolina wren, song sparrow, white-throated sparrow, rock dove, red-bellied woodpecker*, mourning dove*, common grackle*, blue jay*, American goldfinch, northern flicker, European starling, and tufted titmouse*. Mammals expected to occur in these forested areas include both those species acclimated to human disturbance and those species typical of relatively undisturbed forests of limited size. Expected mammals are: the eastern grey squirrel*, eastern red bat, white-tailed deer*, raccoon, eastern cottontail, opossum, eastern mole, and gray fox. Other species expected to be within the project study area include the shorttail shrew, striped skunk, and white-footed mouse.

Primarily terrestrial reptiles and amphibians that utilize open and disturbed areas typical of this community include the following: rat snake, eastern fence lizard, corn snake, and slimy salamander. Primarily terrestrial reptiles and amphibians who would typically favor forested habitats in the region include the following: eastern box turtle*, American toad, five-lined skink, copperhead, gray treefrog, upland chorus frog, wood frog, and slimy salamander.

4.2.2 Aquatic Communities

Aquatic communities within the project study area consist of many small intermittent and perennial streams, as well as a few larger perennial streams and their associated wetlands (e.g., New Hope Creek, Little Creek). Aquatic invertebrates and fish would be expected to be a major component of stream ecosystems, as primary and secondary consumers, and as prey items for organisms higher in the food chain. Typical aquatic organisms would include, caddisflies*, mayflies*, crane flies, crayfish*, stoneflies*, dobsonflies, dragonflies*, mosquitoes*, and black flies, bloodworm midge*, whirligig beetles, water boatman*, water striders*, crayfish*, snails*, Asiatic clam*, mosquito fish*, shiners*, and sunfish*.

4.2.3 Bottomland Hardwood Forest

The New Hope Creek bottomlands provide an important ecological corridor for the movement of animals. A species survey was conducted in the New Hope Creek Corridor bottomland hardwood forest as part of *The Durham County Inventory of Important Natural Areas, Plants and Wildlife,* 1999. The following description was extracted from this report, and a copy of the selected portions of this report can be found in Appendix C that contains a more complete list of species identified within the US 15-501 and Little Creek bottomlands located in the vicinity of the project study area.

Significant species recorded within the US 15-501 hardwood bottomland included four-toed salamanders, dwarf waterdogs, and river otters. Residence of otters in this area is an indication of both the undisturbed qualities of this bottomland as well as there being a substantial supply of fish and other aquatic species upon which they prey.

The Little Creek bottomland in the vicinity of the project study area contains a waterfowl impoundment located north of NC 54. This impoundment is one of seven waterfowl impoundments that were constructed by the USACE and the North Carolina Department of Transportation as mitigation for the loss of floodplains due to the impoundment of Jordan Lake. This Jordan Game Land area is managed by the NCWRC. Each impoundment has concrete control structures to regulate water level and base flow, allowing the sites to drain feely for eight months of the year and then inundating the areas from November through February.



Characteristic bottomland species observed at Little Creek included red-shouldered hawk, wood duck, otter, mink, muskrat, and beaver. The presence of pileated woodpeckers, along with the red-shouldered hawks, is indicative of the extensive nature and relative maturity of the hardwood forest. The most notable animal observed on this tract was the marsh rabbit; this species is one of a suite of essentially Coastal Plain species that occur above the Fall Line only within the extensive floodplains along Triassic Basin streams.

4.3 Jurisdictional Issues

Jurisdictional issues are described in the following subsections.

4.3.1 Clean Water Act of the U.S.

A field delineation of jurisdictional water resources within the project study area was conducted in 2013 and 2014 and again in 2015. Based on these field surveys, a preliminary Jurisdictional Determination (JD) of these features was issued by the USACE on May 12, 2014. Subsequent to the issuance of the JD, the project study area limits were revised. A modification of the May 12, 2014 JD was signed on November 7, 2014 based on the completion of additional field delineations (Appendix E). Fifty-seven jurisdictional streams were identified in the study area (Table 5). The locations of these streams are shown on Figures 47 through 67 in Appendix A. USACE and the NCDWR stream delineation forms are included in Appendix D. The physical characteristics and water quality designations of each jurisdictional stream are detailed in section 4.1.3.1. 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
Α	574	Perennial	Yes	Yes
AA	96	Intermittent	Yes	No
В	187	Perennial	Yes	Yes
С	47	Perennial	Yes	Yes
CC	230	Perennial	Yes	Yes
D	61	Intermittent	Yes	No
DD	250	Intermittent	Yes	Yes
Е	320	Intermittent	Yes	Yes
EE	178	Perennial	Yes	Yes
EEE	78	Intermittent	Yes	No
F	754	Perennial	Yes	Yes
G	198	Intermittent	Yes	Yes
GG	268	Intermittent	Yes	No
GGG	288	Intermittent	Yes	Yes
Н	276	Intermittent	Yes	Yes
НН	106	Perennial	Yes	Yes
1	2,450	Perennial	Yes	Yes
П	403	Intermittent	Yes	Yes
J	4,294	Perennial	Yes	Yes



Map ID	Length (ft.)	Classification	Compensatory Mitigation Required	River Basin Buffer
JJ	463	Perennial	Yes	Yes
JJJ	65	Intermittent	Yes	Yes
К	876	Perennial	Yes	No
KK	684	Perennial	Yes	Yes
KKK	168	Intermittent	Yes	Yes
L	175	Perennial	Yes	No
LL	205	Perennial	Yes	Yes
LLL	90	Intermittent	Yes	No
М	228	Intermittent	Yes	Yes
MM	297	Perennial	Yes	Yes
MMM	208	Intermittent	Yes	Yes
N	565	Intermittent	Yes	No
NN	148	Perennial	Yes	No
0	133	Perennial	Yes	Yes
00	215	Intermittent	Yes	Yes
000	12	Intermittent	Yes	No
Р	252	Intermittent	Yes	No
PP	220	Intermittent	Yes	Yes
Q	387	Intermittent	Yes	Yes
QQ	227	Perennial	Yes	Yes
QQQ	28	Intermittent	Yes	No
R	317	Intermittent	Yes	Yes
RR	683	Perennial	Yes	Yes
S	477	Perennial	Yes	Yes
SS	228	Intermittent	Yes	No
Т	1,297	Perennial	Yes	Yes
TT	712	Perennial	Yes	Yes
UU	115	Intermittent	Yes	No
UUU	409	Perennial	Yes	Yes
V	792	Intermittent	Yes	Yes
W	645	Intermittent	Yes	Yes
WW	250	Perennial	Yes	Yes
Х	180	Perennial	Yes	Yes
XX	66	Intermittent	Yes	No
XXX	72	Intermittent	Yes	Yes
XXX	132	Perennial	Yes	Yes
Υ	1,514	Perennial	Yes	Yes
YY	280	Perennial	Yes	Yes
Z	233	Perennial	Yes	Yes



Eight ponds were identified within the project study area (Figures 47 – 68 in Appendix A).

Forty-six jurisdictional wetlands were identified within the study area (Figures 47 – 68 in Appendix A). Each wetland area was classified using the North Carolina Wetland Assessment Method (NCWAM), and given a quality rating of high, medium, or low by the North Carolina Wetland Functional Assessment Team (NCWFAT, 2010). Wetland classification and quality rating data are presented in Table 6. All wetlands in the study area are within the Cape Fear River basin (USGS Hydrologic Unit 03030002). USACE wetland delineation forms and NCWAM wetland rating forms for each site are included in Appendix D.

Table 6: Jurisdictional Characteristics of Wetlands in the Study Area

Map ID	Figure Number	NCWAM Classification	Hydrologic Classification	NCWAM Wetland Rating	Impacts (ac.)
Α	4M	Headwater forest	PF01/04	High	0.11
AA	4E	Bottomland hardwood forest	PF01/EM	High	2.97
BB	4E	Bottomland hardwood forest	PF01	High	0.38
BBB	4E	Basin wetland	PF01/EM	High	0.35
С	4M	Headwater forest	PF01/EM	High	0.08
CC	4D	Bottomland hardwood forest	PF01	High	0.21
CCC	4E	Basin wetland	PEM	High	0.23
DD	4D	Bottomland hardwood forest	PF01	High	0.06
DDD	4E	Basin wetland	PF01	High	0.29
Е	4K	Bottomland hardwood forest	PF01	High	2.45
EE	4D	Bottomland hardwood forest	PF01	High	1.17
F	4K	Bottomland hardwood forest	PEM	Medium	0.01
FF	4D	Bottomland hardwood forest	PF01/PEM	High	2.09
G	4 J	Bottomland hardwood forest	PFO1	High	0.03
GG	4C	Bottomland hardwood forest	PF01	High	0.37
Н	4J	Non-tidal freshwater marsh	PEM	Medium	0.01
ннн	4F	Non-tidal freshwater marsh	PEM	Low	0.05
1	4J	Bottomland hardwood forest	PFO1	High	0.31
Ш	4F	Bottomland hardwood forest	PF01	High	0.26
J	4 J	Bottomland hardwood forest	PFO1	High	0.71
K	4 J	Bottomland hardwood forest	PFO1	High	0.04
N	4 J	Bottomland hardwood forest	PFO1	High	2.30
NNN	4G	Non-tidal freshwater marsh	PEM	High	0.27
0	4 J	Bottomland hardwood forest	PFO1	High	2.21
000	4 J	Basin wetland	PEM	Low	0.05
Р	4 J	Bottomland hardwood forest	PFO1	High	0.02
Q	4J	Bottomland hardwood forest	PFO1	High	0.25



Map ID	Figure Number	NCWAM Classification	Hydrologic Classification	NCWAM Wetland Rating	Impacts (ac.)
R	41	Headwater forest	PF01/04	Low	0.22
S	41	Headwater forest	PF01	High	0.10
Т	41	Headwater forest	PSS1	Low	0.08
TTT	4N	Bottomland hardwood forest	PF01/04	High	0.21
U	4K	Basin wetland	PF01	Medium	0.01
UUU	4 J	Bottomland hardwood forest	PFO1	High	2.37
V	4K	Bottomland hardwood forest	PF01	Low	0.45
VV	4K	non-tidal freshwater marsh	PEM	Low	0.13
VVV	4 J	Bottomland hardwood forest	PFO1	High	0.06
W	4K	Bottomland hardwood forest	PF01/PEM	High	0.77
WW	4B	Bottomland hardwood forest	PF01/EM	Low	0.04
WWW	4J	Bottomland hardwood forest	PFO1	High	0.18
XX	4 J	Bottomland hardwood forest	PFO1	High	0.10
Υ	4F	Basin wetland	PF01	Medium	0.06
YY	4C	Non-tidal freshwater marsh	PEM	Medium	0.04
YYY	4J	Bottomland hardwood forest	PFO1	High	0.03
Z	4F	Bottomland hardwood forest	PF01	High	0.45
ZZ	4B	Bottomland hardwood forest	PF01/EM	Medium	0.12
ZZZ	4J	Bottomland hardwood forest	PF01	High	0.07

4.3.2 Clean Water Act Permits

The proposed project will likely require an Individual Permit for the purposes of Section 404 certification. This permit must be accompanied by an individual Section 401 Water Quality Certification. The USACE holds the final discretion as to what permit will be required to authorize project construction.

4.3.3 Coastal Zones

The Coastal Zone Management Act of 1972 enables states, including North Carolina, to designate state coastal zone boundaries and develop coastal management programs to improve protection of sensitive shoreline resources and guide sustainable use of coastal areas. The North Carolina Coastal Area Management Act of 1974 establishes a cooperative program of coastal area management between local and state governments. According to the National Oceanic and Atmospheric Administration (NOAA, February 9, 2012) and the North Carolina Department of Environment and Natural Resources (NCDENR), the project area is not located within any of the 20 counties that comprise the state's coastal zone boundaries and that are subject to the rules and policies of the state's Coastal Resources Commission. Impacts to coastal zones would not occur with the proposed project.

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4.3.4 Coastal Area Management Act Areas of Environmental Concern

Coastal Area Management Act (CAMA) wetlands or other areas of Environmental Concern do not occur in Orange or Durham counties or in the study area. Therefore, CAMA regulations would not apply to the study area.

4.3.5 Construction Moratorium

No trout or other construction moratorium will apply to any streams or waters in the study area. A construction moratorium is a period of time that construction may not occur, which is typically associated with the breeding season of a protected species.

4.3.6 N.C. River Basin Buffer Rules

Jordan Lake Buffer Rules apply to streams and waters in the study area. In an effort to improve water quality in the Jordan Lake watershed, a new mandatory buffer rule (15A NCAC 02B .0267) was adopted by the North Carolina Environmental Management Commission (EMC) on August 11, 2009. The purpose of this rule is to protect and preserve existing riparian buffers to maintain their nutrient removal function. Riparian buffers act to remove nitrogen, phosphorus, and other pollutants from rainwater and runoff.

The buffer rule applies to all perennial and intermittent streams, lakes, ponds, and estuaries in the Jordan Lake water basin that are shown on the latest USGS topographic quadrangle maps and Natural Resources Conservation Service soil survey maps. It does not apply to agricultural, forestry, or stormwater ditches. The buffer rule establishes a protected 50-foot wide riparian buffer consisting of two zones. Zone 1 consists of a vegetated area that extends landward a distance of 30 feet on all sides of a surface water. Zone 2 begins at the outer edge of Zone 1 and extends landward 20 feet. Under the buffer rules, Zones 1 and 2 are to remain essentially undisturbed, except for certain exempted and allowed uses provided by 15A NCAC 02B .0267 (6). Uses designated as prohibited under this rule may not proceed within the riparian buffer unless a variance is granted pursuant to 15A NCAC 02B .0267 (9). The buffer rules are administered by the NCDWR.

4.3.7 Rivers and Harbors Act Section 10 Navigable Waters

There are no surface waters identified as "Navigable Waters" under section 10 of the Rivers and Harbors Act (33 U.S.C. § 403) in the study area. The USACE defines navigable waters as those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce (33 C.F.R. § 329.4). The Rivers and Harbors Act limits the construction of any structure that would obstruct navigable waters.

4.3.8 Endangered Species Act Protected Species

The ESA of 1973 (16 U.S.C. § 1531 et seq.), is the federal statute that regulates endangered and threatened species through administering permits, implementing recovery plans, and monitoring listed endangered and threatened species. Species with the federal status of endangered (E), threatened (T), proposed endangered (PE), and proposed threatened (PT) are protected under the ESA. Any action likely to adversely affect a species classified as federally protected will be subject to review by the USFWS. The USFWS lists five federally protected species for Orange and Durham counties (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 the USFWS. The USFWS optimal survey windows are based on



recommendations from the USFWS on the best times to find and identify these species. Optimal survey windows for plants were determined from species recovery plans, field observations, and herbarium specimens at the North Carolina State University herbarium. Optimal survey windows for animals were approved by the National Marine Fisheries Service (NMFS) on April 4, 2008 and the USFWS Raleigh Field Office on April 7, 2008. USFWS concurrence of the Biological Conclusions is pending their review of this report.

Table 7: Federally Protected Species Listed for Orange and Durham Counties

Scientific Name	Common Name	Federal Status	Habitat Present	Biological Conclusion
Rhus michauxii	Michaux's sumac	Endangered	Yes	May affect, not likely to adversely affect
Echinacea laevigata	Smooth coneflower	Endangered	No	No effect
Picoides borealis	Red-cockaded woodpecker*	Endangered	No	No effect
Alasmidonta heterodon	Dwarf wedgemussel	Endangered	No	No effect
Myotis septentrionalis	Northern long-eared bat	Threatened	Yes	Unresolved

^{* -} Historical record (the species was last observed in the county more than 50 years ago)

4.3.8.1 Michaux's Sumac

USFWS optimal survey window: May through October

Habitat Description: Michaux's sumac, endemic to the inner Coastal Plain and lower Piedmont, grows in sandy or rocky, open, upland woods on acidic or circumneutral, well-drained sands or sandy loam soils with low cation exchange capacities. The species is also found on sandy or submesic loamy swales and depressions in the fall line Sandhills region as well as in openings along the rim of Carolina bays; maintained railroad, roadside, power line, and utility rights-of-way; areas where forest canopies have been opened up by blowdowns and/or storm damage; small wildlife food plots; abandoned building sites; under sparse to moderately dense pine or pine/hardwood canopies; and in and along edges of other artificially maintained clearings undergoing natural succession. In the central Piedmont, it occurs on clayey soils derived from mafic rocks. The plant is shade intolerant and, therefore, grows best where disturbance (e.g., mowing, clearing, grazing, periodic fire) maintains its open habitat. Suitable habitat for Michaux's sumac may exist along the existing powerline easements and roadway right-of-ways observed within the project study area.

Biological Conclusion: May affect, not likely to adversely affect

A survey for Michaux's sumac and its habitat was conducted during the biotic community survey in September, 2013. Suitable habitat for Michaux's sumac was present in the study area along roadside shoulders and utility easements. These habitat types exist along most of the project corridor and along all of the alignment alternatives, anywhere that the alignment approaches roads or utility easements. No individuals were found during the survey. A review of the NCNHP records, updated January 2015, indicates no known Michaux's sumac occurrence within 1.0 mile of the study area.

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4.3.8.2 Smooth Coneflower

USFWS optimal survey window: late May through October

Habitat Description: Smooth coneflower is typically found in open woods, glades, cedar barrens, roadsides, clearcuts, dry limestone bluffs, and power line rights-of-way, usually on magnesium and calcium rich soils associated with amphibolite, dolomite or limestone (in Virginia), gabbro (in North Carolina and Virginia), diabase (in North Carolina and South Carolina), and marble (in South Carolina and Georgia). Smooth coneflower occurs in plant communities that have been described as xeric hardpan forests, diabase glades or dolomite woodlands. Optimal sites are characterized by abundant sunlight and little competition in the herbaceous layer. Natural fires, as well as large herbivores, historically influenced the vegetation in this species' range.

Biological Conclusion: No effect

A survey for smooth coneflower and its habitat was conducted during the biotic community survey in September, 2013. No suitable habitat for this species was identified within the project study area, and no individuals were found during the survey. A review of the NCNHP records, updated January 2015, indicates one historical occurrence of smooth coneflower within 1.0 mile of the study area. The habitat where this occurrence was observed is recorded as having been destroyed.

4.3.8.3 Red-cockaded Woodpecker

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

Habitat Description: For nesting/roosting habitat, open stands of pine containing trees 60 years old and older are preferred. Red-cockaded woodpeckers need live, large older pines in which to excavate their cavities. Longleaf pines are most commonly used, but other species of southern pine are also acceptable. Dense stands (stands that are primarily hardwoods, or that have a dense hardwood understory) are avoided. Foraging habitat is provided in pine and pine hardwood stands 30 years old or older with foraging preference for pine trees 10 inches or larger in diameter. In good, moderately-stocked, pine habitat, sufficient foraging substrate can be provided on 80 to 125 acres. Suitable habitat for the red-cockaded woodpecker does not exist in the project study area. Small, scattered patches of loblolly pine trees were identified in the project study area. The majority of vegetation in the project study area consists of hardwood trees and urban landscape plantings.

Biological Conclusion: No effect

Suitable habitat for the red-cockaded woodpecker does not exist in the study area. The entire study area is comprised of maintained/disturbed communities with no stands of mature pine forest. A review of the NCNHP records, updated January 2015, indicates no known red-cockaded woodpecker occurrence within 1.0 mile of the study area.

4.3.8.4 Dwarf Wedgemussel

USFWS optimal survey window: year round

Habitat Description: In North Carolina, the dwarf wedgemussel is known from the Neuse and Tar River drainages. The mussel inhabits creek and river areas with a slow to moderate current and sand, gravel, or firm silt bottoms. Water in these areas must be well oxygenated. Stream banks in these areas are generally stable with extensive root systems holding soils in place.

Biological Conclusion: No effect



The entire project study area is within the Cape Fear River Basin, which is not known to contain this species. A review of the NCNHP records, updated January 2015, indicates no known dwarf wedgemussel occurrence within 1.0 mile of the study area.

4.3.8.5 Northern Long-eared Bat

USFWS optimal survey window: May 15 - August 15;

Habitat Description: On October 2, 2013, the USFWS proposed listing the northern long-eared bat as endangered after a decline in the bat's numbers caused by white-nose syndrome, a fungal disease that this species is susceptible to. On January 16, 2015, the USFWS began a 60-day public comment period regarding the potential listing of the northern long-eared bat as a threatened species. The USFWS made a final listing determination on April 2, 2015, effective May 4, 2015. Northern long-eared bats spend winter hibernating in caves and mines, called hibernacula. They use areas in various sized caves or mines with constant temperatures, high humidity, and no air currents. During the summer, northern long-eared bats roost singly or in colonies underneath bark, in cavities, or in crevices of both live trees and snags (dead trees). Males and non-reproductive females may also roost in cooler places such as caves and mines.

Biological Conclusion: Unresolved

Suitable habitat for the northern long-eared bat was present within the study area's larger undeveloped floodplains. A review of the NCNHP records, updated January 2015, indicates no known northern long-eared bat occurrence within 1.0 mile of the study area. A Biological Conclusion will be added upon pending consultation with the USFWS.

4.3.9 State Endangered Species Act

The North Carolina Endangered Species Act (N.C.G.S. § 113-331 et seq.) limits, regulates, or prohibits the taking, possession, collection, transportation, purchase or sale of those species and is administered by the NCWRC. Endangered, threatened, and rare plants are protected by the North Carolina Plant Protection and Conservation Act (N.C.G.S. § 106-202.12 et seq.). This law is administered by the Plant Conservation Program in the North Carolina Department of Agriculture (NCDA). All federally-listed species are included on the state list. The NCNHP currently lists 38 total species (21 Endangered, 17 Threatened), listed in Table 8. Coordination with NCDENR will take place pending its review of this report.

Table 8: State-listed Endangered and Threatened Species

Taxonomic	Scientific Name	Common Name	State	County
Group			Status	
Bird	Haliaeetus	Bald eagle	Т	Durham, Orange
	leucocephalus			
Bird	Picoides borealis	Red-cockaded	Е	Durham, Orange
		woodpecker		
Freshwater bivalve	Alasmidonta heterodon	Dwarf wedgemussel	Е	Orange
Freshwater bivalve	Alasmidonta undulate	Triangle floater	Т	Durham, Orange
Freshwater bivalve	Alasmidonta varicose	Brook floater	Е	Orange
Freshwater bivalve	Elliptio roanokensis	Roanoke slabshell	Т	Durham
Freshwater bivalve	Fusconaia masoni	Atlantic pigtoe	Е	Durham, Orange



Taxonomic	Scientific Name Common Name		State	County
Group			Status	
Freshwater bivalve	Lampsilis cariosa	Yellow lampmussel	E	Durham, Orange
Freshwater bivalve	Lampsilis radiate	Eastern lampmussel	T	Durham, Orange
Freshwater bivalve	Lasmigona subviridis	Green floater	Е	Durham, Orange
Freshwater bivalve	Strophitus undulates	Creeper	T	Durham, Orange
Freshwater bivalve	Toxolasma pullus	Savannah lilliput	E	Orange
Freshwater bivalve	Villosa vaughaniana	Carolina creekshell	E	Orange
Freshwater fish	Noturus furiosus	Carolina madtom	T	Durham
Vascular plant	Anemone berlandieri	Southern anemone	E	Orange
Vascular plant	Baptisia australis var. aberrans	Prairie blue wild indigo	E	Durham, Orange
Vascular plant	Buchnera Americana	American bluehearts	E	Durham, Orange
Vascular plant	Cardamine douglassii	Douglass's bittercress	Т	Durham, Orange
Vascular plant	Carya laciniosa	Big shellbark hickory	Т	Durham
Vascular plant	Delphinium exaltatum	Tall larkspur	Е	Durham
Vascular plant	Echinacea laevigata	Smooth coneflower	E	Durham, Orange
Vascular plant	Fleischmannia incarnate	Pink thoroughwort	Т	Durham
Vascular plant	Gaylussacia brachycera	Box huckleberry	E	Durham
Vascular plant	Gillenia stipulate	Indian physic	T	Durham, Orange
Vascular plant	Lindera melissifolia	Pondberry	E	Orange
Vascular plant	Lithospermum canescens	Hoary puccoon	Т	Durham
Vascular plant	Panicum flexile	Wiry panic grass	T	Durham, Orange
Vascular plant	Platanthera peramoena	Purple fringeless orchid	Т	Durham, Orange
Vascular plant	Primula meadia	Shooting star	Т	Orange
Vascular plant	Rhus michauxii	Michaux's sumac	E	Durham, Orange
Vascular plant	Ruellia humilis	Low wild-petunia	E	Durham
Vascular plant	Scutellaria australis	Southern skullcap	E	Orange
Vascular plant	Scutellaria leonardii Shale-barren		Е	Durham, Orange
		skullcap		
Vascular plant	Scutellaria nervosa	Veined skullcap	E	Durham
Vascular plant	Symphyotrichum leave var. concinnum	Narrow-leaf aster	Т	Durham, Orange
Vascular plant	Trichostema brachiatum	Glad bluecurls	E	Orange
Vascular plant	Tridens chapmanii	Chapman's redtop	Т	Durham, Orange
Vascular plant	Trifolium reflexum	Buffalo clover	Т	Durham

E– Endangered T – Threatened

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4.3.10 Bald Eagle and Golden Eagle Protection Act

The Bald Eagle and Golden Eagle Protection Act (16 U.S.C. § 668) prohibits the taking of a bald eagle, including any activity that would disturb a bald eagle by interfering with normal breeding, feeding, or sheltering behavior. Habitat for the bald eagle primarily consists of mature forest in proximity to large bodies of open water with abundant fish for foraging. Large, dominant trees are utilized for nesting sites, typically within 1.0 mile of open water. One study showed that eagles prefer nesting near lakes with a circumference greater than 7 miles (Peterson 1986). There are no large bodies of open water in close proximity to the study area. Therefore, no habitat within and near the study area constitutes foraging habitat for the bald eagle, and no detailed surveys for eagle nests or nesting habitat are planned within the study area or within a 660-foot buffer. A review of the NCNHP records, updated July 2014, indicates no known bald eagle occurrence within 1.0 mile of the study area. Consultation with the USFWS is pending review of this document.

4.3.11 Migratory Bird Treaty Act

There are a number of observed and expected bird species located in the project area which fall under the purview of the Migratory Bird Treaty Act of 1918. Bird species that were observed within the project area are listed in Appendix B. This act established a Federal prohibition, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention . . . for the protection of migratory birds . . . or any part, nest, or egg of any such bird." (16 U.S.C. § 703). Consultation with the USFWS is pending review of this document.

4.3.12 Endangered Species Act Candidate Species

The USFWS defines candidate species as plants and animals for which the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the Endangered Species Act, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. As of December 2012, the USFWS lists no candidate species for Durham and Orange counties.

4.3.13 Essential Fish Habitat

The NMFS regulates Essential Fish Habitat (EFH) under Magnuson-Stevens Fishery Conservation and Management Act (P.L. 94-265), as amended by the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (P.L. 109-479). No Essential Fish Habitat has identified within Durham or Orange counties by the National Marine Fisheries Service.



5. Environmental Consequences

5.1 Biotic Communities within Alignment Alternatives

Table 9 indicates the acreage of each biotic community within the limits of construction, or project footprints, of each of the alignment alternatives (see Appendix A Figures 32 through 46). A description of the overall study area acreages follows.

Table 9: Biotic Communities in the Study Area

Biotic Community						
Alignment / Alignment Alternatives	Bottomland (Acres)	Alluvial (Acres)	Mesic Mixed (Acres)	Maintained / Disturbed (Acres)		
LRA	0	3	66	169		
C1	3	1	5	10		
C1A	1	1	9	11		
C2	1	1	8	13		
C2A	1	0	5	19		
NHC 1	2	0	5	22		
NHC 2	3	0	8	16		
NHC LPA	4	0	5	18		
	Rail Operat	ion and Mai	ntenance Facility Sit	es		
Leigh Village	0	0	17	4		
Farrington	0	0	9	16		
Patterson Place	0	0	16	0		
Cornwallis	0	1	12	7		
Alston	0	0	0	21		
Alignment Alternative Combinations (all combinations assume the use of the common						
segments of the Light Rail Alternative)						
C1, NHC 1	5	4	77	200		
C1, NHC 2	6	4	79	195		
C1, NHC LPA	7	4	77	197		
C1A, NHC 1	3	5	80	202		
C1A, NHC 2	4	5	83	196		
C1A, NHC LPA	5	5	80	198		
C2, NHC 1	3	4	79	204		
C2, NHC 2	4	4	82	198		
C2, NHC LPA	5	4	79	200		
C2A, NHC 1	3	4	76	210		
C2A, NHC 2	4	4	79	204		
C2A, NHC LPA	5	4	76	206		

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LRA - Common segments of Light Rail Alternative

5.1.1 C1, NHC 1

The corridor composed of the common segments of the Light Rail Alternative with the C1 Alignment Alternative and NHC 1 Alignment Alternative contains approximately 5 acres of bottomlands, 4 acres of alluvial hardwoods, 77 acres of mesic-mixed and approximately 200 acres of maintained/disturbed.

5.1.2 C1, NHC 2

The corridor composed of the common segments of the Light Rail Alternative with the C1 Alignment Alternative and NHC 2 Alignment Alternative contains approximately 6 acres of bottomlands, 4 acres of alluvial hardwoods, 79 acres of mesic-mixed and approximately 195 acres of maintained/disturbed.

5.1.3 C1, NHC LPA

The corridor composed of the common segments of the Light Rail Alternative with the C1 Alignment Alternative and NHC LPA Alignment Alternative contains approximately 7 acres of bottomlands, 4 acres of alluvial hardwoods, 77 acres of mesic-mixed and approximately 197 acres of maintained/disturbed.

5.1.4 C1A, NHC 1

The corridor composed of the common segments of the Light Rail Alternative with the C1A Alignment Alternative and NHC 1 Alignment Alternative contains approximately 3 acres of bottomlands, 5 acres of alluvial hardwoods, 80 acres of mesic-mixed and approximately 202 acres of maintained/disturbed.

5.1.5 C1A, NHC 2

The corridor composed of the common segments of the Light Rail Alternative with the C1A Alignment Alternative and NHC 2 Alignment Alternative contains approximately 4 acres of bottomlands, 5 acres of alluvial hardwoods, 83 acres of mesic-mixed and approximately 196 acres of maintained/disturbed.

5.1.6 C1A, NHC LPA

The corridor composed of the common segments of the Light Rail Alternative with the C1A Alignment Alternative and NHC LPA Alignment Alternative contains approximately 5 acres of bottomlands, 5 acres of alluvial hardwoods, 80 acres of mesic-mixed and approximately 198 acres of maintained/disturbed.

5.1.7 C2, NHC 1

The corridor composed of the common segments of the Light Rail Alternative with the C2 Alignment Alternative and NHC 1 Alignment Alternative contains approximately 3 acres of bottomlands, 4 acres of alluvial hardwoods, 79 acres of mesic-mixed and approximately 204 acres of maintained/disturbed.

5.1.8 C2, NHC 2

The corridor composed of the common segments of the Light Rail Alternative with the C2 Alignment Alternative and NHC 2 Alignment Alternative contains approximately 4 acres of bottomlands, 4 acres of alluvial hardwoods, 82 acres of mesic-mixed and approximately 198 acres of maintained/disturbed.

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5.1.9 **C2, NHC LPA**

The corridor composed of the common segments of the Light Rail Alternative with the C2 Alignment Alternative and NHC LPA Alignment Alternative contains approximately 5 acres of bottomlands, 4 acres of alluvial hardwoods, 79 acres of mesic-mixed and approximately 200 acres of maintained/disturbed.

5.1.10 C2A, NHC 1

The corridor composed of the common segments of the Light Rail Alternative with the C2A Alignment Alternative and NHC 1 Alignment Alternative contains approximately 3 acres of bottomlands, 4 acres of alluvial hardwoods, 76 acres of mesic-mixed and approximately 210 acres of maintained/disturbed.

5.1.11 C2A, NHC 2

The corridor composed of the common segments of the Light Rail Alternative with the C2A Alignment Alternative and NHC 2 Alignment Alternative contains approximately 4 acres of bottomlands, 4 acres of alluvial hardwoods, 79 acres of mesic-mixed and approximately 204 acres of maintained/disturbed.

5.1.12 C2A, NHC LPA

The corridor composed of the common segments of the Light Rail Alternative with the C2A Alignment Alternative and NHC LPA Alignment Alternative contains approximately 5 acres of bottomlands, 4 acres of alluvial hardwoods, 76 acres of mesic-mixed and approximately 206 acres of maintained/disturbed.

5.2 Natural Areas within Alignment Alternatives

Table 10 indicates the acreage of each Natural Area and the acreage of NCWRC gamelands and waterfowl impoundments within the limits of construction, or project footprints, of each of the alignment alternatives (see Appendix A Figures 68-70).

Table 10: Natural Areas in the Study Area

Natural Area						
Alignment Alternatives	Little Creek Bottomlands and Slopes NHPNA (Acres)	New Hope Creek Bottomland Forest NHPNA (Acres)	Gameland (Acres)	Waterfowl Impoundments (Acres)		
C1	6.1	_	2.3	0.8		
C1A	6.0	_	0.0	0.0		
C2	5.2	_	2.2	0.0		
C2A	5.2	_	2.2	0.0		
NHC 1		1.0	-			
NHC 2	_	1.0	-	_		
NHC LPA	_	3.4	_	_		



6. Mitigation

6.1 Wetland and Stream Mitigation

On February 6, 1990, the Department of the Army (DA) and the U.S. Environmental Protection Agency (EPA) signed a memorandum of agreement (MOA) establishing procedures to determine the type and level of mitigation necessary to comply with the Clean Water Act Section 404(b)(1) Guidelines. This MOA provides for first, avoiding impacts to waters and wetlands through the selection of the least damaging, practical alternative; second, taking appropriate and practical steps to minimize impacts on waters and wetlands; and finally, compensating for any remaining unavoidable impacts to the extent appropriate and practical.

6.1.1 Avoidance and Minimization of Impacts

Throughout the project development and preliminary engineering design process, efforts have been made to avoid and minimize impacts to wildlife habitat, including streams and wetlands. This is exemplified by the development of several alternative alignments in the vicinity of Little Creek and New Hope Creek that follow existing travel corridors, and the shifting of sections of alternative alignments to avoid wetland impacts. Further, several measures and construction techniques were incorporated in the design to avoid and minimize impacts to wetlands and streams, such as using aerial structures on piers to cross larger wetland areas. The placement of the piers would be located outside of wetlands and streams to the greatest extent practicable. Moreover, top-down construction of the aerial structures would minimize disturbance to the wetland soils. For wetland crossings where it is not feasible to use aerial structures, impacts to these resources would be minimized by using retaining walls or similar structures and 2:1 side slopes. Bottomless culverts would be used to minimize stream crossing impacts. Specific design measures can be found in the Basis for Engineering Design (appendix xx) and the Design Criteria documents prepared for this project.

Construction activities would be conducted in accordance with local, state, and federal regulations, as well as best management practices (BMPs), including the NCDENR *Manual of Stormwater Best Management Practices*, the *North Carolina Erosion and Sediment Control Planning and Design Manual*, and the *Design Standards in Sensitive Watersheds* (15A NCAC 04B.0124). Construction staging areas would be located away from wetlands, and preserved wetland areas would be demarcated prior to construction. Wetlands anticipated to be temporarily affected by construction would be restored to their original condition as much as possible and would be planted with an appropriate native wetland seed mix. More information on construction impacts and mitigation are presented in section 4.16 of the DEIS.

6.1.2 Compensatory Mitigation of Impacts

Per the USACE 2008 Regulatory Guidance Letter 08-03, and North Carolina G.S. § 143-214.11 and 143-214.20, the preferred method of compensatory mitigation is through the purchase of credits at a USACE approved mitigation bank. If the purchase of available credits from a regional Mitigation Bank would not satisfy the project's mitigation requirements, the NCDENR Ecosystem Enhancement Program (NCEEP) may also be requested to provide mitigation via purchase of in-lieu fee credits. Similarly, riparian buffer credits to offset impacts to the Jordan Lake water supply riparian buffers may be purchased from regional Mitigation Bank or through the Riparian Buffer Restoration Fund offered by the NCEEP. Other forms of Jordan Lake water supply riparian buffer impact mitigation may include the donation of real property or an interest in real property, or the restoration or enhancement of a non-forested riparian



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buffer as described in 15A NCAC 02B.0268. Specific compensatory mitigation measures will be developed in consultation with the USACE and DWR the Section 404/401 permitting process that will occur during project design.

6.2 Wildlife Mitigation

Adverse effects to aquatic wildlife will be minimized by bridging wetland and stream areas with aerial structures or bottomless culverts and employing sediment and erosion control BMPs. For the larger wetland crossings such as the Little Creek and New Hope Creek areas, the aerial crossing structures will contain an eight to twelve foot clearance between the bottom of the aerial structure and ground level. This clearance will accommodate the passage of animals beneath the span, and maintain the wildlife corridor within the bottomlands. Efforts to avoid, minimize, or mitigate impacts to wildlife and their habitats will continue during final design and construction. Coordination with the USFWS, NCWRC, and the NCDA are pending review of this report. Mitigation measures, if required, will be developed in consultation with these agencies.

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Appendices



Appendix A: Figures



Figure 1: Project Overview

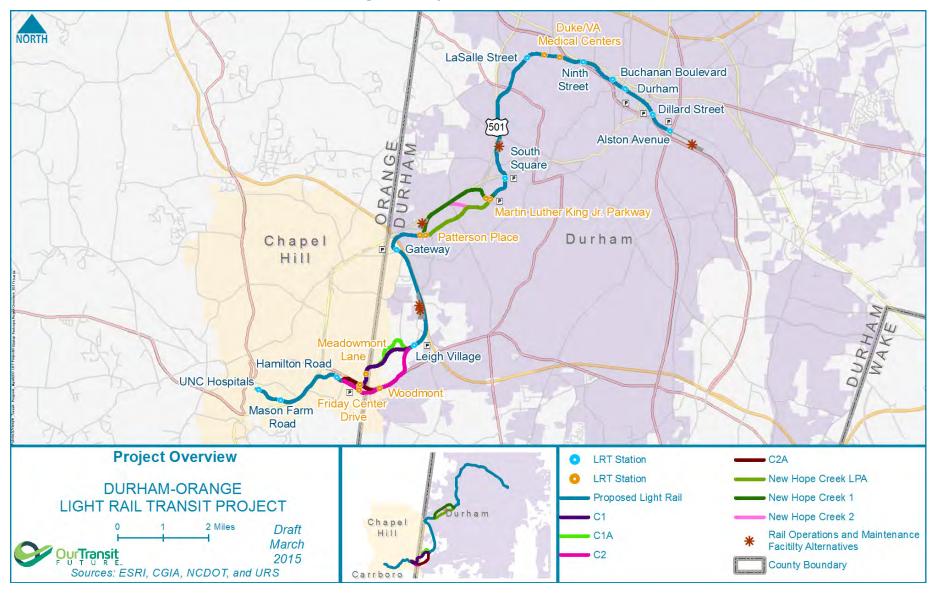




Figure 2: Topographic Features

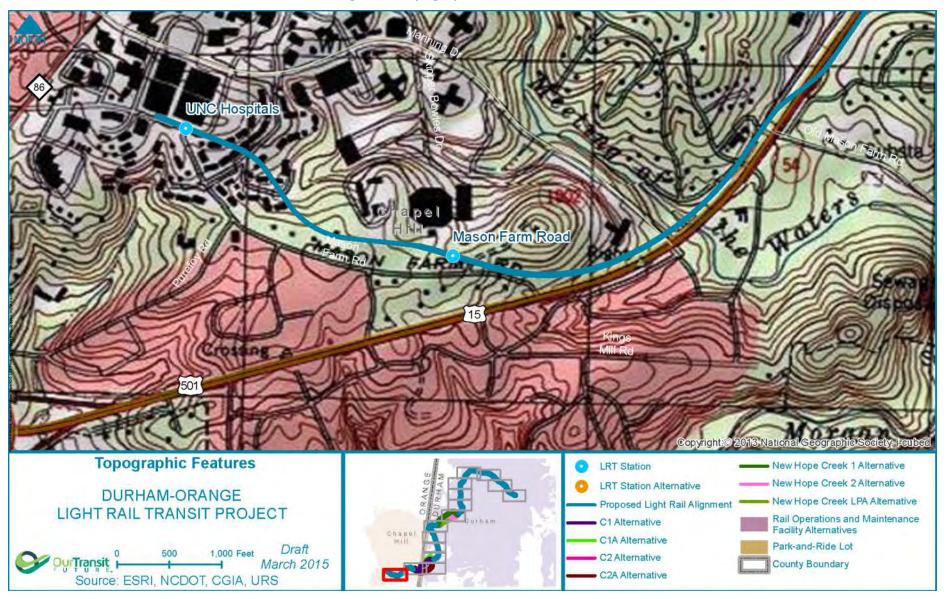
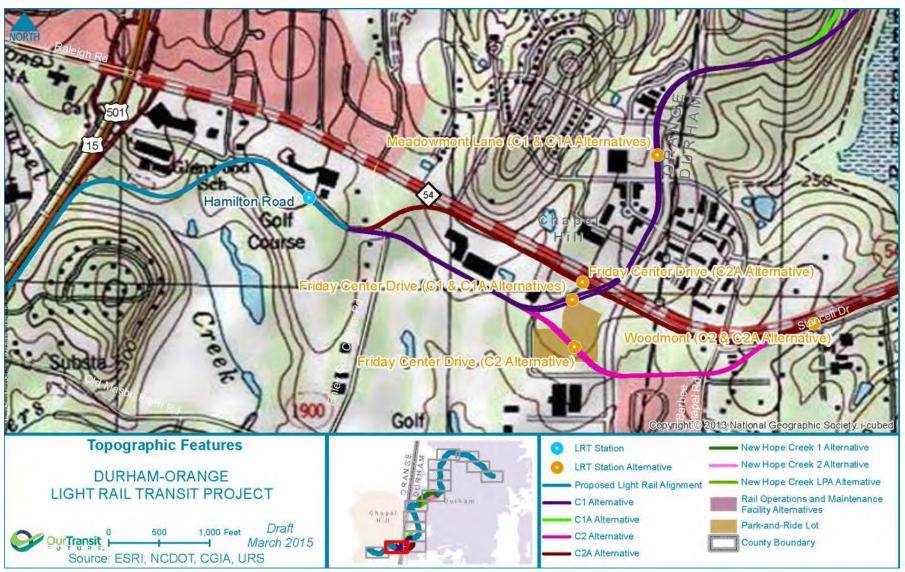




Figure 3: Topographic Features





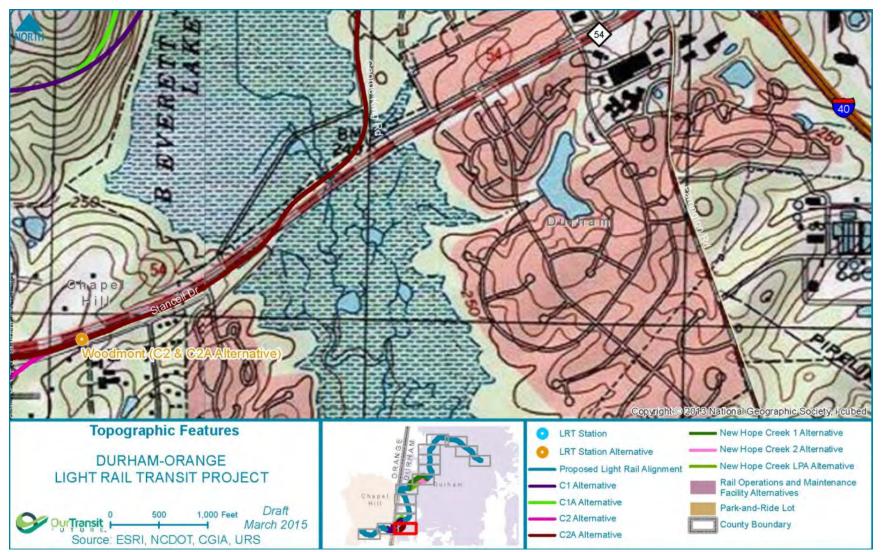


Figure 4: Topographic Features



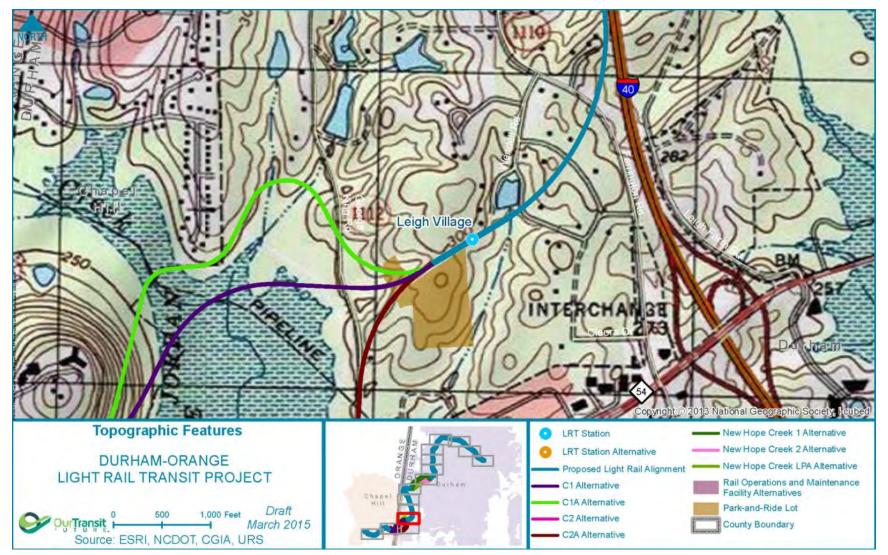


Figure 5: Topographic Features



DURHAM **Topographic Features** LRT Station New Hope Creek 1 Alternative New Hope Creek 2 Alternative LRT Station Alternative **DURHAM-ORANGE** New Hope Creek LPA Alternative Proposed Light Rail Alignment LIGHT RAIL TRANSIT PROJECT Rail Operations and Maintenance Facility Alternatives C1 Alternative Chapel C1A Alternative Park-and-Ride Lot Draft C2 Alternative March 2015 County Boundary C2A Alternative Source: ESRI, NCDOT, CGIA, URS

Figure 6: Topographic Features



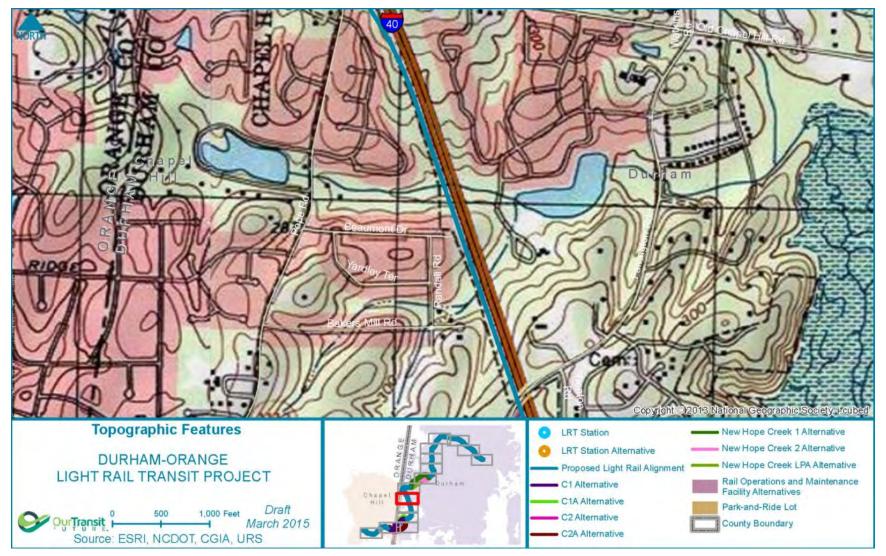


Figure 7: Topographic Features



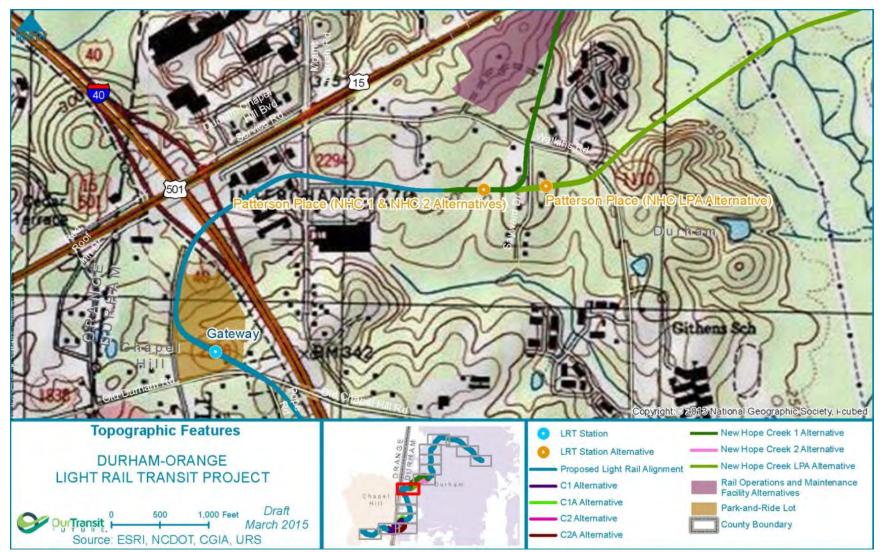


Figure 8: Topographic Features



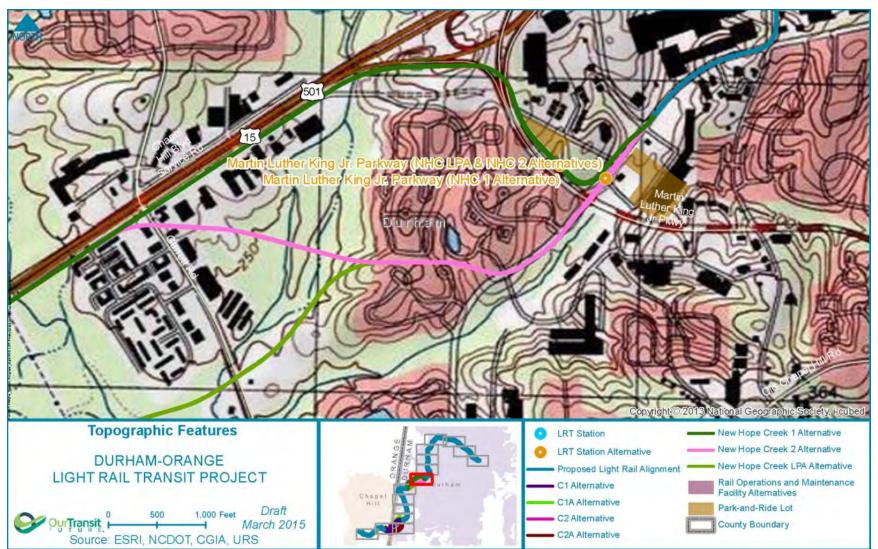


Figure 9: Topographic Features



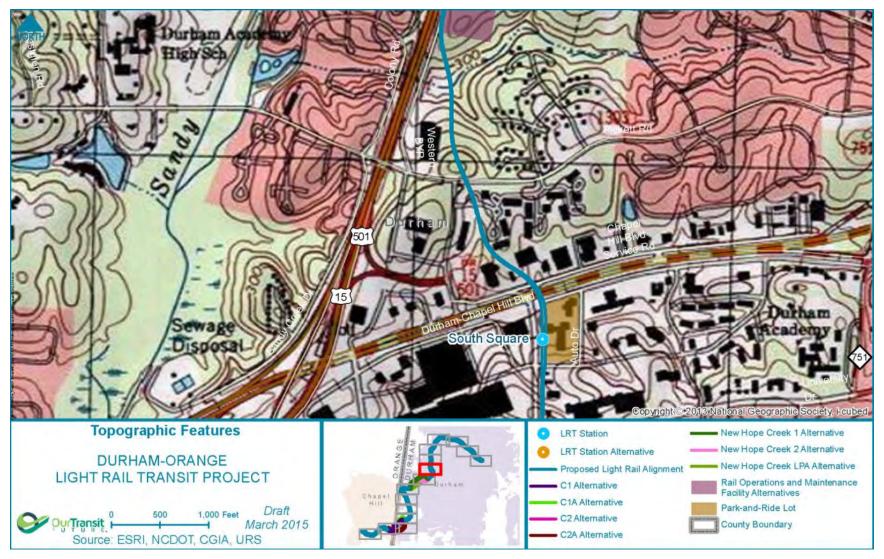


Figure 10: Topographic Features



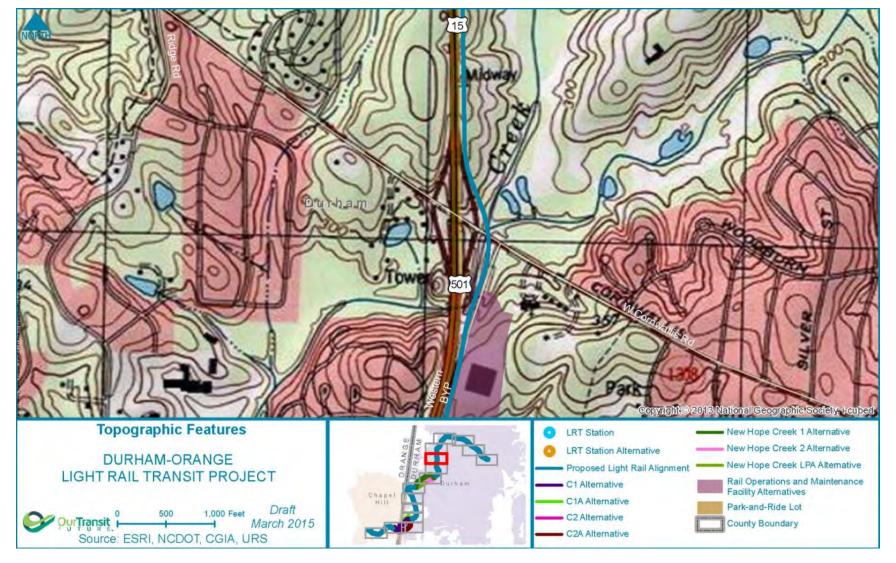


Figure 11: Topographic Features



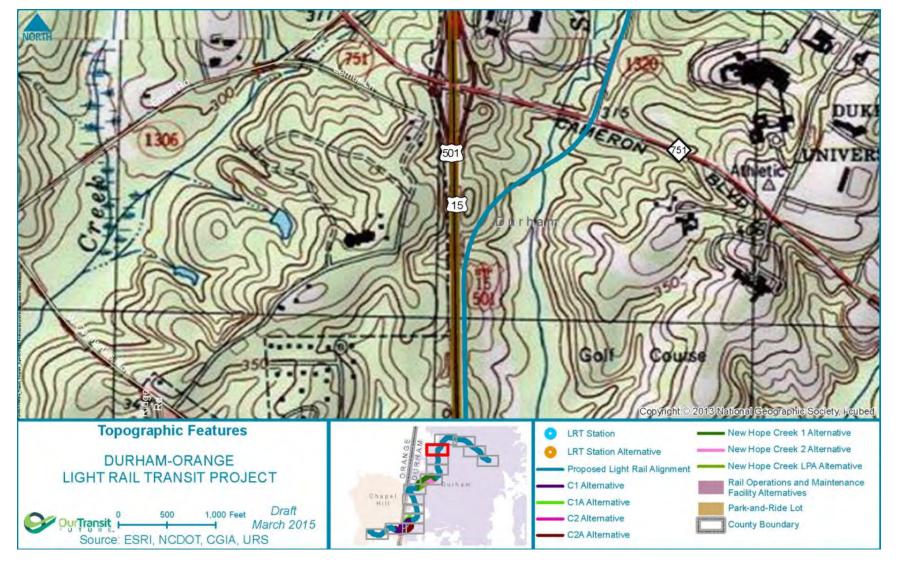


Figure 12: Topographic Features



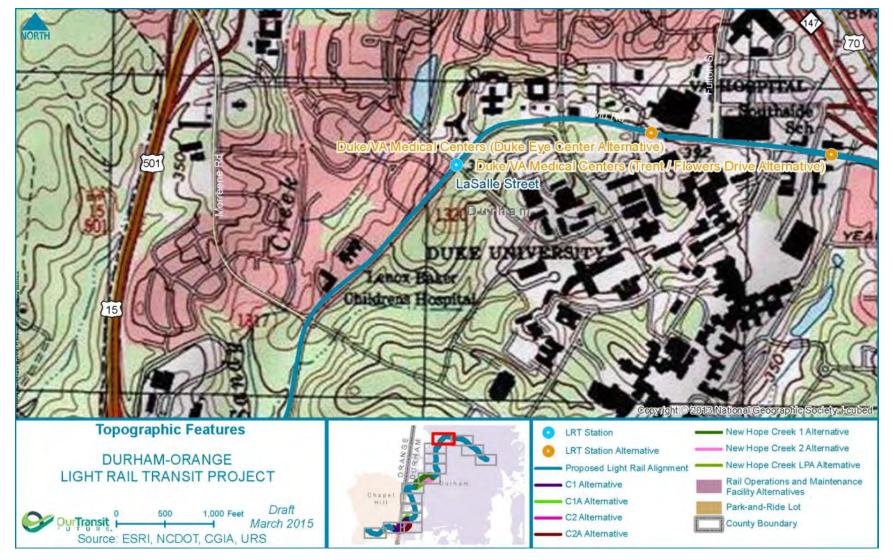


Figure 13: Topographic Features



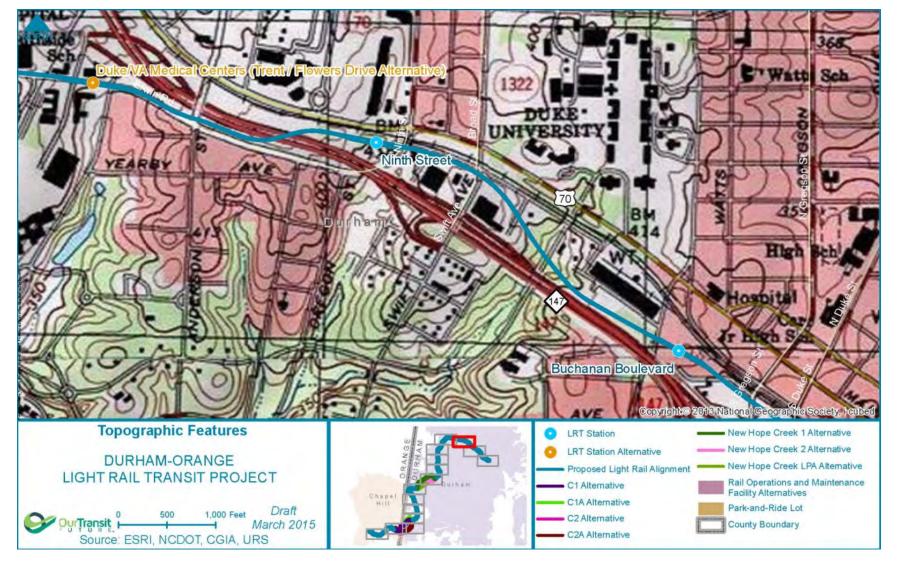


Figure 14: Topographic Features



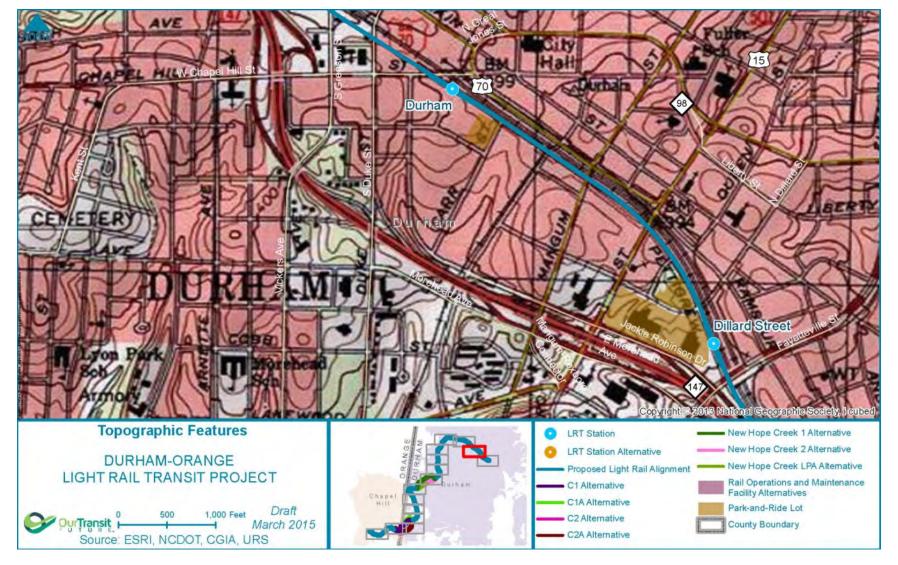


Figure 15: Topographic Features



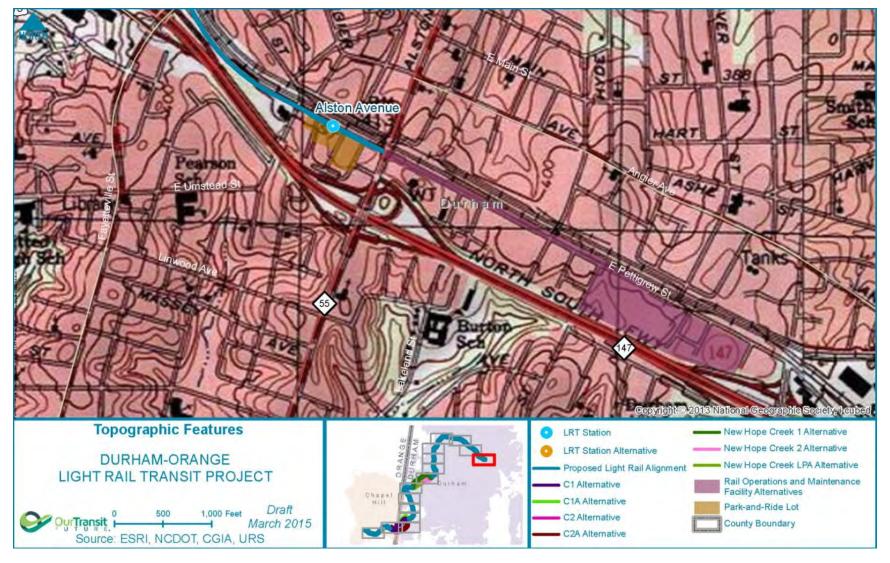


Figure 16: Topographic Features



Figure 17: Soils

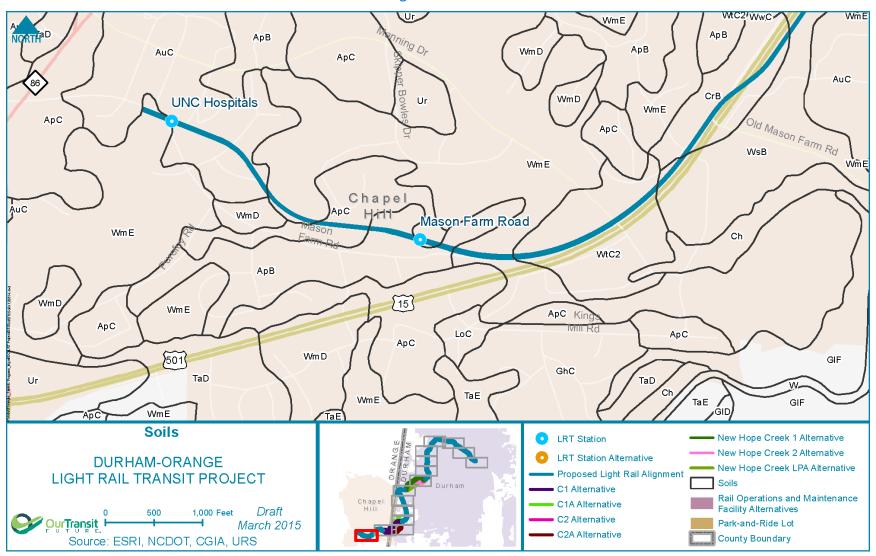




Figure 18: Soils

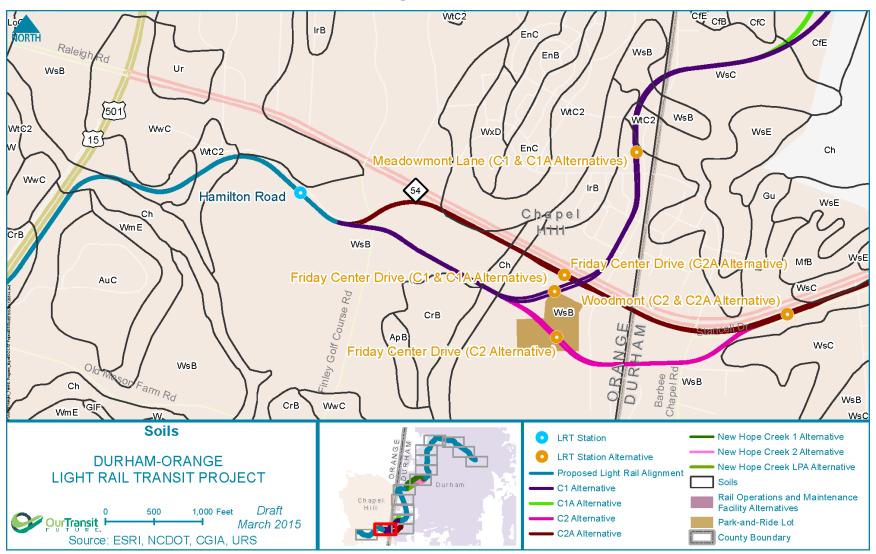




Figure 19: Soils

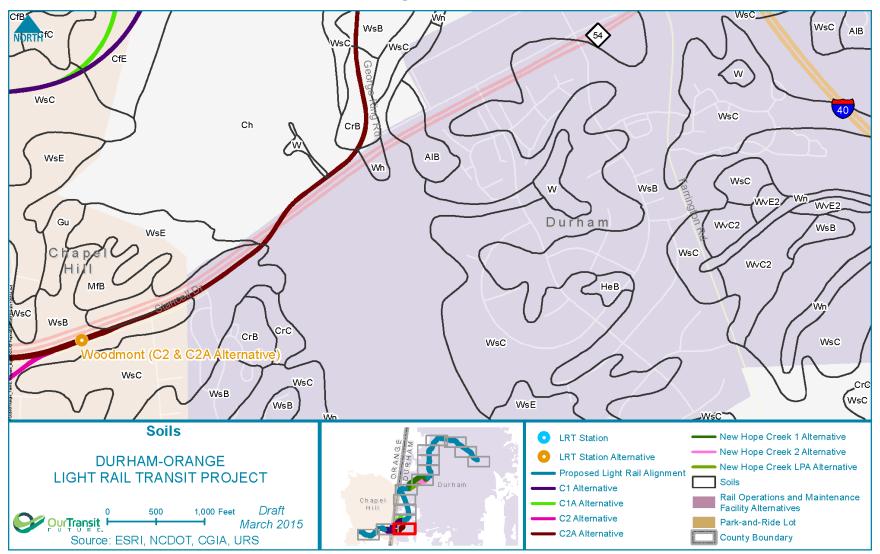




Figure 20: Soils

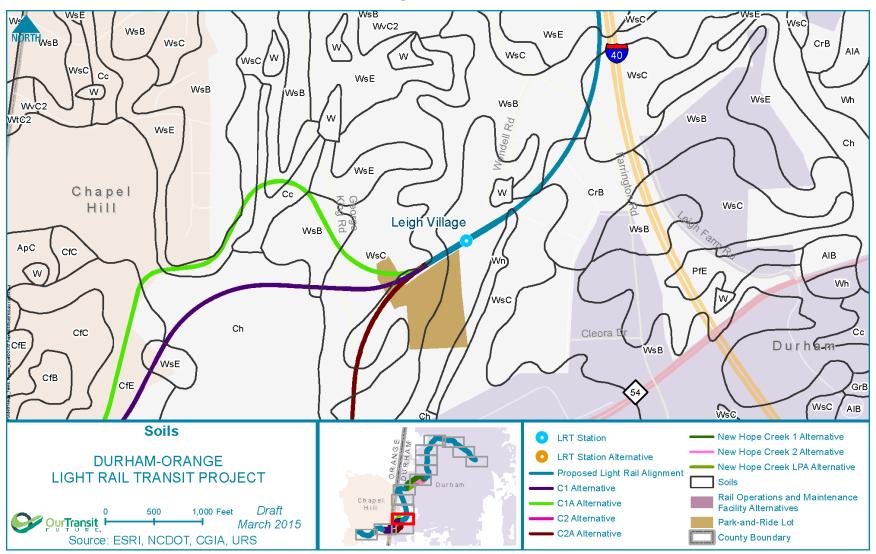




Figure 21: Soils

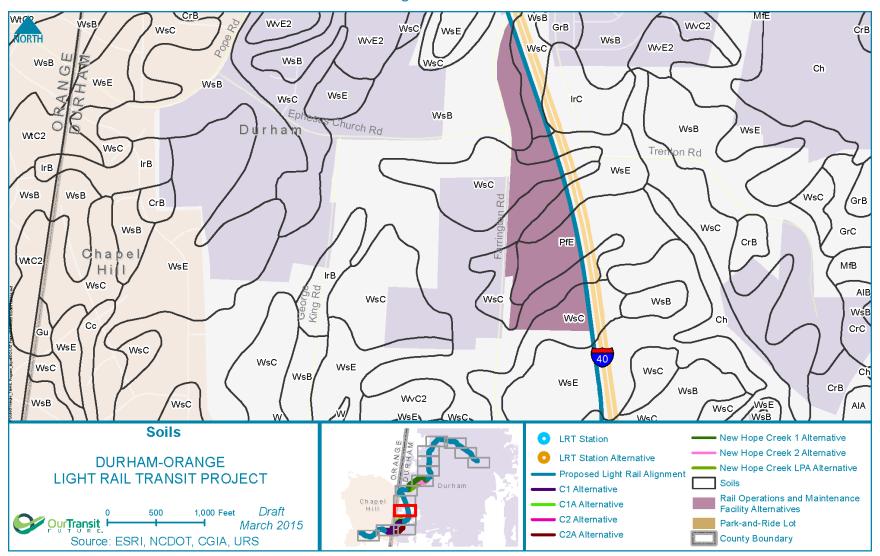




Figure 22: Soils

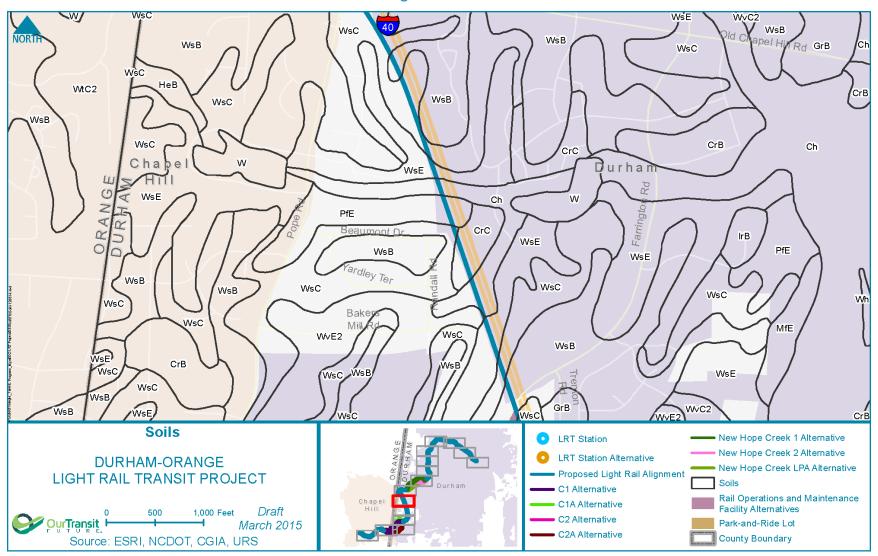




Figure 23: Soils

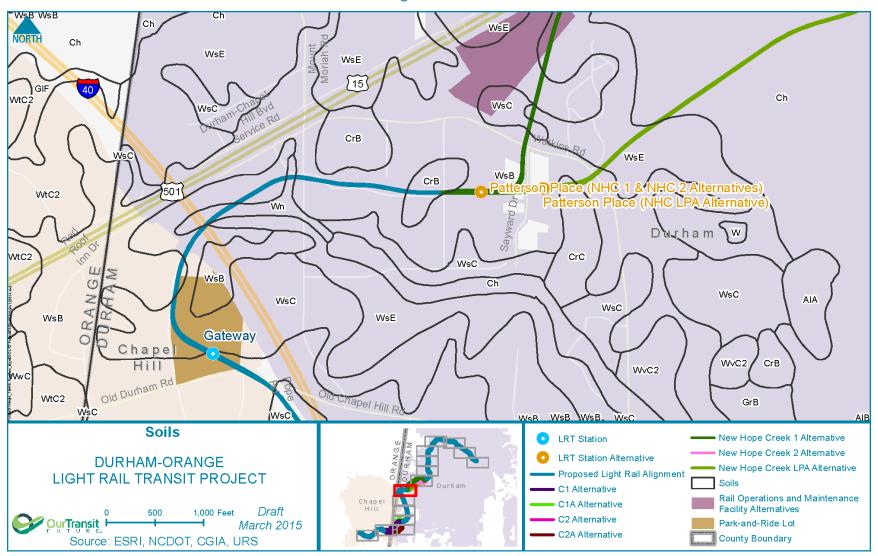




Figure 24: Soils

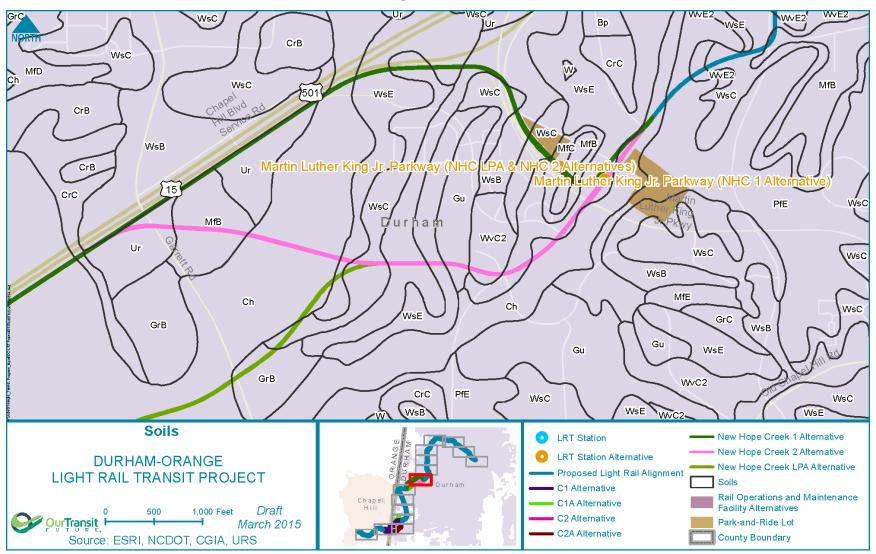




Figure 25: Soils

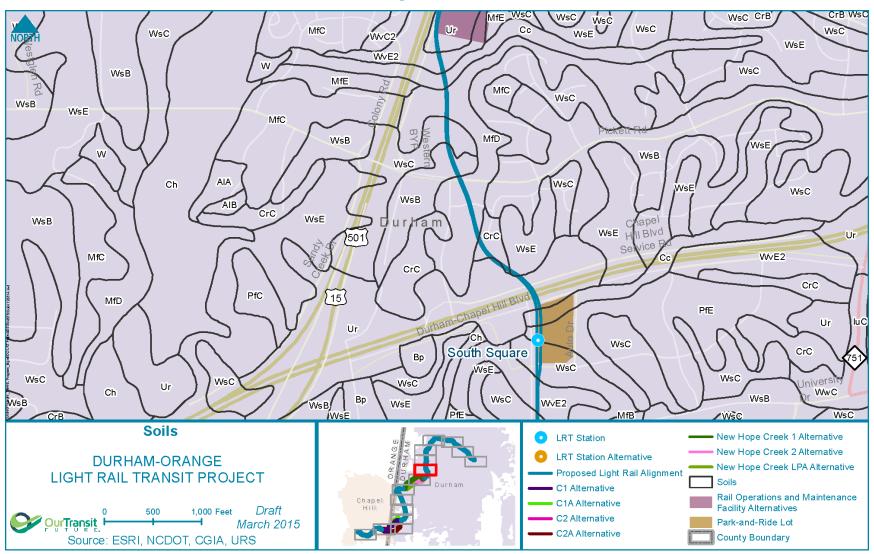




Figure 26: Soils

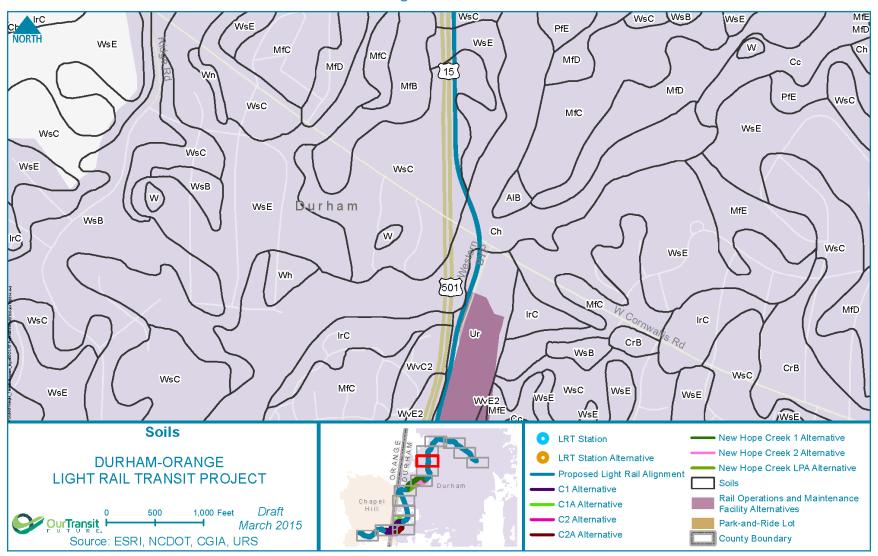




Figure 27: Soils

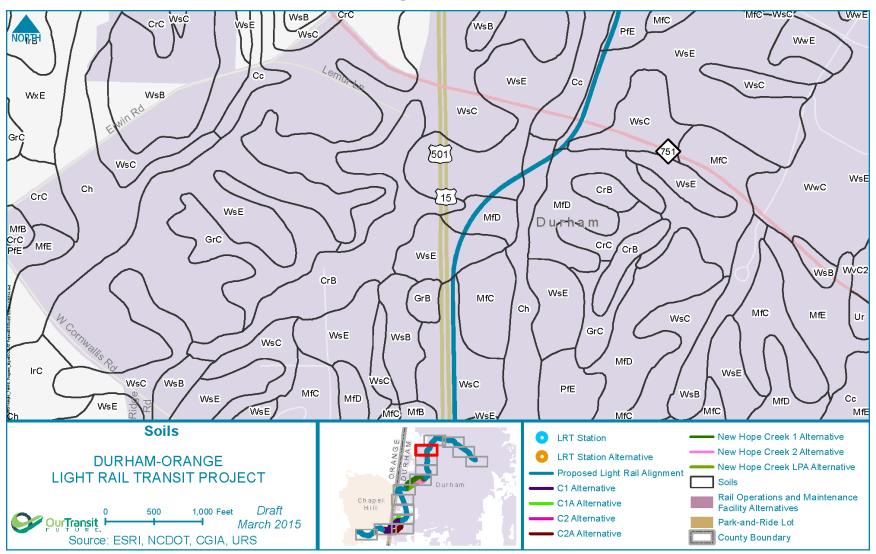




Figure 28: Soils

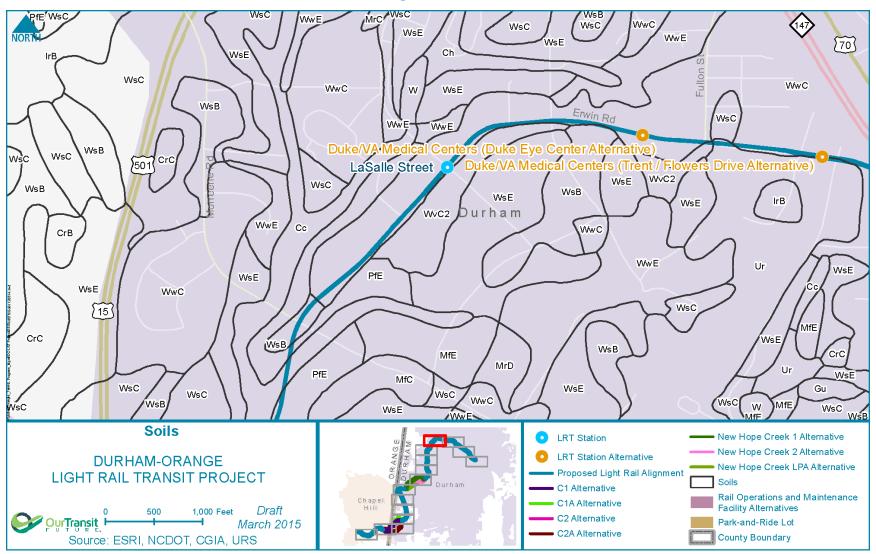




Figure 29: Soils

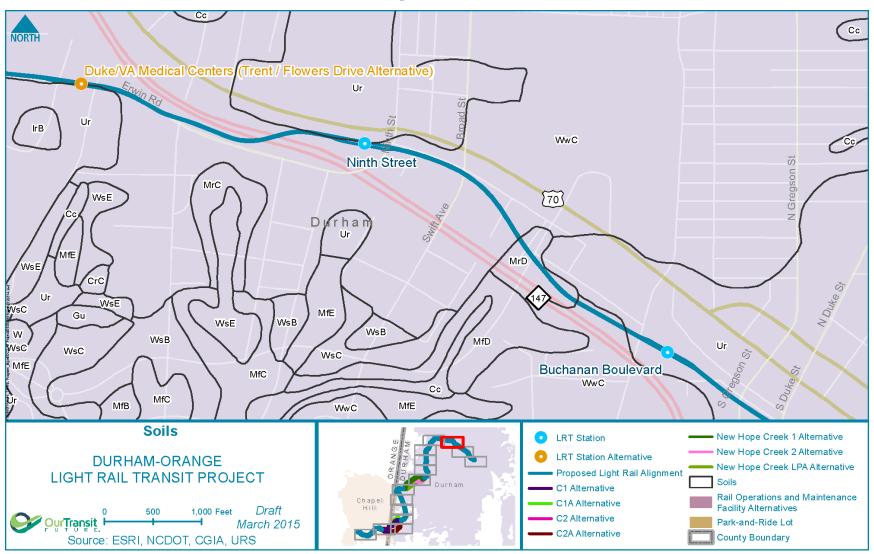




Figure 30: Soils

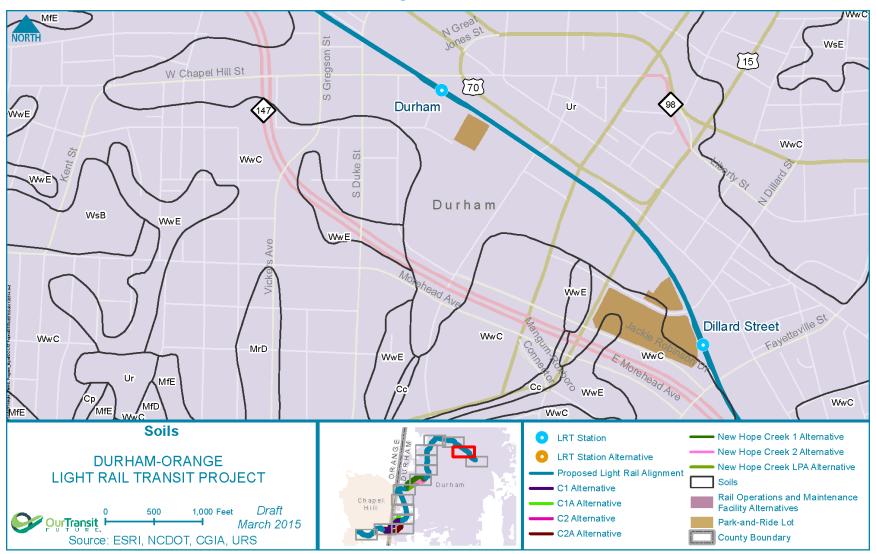




Figure 31: Soils

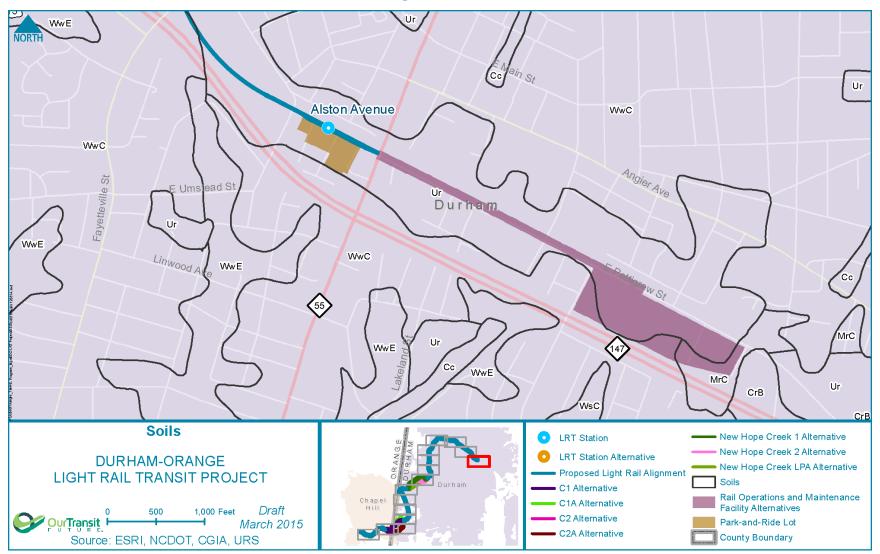




Figure 32: Biotic Communities

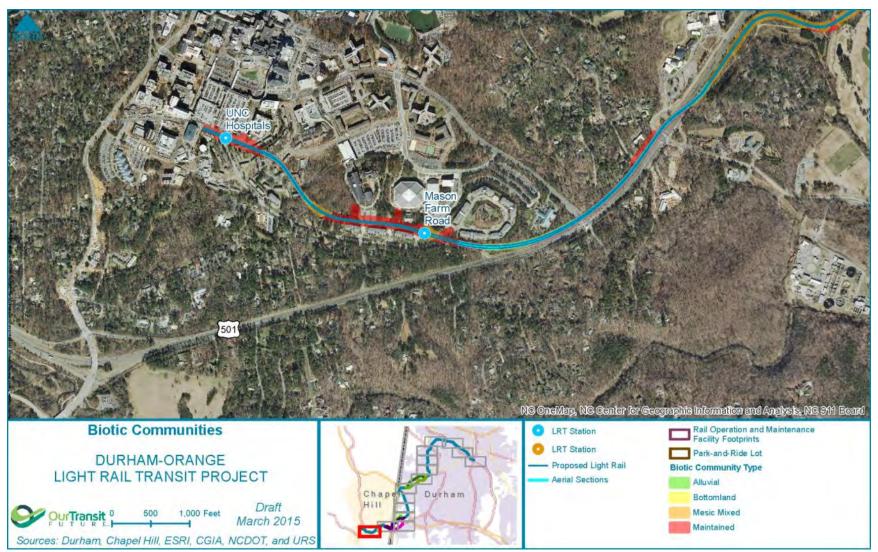




Figure 33: Biotic Communities

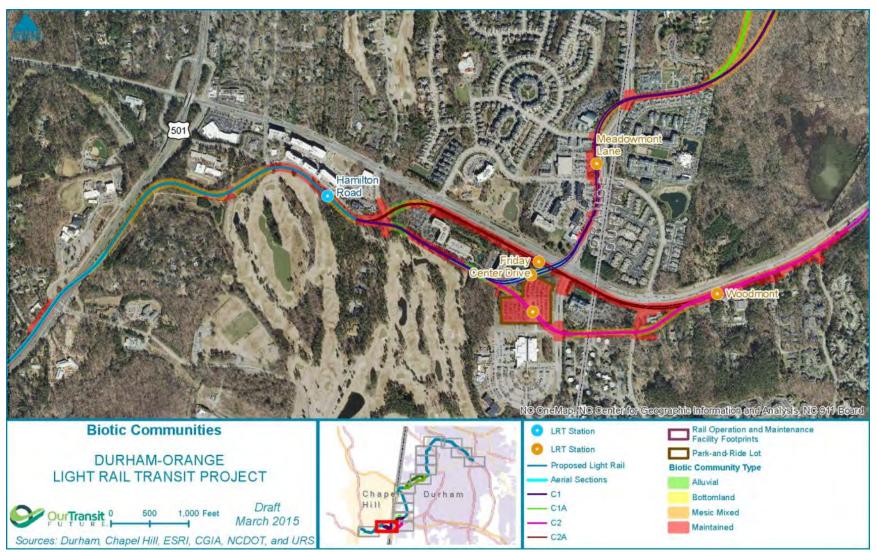




Figure 34: Biotic Communities

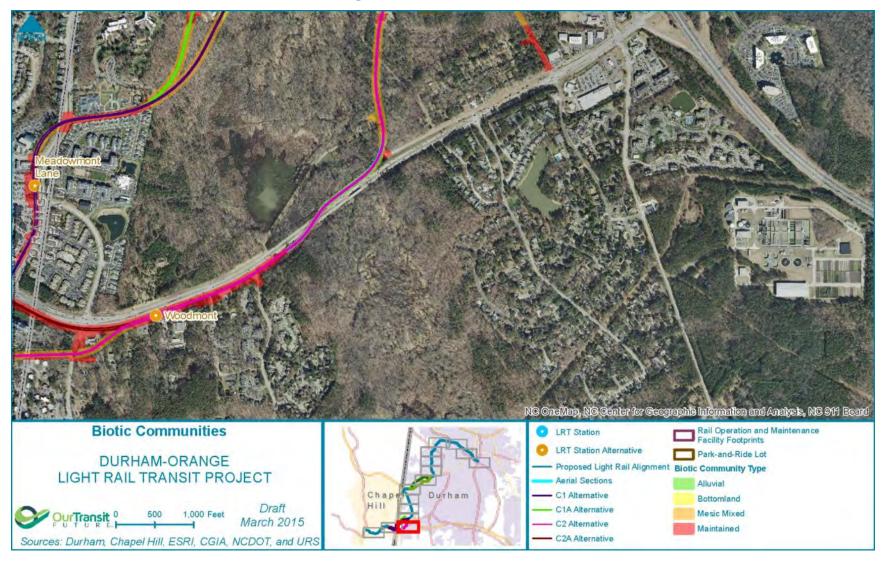




Figure 35: Biotic Communities

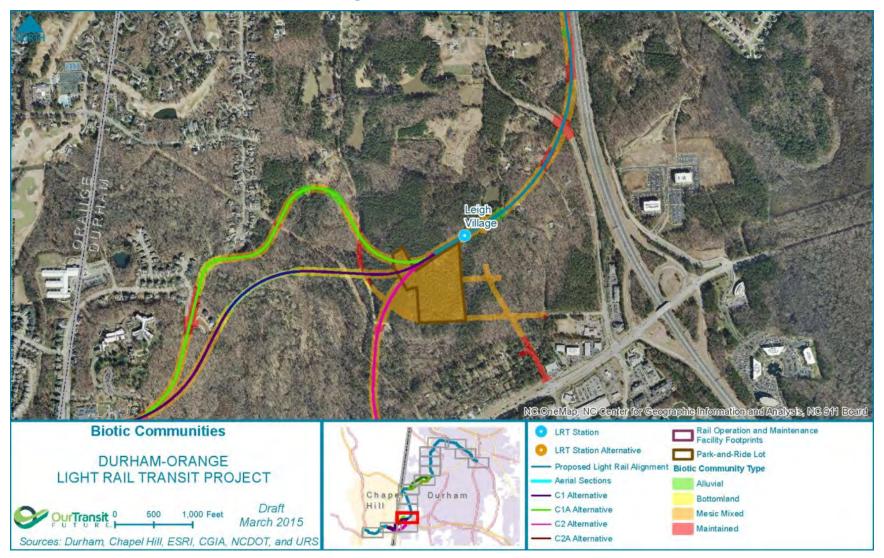
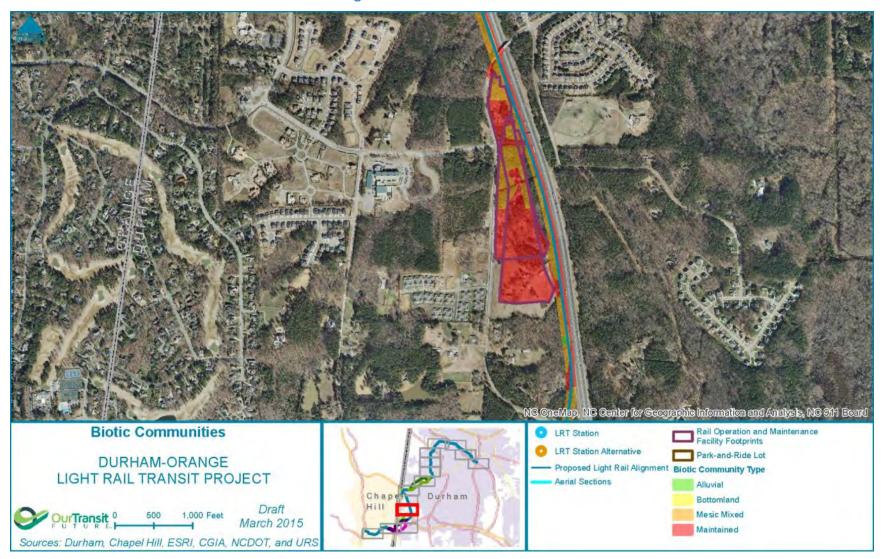




Figure 36: Biotic Communities



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Figure 37: Biotic Communities





Figure 38: Biotic Communities

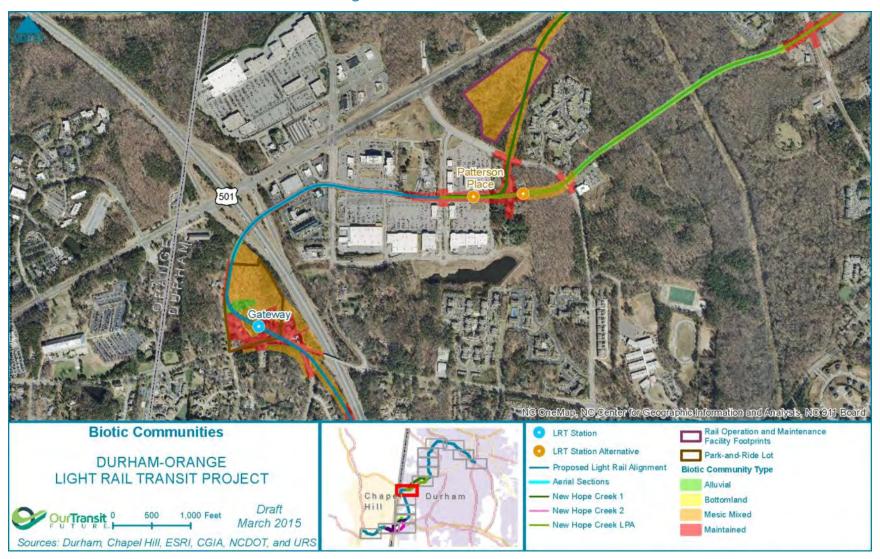




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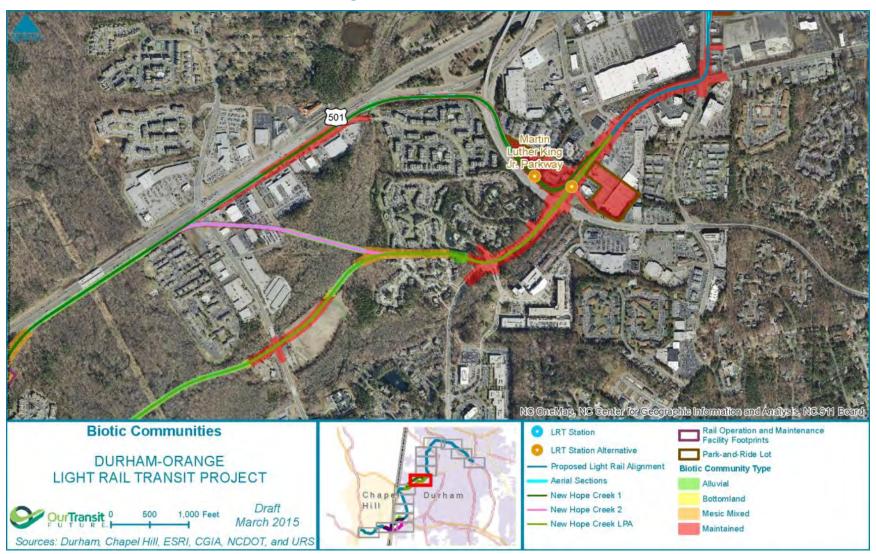




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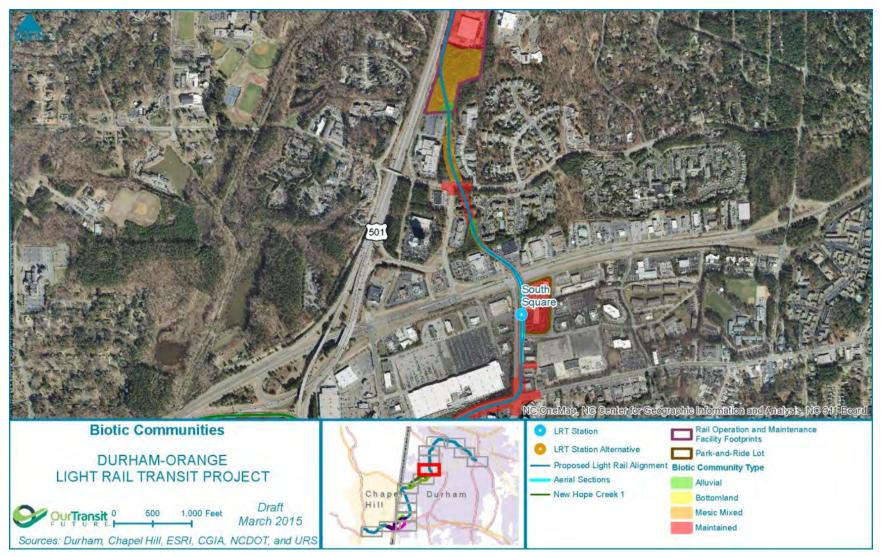
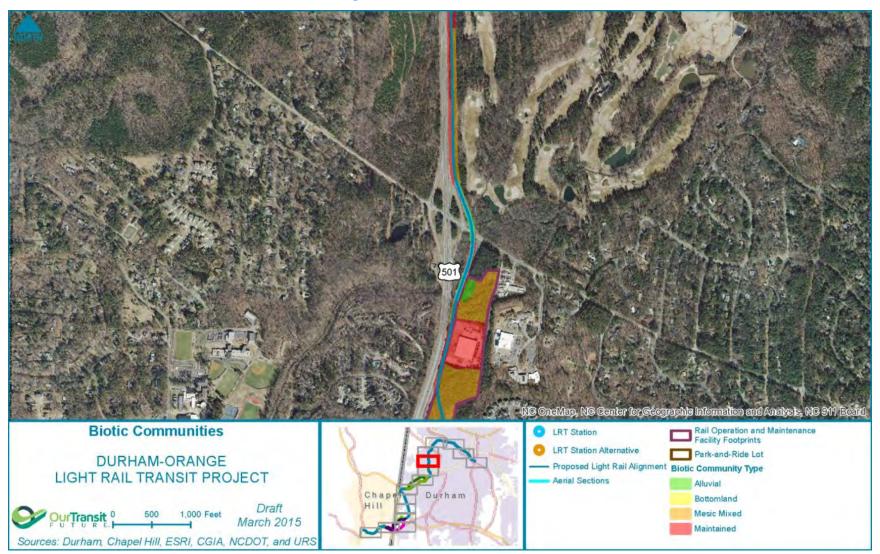




Figure 41: Biotic Communities





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Sources: Durham, Chapel Hill, ESRI, CGIA, NCDOT, and URS

or Geographic Information and Analysis, NG 944 Board **Biotic Communities** Rail Operation and Maintenance Facility Footprints LRT Station LRT Station Alternative Park-and-Ride Lot **DURHAM-ORANGE** - Proposed Light Rail Alignment Biotic Community Type LIGHT RAIL TRANSIT PROJECT Aerial Sections Alluvial Durham Bottomland

Figure 42: Biotic Communities

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Maintained

Draft

March 2015



Figure 43: Biotic Communities

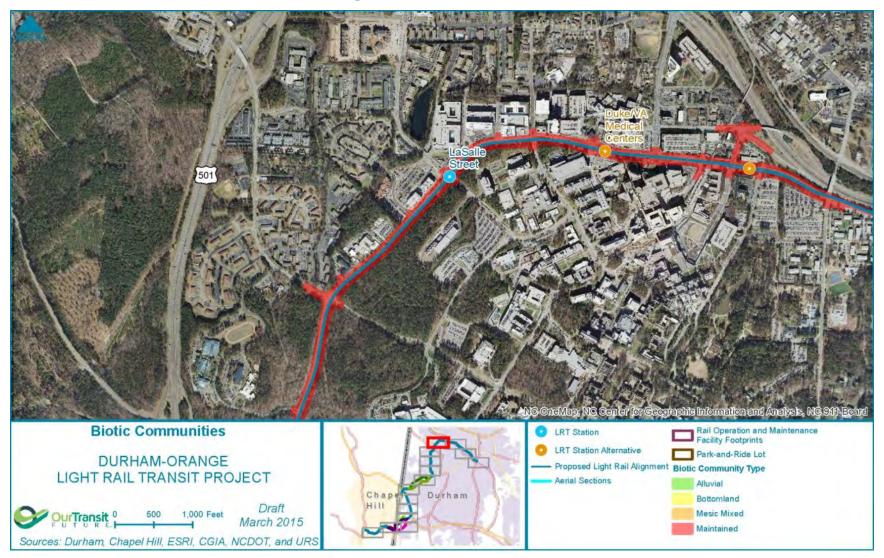




Figure 44: Biotic Communities

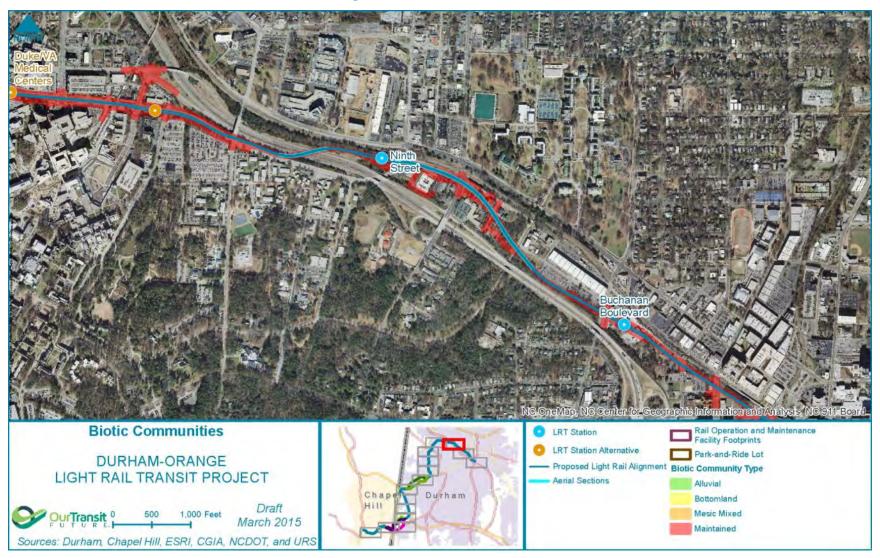




Figure 45: Biotic Communities

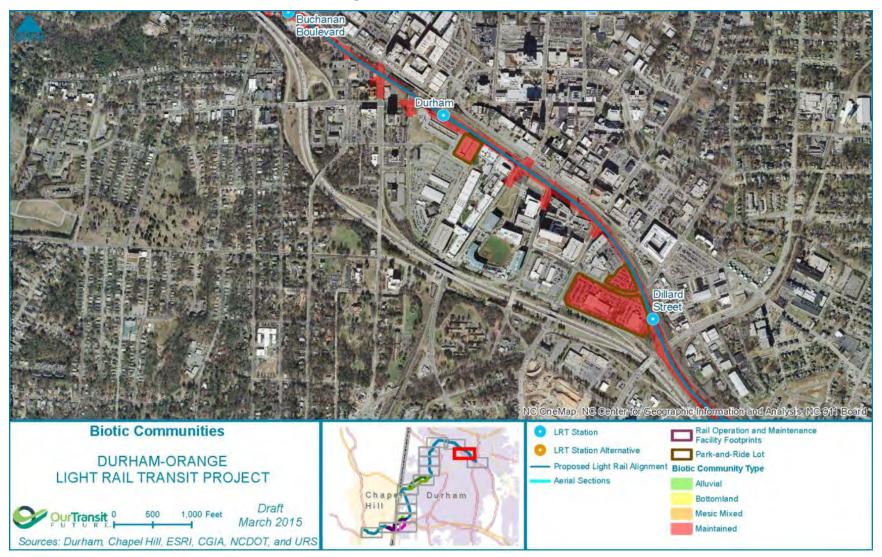




Figure 46: Biotic Communities

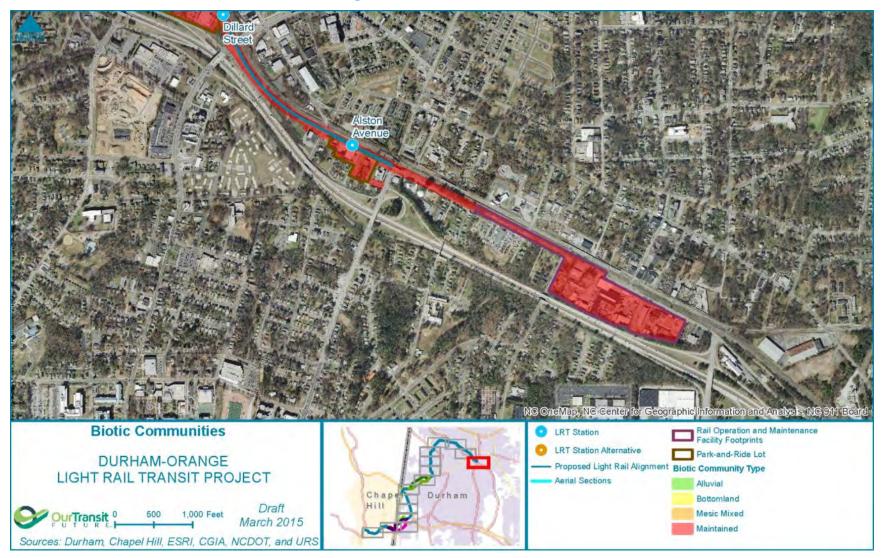


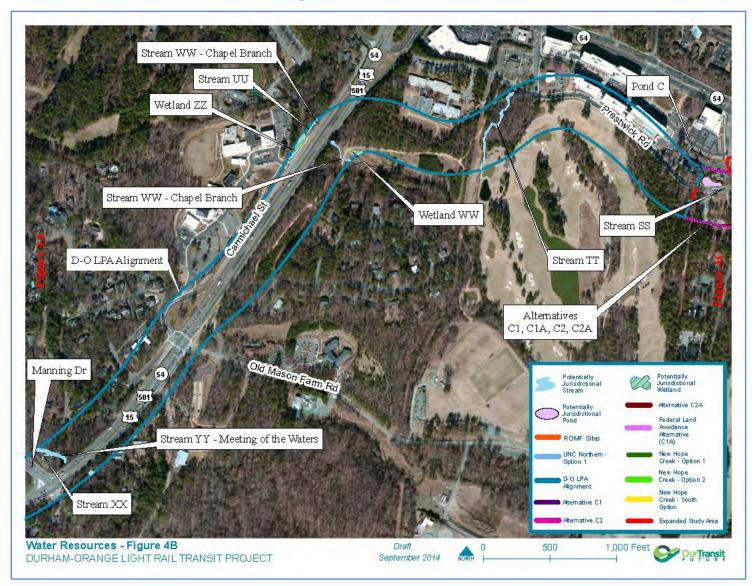


Figure 47: Water Resources





Figure 48: Water Resources



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Figure 49: Water Resources





Figure 50: Water Resources





Potentially Jurisdictional Stream Potentially Jurisdictional Pond Avoidance Alternative ROMF Sites Stream Y - Little Creek (C1A) UNC Northern -New Hope Creek - Option 1 Wetland BB New Hope D-O LPA Creek - Option 2 New Hope Creek - South Option Wetland AA Alternative C1 Wetland BBB Expanded Study Area Stream X Wetland DDD Stream Y - Little Creek Alternative C1 Water Resources - Figure 4E 1,000 Feet OurTransit September 2014 DURHAM-ORANGE LIGHT RAIL TRANSIT PROJECT

Figure 51: Water Resources



Figure 52: Water Resources

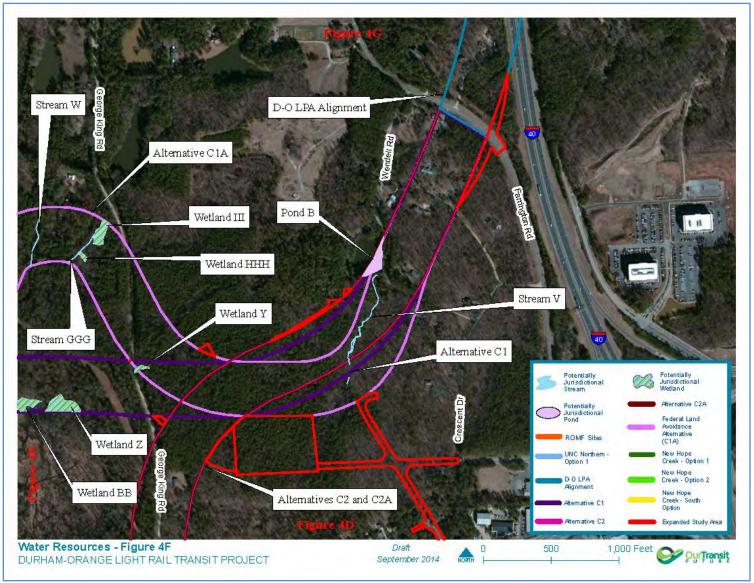




Figure 53: Water Resources

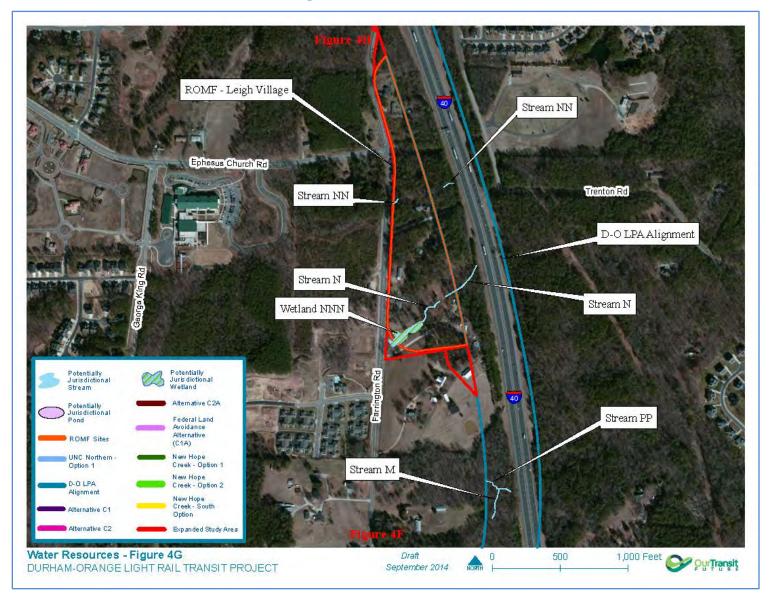




Figure 54: Water Resources





Potentially Jurisdictional Stream Potentially Jurisdictional Wetland D-O LPA Alignment Alternative C2A Potentially Jurisdictional Pond Federal Land Avroidance Alternative ROMF Sites UNC Northern-Option 1 Creek - Option 1 New Hope Creek - Option 2 D-O LPA Alignment New Hope Creek - South Option Alternative C2 Expanded Study Area Wetland R Wetland T Danziger Dr Stream R Old Chapel Hill Rd Old Durham Rd Water Resources - Figure 41 1,000 Feet Draft 500 OurTransit DURHAM-ORANGE LIGHT RAIL TRANSIT PROJECT September 2014

Figure 55: Water Resources

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Figure 56: Water Resources

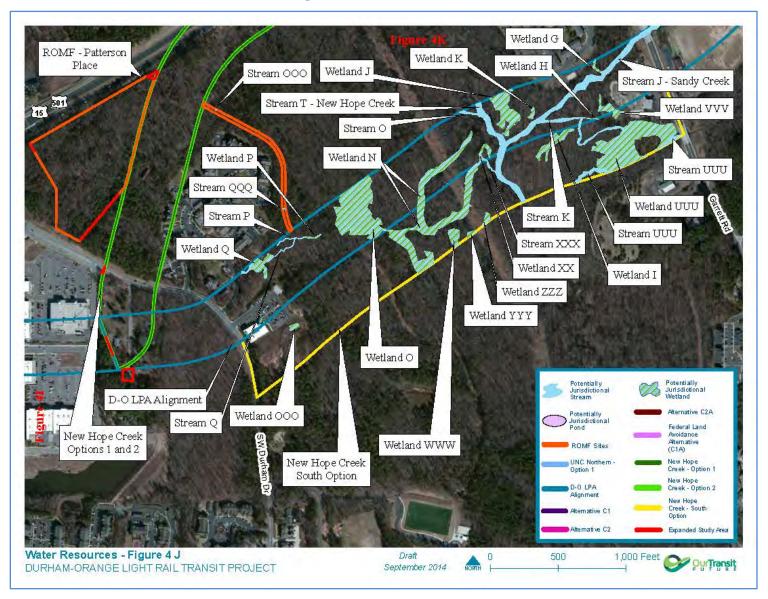




Figure 57: Water Resources

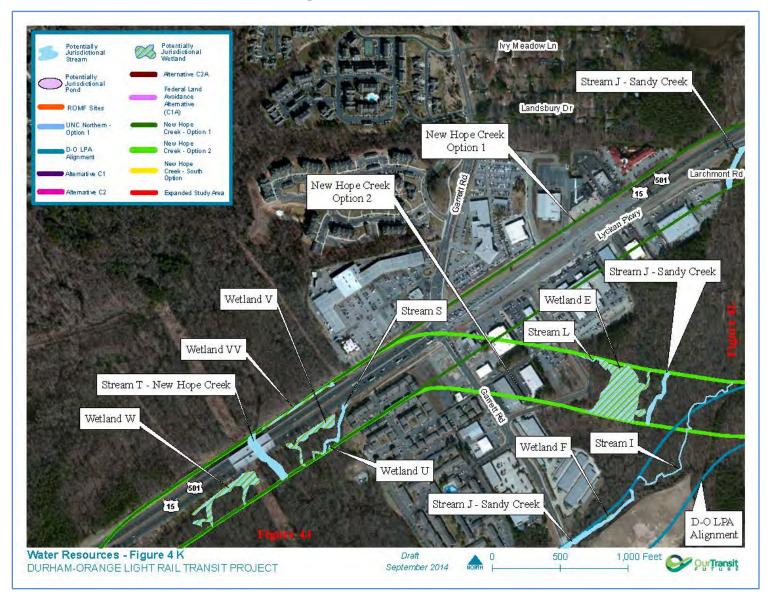




Figure 58: Water Resources

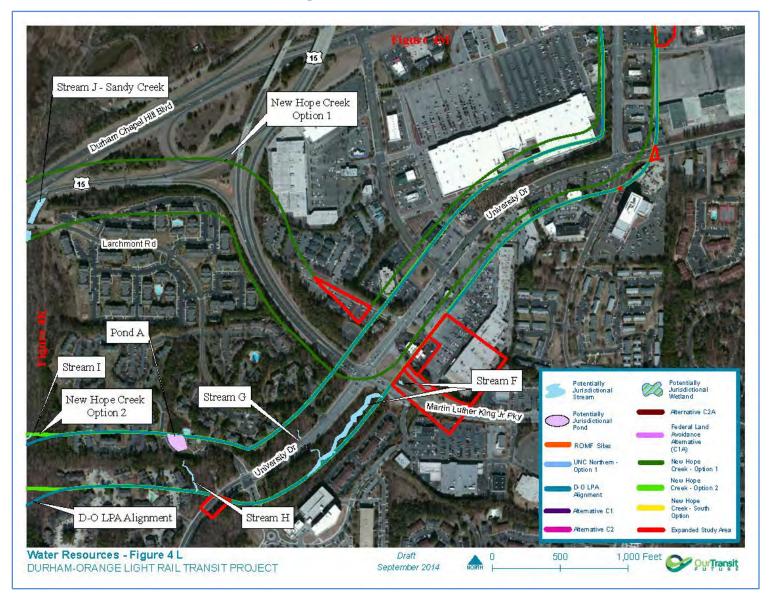
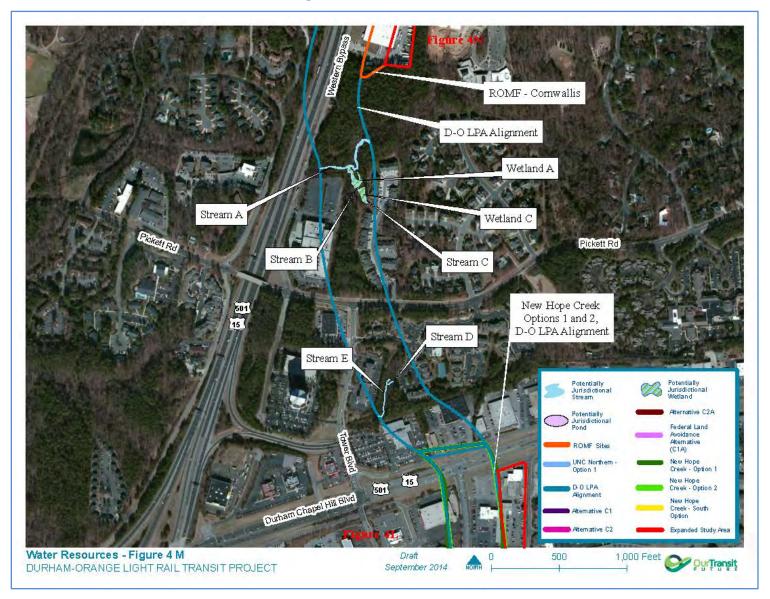




Figure 59: Water Resources





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Figure 60: Water Resources

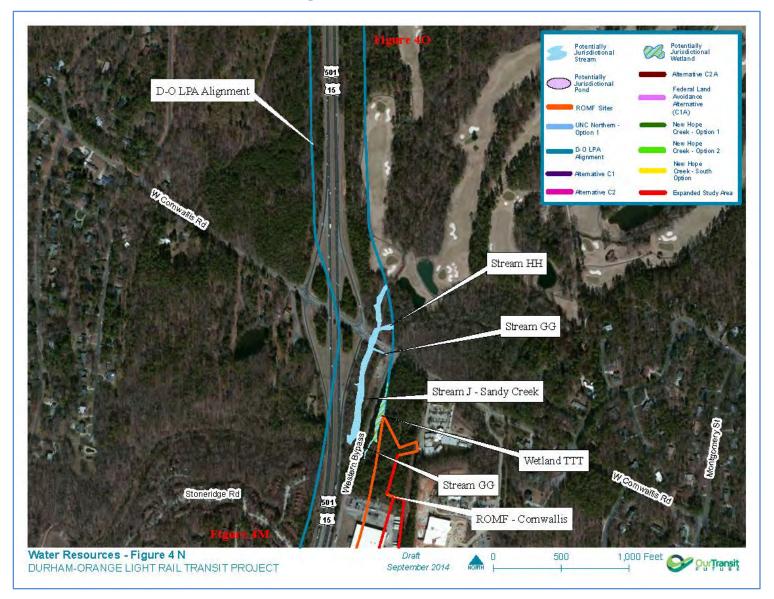




Figure 61: Water Resources

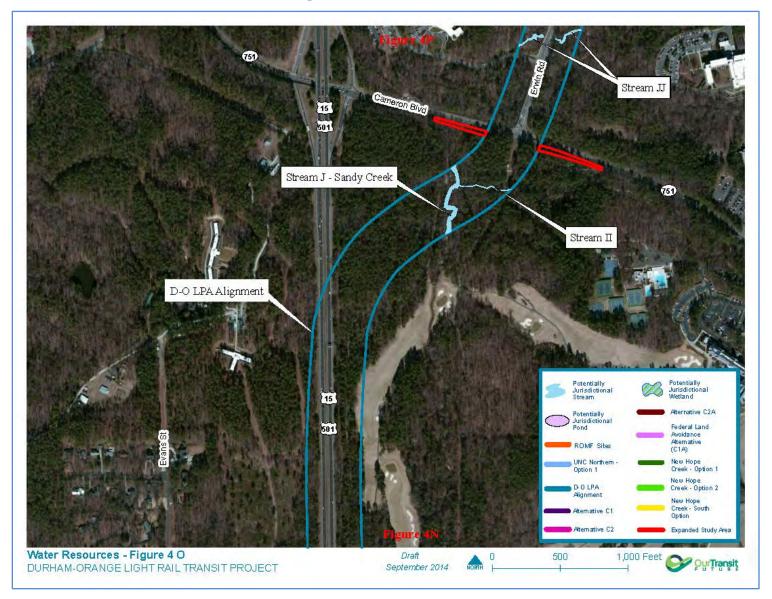




Figure 62: Water Resources





Figure 63: Water Resources

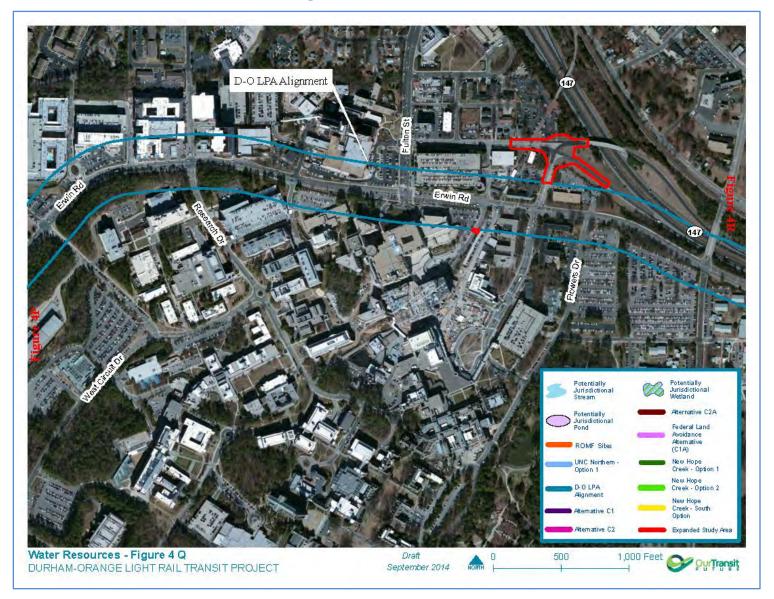




Figure 64: Water Resources





Figure 65: Water Resources





Figure 66: Water Resources

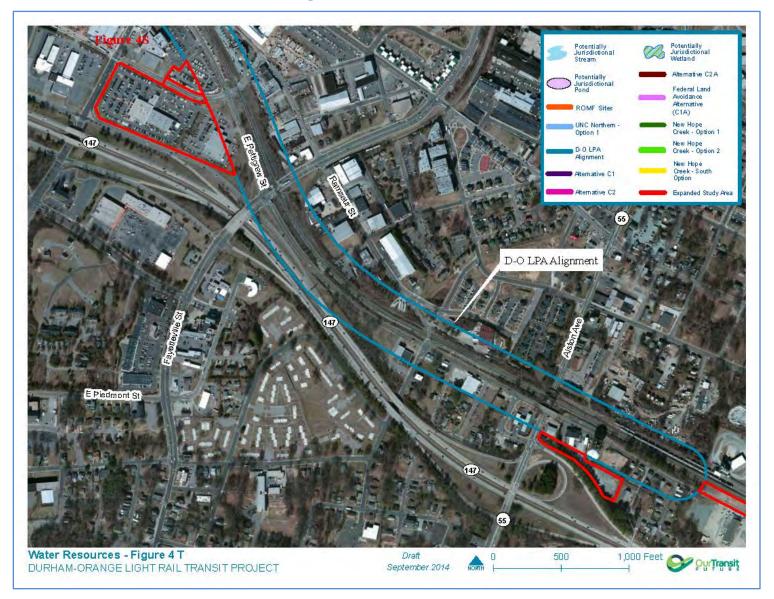


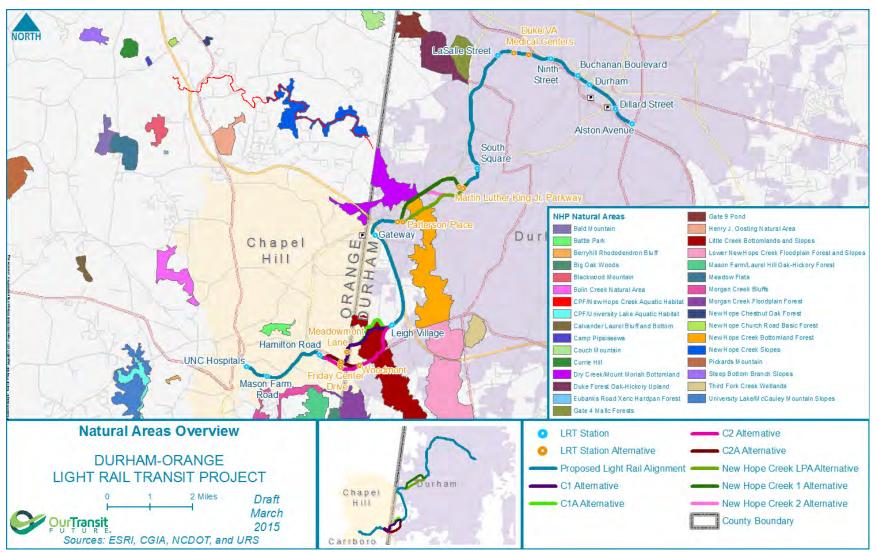


Figure 67: Water Resources

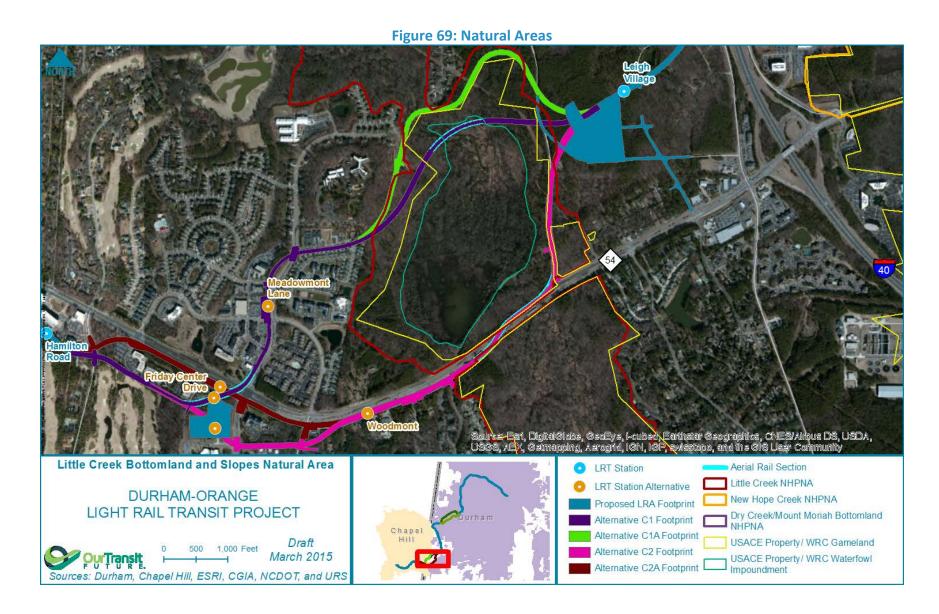




Figure 68: Natural Areas



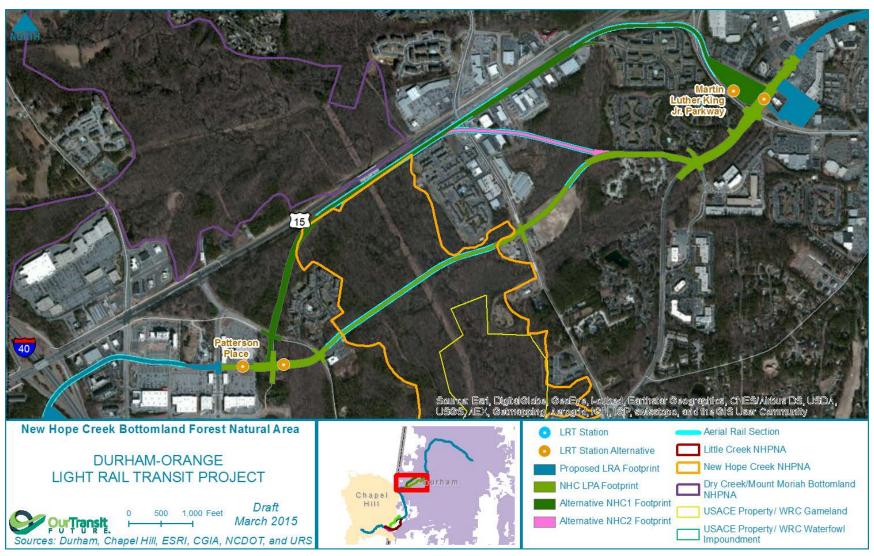




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Figure 70: Natural Areas



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Appendix B: List of Scientific Names



List of Scientific Names		
Common Name	Scientific Name	
American beech	Fagus grandifolia	
American bluehearts	Buchnera Americana	
American elm	Ulmus americana	
American holly	Ilex opaca	
American hornbeam	Carpinus caroliniana	
American sycamore	Platanus occidentalis	
Asiatic Clam	Corbicula fluminea	
Autumn olive	Elaeagnus umbellata	
Bamboo	Bambuseae sp.	
Beggar ticks	Bidens sp.	
Big shellbark hickory	Carya laciniosa	
Black cherry	Prunus serotina	
Black oak	Quercus velutina	
Black walnut	Juglans nigra	
Blackberry	Rubus fruticosus	
Bloodworm midge	Chironomidae	
Box Huckleberry	Gaylussacia brachycera	
Boxelder	Acer negundo	
Broomsedge	Andropogon	
Buffalo clover	Trifolium reflexum	
Bush honeysuckle	Diervilla sp.	
Caddisfly	Trichoptera	
Catbrier (saw, whiteleaf)	Smilax bona-nox, glauca	
Chapman's Redtop	Tridens chapmanii	
Chinese privet	Ligustrum sinense	
Christmas fern	Polystichum acrostichoides	
Common pawpaw	Asimina triloba	
Crabgrass	Digitaria sanguinalis	
Crayfish	Cambarus bartoni	
Dog fennel	Eupatorium capillifolium	
Douglass's bittercress	Cardamine douglassii	
Dragonfly	Odonata	
Duckweed	Lemna sp.	
Eastern Shiner	Notropis sp.	
English ivy	Hedera helix	
False nettle	Boehmeria	
Fireweed	Epilobium angustifolium	
Flowering dogwood	Cornus florida	
Glad bluecurls	Trichostema brachiatum	
Goldenrod	Solidago sp.	
Golden shiner	Notemigonus crysoleucas	
Green ash	Fraxinus pennsylvanica	

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List of Scientific Names		
Common Name	Scientific Name	
Hackberry	Celtis occidentalis	
Heartleaf	Houttuynia cordata	
Hickory	Carya sp.	
Hoary puccoon	Lithospermum canescens	
Hophornbeam	Ostrya virginiana	
Horse nettle	Solanum carolinense	
Horseweed	Conyza sp.	
Indian Physic	Gillenia stipulate	
Ironwood	Carpinus caroliniana	
Japanese barberry	Berberis thunbergii	
Japanese grass	Microstegium vimineum	
Japanese honeysuckle	Lonicera japonica	
Japanese knotweed	Fallopia japonica	
Jewelweed	Impatiens sp.	
Kudzu	Pueraria montana	
Large-flowered trout lily	Erythronium americanum	
Lespedeza	Sericea Lespedeza	
Loblolly pine	Pinus taeda	
Low Wild-petunia	Ruellia humilis	
Maple-leaf viburnum	Viburnum acerifolium	
Mayfly	Ephemeroptera	
Michaux's sumac	Rhus michauxii	
Mimosa	Albizia julibrissin	
Mockernut hickory	Carya tomentosa	
Mosquito	Diptera	
Mosquitofish	Gambusia holbrooki	
Multiflora rose	Rosa multiflora	
Muscadine	Vitis rotundifolia	
Narrow-leaf Aster	Symphyotrichum leave	
Northern red oak	Quercus rubra	
Oriental bittersweet	Celastrus orbiculatus	
Pink Thoroughwort	Fleischmannia incarnate	
Pondberry	Lindera melissifolia	
Posion ivy	Toxicodendron radicans	
Prairie blue wild indigo	Baptisia australis	
Princesstree	Paulownia tomentosa	
Purple fringeless orchid	Platanthera peramoena	
Queen Anne's lace	Daucus carota	
Ragweed	Ambrosia sp.	
Red maple	Acer rubrum	
River birch	Betula nigra	
Sedges	Cyperaceae sp.	
Shagbark hickory	Carya ovata	
Shale-barren skullcap	Scutellaria leonardii	

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List of Scientific Names		
Common Name	Scientific Name	
Shiner	Cyprinella sp.	
Shooting star	Primula meadia	
Silky dogwood	Cornus amomum	
Slippery elm	Ulmus rubra	
Smartweed	Polygonum sp.	
Smooth coneflower	Echinacea laevigata	
Snail	Planorbidae	
Soft rush	Juncus effuses	
Sourwood	Oxydendrum arboreum	
Southern anemone	Anemone berlandieri	
Southern red oak	Quercus falcata	
Southern rein orchids	Habenaria flava	
Southern skullcap	Scutellaria australis	
Spicebush	Lindera benzoin	
Stonefly	Plecoptera	
Sugar maple	Acer saccharum	
Sunfish	Lepomis sp.	
Swamp chestnut oak	Quercus michauxii	
Swamp white oak	Quercus bicolor	
Sweetgum	Liquidambar styraciflua	
Tall Larkspur	Delphinium exaltatum	
Tree-of-heaven	Ailanthus altissima	
Trumpet creeper	Campsis radicans	
Tulip poplar	Liriodendron tulipifera	
Veined skullcap	Scutellaria nervosa	
Virginia pine	Pinus virginiana	
Water boatman	Corixidae	
Watercress	Nasturtium officinale	
Water strider	Gerridae	
Wax myrtle	Morella cerifera	
White ash	Fraxinus americana	
White oak	Quercus alba	
Willow oak	Quercus phellos	
Winged sumac	Rhus copallinum	
Wiry panic grass	Panicum flexile	
Yellow lady's slipper	Cypripedium parviflorum	



Appendix C: The Durham County Inventory of Important Natural Areas, Plants and Wildlife

DURHAM COUNTY INVENTORY OF IMPORTANT NATURAL AREAS, PLANTS AND WILDLIFE

By

STEPHEN P. HALL AND ROBERT D. SUTTER FALL 1999



Edited by Elizabeth Pullman and Ann C. Simpson Maps prepared by Alice C. Wilson

NORTH CAROLINA NATURAL HERITAGE PROGRAM
DURHAM COUNTY INVENTORY REVIEW COMMITTEE
TRIANGLE LAND CONSERVANCY
DURHAM COUNTY

A. New Hope Creek Corridor

2. 15/501 BOTTOMLANDS

SITE DESCRIPTION

County:

Durham

Ouad:

Southwest Durham

Significance:

Zoological: Unknown (not surveyed during the nesting season)

Botanical: 4-State

Landscape Function: Zoological: Medium (DURH 1)

Boundary Integrity:

Medium

Level of Threat:

Zoological: Moderate; Botanical: 3-Medium

Protection Status:

Southern section is owned by the Corps of Engineers. Community Viability: Zoclogical: Medium (DURH 2); Botanical: 1-Poor

SUMMARY OF SIGNIFICANT FEATURES:

- Extensive tract of bottomland hardwood forest providing habitat needed by forest-1. interior species.
- 2. Critical link in the New Hope and Mud Creek Wildlife Corridors.
- A portion of this tract is registered as a State Natural Area. 3.

LANDSCAPE FEATURES:

This part of the New Hope floodplain covers approximately 250 acres, most of which supports a fairly mature stand of bottomland hardwoods. Most trees range between 10" - 15" in diameter, but occasional specimens were observed that were over three feet in diameter. In addition to thickets of introduced privet, patches of native cane (Arundinaria gigantea) are also present, providing shelter for several species of bottomland birds.

As is characteristic of Triassic Basin floodplains, the terrain within this site is quite flat and contains numerous oxbows, floodplain pools and anastomosing channels. However, this tract is the first section of the New Hope Bottomlands upstream from Jordan Lake that is situated above the 100 year floodpool. Judging by the depth of the leaf litter on some of the higher terraces, floods may not completely sweep through over this tract, even though they may be fairly frequent during the late winter.

As is true for the Mt. Moriah Bottomlands located on the opposite side of US 15-501, this site occupies a highly strategic location within the New Hope Wildlife Corridor. The weakest link in this system, which provides a connection between the New Hope Gamelands and the Korstian and Durham Divisions of Duke Forest, is the point crossed by US 15-501. The ever-growing vehicular traffic along this highway, together with the increasing demands to develop this strip,

threaten to ultimately close this corridor off to all but raccoons, opossums and other species able to coexist with urbanization.

Currently, this site is fairly intact. The adjoining slopes, particularly to the west, are only sparsely populated and are covered primarily in mixed second growth woodlands. Apart from the roads located at the northern and southern ends, the main source of habitat disturbance is a powerline cut that runs down the center of the floodplain. Even with the tract divided in two by this strip of old-field vegetation, however, the forests on either side are still wide enough to provide habitat for many species restricted to forest interiors.

DESCRIPTION OF THE FAUNA:

This site was visited only during the winter, and the list of animals is incomplete. Judging from its habitat features, it probably supports a fauna quite comparable to both the Mt. Moriah Bottomlands (including its powerline species) and the Old Chapel Hill Road Bottomlands, which adjoin this tract up and downstream. Twenty or more forest-interior species were recorded on both those tracts, as well as a few rarer species such as four-toed salamanders (Hemidactylium scutatum) and dwarf waterdogs (Necturus punctatus).

One significant species confirmed at this site is river otter (*Lutra canadensis*). A regularly used sprainting site was discovered along the main channel about halfway between the northern and southern ends of this section, and a probable den was found under the roots of a fallen tree less than 100 feet away. Residence of otters in this area is an indication both of the undisturbed qualities of this bottomland, as well as a substantial supply of fish and other aquatic species upon which they prey.

Water quality in this section of the New Hope, once rated as Poor (DEM, 1985), has in fact improved significantly since the wastewater plant on Sandy Creek was closed. Muskrat middens containing fresh shells of the Asiatic clam (*Corbicula fluminea*) were observed along both the main channel, as well as some of the deeper side channels. Although this bivalve is quite tolerant of siltation and disturbed bottom conditions, it is intolerant of chemical pollution and has probably recolonized the area following the abandonment of the wastewater plant. Although normally not a positive sign, its presence suggests that conditions are also improving for the native aquatic species, at least those capable of dealing with sedimentation.

DESCRIPTION OF THE FLORA:

The plant list includes the large-flowered trout lily (Erythronium americanum), yellow lady's slipper (Cypripedium calceolus) and southern rein orchids (Platanthera flava) found in some of the low areas. The rarest plant is Big Shellbark Hickory (Carya laciniosa), a species listed by NHP as a candidate for the endangered and threatened list due to the small numbers found in N.C. There is a thriving population of small trees and one "patriarch" tree present. This whole area has been seriously affected by the increased run-off from development along US 15-501. In the past, the creek and the immediate area were probably as rich in spring ephemerals as

the better areas up and down stream. The vegetation is similar to the floodplain above the Boulevard, except there are many indications of more intensive use as farmlands. Loblolly pines indicating secondary succession frequently intrude all the way down the slopes, and there are indications that the lowlands were used as pasture. The botanically rich areas to the north and south are not repeated along this section. A few scattered trees with impressive diameters occur, and some of the higher areas support spring ephemerals.

PROTECTION STATUS AND THREATS:

Most of this tract is privately owned but a section at the southern end is part of the Corps lands extending north of Jordan Lake and is registered as a State Natural Area. The entire tract, however, is potentially subject to timbering. The registry agreement does not exclude all forestry uses, and elsewhere within the New Hope Gamelands the NC Wildlife Resources Commission, which leases these tracts as gamelands, uses clearcuts to provide openings for deer, bobwhite and other species that benefit from edge habitat. Due to the large powerline clearing already present on this site, however, there is probably not an urgent need for game management.

A more significant threat than timbering is development of the surrounding uplands. Not only will this increase intrusion into this area by humans, domestic animals and urban-tolerant wildlife, but more sewerlines will be needed to serve the growing population in this area and will likely be routed downstream along the New Hope toward the South Durham Wastewater Plant. Increases in impervious surfaces, particularly parking areas serving office complexes and retail centers, threaten to reverse whatever water quality gains have been made in this reach. The expansion of US 15-501, along with the development of frontage roads and shopping centers, will make upstream and downstream movement by animals even more hazardous.

CONSERVATION RECOMMENDATIONS:

Landowners should be informed about the significance of this tract as a natural area. Conservation easements, Natural Heritage Program Registry or management according to a Forest Stewardship plan would all be appropriate means of protecting this site. Conservation efforts should be directed not only toward preserving the bottomland forest, but should also include the wooded buffers on the adjoining slopes, particularly along areas adjacent to the US 15-501 corridor and Old Chapel Hill Road.

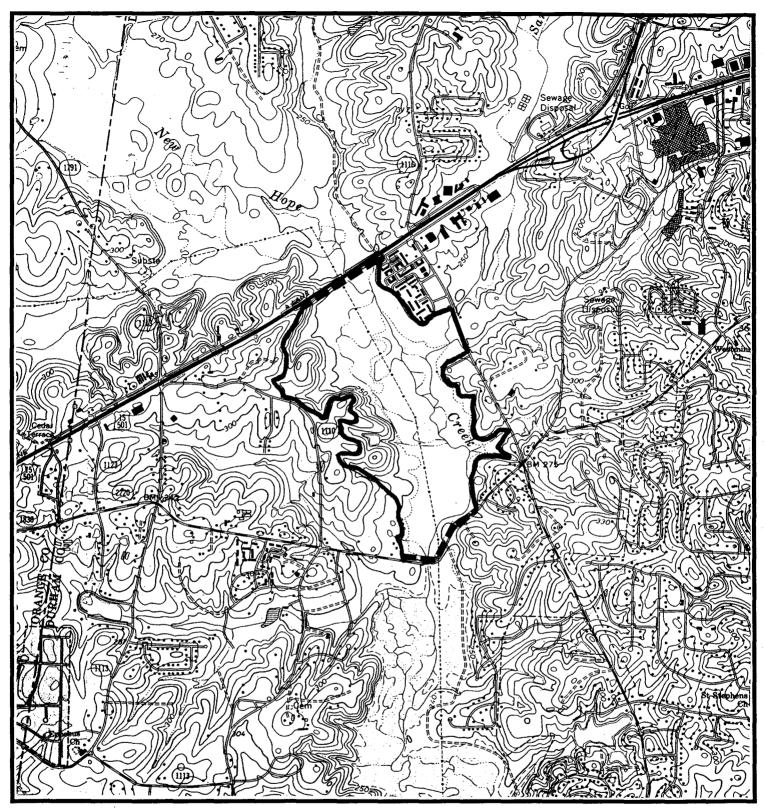
County planning efforts should include measures to control stormwater runoff from adjoining developments, especially the large commercial enterprises projected for the US 15-501 corridor. A high priority should be given for the control of sedimentation and runoff from construction sites in the vicinity of all tributaries of New Hope Creek.

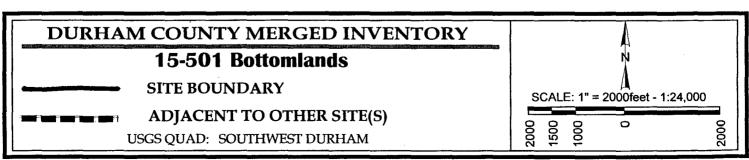
In order to maintain the wildlife corridor function of New Hope Creek, the NC Department of Transportation should be strongly urged to make any bridge replacements using similar structures on piers or pilings, rather than box or pipe culverts. If riprap must be used to prevent erosion, strips of bare earth should be left at the base of the slope to provide a more easily

New Hope Creek Corridor A.2. 15/501 Bottomlands

traversed passageway for deer and other terrestrial species. Creation of additional wildlife crossings through the US 15-501 causeway over New Hope Creek would greatly improve wildlife movements while at the same time reducing the chances of potentially dangerous collisions between vehicles and wildlife.

An expanding deer population in the vicinity of the major highways of US 15-501 and I-40, as well as the heavily traveled thoroughfare along Old Chapel Hill Road, would present a threat not only to traffic but to public support for the New Hope Wildlife Corridor. Bow hunting, which is permitted in the gamelands portion of this tract, should be encouraged by the conservation community. Conversely, management practices such as clearcutting or planting powerline cuts with forage plants preferred by deer should be discouraged.





ZOOLOGICAL SURVEY REPORT

I. LOCATION

USGS Quad: Southwest Durham

Site Boundaries: Primary boundaries enclose floodplains and adjoining slopes along New Hope Creek between US 15-501 downstream to Old Chapel Hill Road; secondary boundaries include areas of second-growth forest and other disturbed habitats located on the uplands that buffer the site along Garrett Road to the east and Watkins Road to the west

Relationship to Previous Inventory Sites: This area was not included in earlier inventories.

II. TERRESTRIAL HABITATS

NHP Element Species:

None recorded

Regionally Rare Species:

None recorded

Indicator Guilds:

Forest Interior Species: Terrapene carolina Pseudacris triseriata Forest/Edge Species: Sciurus carolinensis Glaucomys volans Procyon lotor Odocoileus virginianus Melanerpes carolinus Picoides pubescens Colaptes auratus Parus carolinensis Parus hicolor Sitta carolinensis Cardinalis cardinalis Pipilo erythrophthalmus

Long-Distance Migrants: (not sampled during the nesting season)

Low-nesting Species: Cardinalis cardinalis Pipilo erythrophthalmus

Big-tree Species: Glaucomys volans Sitta carolinensis

Wide-ranging Species: Lutra canadensis

Carnivores/Raptors: Procyon lotor Lutra canadensis Human-sensitive Species: Lutra canadensis Terrapene carolina

Field/Residential Species:
Melanerpes
erythrocephalus
Turdus migratorius
Sturnus vulgaris

Invaders: Sturnus vulgaris

Habitat Features:

Total Site: 435 acres

Size of Primary Area: 250 acres

Habitat Heterogeneity: Moderate; wide floodplain with numerous oxbows and floodplain

pools; forested slopes and ravines; powerline cut with old-field vegetation

Forest Structural Diversity: Hardwood forest with well-developed canopy and subcanopy; scattered stands of cane and occasionally dense thickets of privet; herb layer not seen during the growing season; floodplain does not appear to be frequently swept by floods.

Water Sources: New Hope Creek is perennial; numerous floodplain pools occur in the bottomlands; springs and seeps exist along the base of the slopes.

Amphibian Breeding Sites: Pools were covered with ice when the site visit was made; habitat is potentially present for Ambystoma spp. as well as Hemidactylium; chorus frogs heard calling.

Denning Sites: A moderately fresh den was found dug under fallen tree roots located fairly close to an otter sprainting site; no tracks were observed, and there was a large pile of Sciurus- and Glaucomys-opened hickory nuts outside; no evidence for groundhogs seen; slopes above the bottomlands provide sites for upland dens.

Big Trees/Large Cavities: Majority of hardwoods were between 8 - 10" dbh; one water oak seen over 3' dbh and one southern red oak over 4' dbh, probably an old boundary tree; large cavity present in the large southern red oak.

Snags and Logs: Fallen logs are fairly plentiful; snags not noted.

Mast-producing Species: Plentiful—southern sugar maples, hackberries and ash-leaf maple provide soft mast; hickories (mockernut and northern shagbark) and oaks supply hard mast.

Nectar Sources: Probably present in the powerline cut; sapsucker observed feeding on fresh wells on old sugar maple.

Landscape Features:

Refuge Shape: Broad oblong, following boundaries of the floodplain

Refuge Integrity/Fragmentation: A powerline cut transects the entire site from north to south; a sewerline was noted on the slopes at the southeastern end.

Proximity to Other Refuges/Existence of Corridors: A section of the New Hope Gamelands extends into the southeastern corner of this site and continues downstream to Jordan Lake; upstream, this site is connected to the Korstian and Durham Divisions of Duke Forest, but the bottomlands become fragmented and constrained by development upstream from the Mt. Moriah Bottomlands.

Threats and Disturbances:

Evidence of Past Land Uses: Old boundary trees contain remnant strands of barbed wire, indicating previous use as pasture.

Level of Human Intrusion: Southern end is used as archery-only gamelands; access road comes down from slope on the southwest side of the site and dead-ends at the powerline—possibly used for right-of-way maintenance; recent timbering activities have taken place adjacent to the powerline.

Distance to Nearest Road: Bordered by US 15-501 on the north and Old Chapel Hill Road on the south; Garrett road parallels the tract on the east and Watkins Road on the west.

Potential for Habitat Loss or Fragmentation: Moderate; US 15-501 is planned to be upgraded; bottomland hardwoods are subject to timbering; new roads and sewerlines that could transect portions of this bottomland are also possible.

Potential for Changes in Adjoining Land Use: High; adjoining uplands occur within close proximity to I-40/US 15-501 interchange, a region where intensive development has been targeted.

Species Records:

Sciurus carolinensis (94-01-25/t)
Glaucomys volans (94-01-25/s)
Castor canadensis (94-01-25/s)
Ondatra zibethicus (94-01-25/s)
Procyon lotor (94-01-25/t)
Lutra canadensis (94-01-25/s)
Odocoileus virginianus (94-01-25/s)
Melanerpes erythrocephalus
(94-01-25/o)
Melanerpes carolinus (94-01-25/o)

Sphyrapicus varius (94-01-25/o)
Picoides pubescens (94-01-25/o)
Colaptes auratus (94-01-25/o)
Parus carolinensis (94-01-25/o)
Parus bicolor (94-01-25/o)
Sitta carolinensis (94-01-25/o)
Regulus calendula (94-01-25/o)
Turdus migratorius (94-01-25/o)
Bombycilla cedrorum (94-01-25/o)
Sturnus vulgaris (94-01-25/o)

Dendroica coronata (94-01-25/o) Cardinalis cardinalis (94-01-25/o) Pipilo erythrophthalmus (94-01-25/o) Zonotrichia albicollis (94-01-25/o) Terrapene carolina (94-01-25/t) Pseudacris triseriata (94-01-25/o)

Additional Survey Needs:

Visits need to be made during the peak of the avian nesting season to compile a more complete list of the species that are present within this site.

III. AQUATIC HABITATS

NHP Element Species:

None recorded

Regionally Rare Species:

Etheostoma serriferum (record shared with Mt. Moriah Bottomlands)

Indicator Guilds:

Water-quality Sensitive
Species:
Luxilus albeolus

Percina crassa Elliptio complanata WO Tolerant Species: Anguilla rostrata Ameiurus nebulosus Invading Species: Corbicula fluminea

Habitat Features:

Lotic/Lentic: New Hope Creek is perennial; side channels might dry up during the summer.

Depth/Width: Channel is ca. 30' wide, probably 3-4' deep.

Flow Rate: Moderate

Water Quality/Clarity: Turbid when visited; no foam seen

Bank Condition: Good, except for sections under the powerline cut

Insolation: Stream channels are covered by closed canopy except for powerline cut.

Substrate(s): Sand and silt

Emergent Vegetation: None recorded

Woody Debris: Present Other Shelter: Negligible

Landscape Features:

Stream Classification: 3rd order creek (1-5 m)

Connections to Other Intact Reaches: Sandy Creek is channelized and has had a past history of heavy pollution; upstream portions of New Hope Creek are still in good condition.

Integrity of Adjoining Forests: Slopes are mainly forested in fairly mature pine stands with hardwoods intermixed.

Threats and Disturbances:

DEM Water Quality Ratings: Previously rated as Poor below confluence with Sandy Creek (DEM, 1985) but upgraded to Fair? in 1991 following the closure of the Sandy Creek Wastewater Plant

Sources of Pollution: Although the Sandy Creek Wastewater Plant has been closed, fifteen smaller package plants still exist within the upper New Hope drainage; runoff from impervious surfaces and construction sites will become ever more important.

Barriers to Migration: Bridges at US 15-501 and Old Chapel Hill Road allow passage for aquatic species.

Potential for Impoundment, Flow Alteration or Draining: Increased flooding is likely due to intensive development projected for the adjoining areas.

Species Records:

Castor canadensis (94-01-25/s)
Ondatra zibethicus (94-01-25/s)
Lutra canadensis (94-01-25/s)
Anguilla rostrata (MENH)
Esox americanus (MENH)
Esox niger (MENH)
Notemigonus crysoleucas (MENH)
Semotilus atromaculatus (MENH)

Luxilus albeolus (MENH)
Notropis altipinnis (MENH)
Notropis alborus (MENH)
Moxostoma anisurum (MENH)
Ameiurus nebulosus (MENH)
Noturus insignis (MENH)
Aphredoderus sayanus (MENH)
Micropterus salmoides (MENH)

Lepomis macrochirus (MENH)
Lepomis gibbosus (MENH)
Percina crassa (MENH)
Etheostoma olmstedi (MENH)
Etheostoma serriferum (MENH)
Elliptio complanata (94-01-25/r)
Corbicula fluminea (94-01-25/r)

Additional Survey Needs:

Aquatic sampling is needed to determine current status of fish and waterdog populations.

BOTANICAL SURVEY REPORT

SITE NAME: 15-501 Bottomlands (New)

County:

Durham

Quad:

Southwest Durham

Acreage:

435

Province:

Piedmont

Significance:

4 - State 1 - Poor

Integrity:

Landscape Value: No Special Merit

Threat Status

3 - Medium

Ownership:

Private, County and Corps of Engineers

Summary List of Special Plant Species:

Carya laciniosa

Cypripedium calceolus Erythronium americanum

Platanthera flava

Significant Features: A large area remains with a mature Piedmont Bottomland Forest community. A thriving population of Big Shellbark Hickory (Carya laciniosa) makes this a significant state site.

Priorities and Further Investigation Needed: Plants not well documented except in spring.

Reconnaissance Dates: Spring 1994 and 1995, several earlier trips in 1970's and 1980's.

Surveyors: Jim and Liz Pullman, Harry LeGrand

Location: Site is south of US 15-501 and north of Old Chapel Hill Road (CR1127) and includes all of the floodplain.

Access to Site: Park along Garrett Road (CR1116) and enter via the sewer line, or park at bridge over New Hope Creek and walk north on Corps land.

New Hope Creek Corridor A.2.a. 15/501 Bottomlands (New)

Physical and Biological Description

Slope: Various Grade: Flat to 6%

Topo Position: South of US15-501 along New Hope Creek.

Elevation: 250' - 270' Hydrology: Seasonally wet

Watershed: New Hope Creek - Jordan Lake - Cape Fear River

Soil: Chewacla, Wehadkee in the floodplain, slopes mainly White Store sandy loam with small

areas of Altavista silt loam and Creedmoor sandy loam.

Natural Community: Piedmont Bottomland Forest

Plant Community Types: 1.Piedmont Bottomland Forest:

mixed bottomland hardwoods/ mixed subcanopy and shrubs/

mixed herbs/

Description of Flora: See Site Description

Plant Species List: See following page.

New Hope Creek Corridor A.2.a. 15/501 Bottomlands (New)

HERBS

15/501 Bottomlands, New

CANOPY Acer negundo Acer rubrum Acer saccharum Betula nigra Carya laciniosa Carya ovata Carya tomentosa Celtis laevigata Liquidambar styraciflua Liriodendron tulipifera Pinus echinata Pinus taeda Quercus lyrata Quercus michauxii Quercus phellos Quercus rubrum Ulmus sp.

SUBCANOPY, SHRUBS, VINES
Aesculus sylvatiaca
Arundinaria sp.
Asimina triloba
Cornus florida
Ilex decidua
Ligustrum sinense
Lindera benzoin
Lonicera japonica
Staphylea trifolia
Viburnum prunifolium
Viburnum rafinesquianum

FERNS
Asplenium platyneuron
Botrychium biternatum
Ophioglossum vulgatum
Polystichum acrostichoides
Thelypteris novboracensis
Woodwardia virginica

Amsonia tabernaemontana Arisaema triphyllum Asaarum canadense Cardamine concatenata Cardamine angustata Chaerophullum tainturieri Claytonia virginica Clematis sp. Cypripedium calceolus Erythronium americanum Erythronium umbilicatum Galium sp. Geum spp. Glecoma hederacea Goodyera pubescens Hedyotis caerulea Hexastylis arifolia Impatiens capensis Platanthera flava Podophyllum peltatum Ranunculus spp. Sparganium americanum Stellaria media Thalictrum thalictoides Tipularia discolor Viola affinis Viola eriocarpa Viola papilionacea Zephyranthes atamasco

A. New Hope Creek Corridor

7. LITTLE CREEK BOTTOMLANDS

SITE DESCRIPTION

County:

Durham

Ouad:

Southwest Durham, Chapel Hill

Significance:

Zoological: County (DURH 1); Botanical: 1 - County

Landscape Function: Zoological: Medium (DURH 1)

Boundary Integrity:

Medium

Level of Threat:

Zoological: Low; Botanical: 3 - Medium

Protection Status:

High

Community Viability: Zoological: Low (DURH 1); Botanical: 2 - Medium

SUMMARY OF SIGNIFICANT FEATURES:

- Presence of regionally-rare species: marsh rabbit (Sylvilagus palustris), bowfin (Amia 1. calva) and (historically) flier sunfish (Centrarchus macropterus).
- 2. Large tract of bottomland hardwood forest that provides habitat for many species of forest-interior and other disturbance-sensitive animals.

LANDSCAPE FEATURES:

Little Creek is one of the larger tributaries of New Hope Creek, with branches extending west and north through Chapel Hill and Carrboro as far as Calvander Crossroads. Although portions of the headwaters were identified as significant natural areas in the Orange County Inventory (see Bolin Creek and Battle Park; Sather and Hall, 1988), these sites are separated from the bottomlands in Durham County by a wide area of dense development in the vicinity of University Mall. Portions of the stream have been channelized along this reach, further reducing any function this stream valley has as a corridor for wildlife movements between Orange and **Durham Counties.**

Just east of the county line, however, Little Creek enters the 100 year floodplain of Jordan Lake, where its wildlife habitats receive some degree of protection as part of the New Hope Gamelands. The broad floodplain that occupies virtually the entire Durham section of this watershed is typical of Triassic Basin streams, and together with the confluent bottomlands along New Hope Creek creates an unbroken tract of forest nearly 1.5 miles wide.

Like neighboring sections of New Hope Creek, subimpoundments have been constructed above the two roads that cross Little Creek in Durham County (NC 54 and Farrington Road) in order to create winter foraging habitat for wood ducks. The lower reach, extending perhaps half a mile upstream from the confluence with New Hope Creek, is also flooded at least occasionally

from water backing up from Jordan Lake. Other areas have been flooded by beavers. One large pond with a completely cleared canopy exists within a backwater of the subimpounded area just north of NC 54; the dam on the southern border of this pond is formed by the subimpoundment levee, the remainder by beaver construction.

DESCRIPTION OF THE FAUNA:

The terrestrial and riparian fauna inhabiting this tract is essentially the same as that of the adjoining habitats along New Hope Creek (see Stagecoach Road Bottomland Forest). Characteristic bottomland species observed during the two early spring visits to this site include red-shouldered hawk (Buteo lineatus), wood duck (Aix sponsa), otter (Lutra canadensis), mink (Mustela vison), muskrat (Ondatara zibethica) and beaver (Castor canadensis). The presence of pileated woodpeckers (Dryocopus pileatus), along with the red-shouldered hawks, is indicative of the extensive nature and relative maturity of the hardwood forest. Several large flocks of evening grosbeaks (Coccothraustes vespertinus) were observed feeding on the abundant spring crop of maple and elm seeds, reflecting the importance to migratory, as well as resident animals of the large number of soft mast trees that are found in these bottomlands.

The most notable animal observed on this tract, the marsh rabbit (Sylvilagus palustris), is also undoubtedly shared with adjoining tracts along the New Hope, although it was not recorded there during this inventory; historical records exist from Sandy Creek on the Duke University Campus (Duke Vertebrate Collection), and it also occurs in similar swampy habitats along Morgan Creek (see Morgan Creek Bottomland Forest). This species is one of a suite of essentially Coastal Plain species that occur above the Fall Line only within the extensive floodplains along Triassic Basin streams.

As with other members of this group, its future survival in this region appears to be precarious due to severe fragmentation of its habitat by the construction of Jordan Lake and other impoundments. While the tracks or scat of the related eastern cottontail (Sylvilagus floridanus) were found in nearly all the areas surveyed in this inventory, the distinctive tracks of the marsh rabbit, with their smaller size, narrower footprints, sharper claws and curious walking gait, were observed only at the extreme lower end of the Little Creek floodplain, in a mucky area where the winter floodwaters from Jordan Lake had only recently withdrawn.

The survival of another member of the Coastal Plain group, the bowfin (Amia calva), seems more assured; this hardy predator, locally called a "grinnel," is frequently hooked by fishermen in the vicinity of the subimpoundment on Farrington Road. Based on water quality considerations, other aquatic species belonging to the Coastal Plain/Triassic Basin guild may also have some chance of surviving in this creek. Despite flowing through urban areas in Orange County, the water quality of Little Creek as it crosses the county line has been rated as Good in terms of its chemical parameters and Fair in terms of its biological rating (DEM, 1985). Unlike

New Hope, Third Fork, Morgan and Northeast Creeks no large wastewater plants empty into Little Creek (it does, however, receive stormwater runoff from large tracts of impervious surfaces in Chapel Hill).

The winter flooding of the wood duck subimpoundments, along with backup of water from Jordan Lake, may mitigate any benefits due to water quality. Although the voracious "grinnel" may prosper in these flooded areas, smaller species such as the mudminnow (*Umbra pygmaea*), blue-spotted sunfish (*Enneacanthus gloriosus*) and swamp darter (*Etheostoma fusiforme*)—all recorded from the lower New Hope watershed—may be at increased risk due to predation as their shallow water or isolated pool habitat becomes more deeply inundated, and thus more accessible to bass, crappie, channel catfish, as well as the "grinnel" itself. On the other hand, at least some refuges can still be found in the non-impounded areas, as indicated by the presence of larval marbled salamanders (*Ambystoma opacum*) in at least a few pools: small larvae of this species cannot survive in the presence of fish even as seemingly insignificant as the mosquitofish.

DESCRIPTION OF THE FLORA:

Little Creek has no extensive botanical survey. Short excursions into the floodplain have not produced many special plants. The higher areas and floodplain edges have yielded the usual spring ephemerals, although not in great numbers. One unusual occurrence is the presence of swamp white oak (Quercus bicolor) downstream from the crossing at CR 1108. The site is potentially as good as Stagecoach Bottomlands, but heavy use of surrounding lands for tobacco cultivation in the past 100 years may have been detrimental to the vegetation. Above NC 54, the floodplain is adjacent to several areas of Iredell loam—the area should be checked for basophilic plants.

PROTECTION STATUS AND THREATS:

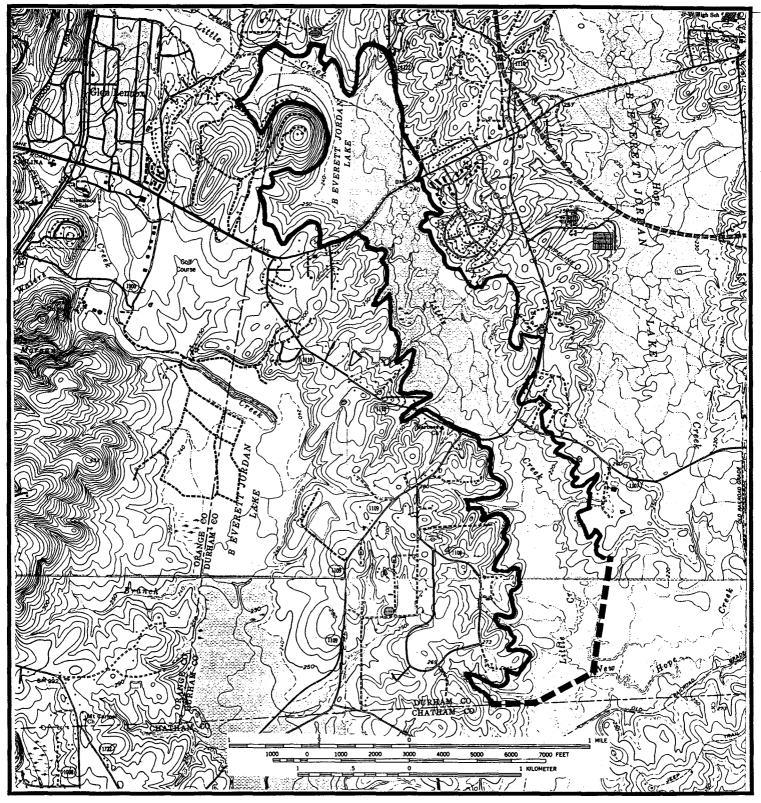
The Little Creek Bottomlands are part of the Corps lands extending north of Jordan Lake and are leased to the NC Wildlife Resources Commission as gamelands. Although protected from development, they are still subject to timbering and other management activities directed towards just a few species of game animals, primarily wood duck and white-tailed deer.

Privately owned lands adjoin the bottomland along both slopes, parts of which are becoming developed right down to the boundary of the Corps lands, particularly along Farrington Road. The large Meadowmont mixed-use development in eastern Chapel Hill will contain some 50 acres of Town parkland in the Durham County portion of the Little Creek floodplain, much of which is wetlands. In the Durham portion of this park, the only use permitted by the Town will be nature trails, short boardwalks, and a wildlife observation platform, with no wetland fill allowed.

CONSERVATION RECOMMENDATIONS:

Conservation recommendations for this tract are the same as for other tracts of the New Hope Gamelands. Management of the subimpounded areas should give more weight to the needs of non-game species and perhaps less to that of the wood duck, which is thriving throughout the region. Some regulation of rabbit hunting or fur-bearer trapping should also be considered if the population of marsh rabbits is to survive within this area.

As is true for the other sites in the New Hope Creek Basin, preservation of upland buffers along the edges of the bottomlands should be given a high priority. These slopes provide denning areas for terrestrial species, as well as refuges during periods of high water. Conservation easements, Natural Heritage Program Registry and Forest Management Plans would all be appropriate means to conserve these strips of uplands.





ZOOLOGICAL SURVEY REPORT

I. LOCATION

USGS Quad: Chapel Hill, Southwest Durham

Site Boundaries: Primary boundaries follow the Corps property line and include the bottomlands and adjoining slopes on both sides of Little Creek from just west of the Orange County line downstream from Jordan Lake; secondary boundaries include undeveloped tracts on the uplands adjoining the Little Creek floodplain

Relationship to Previous Inventory Sites: Not included in previous inventories

II. TERRESTRIAL HABITATS

NHP Element Species:

None recorded

Regionally Rare Species:

Sylvilagus palustris

Indicator Guilds:

Forest Interior Species:
Buteo lineatus
Dryocopus pileatus
Polioptila caerulea
Hylocichia mustelina
Vireo flavifrons
Parula americana
Seiurus aurocapillus
Ambystoma opacum
Bufo americanus
Polygonia interrogationis
Polygonia comma
Haplotrema concavum

Rocest/Edve Species: Sciurus carolinensis Glaucomys volans Ochrotomys nuttalli Urocyon

Procyon lotor
Odocoileus virginianus
Melanerpes
erythrocephalus

Melanerpes carolinus

Picoides pubescens
Cyanocitta cristata
Parus carolinensis
Parus bicolor
Sitta carolinensis
Sitta pusilla
Thryothorus ludovicianus
Dendroica dominica
Cardinalis cardinalis
Carduelis tristis
Coluber constrictor
Pseudacris crucifer
Erynnis juvenalis
Papilio glaucus

Long-Distance Migrants (not sampled during the nesting season): Polioptila caerulea Hylocichla mustelina Vireo flavifrons Seiurus aurocapillus Low-nesting Species: Seiurus aurocapillus Cardinalis cardinalis

Big-tree/Snag Species:
Glaucomys volans
Aix sponsa
Buteo lineatus
Dryocopus pileatus
Sitta carolinensis

Wide-ranging Species:
Urocyon
cinereoargenteus
Mustela vison
Lutra canadensis
Buteo lineatus
Dryocopus pileatus

Carnivores/Raptors: Urocyon cinereoargenteus Procyon lotor Mustela vison Lutra canadensis Buteo lineatus

Human-sensitive Species:
Mustela vison
Lutra canadensis
Aix sponsa
Coluber constrictor

Non-forest Species:
Sayornis phoebe
Corvus brachyrhynchos
Turdus migratorius
Sturnus vulgaris
Vireo griseus
Quiscalus quiscula
Molothrus ater
Everes comyntas

Invadera: Canis familiaris Sturnus vulgaris Molothrus ater

Habitat Features:

Size of Primary Area: 1,578 acres

Habitat Heterogeneity: Moderate—slopes are wooded in hardwoods and pine stands and vary from steep to gentle; bottomland are wooded almost completely in hardwoods; floodplain pools and old oxbows are widespread, beaver ponds are occasional but well-developed in some areas; subimpoundments limit availability of large areas of the bottomlands during the winter; Jordan Lake also appears to flood the lower reach of Little Creek during the winter; farmland and old fields border the watershed along significant portions of its boundary.

Forest Structural Diversity: Well-developed in non-impounded areas, with levees supporting large patches of *Claytonia*, *Erythronium* and other wildflowers

Water Sources: Abundant -- seasonally flooded impoundment; perennial stream; intermittent tributaries; floodplain pools; beaver pond

Amphibian Breeding Sites: Abundant ranid tadpoles seen throughout the bottomland; Ambystoma opacum larvae were found in one backwater next to the creek but had probably been washed-in from a more isolated pool upstream.

Denning Sites: Bank dens noted for beaver; uplands provide sites for other species. Big Trees/Large Cavities: Most trees are 1' dbh or less; trees between 2' to 3' dbh were also noted (e.g., Carya ovata, Quercus rubra); scattered stands are composed of individuals ranging between 18" - 24" dbh.

Snags and Logs: Numerous

Mast-producing Species: Oaks, maples, hickories, beeches, hornbeams, elms are all abundant.

Nectar Sources: No butterfly plants noted

Landscape Features:

Refuge Shape: Oblong, following contours of the bottomland

Refuge Integrity/Fragmentation: Bottomland is crossed by two roads in Durham County: NC 54 and Farrington Road (SR 1110); wildlife subimpoundments exist on the upstream side of both roads; riprap beneath these bridges probably impedes travel by some species (e.g., deer).

Proximity to Other Refuges/Existence of Corridors: Contiguous with the Stage Coach Bottomlands downstream and other tracts of the Jordan Lake gamelands; headwaters upstream in Orange County are fragmented by dense development.

Threats and Disturbances:

Evidence of Past Land Uses: Remnants of barbed wire fencing and old farm ponds are present, indicating that pasturage may have been a significant land use in the past.

Level of Human Intrusion: Moderate; hunting occurs during the winter.

Distance to Nearest Road: NC 54 and Farrington Road cross the bottomlands; secondary, residential and farm roads occur on the adjoining uplands.

Potential for Habitat Loss or Fragmentation: High; prolonged winter flooding is altering the ground cover, shrub layer and perhaps the canopy composition in the subimpoundments.

Potential for Changes in Adjoining Land Use: Residential development is encroaching on the bottomlands along Farrington Road.

Species Records:

Sylvilagus palustris (94-04-06/t) Sylvilagus sp. (94-04-06/s) Sciurus carolinensis (94-04-06/t) Sciurus carolinensis (94-04-07/t) Glaucomys volans (94-04-06/t) Castor canadensis (94-04-06/s) Castor canadensis (94-04-07/t) Ochrotomye nuttalli (94-04-06/n) Ondatra zibethicus (94-04-06/t) Ondatra zibethicus (94-04-07/t) Urocyon cinereoargenieus (94-04-06/t) Canis familiaris (94-04-06/t) Canis familiaris (94-04-07/t) Procyon lotor (94-04-06/t) Procyon loter (94-04-07/t) Mustela vison (94-04-06/t) Lutra canadensis (94-04-06/t) Odocoileus virginianus (94-04-06/s) Odocoileus virginianus (94-04-07/t) Ardea herodias (94-04-06/t) Branta canadensis (94-04-07/o) Aix sponse (94-04-06/o) Aix sponse (94-04-07/o) Anas platyrhynchos (94-04-06/o) Anas platyrhynchos (94-04-07/o) Butco lineatus (94-04-06/o) Buteo lineaus (94-04-07/o) Melanerpes erythrocephalus (94-04-06/o) Melanernes erythrocephalus (94-04-07/o) Melanerpes carolinus (94-04-06/o)

Melanerpes carolinus (94-04-07/o) Picoides pubescens (94-04-06/o) Picoides pubescens (94-04-07/o) Dryocopus pileatus (94-04-06/o) Sayornis phoebe (94-04-06/o) Cyanocitta cristata (94-04-06/o) Cyanocitta cristata (94-04-07/o) Corvus brachyrhynchos (94-04-06/o) Corvus brachyrhynchos (94-04-07/o) Parus carolinensis (94-04-07/o) Parus bicolor (94-04-06/o) Parus bicolor (94-04-07/o) Sitta carolinensis (94-04-07/o) Sitta pusilla (94-04-06/o) Thryothorus ludovicianus (94-04-06/o) Thryothorus ludovicianus (94-04-07/o) Regulus satrapa (94-04-06/o) Regulus calendula (94-04-06/o) Regulus calendula (94-04-07/o) Polioptila caerulea (94-04-06/o) Polioptila caerulea (94-04-07/o) Hylocichia mustelina (94-04-07/o) Turdus migratorius (94-04-06/o) Sturmus vulgaris (94-04-07/o) Viree griseus (94-04-07/o) Virso flavifrons (94-04-07/o) Parula americana (94-04-06/o) Parula americana (94-04-07/o) Dendroica compata (94-04-06/o) Dendroica coronata (94-04-07/o) Dendroica dominica (94-04-06/o) Dendroica dominica (94-04-07/o) Seiurus aurocapillus (94-04-06/o)

Cardinalis cardinalis (94-04-06/o) Cardinalis cardinalis (94-04-07/o) Zonotrichia albicollis (94-04-06/o) Zonotrichia albicollis (94-04-07/o) Quiscalus quiscula (94-04-06/o) Quiscalus quiscula (94-04-07/o) Molothrus ater (94-04-06/o) Carduelis tristis (94-04-06/o) Coccothraustes vespertinus (94-04-06/o) Chelydra serpentina (94-04-06/o) Pseudemys concinna (94-04-06/?) Coluber constrictor (94-04-07/o) Ambystoma opacum (94-04-06/l) **Bufo americanus (94-04-07/o)** Acris crepitans (94-04-06/o) Pseudacris crucifer (94-04-06/o) Pseudacris crucifer (94-04-07/o) Rana clamitans (94-04-06/o) Erynnis juvenalis (94-04-06/o) Erynnis juvenalis (94-04-07/o) Papilio glaucus (94-04-06/o) Everes comyntas (94-04-06/o) Polygonia interrogationis (94-04-07/o) Polygonia comma (94-04-06/o) Polygonia comma (94-04-07/e) Haplotrema concavnun (94-04-07/o)

Additional Survey Needs:

Not surveyed during the avian nesting season. Presence of species such as Kentucky warbler should be determined in order to assess the impacts of the flooding from the sub-impoundments on habitat suitability.

III. AQUATIC HABITATS

NHP Element Species:

None recorded

Regionally Rare Species:

Amia calva Centrarchus macropterus

Indicator Guilds:

Water-quality Sensitive
Species:

Luxilus albeolus Notropis amoenus Elliptio complanata WO Tolerant Species: Gambusia affinis holbrooki Invading Species: Corbicula fluminea

Habitat Features:

Lotic/Lentic: Little Creek is perennial; large areas are seasonally impounded for wood duck management; deep oxbows and beaver ponds provide lentic habitat throughout the year.

Depth/Width: Channel ranges between 15' - 35' wide; probably from 3' - 4' deep

Flow Rate: Moderate to slow

Water Quality/Clarity: Turbid when examined Bank Condition: Appears to be in good condition

Insolation: Canopy is closed except for a large beaver pond located within the NC 54

subimpoundment.

Substrate(s): Sand and silt; no riffles seen

Emergent Vegetation: Cattails and other emergent vegetation are developing in the large beaver impoundment; small areas of emergents were noted in some of the better insolated backwaters.

Woody Debris: Present Other Shelter: Negligible

Landscape Features:

Stream Classification: 2nd order, small river (5-25 m)

Connections to Other Intact Reaches: Confluent with New Hope Creek

Integrity of Adjoining Forests: Good

Threats and Disturbances:

DEM Water Quality Ratings: Biological Rating of Fair; Water Quality Index of Good at the county line (DEM, 1985)

Sources of Pollution: Falconbridge Wastewater Treatment Plant and a few small package treatment plants discharge into Little Creek or its tributaries upstream in Orange County; runoff from residential and commercial districts in Chapel Hill are significant non-point sources.

Barriers to Migration: Upstream movements through the subimpoundments are probably blocked for all but the strongest swimming fish during the winter when the sluice gates are partially closed; however, travel is probably unrestricted during most of the year, including spring and summer spawning seasons.

Potential for Impoundment, Flow Alteration or Draining: Natural hydrology has been completely altered due to seasonal impounding.

Species Records:

Castor canadensis (94-04-06/s)
Castor canadensis (94-04-07/t)
Ondatra zibethicus (94-04-06/t)
Ondatra zibethicus (94-04-07/t)
Mustela vison (94-04-06/t)
Lutra canadensis (94-04-06/t)
Chelydra serpentina (94-04-06/o?)
Pseudemys concinna (94-04-06/o?)

Rana clamisans (94-04-06/o)

Amia caiva (94-04-06/o)

Notemigonus crysoleucas (MEHN)

Luxilus albeolus (MEHN)

Notropis amoenus (MEHN)

Notropis altipinnis (MEHN)

Gambusia affinis holbrooki

(94-04-06/o)

Gambusia affinis holbrooki
(94-04-07/0)

Centrarchus macropterus (MEHN)

Lepomis macrochirus (94-04-06/0)

Lepomis gibbosus (MEHN)

Elliptio complanata (94-04-06/t)

Corbicula fluminea (94-04-07/t)

Additional Survey Needs:

An aquatic survey is needed in order to determine the population status of several Coastal Plain species that have previously been recorded in the area.

BOTANICAL SURVEY REPORT

SITE NAME: Little Creek Bottomlands (New)

County:

Durham

Quad:

Southwest Durham, Chapel HIll

Acreage:

1,578

Province:

Piedmont

Significance: 1 - County

Integrity:

2 - Medium

Landscape Value:

No Special Merit

Threat Status:

3 - Medium

Ownership: Public; Corps of Engineers

Summary List of Special Plant Species: Quercus bicolor

Significant Features: Some of this Piedmont Bottomland Forest has not been impacted by sub-

impoundments and/or Jordan Lake and remains in good condition.

Priorities and Further Investigation: Plants need extensive documentation.

Reconnaissance Dates: Cursory visits 1986 through 1996.

Surveyors: Jim and Liz Pullman

Location: Site extends from the entrance of Little Creek along the Orange County Line and includes the floodplain and low slopes to the Chatham County line.

Access to Site: Park at the sub-impoundment parking areas either at NC54 or at Farrington Road (CR1110).

New Hope Creek Corridor A.7.a. Little Creek Bottomlands (New)

Graue: Flat to 43/0

Topo Position: Along Little Creek north and south of NC54 and south of CR1110

220 to 240' Elevation:

Hydrology: Seasonally wet. partly flooded in winter Watershed: Little Creek - Jordan Lake - Cape Fear River

Soil: Chewacla, Wehadkee in the floodplain with slopes of White Store and Cecil sandy loam,

Altavista and Roanoke silt loam, Iredell and Wahee loam.

Natural Community: Piedmont Bottomland Forest

Plant Community Types: 1. Piedmont Bottomland Forest:

mixed bottomland hardwoods/ mixed subcanopy and shrubs/

SUBCANOPY, SHRUBS,

sparse herbs

VINES

None recorded

Description of Flora: See Site Description

Plant Species List: Little Creek Bottomlands (New)

CANOPY

Acer spp.

Carya ovata

Carya spp.

Fagus grandifolia Quercus bicolor

Quercus rubra

Quercus spp.

Ostyra virginiana

Ulmus spp.

HERBS

Aster divaricatus

Claytonia virginica Erythronium umbilicatum



Appendix D: USACE / DWQ Wetland and Stream Data Forms

USACE Wetland Determination Data Forms

USACI	Wetland Determination Data Forms
Map ID	NCWAM Classification
А	PF01/04
AA	PF01/EM
В	PF01/04
BB	PF01
BBB	PF01/EM
С	PF01/EM
СС	PF01
ccc	PEM
D	PF01/04/EM
DD	PF01
DDD	PF01
E	PF01
EE	PF01
F	PEM
FF	PF01/PEM
G	PFO1
GG	PF01
Н	PEM
ННН	PEM
ı	PFO1
III	PF01
J	PFO1
К	PFO1
N	PFO1
NNN	PEM
0	PFO1
000	PEM
Р	PFO1
Q	PFO1
R	PF01/04
S	PF01
Т	PSS1
TTT	PF01/04
U	PF01
UUU	PFO1
V	PF01
VV	PEM
VVV	PFO1
W	PF01/PEM
ww	PF01/EM
WWW	PFO1
XX	PFO1
Υ	PF01
YY	PEM
YYY	PFO1
Z	PF01
ZZ	PF01/EM
ZZZ	PF01

Project/Site: TTA Light Rail Transit	City/County: Durham		Sampling Date 06-04-13
Applicant/Owner: Triangle Transit		State: NC	Sampling Point: Wetland A - DP#
	Section, Township, Re		
Landform (hillslope, terrace, etc.): hillslope	Local relief (concave, con	vex, none): Concave	Slope (%):_ ~5
Subregion (LRR or MLRA) LRR P Lat: 35.97	5203 Lor	ng: -78.957812	Datum: NAD 83
Soil Map Unit Name: Mayodan sandy loam, 10 to 15% slopes		NWI classifi	
Are climatic / hydrologic conditions on the site typical for this tir			
Are Vegetation, Soil, or Hydrology sign			
Are Vegetation, Soil, or Hydrology natu			
SUMMARY OF FINDINGS – Attach site map sh			
The state of the s			o, important router oo, etci
Hydrophytic Vegetation Present? Yes X No		d Area	
Hydric Soil Present? Yes X No	WILLIII G WOLLD	nd? Yes X	No
Wetland Hydrology Present? Yes X No Remarks: DDM (Wetland A) is representation of a Wetland			
HYDROLOGY			
Wetland Hydrology Indicators:		Secondary Indic	ators (minimum of two required)
Primary Indicators (minimum of one is required; check all that		Surface Soi	' '
	quatic Plants (B14)		getated Concave Surface (B8)
	en Sulfide Odor (C1) d Rhizospheres on Living Roof	Drainage Pa ts (C3) Moss Trim L	
	ce of Reduced Iron (C4)		Water Table (C2)
	Iron Reduction in Tilled Soils (
	uck Surface (C7)		'isible on Aerial Imagery (C9)
Algal Mat or Crust (B4) Other (Explain in Remarks)	Stunted or S	Stressed Plants (D1)
Iron Deposits (B5)		Geomorphic	
Inundation Visible on Aerial Imagery (B7)		Shallow Aqu	
X Water-Stained Leaves (B9) Aquatic Fauna (B13)		Microtopogr FAC-Neutra	aphic Relief (D4)
Field Observations:		1 AC-1464116	11631 (00)
Surface Water Present? Yes No _x Depth	(inches):		
Water Table Present? Yes X No Depth			
Saturation Present? Yes X No Depth		etland Hydrology Prese	nt? Yes X No
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aeri	al photoe provious inspections	:) if available:	
ata (or oan gaage, memoring war, don	ar priotos, provioda mapocarone	y, ii aranabio.	
Remarks: Water-stained leaves and other indicators of surface v	ustan inflyance was absonied with	ain Watland A	
water-stained leaves and other indicators of surface v	vater influence were observed with	iii weliand A.	

	Absolute	Dominant		Dominance Test worksheet:
Tree Stratum (Plot size: 30')		Species?	<u>Status</u>	Number of Dominant Species
1 Acer rubrum	70	Yes	FAC	That Are OBL, FACW, or FAC: 3 (A)
2 Pinus taeda		Yes	FAC	Total Number of Dominant
3	-			Species Across All Strata:3 (B)
4,				Percent of Dominant Species
5,				That Are OBL, FACW, or FAC: 100 (A/B)
6				
7				Prevalence Index worksheet:
		= Total Cov	er	Total % Cover of Multiply by:
50% of total cover: 45 _	20% o	f total cover:	18	OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')				FACW species x 2 =
Carpinus caroliniana	35	Yes	FAC	FAC species x 3 =
2 Liquidambar styraciflua	15	No	FAC	FACU species x 4 =
2 Liquatrum ginanga	10	No	FACU	UPL species x 5 =
4 Ilex opaca	10	No	FACU	Column Totals:(A)(B)
= 111 1 .	10	No	FAC	
5. Ulmus rubra	-			Prevalence Index = B/A =
6 Elaeagnus angustifolia	10	No	FACU	Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
8.,				X 2 - Dominance Test is >50%
9				3 - Prevalence Index is ≤3 0 ¹
	90	= Total Cov	er	4 - Morphological Adaptations ¹ (Provide supporting
50% of total cover: 45	20% ol	f total cover:	18	II .
Herb Stratum (Plot size 1.5 m)				data in Remarks of on a separate sheet)
1				Problematic Hydrophytic Vegetation ¹ (Explain)
2				
				¹Indicators of hydric soil and wetland hydrology must
3				be present, unless disturbed or problematic
4				Definitions of Four Vegetation Strata:
5				Tree - Woody plants, excluding vines, 3 in(7.6 cm) or
6	-		-	more in diameter at breast height (DBH), regardless of
7				height
8				Sapling/Shrub - Woody plants, excluding vines, less
9				than 3 in DBH and greater than or equal to 3.28 ft (1
10				m) tall
11				
		- Total Cau	or.	Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3 28 ft tall
50% of total cover;		= Total Cov fitotal cover		or size, and woody plants loss than 5 20 it tall
	20 /0 01	TOTAL COVOL		Woody vine - All woody vines greater than 3 28 ft in
Woody Vine Stratum (Plot size: 1 m)				height
1,			$\overline{}$	
2			_	
3,				
4				Hydrophytic
5				Vegetation
		= Total Cov	er	Present? Yes X No
50% of total cover:				
Remarks: (Include photo numbers here or on a separate				I.
postate postate postate in a more from a supplicate				
Hydrophytic vegetation identified within Wetland	A.			

Depth	Matrix			ox Feature	S		_	
(inches)	Color (moist)	_ %	Color (moist)	%	Type ¹	_Loc ²	Texture	Remarks
0-3	7.5 YR 4/3	100				_	SCL	
3-6	10 YR 5/4	100		-	_		Sand	
6-20	7.5 YR 5/1	70	2.5 YR 4/6	30	C	PL	CL	_
							_	
								_
						-	-	
			-				-	
	-			-	_	_	-	
T 0			5 1 11111			-	21	
	Concentration, D=Dep I Indicators:	oletion, RM	=Reduced Matrix, M	S=Masked	d Sand Gr	ains		PL=Pore Lining, M=Matrix licators for Problematic Hydric Soils ³ :
_ Histos			Dark Surfac	e (S7)				2 cm Muck (A10) (MLRA 147)
	Epipedon (A2)		Polyvalue B		ice (S8) (N	ILRA 147,		Coast Prairie Redox (A16)
Black l	Histic (A3)		Thin Dark S	urface (S9) (MLRA 1			(MLRA 147, 148)
	gen Sulfide (A4)		Loamy Gley		(F2)		_	Piedmont Floodplain Soils (F19)
	ed Layers (A5)		X Depleted Ma		-61			(MLRA 136, 147) Very Shallow Dark Surface (TF12)
	luck (A10) (LRR N) ed Below Dark Surfac	ce (A11)	Redox Dark Depleted Da				_	Other (Explain in Remarks)
	Dark Surface (A12)	(, , , ,	Redox Depr				_	(=-4
	Mucky Mineral (S1) (I	LRR N,	Iron-Mangar		es (F12) (LRR N,		
	RA 147, 148)		MLRA 13				31	
	Gleyed Matrix (S4) Redox (S5)		Umbric Surfa Piedmont FI					ndicators of hydrophytic vegetation and wetland hydrology must be present,
	ed Matrix (S6)		Red Parent I					unless disturbed or problematic
	Layer (if observed)	:					İ	
Туре: _								
Depth (i	nches):						Hydric S	oil Present? Yes X No
emarks:								
	Hydric soils in	dentified wit	thin Wetland A.					

Project/Site TTA Light Rail Transit	City/	County: Durham		Sampling Date: 7-31-13			
pplicant/Owner: Triangle Transit				Sampling Point Wetland AA - DP#			
vestigator(s): Brandon Phillips, CHMM	Sed						
andform (hillslope, terrace, etc.) _terrace	Local re	elief (concave, convex, nor	e): Concave	Slope (%):_0			
Subregion (LRR or MLRA):LRR P	Lat: 35.915304	Long: -79	0.001425	Datum: NAD 83			
oil Map Unit Name Chewacla loam,							
re climatic / hydrologic conditions on the							
Are Vegetation, Soil, or Hy							
Are Vegetation, Soil, or Hy							
SUMMARY OF FINDINGS – Att							
	Yes_X No	1					
	Yes X No	Is the Sampled Area	Van V	Na			
	Yes X No	within a Wetland?	Tes _A_	No			
HYDROLOGY Wetland Hydrology Indicators:			Secondary Indica	stors (minimum of two required).			
Primary Indicators (minimum of one is re	equired check all that apply?		Surface Soil	the state of the s			
Surface Water (A1)	True Aquatic Plants			getated Concave Surface (B8)			
X High Water Table (A2)	Hydrogen Sulfide O		Drainage Patterns (B10)				
X Saturation (A3)		res on Living Roots (C3)	Moss Trim L				
X Water Marks (B1)	Presence of Reduce		Dry-Season	Water Table (C2)			
Sediment Deposits (B2)		on in Tilled Soils (C6)	Crayfish Bur				
Drift Deposits (B3)	Thin Muck Surface (isible on Aerial Imagery (C9)			
Algal Mat or Crust (B4) Iron Deposits (B5)	Other (Explain in Re	emarks)		tressed Plants (D1) Position (D2)			
Inundation Visible on Aerial Imagery	(B7)		Shallow Aqu				
Water-Stained Leaves (B9)	()		Microtopogra				
Aquatic Fauna (B13)			FAC-Neutral				
ield Observations:							
Surface Water Present? Yes				- 1			
	No Depth (inches): 2						
Saturation Present? Yes X Includes capillary fringe)	No Depth (inches): 0	Wetland H	ydrology Preser	nt? Yes X No			
Describe Recorded Data (stream gauge,	monitoring well, aerial photos, pr	evious inspections), if avai	lable:				
Remarks							
	indicators of surface water influence	were observed within Wetla	nd AA.				

		ant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 30')	<u>% Cover</u> Specie		Number of Dominant Species That Are OBL, FACW, or FAC:1 (A)
23			Total Number of Dominant Species Across All Strata:1 (B)
4 5			Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)
6			Prevalence Index worksheet:
7			
	= Total C		Total % Cover of: Multiply by:
50% of total cover:	20% of total cov	/er:	OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10'			FACW species x 2 =
1,			FAC species x 3 =
2			FACU species x 4 =
3			UPL species x 5 =
4			Column Totals: (A) (B)
5			Prevalence Index = B/A =
6			Hydrophytic Vegetation Indicators:
7			1 - Rapid Test for Hydrophytic Vegetation
8			X 2 - Dominance Test is >50%
9			3 - Prevalence Index is ≤3 0 ¹
	= Total C		4 - Morphological Adaptations ¹ (Provide supporting
50% of total cover:	20% of total cov	/er:	data in Remarks or on a separate sheet)
Herb Stratum (Plot size: 1.5 m)			Problematic Hydrophytic Vegetation¹ (Explain)
Saururus cernuus	60 Yes	OBL	1 Toblematic Hydrophytic Vegetation (Explain)
2 Carex sp.	10 No	<u></u>	1 malicators of budging call and wetland budgelogg rough
3. Lonicera japonica	10No	FAC	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
4 Juncus effusus	10No	FACW	Definitions of Four Vegetation Strata:
5			
6			Tree – Woody plants, excluding vines, 3 in (7 6 cm) or more in diameter at breast height (DBH), regardless of
7			height.
8			
9			Sapling/Shrub – Woody plants, excluding vines, less than 3 in, DBH and greater than or equal to 3,28 ft (1
10			m) tall.
11			Herb - All herbaceous (non-woody) plants, regardless
	90 = Total C	Cover	of size, and woody plants less than 3.28 ft tall
50% of total cover: 45			
Woody Vine Stratum (Plot size:1 m)		7	Woody vine – All woody vines greater than 3.28 ft in height.
1			neight
2			
3			
4			
			Hydrophytic Vegetation
5	= Total C	Covor	Present? Yes X No
50% of total cover:			
Remarks: (Include photo numbers here or on a separate s	sneet)		
Hydrophytic vegetation identified within Wetland	AA. A variable indicate	or rating "V" is	for the unidentified species.
Data point taken in emergent portion of wetland.			

nches)	Color (moist) 10 YR 6/1	<u>%</u> <u>85</u>	Color (moist) 7.5 YR 4/6	15	Type ¹ C	Loc² PL	Texture Clay	Remarks
3-20	10 18 0/1		7.5 18 4/0				Clay	1
		_			_			4
		_						-
		_		_		_		-
		_		_				-
		-		-			_	n European Shretana
		etion, RM=	Reduced Matrix, M	S=Masked	Sand Gra	ins.		L=Pore Lining, M=Matrix ators for Problematic Hydric Soils ³ :
ydric Soil Indi				(0.7)				·
_ Histosol (A1			Dark Surfac		- (00) (84	L DA 447		cm Muck (A10) (MLRA 147)
_ Histic Epipe			Polyvalue B				148) (Coast Prairie Redox (A16)
_ Black Histic _ Hydrogen Si			Thin Dark S Loamy Gley		-	47, 148)		(MLRA 147, 148) Piedmont Floodplain Soils (F19)
Trydrogen Si Stratified La			X Depleted Ma		- 2)			(MLRA 136, 147)
_ 2 cm Muck (Redox Dark		3)		\	/ery Shallow Dark Surface (TF12)
	low Dark Surface	(A11)	Depleted Da					Other (Explain in Remarks)
	Surface (A12)	,	X Redox Depr				_	,
	y Mineral (S1) (L	RR N,	Iron-Mangar	nese Masse	s (F12) (l	.RR N,		
MLRA 14	7, 148)		MLRA 13	36)				
	ed Matrix (S4)		Umbric Surf					licators of hydrophytic vegetation and
_ Sandy Redo			Piedmont FI					etland hydrology must be present,
Stripped Ma			Red Parent	Material (F2	(1) (MLR/	127, 147) un	less disturbed or problematic
estrictive Laye	er (if observed):							
Туре:								
Depth (inches	s):		_				Hydric Soil	Present? Yes X No
emarks:								
Hydric soil	l identified within V	Wetland AA						

Project/Site: TTA Light Rail Transit	City/County: Durha	m	Sampling Date: 06-04-13
Applicant/Owner: Triangle Transit			Sampling Point: Wetland B - DP#2
	Section, Township,		
Landform (hillslope, terrace, etc.) basin	Local relief (concave, o	convex, none): Concave	Slope (%) _0
Subregion (LRR or MLRA): LRR P Lat. 35.97			
Soil Map Unit Name White Store clay loam, 10 to 25% slope			
Are climatic / hydrologic conditions on the site typical for this ti			
Are Vegetation, Soil, or Hydrology sign			
Are Vegetation, Soil, or Hydrology nat			
SUMMARY OF FINDINGS – Attach site map st	lowing sampling poir	it locations, transects	s, important reatures, etc.
Hydrophytic Vegetation Present? Yes X No_	is the Samp	led Δrea	
Hydric Soil Present? Yes X No	within a We	tland? Yes_X_	No
Wetland Hydrology Present? Yes X No_			
LIVER OLOOV			
HYDROLOGY		Constant India	at the factories at the common at
Wetland Hydrology Indicators:	t		ators (minimum of two required)
Primary Indicators (minimum of one is required; check all that Surface Water (A1) True A	r appiv) quatic Plants (B14)		getated Concave Surface (B8)
	gen Sulfide Odor (C1)	Drainage Pa	
	ed Rhizospheres on Living R		
	ce of Reduced Iron (C4)		Water Table (C2)
	:Tron Reduction in Tilled Soi		
	uck Surface (C7)		isible on Aerial Imagery (C9)
	Explain in Remarks)		Stressed Plants (D1)
Iron Deposits (B5)		Geomorphic	
(nundation Visible on Aerial Imagery (B7) X Water-Stained Leaves (B9)		Shallow Aqu	
Aquatic Fauna (B13)		Microtopogr FAC-Neutra	aphic Relief (D4)
Field Observations:		1 7/0-140484	r rest (E/O)
Surface Water Present? Yes No _x _ Depth	(inches):		
Water Table Present? Yes No X Depth			
Saturation Present? Yes X No Depth		Wetland Hydrology Prese	nt? Yes_X No
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aer		and if available	
Describe Recorded Data (stream gauge, monitoring well, aer	iai priotos, previous irispecti	oris), il avallable	
Remarks:			
Water-stained leaves and other indicators of surface	water influence were observed	within Wetland B.	

	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 30'		Species?		Number of Dominant Species
Liquidambar styraciflua	40	Yes	FAC	That Are OBL, FACW, or FAC:
2 Pinus taeda	40	Yes	FAC	
3 Acer rubrum	20	Yes	FAC	Total Number of Dominant Species Across All Strata:4 (B)
7,				Species Across All Strata.
4				Percent of Dominant Species
5				That Are OBL, FACW, or FAC:(A/B)
6				Prevalence Index worksheet:
7,				Total % Cover of: Multiply by:
		= Total Cov		OBL species x 1 =
50% of total cover: <u>50</u>	20% of	total cover:		
Sapling/Shrub Stratum (Plot size: 10')				FACW species x 2 =
Carpinus caroliniana	35	Yes	FAC	FAC species x 3 =
2 Liquidambar styraciflua	15	No	FAC	FACU species x 4 =
3 Ligustrum sinense	10	No	FACU	UPL species x 5 =
4 Ilex opaca	10	No	FACU	Column Totals: (A) (B)
5. Ulmus rubra	10	No	FAC	
6 Elaeagnus angustifolia	10	No	FACU	Prevalence Index = B/A =
				Hydrophytic Vegetation Indicators:
7			_	1 - Rapid Test for Hydrophytic Vegetation
8				X 2 - Dominance Test is >50%
9			$\overline{}$	3 - Prevalence Index is ≤3.01
45		= Total Cov		4 - Morphological Adaptations (Provide supporting
50% of total cover: 45	20% of	total cover:	10	data in Remarks or on a separate sheet)
Herb Stratum (Plot size)				Problematic Hydrophytic Vegetation¹ (Explain)
1,				Toblematic Hydrophytic vegetation (Explain)
2				1
3				Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
4				
5				Definitions of Four Vegetation Strata:
				Tree - Woody plants, excluding vines, 3 in (7.6 cm) or
6				more in diameter at breast height (DBH), regardless of
7				height
8				Sapling/Shrub - Woody plants, excluding vines, less
9				than 3 in DBH and greater than or equal to 3 28 ft (1
10				m) tall_
11				Herb - All herbaceous (non-woody) plants, regardless
		= Total Cov		of size, and woody plants less than 3 28 ft tall
50% of total cover:	20% of	total cover:		
Woody Vine Stratum (Plot size 1 m				Woody vine - All woody vines greater than 3 28 ft in height.
1				noight.
2				
3				
4				Hydrophytic
5				Vegetation No. No.
		= Total Cov		Present? Yes X No
50% of total cover:	20% of	total cover:		
Remarks: (Include photo numbers here or on a separate s	sheet)			
Hydrophytic vegetation identified within Wetland	R			
riyotophyne vegetanon identified within wetland	ь.			

Depth	Matrix			ox Feature				
inches)	Color (moist)	%	Color (moist)	%	Type ¹	_Loc ²	Texture	Remarks
0-3	7.5 YR 4/3	100				_	SCL	-
3-6	10 YR 5/4	100		-			Sand	
6-20	7.5 YR 5/1	70	10 YR 5/4	30	C	PL	CL	
						_		
				-	-			-
Tuno: C=C	oncentration, D=Det	pletion DM	-Doducad Matrix M	S=Macka	M Cand Gra	inc	2 postion: D	 L=Pore Lining, M=Matrix
	Indicators:	plenon, ravi-	-neduced Mank, M	19-IAISPER	J Danu Gra	1115		ators for Problematic Hydric Soils ³ :
Histosof			Dark Surfac	e (S7)				cm Muck (A10) (MLRA 147)
Histic Ep	oipedon (A2)		Polyvalue B	elow Surfa				Coast Prairie Redox (A16)
Black Hi			Thin Dark S			47, 148)		(MLRA 147, 148)
	en Sulfide (A4)		Loamy Gley		F2)		— F	iedmont Floodplain Soils (F19)
	d Layers (A5) ick (A10) (LRR N)		X Depleted Ma		E6)		١,	(MLRA 136, 147) ery Shallow Dark Surface (TF12)
	d Below Dark Surfac	ce (A11)	Depleted Da					ther (Explain in Remarks)
	ark Surface (A12)		Redox Depr				_	, , ,
	/lucky Mineral (S1) (LRR N,	Iron-Mangar		es (F12) (L	.RR N,		
	A 147, 148)		MLRA 13		INAL ID A 400	. 400)	31	·
	Redox (S5)		Umbric Surfa Piedmont FI					icators of hydrophytic vegetation and that the standard standard standard standard from the standard s
								less disturbed or problematic
	Matrix (S6)		Red Parent I	Marshal (i				
Stripped		;	Red Parent	ividional (i	, .			
_ Stripped	Matrix (S6)			viatorial (i				
Stripped Restrictive L Type	l Matrix (S6) Layer (if observed)			widtomar (i			Hydric Soil	Present? Yes X No
Stripped Restrictive L Type	Matrix (S6) Layer (if observed)			viatoriai (i				Present? Yes <u>X</u> No
Stripped Restrictive L Type Depth (ind	Matrix (S6) Layer (if observed)			viatoriai (i				Present? Yes X No
Stripped Restrictive L Type Depth (index emarks:	Matrix (S6) Layer (if observed)		=	waterran (i				Present? Yes X No
Stripped estrictive L Type Depth (indemarks:	Matrix (S6) Layer (if observed) ches)		=	viatoriai (i				Present? Yes <u>X</u> No
Stripped lestrictive L Type Depth (ind emarks:	Matrix (S6) Layer (if observed) ches)		=	vatoria (i				Present? Yes <u>X</u> No
Stripped restrictive L Type Depth (indemarks:	Matrix (S6) Layer (if observed) ches)		=	vatoriai (i				Present? Yes <u>X</u> No
Stripped restrictive L Type Depth (indemarks:	Matrix (S6) Layer (if observed) ches)		=	vatoriai (i				Present? Yes <u>X</u> No
Stripped restrictive L Type Depth (indemarks:	Matrix (S6) Layer (if observed) ches)		=	vatoriai (i				Present? Yes <u>X</u> No
Stripped lestrictive L Type Depth (ind emarks:	Matrix (S6) Layer (if observed) ches)		=	vatoriai (i				Present? Yes <u>X</u> No
Stripped lestrictive L Type Depth (ind emarks:	Matrix (S6) Layer (if observed) ches)		=	vatoriai (i				Present? Yes <u>X</u> No
Stripped lestrictive L Type Depth (ind emarks:	Matrix (S6) Layer (if observed) ches)		=	vatoriai (i				Present? Yes <u>X</u> No
Stripped restrictive L Type Depth (indemarks:	Matrix (S6) Layer (if observed) ches)		=	vatoriai (i				Present? Yes <u>X</u> No
Stripped restrictive L Type Depth (indemarks:	Matrix (S6) Layer (if observed) ches)		=	vatoriai (i				Present? Yes X No
Stripped lestrictive L Type Depth (ind emarks:	Matrix (S6) Layer (if observed) ches)		=	vatoriai (i				Present? Yes X No
Stripped Restrictive L Type Depth (index emarks:	Matrix (S6) Layer (if observed) ches)		=	varona (i				Present? Yes <u>X</u> No
Stripped lestrictive L Type Depth (ind emarks:	Matrix (S6) Layer (if observed) ches)		=	varona (i				Present? Yes <u>X</u> No
Stripped lestrictive L Type Depth (ind emarks:	Matrix (S6) Layer (if observed) ches)		=	varona (i				Present? Yes <u>X</u> No
Stripped lestrictive L Type Depth (ind emarks:	Matrix (S6) Layer (if observed) ches)		=	varona (i				Present? Yes X No
_ Stripped estrictive L Type Depth (indemarks:	Matrix (S6) Layer (if observed) ches)		=	waterran (i				Present? Yes X No
_ Stripped estrictive L Type Depth (indemarks:	Matrix (S6) Layer (if observed) ches)		=	varona (i				Present? Yes X No No

Project/Site: TTA Light Rail Transit	City/County:	Ourham	Sampling Date:				
Applicant/Owner: Triangle Transit			Sampling Point: Wetland BB - DP#				
	Section, Towns						
_andform (hillslope, terrace, etc.)terrace							
	Lat: <u>35.914080</u>						
Soil Map Unit Name: Chewacla loam, 0 to							
Are climatic / hydrologic conditions on the sit							
Are Vegetation, Soil, or Hydr							
Are Vegetation, Soil, or Hydr							
SUMMARY OF FINDINGS – Attac	h site map showing sampling p	oint locations, transec	ts, important features, etc.				
Hydrophytic Vegetation Present? Y	es X No le the S						
	is trie s	ampled Area	No				
Wetland Hydrology Present? Y	101011111	Wetland? Yes X	No				
Remarks: DP#41 (Wetland BB) is rep	resentative of a Wetland. See Approximate W	aters of the U.S Boundary map Ex	thibit for Location of DP#41				
HYDROLOGY							
Wetland Hydrology Indicators:		Secondary Indi	cators (minimum of two required)				
Primary Indicators (minimum of one is requ	ired: check all that apply)	Surface So					
Surface Water (A1)	True Aquatic Plants (B14)		/egetated Concave Surface (B8)				
X High Water Table (A2)	Hydrogen Sulfide Odor (C1)		ninage Patterns (B10)				
X Saturation (A3)	Oxidized Rhizospheres on Livi	ng Roots (C3) Moss Trim	Lines (B16)				
X Water Marks (BT)	Presence of Reduced Iron (C4)) Dry-Seaso	n Water Table (C2)				
Sediment Deposits (B2)	Recent Iron Reduction in Tilled		urrows (C8)				
Drift Deposits (B3)	Thin Muck Surface (C7)		Visible on Aerial Imagery (C9)				
Algal Mat or Crust (B4)	Other (Explain in Remarks)		Stressed Plants (D1)				
Iron Deposits (B5)	37)		ic Position (D2)				
Inundation Visible on Aerial Imagery (E X Water-Stained Leaves (B9)	31)		quitard (D3) graphic Relief (D4)				
Aquatic Fauna (B13)			ral Test (D5)				
Field Observations:		1710-110411	ar rest (50)				
Surface Water Present? Yes	No. x Denth (inches):						
	No Depth (inches): 3"						
	No Depth (inches): 0"	Wetland Hydrology Pres	ent? Yes X No				
(includes capillary fringe)							
Describe Recorded Data (stream gauge, m	onitoring well, aerial photos, previous insp	pections), if available:					
Remarks							
	dicators of surface water influence were obser	ved within Wetland BB.					

	Absolute	Dominant		Dominance Test worksheet:
Tree Stratum (Plot size: 30')		Species?	Status	Number of Dominant Species
Platanus occidentalis	60	Yes	FACW	That Are OBL, FACW, or FAC: (A)
2 Acer rubrum 3	40	Yes	FAC	Total Number of Dominant Species Across All Strata:3 (B)
5			_	Percent of Dominant Species That Are OBL, FACW, or FAC:
6				Prevalence Index worksheet:
7,				Total % Cover of: Multiply by:
FOR of total access 50		= Total Cove		OBL species x 1 =
50% of total cover: 50	20% 01	total cover.	20	FACW species x 2 =
Sapling/Shrub Stratum (Plot size: 10')				FAC species x 3 =
1				FACU species x 4 =
2				UPL species x 5 =
3				Column Totals: (A) (B)
4				Column rotals(A)(B)
5				Prevalence Index = B/A =
6				Hydrophytic Vegetation Indicators:
7,				1 - Rapid Test for Hydrophytic Vegetation
8				X 2 - Dominance Test is >50%
9				3 - Prevalence Index is ≤3 0 ¹
		= Total Cove		4 - Morphological Adaptations (Provide supporting
50% of total cover:	20% of	total cover:_		data in Remarks or on a separate sheet)
Herb Stratum (Plot size1.5 m)				Problematic Hydrophytic Vegetation (Explain)
1 Microstegium vimineum	80	Yes	FAC	Froblematic Hydrophytic Vegetation (Explain)
2 Juncus effusus	10	No	FACW	The disease of headrings if an about the delegation and the
3 Lonicera japonica	10	No	FAC	Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
4				Definitions of Four Vegetation Strata:
5,				_
6				Tree – Woody plants, excluding vines, 3 in (7.6 cm) or
7				more in diameter at breast height (DBH), regardless of height
8				
9				Sapling/Shrub - Woody plants, excluding vines, less than 3 in DBH and greater than or equal to 3 28 ft (1
10				m) tall
11				Hart All harbons of the same hard to the
		Total Cove	r	Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3,28 ft tail.
50% of total cover:40				
Woody Vine Stratum (Plot size: 1 m)				Woody vine - All woody vines greater than 3 28 ft in height
1				
2		_	_	
3			-	
4				Hydrophytic
5		$\overline{}$	-	Vegetation
F0W 41 11		Total Cove		Present? Yes X No
50% of total cover:		total cover:_	-	
Remarks: (Include photo numbers here or on a separate si	heet)			
Hydrophytic vegetation identified within Wetland B	В.			
				1.74

Depth (inches)	Matrix Color (moist)	%	Redox Color (moist)	Features %	Type ¹	Loc ²	Texture		Domorto	
			7.5 YR 4/6			PL			Remarks	
0-20	10 YR 7/1	85	7.5 TK 4/0	15	C		Clay			
		. — .		_						
-										
		السند								
				_		_				
	-					_				
	ncentration, D=Dep	letion, RM=F	Reduced Matrix, MS	=Masked	Sand Gra	ains.		L=Pore Lining		
dric Soil I	ndicators:						Indic	ators for Prob	lematic Hydri	c Soils ³ :
_ Histosol			Dark Surface					cm Muck (A10		
	ipedon (A2)		Polyvalue Bei				148) (Coast Prairie R		
_ Black His	atic (A3) n Sulfide (A4)		Thin Dark Sui			47, 148)	r	(MLRA 147,		O)
	Layers (A5)		Loamy Gleye X Depleted Mat		- 2)		<u> </u>	Piedmont Flood (MLRA 136,		9)
	ck (A10) (LRR N)		Redox Dark 9		3)		\	ery Shallow D		F12)
	Below Dark Surfac	e (A11)	Depleted Dar					Other (Explain i		,
	rk Surface (A12)		X Redox Depre		,					
	ucky Mineral (S1) (L	_RR N,	Iron-Mangane		s (F12) (I	_RR N,				
	147, 148)		MLRA 136		41 DA 40	2 420)	31	dia atau an at la cala		4: I
_SandyG _SandyR	leyed Matrix (S4)		Umbric Surface Piedmont Flo					dicators of hydr etland hydrolog		
	Matrix (S6)		Red Parent N					iless disturbed		
	ayer (if observed):			,	, ,	,	i e			
Type:			_							
Depth (inc	hes):						Hydric Soi	IPresent?	es_X	No
emarks:										
Hydric	soil identified within	Wetland BB.								
			•							

oject/Site: TTA Light Rail Tran	ISIT	City/Co	unty: Durham		Sampling Date: 12-09-13
plicant/OwnerTriangle Transit					Sampling Point: Wetland BBB -
estigator(s): Brandon Phillips,	, CHMM	Section			
ndform (hillslope, terrace, etc.)	terrace	Local relief	(concave, convex, nor	ne): Concave	Slope (%): 0
bregion (LRR or MLRA): LRF					Datum: NAD 83
il Map Unit Name Chewac					eation: PFO1/EM
e climatic / hydrologic condition:	s on the site typical f	for this time of year? Yes			
					present? Yes X No
Vegetation, Soil					
					, important features, etc.
	- Attach site ii	nap snowing samp	ing point locatio	nis, transects	, important reatures, etc.
ydrophytic Vegetation Present'		No	s the Sampled Area		
ydric Soil Present?		No \ \	vithin a Wetland?	Yes X	No
/etland Hydrology Present?	Yes X	No			
DROLOGY etland Hydrology Indicators				Secondary Indica	tors (minimum of two required)
imary Indicators (minimum of o	one is required, chec	k all that apply)		Surface Soil	Cracks (B6)
Surface Water (A1)		True Aquatic Plants (B1			getated Concave Surface (B8)
_ High Water Table (A2)	_	Hydrogen Sulfide Odor		Drainage Pal	tterns (B10)
_ Saturation (A3)	_	Oxidized Rhizospheres		Moss Trim Li	
Water Marks (B1)		Presence of Reduced In			Water Table (C2)
Sediment Deposits (B2) Drift Deposits (B3)	_	Recent Iron Reduction i Thin Muck Surface (C7)		Crayfish Burn	ows (C8) sible on Aerial Imagery (C9)
_ Algal Mat or Crust (B4)		Other (Explain in Rema			tressed Plants (D1)
_ Iron Deposits (B5)	anama	(=,	,	Geomorphic	
_ Inundation Visible on Aerial I	Imagery (B7)			Shallow Aqui	tard (D3)
Water-Stained Leaves (B9)				Microtopogra	
Aquatic Fauna (B13)				FAC-Neutral	Test (D5)
eld Observations: rface Water Present? Y	/ac No. v	Denth (inches):			
			-		
			Wetland H	lvdrology Presen	nt? Yes X No
cludes capillary fringe)					
ater Table Present? Y aturation Present? Y noludes capillary fringe)	/es_X No /es_X No	Depth (inches): 2" Depth (inches): 0" well, aerial photos, previo			nt? Yes <u>X</u> No

	Absolute			Dominance Test worksheet:
Tree Stratum (Plot size: 30')				Number of Dominant Species That Are OBL, FACW, or FAC: (A)
3				Total Number of Dominant Species Across All Strata: 1 (B)
4				Percent of Dominant Species That Are OBL, FACW, or FAC:
6			_	Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
50% of total cover:		= Total Cove		OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')	20% 01	total cover.	_	FACW species x 2 =
				FAC species x 3 =
1				FACU species x 4 =
2				UPL species x 5 =
3				Column Totals: (A) (B
5				
				Prevalence Index = B/A =
				Hydrophytic Vegetation Indicators:
3				1 - Rapid Test for Hydrophytic Vegetation
				X 2 - Dominance Test is >50%
)		= Total Cove	r	3 - Prevalence Index is ≤3 0¹
50% of total cover.				4 - Morphological Adaptations (Provide supporting
Herb Stratum (Plot size: 1.5 m				data in Remarks or on a separate sheet)
Campunus campuna	60	Yes	OBL	Problematic Hydrophytic Vegetation¹ (Explain)
Carex sp.	10	No	v	
Lonicera japonica	10	No		¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
1,				Definitions of Four Vegetation Strata:
5				Tree - Woody plants, excluding vines, 3 in (7.6 cm)
5 ₃				more in diameter at breast height (DBH), regardless of height
3				
				Sapling/Shrub - Woody plants, excluding vines, less than 3 in DBH and greater than or equal to 3 28 ft (1
0				m) tall
1		-		Mank All bank are see County or sky aloute and an area
		= Total Cove	r	Herb — All herbaceous (non-woody) plants, regardles of size, and woody plants less than 3.28 ft tall.
50% of total cover: 40	20% of	total cover:_	16	
Voody Vine Stratum (Plot size: 1 m)				Woody vine – All woody vines greater than 3 28 ft in height.
<u> </u>			_	
2				
3			_	1
				Hydrophytic
N		T	_	Vegetation Present? Yes X No
50% of total cover:		= Total Cove total cover		Present? Yes X No
Remarks: (Include photo numbers here or on a separate				
Hydrophytic vegetation identified within Wetland		ble indicator r	ating "V" i	is for the unidentified species.
Data point taken in emergent portion of wetland.			5	•

Depth (inches)	Matrix Color (moist)	%		Features	Type ¹	Loc ²	Taytur		Domor	140
	Color (moist)		Color (moist) 7.5 YR 4/6			PL	Textur	<u> </u>	Remar	na .
0-20	10 YR 6/1	85	7.5 IK 4/0	15	C	PL	Clay	_		
							_	_		
							-			
								_		
							_			
		-								
	-			-	_		-			
				_		_	_			
	ncentration D=Dep	letion, RM=Red	uced Matrix, MS	=Masked :	Sand Grai	ns.			ining, M=Mat	
lydric Soil I										: Hydric Soils
_ Histosol			_ Dark Surface						k (A10) (MLR	
	ipedon (A2)	_	_ Polyvalue Bel				148) _		irie Redox (A	.16)
Black His		_	_ Thin Dark Su			17, 148)			147, 148)	-: (540)
	n Sulfide (A4) Layers (A5)		_ Loamy Gleye		2)		_		Floodplain So 136, 147)	olis (F.19)
	ck (A10) (LRR N)		_ Depleted Mat _ Redox Dark S		83				low Dark Surf	face (TE12)
	Below Dark Surface		_ Redox Dark c _ Depleted Dari						olain in Rema	
	rk Surface (A12)		Redox Depre				_	001 (2.4)	ordin in redina	
_	ucky Mineral (S1) (L		_ Iron-Mangane			RR N,				
	147, 148)		MLRA 136		. , ,	,				
	leyed Matrix (S4)		_ Umbric Surfac							vegetation and
Sandy R		_	_ Piedmont Flo						drology must l	
_ Stripped			_ Red Parent M	laterial (F2	1) (MLRA	127, 147	7)	unless distu	urbed or probl	lematic
	ayer (if observed):									
Туре:		-					1			
Depth (inc	hes):						Hydric	Soil Present	? Yes <u>X</u>	No
emarks:							-			
Hydric	soil identified within	Wetland BBB.								

Applicant/Owner Triangle Transit Applicant Triangle Transporce Applicant Triangle Transporce Applicant Triangle Transporce Applicant Triangle	Project/Site: TTA Light Rail Transit	City/County: Durham		Sampling Date 06-04-13			
Section, Township, Renge Section, Township,	Applicant/Owner: Triangle Transit						
Submap Care	Investigator(s): Brandon Phillips, CHMM	Section, Township, Rang	je;				
Are climate / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.) Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No (If needed, explain any answers in Remarks.) SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc. Hydrophytic Vegetation Fresent? Yes X No (If needed, explain any answers in Remarks.) SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc. Hydrophytic Vegetation Fresent? Yes X No (If needed, explain any answers in Remarks.) Femalis: DP#3 (Wetland C) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#3 Wetland Hydrology Present? Yes X No (If needed, explain any answers in Remarks.) Firmary Indicators (If needed, explain any answers in Remarks.) Hydrophytic Vegetation Fresent? Yes X No (If needed, explain any answers in Remarks.) DP#3 (Wetland C) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#3 Wetland Hydrology Indicators: Secondary Indicators (Innimum of two required) Surface Water (A1)	Landform (hillslope, terrace, etc.) <u>terrace</u>	Local relief (concave, conve	x, none): Concave	Slope (%):_ 0			
Are climate / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.) Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No (If needed, explain any answers in Remarks.) SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc. Hydrophytic Vegetation Fresent? Yes X No (If needed, explain any answers in Remarks.) SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc. Hydrophytic Vegetation Fresent? Yes X No (If needed, explain any answers in Remarks.) Femalis: DP#3 (Wetland C) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#3 Wetland Hydrology Present? Yes X No (If needed, explain any answers in Remarks.) Firmary Indicators (If needed, explain any answers in Remarks.) Hydrophytic Vegetation Fresent? Yes X No (If needed, explain any answers in Remarks.) DP#3 (Wetland C) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#3 Wetland Hydrology Indicators: Secondary Indicators (Innimum of two required) Surface Water (A1)	Subregion (LRR or MLRA): LRR P Lat. 35.975	5664 Long:	-78.957633	Datum: NAD 83			
Are Vegetation	Soil Map Unit Name: Mayodan sandy loam, 10 to 15% slopes		NWI classit	fication: PF01/EM			
Sollor Hydrologynaturally 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?	Are climatic / hydrologic conditions on the site typical for this tin	ne of year? Yes <u>X</u> No	(If no, explain in	Remarks)			
Sollor Hydrologynaturally 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?	Are Vegetation, Soil, or Hydrology sign	ificantly disturbed? Are "N	ormal Circumstances'	present? Yes X No			
Hydrophytic Vegetation Present? Hydric Soil Present? Yes X No Wetland Hydrology Present? Yes X No No Wetland? Wetland Hydrology Present? Yes X No							
Hydric Soil Present? Wetland Hydrology Present? Wetland C) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#3 HYDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) Surface Water (A1) High Water Table (A2) Saturation (A3) Vater Marks (B1) Secondary Indicators (minimum of two required) X Saturation (Day) X Saturation (Day) X Saturation Present? Secondary Indicators (minimum of two required) Drainage Patterns (B10) X Water Marks (B1) Presence of Reduced Iron (C4) Drainage Patterns (B16) Drift Deposits (B3) Drift Deposits (B3) Other (Explain in Remarks) Stunted or Stressed Plants (D1) Fron Deposits (B5) In Inundation Visible on Aerial Imagery (B7) Aquatic Fauna (Bats) Filed Observations: Surface Water Present? Ves No Depth (inches): Saturation Present? Ves No Depth (inches): Saturation Present? Ves No Depth (inches): Surface water (Pas No Carpain (C4) Wetland Hydrology Present? Pas No Carpain (C6) Wetland Hydrology Present? Pas No Car	SUMMARY OF FINDINGS – Attach site map sh	owing sampling point lo	cations, transect	s, important features, etc.			
Hydric Soil Present? Wetland Hydrology Present? Wetland C) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#3 HYDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) Surface Water (A1) High Water Table (A2) Saturation (A3) Vater Marks (B1) Secondary Indicators (minimum of two required) X Saturation (Day) X Saturation (Day) X Saturation Present? Secondary Indicators (minimum of two required) Drainage Patterns (B10) X Water Marks (B1) Presence of Reduced Iron (C4) Drainage Patterns (B16) Drift Deposits (B3) Drift Deposits (B3) Other (Explain in Remarks) Stunted or Stressed Plants (D1) Fron Deposits (B5) In Inundation Visible on Aerial Imagery (B7) Aquatic Fauna (Bats) Filed Observations: Surface Water Present? Ves No Depth (inches): Saturation Present? Ves No Depth (inches): Saturation Present? Ves No Depth (inches): Surface water (Pas No Carpain (C4) Wetland Hydrology Present? Pas No Carpain (C6) Wetland Hydrology Present? Pas No Car	Hydrophytic Vegetation Present? Yes X No	In the Committed to					
Wetland Hydrology Present? Yes X No		is the Sampled A		No			
HYDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one is required, check all that apply) Surface Water (A1) High Water Table (A2) Hydrogen Sulfide Odor (C1) Saturation (A3) Vater Marks (B1) Presence of Reduced Iron (C4) Diy-Season Water Table (C2) Sediment Deposits (B3) Thin Muck Surface (C7) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B7) Water-Stained Leaves (B9) Aquatic Fauna (B13) Eight Observations: Surface Water Table (Pesent? Yes No X Depth (inches): (Includes capillary fringe) Wetland Hydrology Present? Yes X No Depth (inches): (Includes capillary fringe) Secondary Indicators (minimum of two required) Surfaces (B6) Surface Water (A1) Sparsely Vegetated Concave Surface (B8) Sparsely Vegetated Concave Surface (B14) Sparsely Vegetated Conca			100,11				
Primary Indicators (minimum of one is required; check all that apply) Surface Water (A1) High Water Table (A2) High Water Table (A2) 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) Field Observations: Surface Water (A1) Surface Water (A1) True Aquatic Plants (B14) Drift Deposits (B2) Recent Iron Reduction in Tilled Soils (C6) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief (D4) FAC-Neutral Test (D5) Field Observations: Surface Water Present? Yes No X Depth (inches): Saturation Present? Yes X No Depth (inches): Getting the Aquatic Hydrology Present? Yes X No (Inches): Water Table Present? Yes X No (Inches): Saturation Present? Yes X No (Inches): Saturation Present? Yes X No (Inches): Surface Water Prince Water Present? Yes X No (Inches): Saturation Present? Yes X No (Inches): Surface Water Present? Yes X No (Inches): Saturation Present? Yes X No (Inches): Surface Water Present? Yes X No (Inches): Saturation Present? Yes X No (Inches): Surface Water Packet Advance (C1) Surface Vater T	HYDROLOGY	_					
Surface Water (A1)	Wetland Hydrology Indicators:		Secondary India	cators (minimum of two required)			
High Water Table (A2) Hydrogen Sulfide Odor (C1) Drainage Patterns (B10) Water Marks (B1) Presence of Reduced Iron (C4) 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) Field Observations: Surface Water Present? Yes No X Depth (inches): Saturation (C1) Drainage Patterns (B10) Moss Trim Lines (B16) Moss Trim Lines (B16) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Saturation Visible on Aerial Imagery (C9) Shallow Aquitard on (C1) Field Observations: Surface Water Present? Yes No X Depth (inches): Saturation Present? Yes No Depth (inches): Saturation Present? Yes X No Depth (inches): Ordinage Patterns (B10) Moss Trim Lines (B10) Moss Trim Lines (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Saturation Present? Yes X No Depth (inches): Ordinates Capillary fringe)	Primary Indicators (minimum of one is required; check all that	apply)	Surface So	il Cracks (B6)			
X Saturation (A3)	Surface Water (A1) True Ac	quatic Plants (B14)	Sparsely V	egetated Concave Surface (B8)			
X Water Marks (B1) Presence of Reduced Iron (C4) Dry-Season Water Table (C2) Sediment Deposits (B2) Recent Iron Reduction in Tilled Soils (C6) Crayfish Burrows (C8) Drift Deposits (B3) Thin Muck Surface (C7) Saturation Visible on Aerial Imagery (C9) Algal Mat or Crust (B4) Other (Explain in Remarks) Stunted or Stressed Plants (D1) Find Deposits (B5) Geomorphic Position (D2) Inundation Visible on Aerial Imagery (B7) Shallow Aquitard (D3) X Water-Stained Leaves (B9) Microtopographic Relief (D4) Aquatic Fauna (B13) FAC-Neutral Test (D5) Field Observations: Water Table Present? Yes No X Depth (inches): Saturation Present? Yes No Depth (inches): Guides capillary fringe) Wetland Hydrology Present? Yes X No Includes capillary fringe)							
Sediment Deposits (B2)							
Drift Deposits (B3)							
Algal Mat or Crust (B4)Other (Explain in Remarks)Stunted or Stressed Plants (D1) Iron Deposits (B5) Geomorphic Position (D2) Inundation Visible on Aerial Imagery (B7) Shallow Aquitard (D3) X							
Iron Deposits (B5) Geomorphic Position (D2) Inundation Visible on Aerial Imagery (B7) Shallow Aquitard (D3) X_ Water-Stained Leaves (B9) Aquatic Fauna (B13) FAC-Neutral Test (D5) Field Observations: Surface Water Present? Yes No _X Depth (inches): Water Table Present? Yes No _X Depth (inches): Water Table Present? Yes No Depth (inches): Wetland Hydrology Present? Yes X No Output (includes capillary fringe)							
Inundation Visible on Aerial Imagery (B7) X Water-Stained Leaves (B9) Aquatic Fauna (B13) Field Observations: Surface Water Present? Yes No X Depth (inches): Water Table Present? Yes No X Depth (inches): Saturation Present? Yes X No Depth (inches): 0" Wetland Hydrology Present? Yes X No (Inches): 0"	~	Explain in (Contacks)					
X Water-Stained Leaves (B9) Microtopographic Relief (D4) Aquatic Fauna (B13) FAC-Neutral Test (D5) Field Observations: Surface Water Present? Yes NoX Depth (inches): Water Table Present? Yes No Depth (inches): Wetland Hydrology Present? YesX No (includes capillary fringe)							
Field Observations: Surface Water Present? Yes No X Depth (inches):							
Surface Water Present? Yes No X Depth (inches): Water Table Present? Yes No X Depth (inches): Saturation Present? Yes X No Depth (inches): 0" Wetland Hydrology Present? Yes X No (includes capillary fringe)	Aquatic Fauna (B13)		FAC-Neutra	al Test (D5)			
Water Table Present? Yes No X Depth (inches): Saturation Present? Yes X No Depth (inches): 0" Wetland Hydrology Present? Yes X No (includes capillary fringe)							
Saturation Present? Yes X No Depth (inches): 0" Wetland Hydrology Present? Yes X No (includes capillary fringe)							
(includes capillary fringe)							
	Saturation Present? Yes A No Depth (includes capillary frince)	(inches): 0" Wetla	and Hydrology Prese	ent? Yes X No			
		al photos, previous inspections).	if available.				
		vater influence were observed within	Wetland C.				
Water-stained leaves and other indicators of surface water influence were observed within Wetland C.							

Tree Stratum (Plot size30')	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species
Platanus occidentalis	40	Yes	FAC	That Are OBL, FACW, or FAC
2. Pinus taeda	25	Yes	FAC	Tatal bloods on at Dansin and
3 Acer rubrum		No	FAC	Total Number of Dominant Species Across All Strata: 7 (B)
4				
5				Percent of Dominant Species That Are OBL, FACW, or FAC: 86 (A/B)
6				THALTHOUGH, THOW, OF THE.
7				Prevalence Index worksheet:
-		= Total Cov	er	Total % Cover of: Multiply by:
50% of total cover: <u>40</u>	20% of	total cover:	16	OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')				FACW species x 2 =
1 Alnus serrulata	75	Yes	OBL	FAC species x 3 =
2 Quercus phellos	15	No	FAC	FACU species x 4 =
3				UPL species x 5 =
				Column Totals: (A) (B)
4			_	
5				Prevalence Index = B/A =
6,				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
8	-			X 2 - Dominance Test is >50%
9	. —			3 - Prevalence Index is ≤3 0 ¹
		= Total Cove		4 - Morphological Adaptations (Provide supporting
50% of total cover: 45	20% of	total cover.	18	data in Remarks or on a separate sheet)
Herb Stratum (Plot size 1.5 m)				Problematic Hydrophytic Vegetation¹ (Explain)
1 Ligustrum sinense	5	Yes	FACU	Problematic Hydrophytic vegetation (Explain)
2 Lonicera japonica	5	Yes	FAC	1. C. bank of the tribunal and contained by the transfer
3 Smilax rotundifolia	5	Yes	FAC	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
4 Toxicodendron radicans	5	Yes	FAC	Definitions of Four Vegetation Strata:
5				Definitions of Four Vegetation Strata.
6				Tree - Woody plants, excluding vines, 3 in. (7.6 cm) or
7				more in diameter at breast height (DBH), regardless of height
8				noght
				Sapling/Shrub – Woody plants, excluding vines, less
9				than 3 in DBH and greater than or equal to 3 28 ft (1 m) tall
10		_		my ten
1	20			Herb - All herbaceous (non-woody) plants, regardless
F20% of both 100		= Total Cove		of size, and woody plants less than 3 28 ft tall
50% of total cover: _10	20% of	total cover:	-4	Woody vine - All woody vines greater than 3.28 ft in
Woody Vine Stratum (Plot size: 1 m)				height
1				
2				
3	-			
4				Hydrophytic
5				Vegetation
		= Total Cove	∍r	Present? Yes X No
50% of total cover:	20% of	total cover.		
Remarks: (Include photo numbers here or on a separate	sheet,)			
Hydrophytic vegetation identified within Wetland	C.			

	cription: (Describe t	to the depth i				or confirm	n the abs	sence of Indic	ators.)	
Depth (inches)	Matrix Color (moist)	%	Redo Color (moist)	x Features %	Type1	Loc ²	Textu	IF O	Remarks	
			Color (Illoist)	/0				<u> 116 </u>	Remarks	
0-20	7.5 YR 3/2	100					CL	_		
							_			
						_	-			
						$\overline{}$	-			
							-			
				-			-			
							_			
	oncentration, D=Depl	etion, RM=Re	duced Matrix, MS	S=Masked	Sand Gra	ins			ining, M=Matrix	
Hydric Soil								Indicators for	Problematic Hydric	Soils ³ :
Histosol			Dark Surface						k (A10) (MLRA 147)	
	oipedon (A2)	-	Polyvalue Be				148)		irie Redox (A16)	
	istic (A3)		Thin Dark Su			47, 148)			147, 148)	
	en Sulfide (A4)		Loamy Gleye		(2)				Floodplain Soils (F19)
	d Layers (A5) ick (A10) (LRR N)		X Depleted Mal Redox Dark		31				136, 147) Iow Dark Surface (TF	10)
	d Below Dark Surface		Redux Dark : Depleted Dar						olain in Remarks)	12)
	ark Surface (A12)		Depleted Dal Redox Depre					Other (LA	Jiaili III Remarks)	
	/lucky Mineral (S1) (L		Tron-Mangan			RR N.				
	A 147, 148)		MLRA 130		⊃ (r 12) (=					
	Bleyed Matrix (S4)		Umbric Surfa		/ILRA 136	5, 122)		³ Indicators o	f hydrophytic vegetati	on and
	Redox (S5)		Piedmont Flo				8)		drology must be prese	
Stripped	Matrix (S6)		Red Parent N					unless distr	urbed or problematic	
Restrictive l	Layer (if observed):									
Type										
Depth (inc	ches):						Hydrid	c Soil Present	? Yes <u>X</u> No	0
Remarks;							1			
Hyd	dric soil identified with	in Wetland C.								

Project/Site TTA Light Rail Transit	City/	County: Durham		Sampling Date: 11-05-13
Applicant/Owner Triangle Transit			State: NC	Sampling Point: Wetland CC - DP#
nvestigator(s): Brandon Phillips, CHMI	M Sec			
_andform (hillslope, terrace, etc.) <u>terra</u>				
	Lat: _35.906439			
Soil Map Unit Name: Chewacla loam				
Are climatic / hydrologic conditions on th				
Are Vegetation, Soil, or I				*
Are Vegetation, Soil, or I				
SUMMARY OF FINDINGS – At	tach site map showing sa	inpling point location	ons, transects	, important reatures, etc.
Hydrophytic Vegetation Present?	Yes X No	Is the Sampled Area		
Hydric Soil Present?	Yes X No	within a Wetland?	Yes X	No
Wetland Hydrology Present?	Yes X No			
HYDROLOGY				
Wetland Hydrology Indicators:			Secondary Indica	tore (minimum of two required)
Primary Indicators (minimum of one is	required check all that annly)		Surface Soil	tors (minimum of two required) Cracks (B6)
Surface Water (A1)	True Aquatic Plants			getated Concave Surface (B8)
High Water Table (A2)	Hydrogen Sulfide O		Drainage Pal	
Saturation (A3)		res on Living Roots (C3)	Moss Trim Li	
X Water Marks (B1)	Presence of Reduce	d Iron (C4)	Dry-Season 1	Water Table (C2)
Sediment Deposits (B2)		on in Tilled Soils (C6)	Crayfish Buri	
Drift Deposits (B3)	Thin Muck Surface (sible on Aerial Imagery (C9)
Algal Mat or Crust (B4) Iron Deposits (B5)	Other (Explain in Re	marks)		ressed Plants (D1)
Inundation Visible on Aerial Image	rv (B7)		Geomorphic Shallow Aqui	
X Water-Stained Leaves (B9)	<i>y</i> (01)			phic Relief (D4)
Aquatic Fauna (B13)			FAC-Neutral	
Field Observations:				
	No_x Depth (inches)			
	No X Depth (inches):			
Saturation Present? Yes (includes capillary fringe)	No X Depth (inches):	Wetland H	Hydrology Presen	t? Yes_X No
Describe Recorded Data (stream gauge	e, monitoring well, aerial photos, pr	evious inspections), if ava	ilable	
Remarks: Water-stained leaves and other	er indicators of surface water influence	were observed within Wetla	and CC.	

	Absolute Dominant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 30')	% Cover Species? Status	Number of Dominant Species
1 Fraxinus pennsylvanica	45 Yes FACW	That Are OBL, FACW, or FAC:3 (A)
2 Acer rubrum	40 37 74.0	Total Number of Dominant
3. Ulmus americana	15 No FACW	Species Across All Strata:5(B)
4		
		Percent of Dominant Species
5		That Are OBL, FACW, or FAC: 60 (A/B)
6		Prevalence Index worksheet:
7		Total % Cover of: Multiply by:
	= Total Cover	
50% of total cover: 50	20% of total cover20	OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')		FACW species x 2 =
Ligustrum sinense	15 Yes FACU	FAC species x 3 =
2		FACU species x 4 =
		UPL species x 5 =
3		Column Totals: (A) (B)
4		Column Fotals. (7)
5		Prevalence Index = B/A =
6		Hydrophytic Vegetation Indicators:
7		
8		1 - Rapid Test for Hydrophytic Vegetation
9		X 2 - Dominance Test is >50%
9		3 - Prevalence Index is ≤3 0¹
F00/ -f-1-1 75	1000100101	4 - Morphological Adaptations (Provide supporting
	20% of total cover:3	data in Remarks or on a separate sheet)
Herb Stratum (Plot size: 1.5 m)		Problematic Hydrophytic Vegetation ¹ (Explain)
1_Lonicera japonica	10 Yes FAC	i Tobiomatic Hydrophytic Vogotation (Explain)
2 Carex sp.		1
3		¹Indicators of hydric soil and wetland hydrology must
		be present, unless disturbed or problematic
4		Definitions of Four Vegetation Strata:
5		Tree - Woody plants, excluding vines, 3 in. (7.6 cm) or
6		more in diameter at breast height (DBH), regardless of
7		height
8		ContinuiOharda M/contrallente evalualinguines land
9		Sapling/Shrub - Woody plants, excluding vines, less than 3 in DBH and greater than or equal to 3 28 ft (1
		m) tall
10		117, 6311
11		Herb - All herbaceous (non-woody) plants, regardless
	20 = Total Cover	of size, and woody plants less than 3.28 ft tall
50% of total cover:10_	20% of total cover:4	Woody vine - All woody vines greater than 3.28 ft in
Woody Vine Stratum (Plot size: 1 m)		height
1		
2		
3		
4		Hydrophytic
5		Vegetation
	= Total Cover	Present? Yes X No
50% of total cover:	20% of total cover:	
Remarks: (Include photo numbers here or on a separate s	heet)	j.
Hydrophytic vegetation identified within Wetland C	CC. A variable indicator rating "V" is	for the unidentified species.
	_	

Histic Epipedon (A2) Polyvalue Below Surface (S8) (MLRA 147, 148) Coast Pr Black Histic (A3) Thin Dark Surface (S9) (MLRA 147, 148) (MLRA Hydrogen Sulfide (A4) Loamy Gleyed Matrix (F2) Piedmon Stratified Layers (A5) X Depleted Matrix (F3) (MLRA 2 cm Muck (A10) (LRR N) Redox Dark Surface (F6) Very Sha Depleted Below Dark Surface (A11) Depleted Dark Surface (F7) Other (E: X Redox Depressions (F8) Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) Iron-Manganese Masses (F12) (LRR N, MLRA 136) Sandy Gleyed Matrix (S4) Umbric Surface (F13) (MLRA 136, 122) Indicators Sandy Redox (S5) Piedmont Floodplain Soils (F19) (MLRA 148) wetland hy Restrictive Layer (if observed): Type:	Remarks
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains Location: PL=Pore	
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains **Location: PL=Pore	
Histosol (A1)	
Histosol (A1)	
ydric Soil Indicators: Histosol (A1) Dark Surface (S7) Polyvalue Below Surface (S8) (MLRA 147, 148) Black Histic (A3) Thin Dark Surface (S9) (MLRA 147, 148) Hydrogen Sulfide (A4) Stratified Layers (A5) Z Depleted Matrix (F2) Peleted Matrix (F3) Depleted Below Dark Surface (A11) Depleted Dark Surface (F6) Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) Sandy Gleyed Matrix (S4) Sandy Gleyed Matrix (S4) Sandy Redox (S5) Sandy Redox (S5) Barrictive Layer (if observed): Type: Depth (inches): Hydric Soil Preserved Indicators (A12) Polyvalue Below Surface (S9) (MLRA 147, 148) Loamy Gleyed Matrix (F2) Piedmont Floodplain Soils (F19) (MLRA 148) Wetland hy Unless discontinued in the server of	
Histosol (A1)	
Type: Depth (inches): Hydric Soil Preser emarks:	ck (A10) (MLRA 147) airie Redox (A16) a 147, 148) Floodplain Soils (F19) a 136, 147) Ilow Dark Surface (TF12) plain in Remarks) of hydrophytic vegetation and drology must be present, urbed or problematic
emarks:	
emarks:	t? Yes_X No

Project/Site: TTA Light Rail Transit	City/County Durham		Sampling Date 12-09-13
Applicant/Owner Triangle Transit			Sampling Point: Wetland CCC - DP#
nvestigator(s): Brandon Phillips, CHMM	Section, Township, Range:		
Landform (hillslope, terrace, etc.) terrace			
IDDD	it: <u>35.913820</u> Leng: <u>-7</u>		Datum; NAD 83
Soil Map Unit Name Chewacla loam, 0 to 2% slope			
Are climatic / hydrologic conditions on the site typical			
Are Vegetation, Soil, or Hydrology			, and the second
Are Vegetation, Soil, or Hydrology			
SUMMARY OF FINDINGS – Attach site r	nap snowing sampling point location	ons, transects	s, important features, etc.
Hydrophytic Vegetation Present? Yes X	No le the Semulad Area		
	Is the Sampled Area within a Wetland?	Yes X	No
Wetland Hydrology Present? Yes X	No	100	
HYDROLOGY			
Wetland Hydrology Indicators:		Secondary Indica	ators (minimum of two required)
Primary Indicators (minimum of one is required, ched	ck all that apply)	Surface Soil	
Surface Water (A1)	True Aquatic Plants (B14)		getated Concave Surface (B8)
X High Water Table (A2)	. Hydrogen Sulfide Odor (C1)	Drainage Pa	
X Saturation (A3)	Oxidized Rhizospheres on Living Roots (C3)	Moss Trim L	
X Water Marks (B1)	Presence of Reduced Iron (C4)		Water Table (C2)
Sediment Deposits (B2) Drift Deposits (B3)	, Recent Iron Reduction in Tilled Soils (C6)	Crayfish Bur	
	, Thin Muck Surface (C7) , Other (Explain in Remarks)		isible on Aerial Imagery (C9) tressed Plants (D1)
Iron Deposits (B5)	outor (Explain III Tomarko)		Position (D2)
Inundation Visible on Aerial Imagery (B7)		Shallow Aqu	
X Water-Stained Leaves (B9)		Microtopogra	aphic Relief (D4)
Aquatic Fauna (B13)		FAC-Neutral	Test (D5)
Field Observations:	Frankli Co. L. V		
Surface Water Present? Yes No_X Water Table Present? Yes X No	Depth (inches): Depth (inches):2"		
		-hidrology Broson	nt? Yes X No
(includes capillary fringe)		•	it? Fes A No
Describe Recorded Data (stream gauge, monitoring	well, aeri al ph otos, previous in spections), if ava	ailable	
Remarks:			
Water-stained leaves and other indicators of	surface water influence were observed within Wetla	and CCC.	

	Absolute Dominant Inc	
Tree Stratum (Plot size: 30')		That Are OBL, FACW, or FAC: (A)
3		Species Across All Strata: 1 (B)
5		That Are OBL, FACW, or FAC: 100 (A/B)
6		Prevalence Index worksheet:
7		Total % Cover of Multiply by:
50% of total cover:	= Total Cover	
Sapling/Shrub Stratum (Plot size:10')	20 % of total cover	FACW species x 2 =
1		540
2		
3		——————————————————————————————————————
4		
5		Trevalence maex - DrA -
6		
7		- I - I/abid i est ioi i ival oblivite vedetation
8		X 2 - Dominance Test is >50%
9		3 - Prevalence Index is ≤3 0 ¹
	= Total Cover	4 - Morphological Adaptations (Provide supporting
50% of total cover:	20% of total cover:	data in Remarks or on a separate sheet)
Herb Stratum (Plot size: 1.5 m)	(0)	Problematic Hudrophytic Vegetation (Explain)
Saururus cernuus		OBE
2 Carex sp.		V 1 Indicators of hydric soil and wetland hydrology must
3 Lonicera japonica		be present, unless disturbed or problematic
4		Bettititiette et i eat regetation et ata,
5		The Mark whether evaluation with a 2 in (7 C and an
6		Tree – Woody plants, excluding vines, 3 in (7.6 cm) or more in diameter at breast height (DBH), regardless of
7		height
8		Sapling/Shrub - Woody plants, excluding vines, less
9		than 3 in DBH and greater than or equal to 3 28 ft (1
10		
11		Herb - All herbaceous (non-woody) plants, regardless
	= Total Cover	of size, and woody plants less than 3 28 ft tall
50% of total cover:40_	20% of total cover:	16 Weach, when All woods with an area for them 2.29 ft in
Woody Vine Stratum (Plot size: 1 m)		Woody vine - All woody vines greater than 3 28 ft in height.
1		
2		
3		
4		I bule selvate
5		Hydrophytic Vegetation
	= Total Cover	Present? Yes X No
50% of total cover:		
Remarks: (Include photo numbers here or on a separate sh		
Hydrophytic vegetation identified within Wetland Co	CC. A variable indicator rati	ing "V" is for the unidentified species.

0-20	Color (moist) 10 YR 6/1		7.5 YR 4/6		C C	PL	Texture Clay	Ren	narks
0-20	10 YR 6/1		7.5 YR 4/6			PL_	Clay	-	
		==				_		-	
								-	
								-	
100									
						_			
						_			
Tuna C-Can	controtion D-Dani	ation DMAD	hinad Matelia MC	- Maakad C	Can d Crai		21 continue DI	-Dava Lining Mah	A metalica
Hydric Soil Ind	centration, D=Depl	etion, Rivi-Ret	idced Matrix, MS	=iviasked s	sand Grai	IIS.		.=Pore Lining, M=N tors for Problema	
Histosol (A			Dork Curtage	(07)					
Histosof (A Histic Epipe			Dark Surface Polyvalue Bel		(CO) /MI	DA 147		cm Muck (A10) (M l	•
Flack Histic		_	Polyvalue Bel Thin Dark Sur					oast Prairie Redox (MLRA 147, 148)	(A 10)
Black Filsuc Hydrogen S		_	Fillif Dark Sui Loamy Gleyei			1, 140)		edmont Floodplain	Soils (F19)
Stratified La		<u> </u>	Depleted Mat		<u>~</u> ;			(MLRA 136, 147)	00113 (1 10)
2 cm Muck			_ Redox Dark S)			ery Shallow Dark S	urface (TE12)
	elow Dark Surface		_ _ Depleted Darl					her (Explain in Rei	
Thick Dark			Redox Depres				_	, ,	,
Sandy Muc	ky Mineral (S1) (L l	RR N,	Iron-Mangane	ese Masses	(F12) (Li	RR N,			
MLRA 14	47, 148)		MLRA 136						
Sandy Gley	red Matrix (S4)	_	Umbric Surfac	ce (F13) (M	ILRA 136	, 122)	³Indi	cators of hydrophyt	ic vegetation and
Sandy Red		_	_ Piedmont Floo					land hydrology mu	
Stripped Ma	atrix (S6)	_	_ Red Parent M	laterial (F2	1) (MLRA	127, 147) unle	ess disturbed or pro	oblematic
Restrictive Lay	er (if observed):						1		
Туре:									
Depth (inche	es):						Hydric Soil I	Present? Yes	K No
Remarks:									
Hydric so	il identified within V	Vetland CCC.							
21) 2110 00.	,	, , , , , , , , , , , , , , , , , , , ,							

Project/Site: TTA Light Rail Transit	City/Cour	nty: Durham		Sampling Date 06-05-13
Applicant/Owner: Triangle Transit			State: NC	Sampling Point: Wetland D - DP#
		Township, Range:		
Landform (hillslope, terrace, etc.) terrace	Local relief (concave, convex, no	ne); Concave	Slope (%): 0
Subregion (LRR or MLRA): LRR P Lat: 35.				Datum: NAD 83
Soil Map Unit Name Chewacla loam, 0 to 2% slopes, frequency				ication: PF01/04/EM
Are climatic / hydrologic conditions on the site typical for this	stime of year? Yes	x No	(If no, explain in l	Remarks)
Are Vegetation, Soil, or Hydrologys				
Are Vegetation, Soil, or Hydrologyn				
SUMMARY OF FINDINGS – Attach site map				
		31		
Hydrophytic Vegetation Present? Yes X No	13	the Sampled Area		
Hydric Soil Present? Yes X No Wetland Hydrology Present? Yes X No		ithin a Wetland?	Yes X	No
DP#4 (Wetland D) is representative of a Wet				1
HYDROLOGY				
Wetland Hydrology Indicators:			Secondary India	ators (minimum of two required)
Primary Indicator's (minimum of one is required; check all the	hat apply)		Surface Soi	
	Aquatic Plants (B14	1)	Sparsely Ve	egetated Concave Surface (B8)
	ogen Sulfide Odor ('		Drainage Pa	atterns (B10)
		n Living Roots (C3)	Moss Trim I	
	ence of Reduced Iro			Water Table (C2)
	ent Iron Reduction in	Tilled Soils (C6)	Crayfish Bu	
	Muck Surface (C7)	· · · · ·		/isible on Aerial Imagery (C9)
Algal Mat or Crust (B4) Othe Iron Deposits (B5)	r (Explain in Remark	(5)	Geomorphic	Stressed Plants (D1)
Inon Deposits (B3) Inundation Visible on Aerial Imagery (B7)			Shallow Aqu	
X Water-Stained Leaves (B9)				raphic Relief (D4)
Aquatic Fauna (B13)			FAC-Neutra	The state of the s
Field Observations:				
Surface Water Present? Yes No _x _ Dep				
Water Table Present? Yes No X Dep				1
Saturation Present? Yes No X Dep (includes capillary fringe)	th (inches):	Wetland I	lydrology Prese	ent? Yes X No
Describe Recorded Data (stream gauge, monitoring well, a	erial photos, previou	ıs inspections), if ava	ilable:	
				4
Remarks: Water-stained leaves and other indicators of surfac	e water influence were	observed within Wetl	and D.	
				1

Tree Stratum (Plot size: 30')	FAC FACW IT	Number of Dominant Species That Are OBL, FACW, or FAC: Total Number of Dominant Species Across All Strata: Percent of Dominant Species That Are OBL, FACW, or FAC: Percent of Dominant Species That Are OBL, FACW, or FAC: Nultiply by: OBL species FACW species FACW species FACU species FACU species Column Totals (A) Prevalence Index = B/A = Hydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation X 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3 0¹ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation¹ (Explain) ¹Indicators of hydric soil and wetland hydrology must
Pinus taeda 30 Yes 30 Platanus occidentalis 20 Yes 30 Yes	FAC FACW 17 V OBL	Total Number of Dominant Species Across All Strata: 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 4 = UPL species X 5 = Column Totals (A) Prevalence Index = B/A = Hydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation X 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3 0¹ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation¹ (Explain) ¹Indicators of hydric soil and wetland hydrology must
Platanus occidentalis 20 Yes	FACW IT I	Percent of Dominant Species That Are OBL, FACW, or FAC: Total % Cover of: Multiply by: OBL species FACW species FACU species Y 4 = UPL species Column Totals Meltiply by: (A) (B) Prevalence Index worksheet: Total % Cover of: Multiply by: (B) (B) Multiply by: (B) (B) (B) (B) Meltiply by: (B) (B) (B) (B) (B) (B) (B) (B
4	To the second of	Percent of Dominant Species That Are OBL, FACW, or FAC: Total % Cover of: Multiply by: OBL species FACW species FACU species Y 4 = UPL species Column Totals Meltiply by: (A) Prevalence Index worksheet: Total % Cover of: Multiply by: Multiple by: Multiple by: Multiple by: Multiple by: Multiple by: Multiple by: Multi
5.	TOBL	Prevalence Index worksheet:
5.	TOBL	Prevalence Index worksheet:
Sapling/Shrub Stratum (Plot size: 10' 10' 20% of total cover: 42.5 20% of total cover: 20% of tota	TO TO THE TOTAL TO	Total % Cover of: Multiply by: OBL species
85	17	OBL species
Sapling/Shrub Stratum (Plot size: 10') 1	17	OBL species
Sapling/Shrub Stratum (Plot size: 10')	v OBL	FACW species x 2 =
1	v OBL	FAC species
2	v OBL	FACU species x 4 =
3	v OBL	UPL species x 5 =
4	v OBL	Column Totals (A) (B) Prevalence Index = B/A = Hydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation X 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3 0¹ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation¹ (Explain) ¹Indicators of hydric soil and wetland hydrology must
4	v OBL	Prevalence Index = B/A = Hydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation X 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3 0¹ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation¹ (Explain) ¹Indicators of hydric soil and wetland hydrology must
5	v OBL	Hydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation X 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3 0¹ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation¹ (Explain) ¹Indicators of hydric soil and wetland hydrology must
6	v OBL	Hydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation X 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3 0¹ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation¹ (Explain) ¹Indicators of hydric soil and wetland hydrology must
7	V OBL	1 - Rapid Test for Hydrophytic Vegetation
8	V OBL	 X 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3 0¹ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation¹ (Explain) ¹Indicators of hydric soil and wetland hydrology must
9 = Total Cov	V OBL	3 - Prevalence Index is ≤3 0¹ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation¹ (Explain) ¹Indicators of hydric soil and wetland hydrology must
- Total Cov 20% of total cover: 20% of total cover: Herb Stratum (Plot size: 1.5 m) 60 Yes 2 Saururus cernuus 25 Yes 3 Festuca sp. 10 No 4 Boehmeria cylindrica 5 No	V OBL	4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation¹ (Explain) ¹Indicators of hydric soil and wetland hydrology must
Solve of total cover: 20% of total cover: Herb Stratum (Plot size: 1.5 m)	V OBL	data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation¹ (Explain) ¹Indicators of hydric soil and wetland hydrology must
Herb Stratum (Plot size: 1.5 m) 1 Carex sp. 60 Yes 2 Saururus cernuus 25 Yes 3 Festuca sp. 10 No 4 Boehmeria cylindrica 5 No	V OBL	Problematic Hydrophytic Vegetation ¹ (Explain) Indicators of hydric soil and wetland hydrology must
Carex sp. 60 Yes 2 Saururus cernuus 25 Yes 3 Festuca sp. 10 No 4 Boehmeria cylindrica 5 No	OBL	¹ Indicators of hydric soil and wetland hydrology must
2 Saururus cernuus 25 Yes 3 Festuca sp. 10 No 4 Boehmeria cylindrica 5 No	OBL	¹ Indicators of hydric soil and wetland hydrology must
3 Festuca sp. 10 No 4 Boehmeria cylindrica 5 No		¹ Indicators of hydric soil and wetland hydrology must
4 Boehmeria cylindrica 5 No		indicators of flydric soil and wetland flydrology flust
		be present, unless disturbed or problematic.
	FACW	Definitions of Four Vegetation Strata:
5		
6		Tree – Woody plants, excluding vines, 3 in (7.6 cm) or
7,		more in diameter at breast height (DBH), regardless of height
8		
9		Sapling/Shrub - Woody plants, excluding vines, less
		than 3 in DBH and greater than or equal to 3 28 ft (1 m) tall
10		ini) tan
11		Herb – All herbaceous (non-woody) plants, regardless
= Total Cov		of size, and woody plants less than 3 28 ft tall
50% of total cover: 20% of total cover:	20	Woody vine - All woody vines greater than 3 28 ft in
Woody Vine Stratum (Plot size: 1 m		height.
1		
2		
3		
4		
5		Hydrophytic
	_	Vegetation Present? Yes _X No
= Total Cove		Trouble Troubl
50% of total cover: 20% of total cover: Remarks: (Include photo numbers here or on a separate sheet.)	_	

3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	ix		< Features	Turn of	1.002	Taxaba	Damanla
ches) Color (moist		Color (moist)		Type ¹ .	Loc ²	Textı	
-20 7.5 YR 4/2		10 YR 5/8			PL	Clay	/
-			-			_	
						_	
							Ψ =
pe: C=Concentration, D=	Depletion, RM=Re	duced Matrix, MS	=Masked S	Sand Grai	ns		on: PL=Pore Lining, M=Matrix
dric Soil Indicators:		D 10 1	(0.7)				Indicators for Problematic Hydric Soils ³
Histosol (A1) Histic Epipedon (A2)	-	_ Dark Surface _ Polyvalue Bel		- (S8) (M I	RA 1/17		2 cm Muck (A10) (MLRA 147) Coast Prairie Redox (A16)
Black Histic (A3)	_	Folyvalue Bel Thin Dark Sul				.40)	(MLRA 147, 148)
Hydrogen Sulfide (A4)	-	Loamy Gleye	d Matrix (F				Piedmont Floodplain Soils (F19)
Stratified Layers (A5)		X Depleted Mat					(MLRA 136, 147)
2 cm Muck (A10) (LRR N Depleted Below Dark Su		_ Redox Dark 9 _ Depleted Dar					Very Shallow Dark Surface (TF12) Other (Explain in Remarks)
Thick Dark Surface (A12		Redox Depre					Other (Explain in Remarks)
Sandy Mucky Mineral (S		Iron-Mangane			RR N,		
MLRA 147, 148)		MLRA 136					3
Sandy Gleyed Matrix (S4 Sandy Redox (S5)	ł) –	Umbric Surface Piedmont Flo				D)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present,
Stripped Matrix (S6)		Red Parent M					unless disturbed or problematic
strictive Layer (if observ	ed):			, (
Туре							
Depth (inches):						Hydri	c Soil Present? Yes <u>X</u> No
marks:							
	in Wetland D.						
Hydric soil identified with							
Hydric soil identified with							
Hydric soil identified with							
Hydric soil identified with							
Hydric soil identified with							
Hydric soil identified with							
Hydric soil identified with							
Hydric soil identified with							
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Hydric soil identified with							
Hydric soil identified with							
Hydric soil identified with							
Hydric soil identified with							
Hydric soil identified with							

Project/SiteTTA Light Rail Transit	City/County:	Durham	Sampling Date: 06-05-13
Applicant/Owner: Triangle Transit			NC Sampling Point: Upland D - DP#4.
	Section, Towns		
Landform (hillslope, terrace, etc.): terrace			
Subregion (LRR or MLRA): LRR P Lat: 3	5.960118	Long: -78.962445	Datum: NAD 83
Soil Map Unit Name: White Store clay loam. 2 to 10% sl			
Are climatic / hydrologic conditions on the site typical for th			
Are Vegetation, Soil, or Hydrology			
Are Vegetation, Soil, or Hydrology			
SUMMARY OF FINDINGS – Attach site map			
SOMMAN OF FINDINGS - Attach site map	silowing sampling p	Joint locations, trai	nisects, important reatures, etc.
Hydrophytic Vegetation Present? Yes X	I IS III & S	ampled Area	
Hydric Soil Present? Yes I	No_X within a		es NoX
Wetland Hydrology Present? Yes Remarks:	No_X		
HYDROLOGY			
Wetland Hydrology Indicators:		Seconda	ary Indicators (minimum of two required)
Primary Indicators (minimum of one is required, check all	I that apply)	Surfa	ace Soil Cracks (B6)
Surface Water (A1) Tru	ue Aquatic Plants (B14)		rsely Vegetated Concave Surface (B8)
	drogen Sulfide Odor (C1)		nage Patterns (B10)
	idized Rhizospheres on Livi		s Trim Lines (B16)
	esence of Reduced Iron (C4		Season Water Table (C2)
	cent Iron Reduction in Tilled		/fish Burrows (C8)
	in Muck Surface (C7) ner (Explain in Remarks)		rration Visible on Aerial Imagery (C9) Ited or Stressed Plants (D1)
Algali Mat of Crust (B4)	rei (Expiaiii iii Reiliaiks)		morphic Position (D2)
Inundation Visible on Aerial Imagery (B7)			llow Aquitard (D3)
Water-Stained Leaves (B9)		Micro	otopographic Relief (D4)
Aquatic Fauna (B13)		FAC	-Neutral Test (D5)
Field Observations:			
Surface Water Present? Yes No X De			
Water Table Present? Yes No X De Saturation Present? Yes No X De		Watland Hydrology	y Present? Yes No_X
(includes capillary fringe)	spur (inches)	wettand Hydrology	y Present? YesNo_A
Describe Recorded Data (stream gauge, monitoring well,	aerial photos, previous insp	pections), if available	
Remarks:			
No indicators of hydrology were observed within	upland D.		

	Absolute	Dominant		Dominance Test worksheet:	
Tree Stratum (Plot size:)	% Cover	Species?	<u>Statuş</u>	Number of Dominant Species	
1 Acer rubrum	40	Yes	FAC	That Are OBL, FACW, or FAC:	(A)
2. Pinus taeda	20	Yes	FAC	Total bloomban of Danis and	
3 Fraxinus americana	20	Yes	FACU	Total Number of Dominant Species Across All Strata:	8 (B)
*				Species Across Air Strata.	(D)
4			$\overline{}$	Percent of Dominant Species	
5				That Are OBL, FACW, or FAC:	75 (A/B
6				December 1 december 1	
7				Prevalence Index worksheet:	
		= Total Cov	er	Total % Cover of:	
50% of total cover: <u>40</u>	20% of	f total cover	16	OBL species x 1	=
Sapling/Shrub Stratum (Plot size: 10')				FACW species x 2	<u>></u> =
1 Asimina triloba	40	Yes	FAC	FAC species x 3	
2 Betula nigra	25	Yes	FACW	FACU species x 4	
·		Tes	FACW		
3				UPL species x 5	
4				Column Totals (A)	(B)
5				Day of the Bulk State	
6				Prevalence Index = B/A =	
				Hydrophytic Vegetation Indicat	ors:
7				1 - Rapid Test for Hydrophyti	c Vegetation
8		_		X 2 - Dominance Test is >50%	
9				3 - Prevalence Index is ≤3 0 ¹	
		= Total Cov	er	4 - Morphological Adaptation	
50% of total cover:32.5	20% of	total cover:	13		
Herb Stratum (Plot size: 1.5 m)				data in Remarks or on a s	,
1_Lonicera japonica	10	Yes	FAC	Problematic Hydrophytic Veg	etation¹ (Explain)
9 C: 1 4:5-1: -	10	Yes	FAC		
*			FACU	Indicators of hydric soil and wetla	and hydrology must
3 Gaultheria procumbens				be present, unless disturbed or pr	oblematic
4				Definitions of Four Vegetation	Strata:
5					
6,				Tree – Woody plants, excluding v	
7				more in diameter at breast height height	(DBH), regardless of
				Holgitt	
8				Sapling/Shrub - Woody plants, e	
9,				than 3 in DBH and greater than o	or equal to 3 28 ft (1
10,		_		m) tall	
11,				Herb - All herbaceous (non-wood	iv) plants, regardless
	25	= Total Cove	er	of size, and woody plants less that	
50% of total cover:12.5					
Woody Vine Stratum (Plot size: 1 m)				Woody vine – All woody vines gr height.	eater than 3 28 ft in
1				Height	
2		-			
3					
4				Hydrophytic	
5				Vegetation	
		= Total Cove	er	Present? Yes X	No
50% of total cover:					
Remarks: (Include photo numbers here or on a separate s				I.	
. come no. America busto unimpora trata of our disabilitate s	moot j				
Hydrophytic vegetation identified within Upland D).				

Depth (inches)	Matrix Color (moist) %	Redox Features Color (moist) % Type ¹ Loc ²	Texture Remarks
0-3	10 YR 4/3		Sandy loam Clay loam
3-8	7.5 YR 4/4		-
8-20	7.5 YR 4/3		Sandy clay loam
-			
ype: C=C	oncentration, D=Depletion, RN	/I=Reduced Matrix, MS=Masked Sand Grains	² Location: PL=Pore Lining, M=Matrix
ydric Soil	Indicators:		Indicators for Problematic Hydric Soils ³
_ Histosol		Dark Surface (S7)	2 cm Muck (A10) (MLRA 147)
	oipedon (A2)	Polyvalue Below Surface (S8) (MLRA 147,	
	istic (A3)	Thin Dark Surface (S9) (MLRA 147, 148)	(MLRA 147, 148)
	en Sulfide (A4) d Layers (A5)	Loamy Gleyed Matrix (F2)Depleted Matrix (F3)	Piedmont Floodplain Soils (F19) (MLRA 136, 147)
	ick (A10) (LRR N)	Redox Dark Surface (F6)	Very Shallow Dark Surface (TF12)
_	d Below Dark Surface (A11)	Depleted Dark Surface (F7)	Other (Explain in Remarks)
	ark Surface (A12)	Redox Depressions (F8)	
	Nucky Mineral (S1) (LRR N,	Iron-Manganese Masses (F12) (LRR N,	
	A 147, 148)	MLRA 136)	2
	Gleyed Matrix (S4)	Umbric Surface (F13) (MLRA 136, 122)	³ Indicators of hydrophytic vegetation and
Sandy R Stripped	Matrix (S6)	Piedmont Floodplain Soils (F19) (MLRA 14Red Parent Material (F21) (MLRA 127, 147	
	Layer (if observed):		amoss distarbod of problematic
	ches):		Hydric Soil Present? Yes No _X
emarks			
Hydric s	oil not identified within Upland	D.	

Project/Site TTA Light Rail T	ransit		City/C	Durham		Sampling Date:	11-05-13
Applicant/Owner Triangle Tra							
Investigator(s) Brandon Phill	ips, CHMM		Sectio				
Landform (hillslope, terrace, et	basin						e (%) 0
Subregion (LRR or MLRA)			t 35.907254				,
Soil Map Unit Name Cher	wacla loam, 0	to 2% slope	es, frequently flooded		NWI classifi	cation: PF01	
Are climatic / hydrologic condit							-
Are Vegetation, Soil							No
Are Vegetation, Soil							140
					•		
SUMMARY OF FINDIN	GS – Alla	ch site i	nap snowing sam	pling point locati	ions, transects	s, important re	atures, etc.
Hydrophytic Vegetation Prese	ent?	Yes_X_	_ No	Is the Sampled Area			
Hydric Soil Present?			No	within a Wetland?		No	
Wetland Hydrology Present?		Yes X	No				
LIVER OLD COV							
HYDROLOGY							
Wetland Hydrology Indicate Primary Indicators (minimum		miroel choo	all that apply			ators (minimum of t	wo required)
Surface Water (A1)	or one is req		.к ан шатарруу - True Aquatic Plants (Е		Surface Soil	r Cracks (Bb) egetated Concave S	urfaco (B8)
X High Water Table (A2)			Hydrogen Sulfide Odo			atterns (B10)	urrace (Do)
X Saturation (A3)			Oxidized Rhizosphere				1
X Water Marks (B1)		_	Presence of Reduced	ron (C4)	Dry-Season	Water Table (C2)	
Sediment Deposits (B2)			Recent Iron Reduction		Crayfish Bur		
Drift Deposits (B3)		_	Thin Muck Surface (C			isible on Aerial Ima	
Algal Mat or Crust (B4) Iron Deposits (B5)			Other (Explain in Rem	arks)		Stressed Plants (D1 : Position (D2))
Inundation Visible on Aer	nal Imagery (B7)			Shallow Aqu		
X Water-Stained Leaves (E						aphic Relief (D4)	
Aquatic Fauna (B13)					FAC-Neutra	l Test (D5)	
Field Observations:							
Surface Water Present? Water Table Present?			Depth (inches): 5"	- 1			
Saturation Present?			Depth (inches). 5	Wetland	Hydrology Press	nt? Yes X	No
(includes capillary fringe)						III. 169 <u>V</u>	140
Describe Recorded Data (stre	am gauge, n	nonitoring	well, aerial photos, prev	ous inspections), if av	ailable:		
Remarks.							
Water-stained leav	es and other in	ndicators of	surface water influence w	ere observed within Wet	land DD.		
							ļ,
							1

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

Sampling Point: Wetland DD - DP#18

Trans Chapture (District 20)	Absolute Dominant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 30')	% Cover Species? Status	Number of Dominant Species
1Betula nigra		That Are OBL, FACW, or FAC:3 (A)
2 Acer rubrum 3		Total Number of Dominant Species Across All Strata:3(B)
5		Percent of Dominant Species That Are ORL FACW or FAC 100 (A/R)
6		
7		Prevalence index worksheet:
	= Total Cover	
Control of the state of the sta	20% of total cover; 20	OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')		FACW species x 2 =
1		FAC species x 3 =
2		FACU species x 4 =
3		UPL species x 5 =
4		Column Totals: (A) (B)
5		Prevalence Index = B/A =
6		Hydrophytic Vegetation Indicators:
7		1 - Rapid Test for Hydrophytic Vegetation
8		X 2 - Dominance Test is >50%
9		3 - Prevalence Index is ≤3 0 ¹
	= Total Cover	4 - Morphological Adaptations (Provide supporting
50% of total cover:	20% of total cover:	data in Remarks of on a separate sheet)
Herb Stratum (Plot size: 1.5 m)	15 Yes FAC	Problematic Hydrophytic Vegetation ¹ (Explain)
Smilax rotundifolia	10 100	
2		¹Indicators of hydric soil and wetland hydrology must
3		be present, unless disturbed or problematic
4		Definitions of Four Vegetation Strata:
5		
6		Tree – Woody plants, excluding vines, 3 in (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8		
9,		Sapling/Shrub - Woody plants, excluding vines, less than 3 in DBH and greater than or equal to 3 28 ft (1
10,		m) tall
11,		Llaub. All hodbooccus (non use shi) nlaub.
50% of total cover: 7.5	15 = Total Cover	Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3 28 ft tall
	20% of total cover: 3	Woody vine - All woody vines greater than 3.28 ft in
Woody Vine Stratum (Plot size 1 m)		height
1		
2		
3		
4		Hydrophytic
5		Vegetation
50% of total cover:	= Total Cover 20% of total cover:	Present? Yes X No
Remarks: (Include photo numbers here or on a separate s	neet)	
Hydrophytic vegetation identified within Wetland I	DD.	

Depth	Matrix		Rede	ox Feature	S			
inches)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	
0-4	10 YR 4/2		7.5 YR 4/6	30	C	PL	SCL	Oxidized rhizospheres
4-9	2.5 Y 5/1	80	7.5 YR 4/6		C	PL	SCL	
9-20	10 YR 5/1	90	7.5 YR 4/4		C	PL	Clay	_
		_		_	_		_	
				=	=	_	-	
	Concentration, D=Dep	oletion, RM	=Reduced Matrix, M	S=Masked	Sand Gra	ains		: PL=Pore Lining, M=Matrix dicators for Problematic Hydric Solls ³ :
_ Histoso			Dark Surface	s (S7)				· · · · · · · · · · · · · · · · · · ·
	r(AT) pipedon (A2)		Dark Surface Polyvalue Be		ce (S8) (M	ILRA 147.		_ 2 cm Muck (A10) (MLRA 147) _ Coast Prairie Redox (A16)
_ Black H	istic (A3)		Thin Dark St	urface (S9)	(MLRA 1			(MLRA 147, 148)
	en Sulfide (A4)		Loamy Gley		F2)			Piedmont Floodplain Soils (F19)
	d Layers (A5) uck (A10) (LRR N)		X Depleted Ma		(6)			(MLRA 136, 147)
	dck (A10) (LKK N) d Below Dark Surfac	e (A11)	Redox Dark Depleted Da					Very Shallow Dark Surface (TF12) Other (Explain in Remarks)
	ark Surface (A12)	(/(1)	X Redox Depre				_	Other (Explain in Remarks)
	Mucky Mineral (S1) (I	LRR N,	Iron-Mangan	,	•	_RR N,		
	A 147, 148)		MLRA 13					
	Gleyed Matrix (S4)		Umbric Surfa					Indicators of hydrophytic vegetation and
	Redox (S5)		Piedmont Flo					wetland hydrology must be present,
	d Matrix (S6) Layer (if observed)		Red Parent N	Material (F	21) (MLR	4 127, 147)	unless disturbed or problematic
	Layer (II observed)							
			_				I budei a O	oil Brassetto Van V
emarks:	ches):		_				Hydric S	Soil Present? Yes X No
Hydric	soil identified within V	Vetland DD						

Parador Transit Parador Transit Section, Township, Range Parador Phillips, CHMM Section, Township, Range Parador Millslope, terrace, etc.) Lerre Lat 35.907254 Long 78.995358 Datum NAD 83 Map Unit Name Chewacia loam, 0 to 2% slopes, frequently flooded NPW1 classification NA Map Unit Name Chewacia loam, 0 to 2% slopes, frequently flooded NPW1 classification NA Map Unit Name Chewacia loam, 0 to 2% slopes, frequently flooded NPW1 classification NA Map Unit Name Chewacia loam, 0 to 2% slopes, frequently flooded NPW1 classification NA Map Unit Name Chewacia loam, 0 to 2% slopes, frequently flooded NPW1 classification NA Map Unit Name Chewacia loam, 0 to 2% slopes, frequently flooded NPW1 classification NA Map Unit Name Chewacia loam, 0 to 2% slopes, frequently flooded NPW1 classification NA Map Unit Name Chewacia loam, 0 to 2% slopes, frequently flooded NPW1 classification NA Map Unit Name Chewacia loam, 0 to 2% slopes, frequently flooded NPW1 classification NA Map Unit Name Chewacia loam, 0 to 2% slopes, frequently flooded NPW1 classification NA Map Unit Name Chewacia loam, 0 to 2% slopes, frequently flooded NPW1 classification NA Map Unit Name Chewacia loam, 0 to 2% slopes, frequently flooded NPW1 classification NA Map Unit Name Chewacia loam, 0 to 2% slopes, frequently flooded NPW1 classification NA Map Unit Name Chewacia loam, 0 to 2% slopes, frequently flooded NPW1 classification NA Map Unit Name Chewacia loam, 0 to 2% slopes, frequently flooded NPW1 classification NA Map Unit Name Chewacia loam, 0 to 2% slopes, frequently flooded NPW1 classification NA Map Unit Name Chewacia loam, 0 to 2% slopes, frequently flooded NPW1 classification NA Map Unit Name Chewacia loam, 0 to 2% slopes, frequently flooded NPW1 classification NA Map Unit Name Chewacia loam, 0 to 2% slopes, frequently flooded NPW1 classificati	roject/Site TTA Light Rail Transit		City/County: Durham		Sampling Date 07-30-13
Section, Township, Ranger Section Sectio	pplicant/Owner: Triangle Transit				
Control Cont	vestigator(s): Brandon Phillips, CHM	M			
Map Unit Name Chewacal Joam, 0 to 2% slopes, frequently flooded New Control Chewacal Joam, 0 to 2% slopes, frequently flooded New Control Chewacal Joam, 0 to 2% slopes, frequently flooded New Control Chewacal Joam, 0 to 2% slopes, frequently flooded New Control Chewacal Joam, 0 to 2% slopes, frequently flooded New Control Chewacal Joam, 0 to 2% slopes, frequently flooded New Control Chewacal Joan, 1 to 2% slopes, frequently flooded New Control Chewacal Joan, 1 to 2% slopes, frequently flooded New Control Chewacal Joan, 1 to 2% slopes, frequently flooded New Control Chewacal Joan, 1 to 2% slopes, frequently flooded New Control Chewacal Joan, 1 to 2% slopes, frequently flooded New Control Chewacal Joan, 1 to 2% slopes, frequently flooded New Control Chewacal Joan, 1 to 2% slopes, frequently fl	andform (hillslope, terrace, etc.) terra				
Map Unit Name Chewacia loam, 0 to 2% slopes, frequently flooded NWI classification NA					
collination / Inydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks) In Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No (If needed, explain any answers in Remarks.) UMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc. UMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc. Understand Pydrology Present? Yes No X					
Vegetation					
Soli					
Adjustic Proposition (Page 11) Surface Soil Cracks (Bis) Surface Water (All) Surface (Bis) Sur					
ydrophytic Vegetation Present? Yes No Within a Wetland? Yes No X Some of the U.S. Boundary map Exhibit for Location of DP#18A					
within a Wetland? Yes No X Yes No X Within a Wetland? Permarks DP#18A (Upland DD) is representative of an Upland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#18A DP#18A (Upland DD) is representative of an Upland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#18A DP#18A (Upland DD) is representative of an Upland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#18A DP#18A (Upland DD) is representative of an Upland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#18A DP#18A (Upland DD) is representative of an Upland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#18A DP#18A (Upland DD) is representative of an Upland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#18A DP#18A (Upland DD) is representative of an Upland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#18A DP#18A (Upland DD) is representative of an Upland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#18A DP#18A (Upland DD) is representative of an Upland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#18A DP#18A (Upland DD) is representative of an Upland. See Approximate Waters of the U.S Boundary Indicators (minimum of two required) Secondary Indicators (minimum of cree is required) Surface Water Table (A2) Surface Valer (A1) Sparsely Vogetated Concave Surface (B8) Approximation (C4) Drainage Patterns (B10) Surface Valer Present? Yes No X Depth (inches): Surface Valer Prese	UMMARY OF FINDINGS - A	ttach site map showing	sampling point locati	ons, transect	s, important features, etc.
within a Wetland? Yes No X Yes No X Within a Wetland? Permarks DP#18A (Upland DD) is representative of an Upland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#18A DP#18A (Upland DD) is representative of an Upland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#18A DP#18A (Upland DD) is representative of an Upland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#18A DP#18A (Upland DD) is representative of an Upland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#18A DP#18A (Upland DD) is representative of an Upland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#18A DP#18A (Upland DD) is representative of an Upland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#18A DP#18A (Upland DD) is representative of an Upland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#18A DP#18A (Upland DD) is representative of an Upland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#18A DP#18A (Upland DD) is representative of an Upland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#18A DP#18A (Upland DD) is representative of an Upland. See Approximate Waters of the U.S Boundary Indicators (minimum of two required) Secondary Indicators (minimum of cree is required) Surface Water Table (A2) Surface Valer (A1) Sparsely Vogetated Concave Surface (B8) Approximation (C4) Drainage Patterns (B10) Surface Valer Present? Yes No X Depth (inches): Surface Valer Prese	Hydrophytic Vegetation Present?	Yes X No			
Parallel Hydrology Present? Yes No X	lydric Soil Present?		·	Yes	No X
Company Comp	Vetland Hydrology Present?	YesNo_X	THOUSE A TOURS	100	
Secondary Indicators (minimum of one is required; check all that apply) Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Presence of Reduced Iron (C4) Drift Deposits (B3) Drift Deposits (B3) Iron Agual Mat or Crust (B4) Iron Deposits (B5) Iron Deposits (B6) Water-Stained Leaves (B9) Aquatic Fauna (B13) Edd Observations: Irrace Water Present? Yes No X Depth (inches): Satural photos, previous inspections), if available Secondary Indicators (minimum of two required) Surface Soil Cracks (B6) Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B8) Moss Trim Lines (B10) Moss Trim Lines (B16) Dry, Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief (D4) FAC-Neutral Test (D5) Edd Observations: Irrace Water Present? Yes No X Depth (inches): Saturation Present? Yes No X Depth (inches): Saturation Present? Yes No X Depth (inches): Secribe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available					
Secondary Indicators (minimum of one is required; check all that apply) Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Presence of Reduced Iron (C4) Drift Deposits (B3) Drift Deposits (B3) Iron Agual Mat or Crust (B4) Iron Deposits (B5) Iron Deposits (B6) Water-Stained Leaves (B9) Aquatic Fauna (B13) Edd Observations: Irrace Water Present? Yes No X Depth (inches): Satural photos, previous inspections), if available Secondary Indicators (minimum of two required) Surface Soil Cracks (B6) Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B8) Moss Trim Lines (B10) Moss Trim Lines (B16) Dry, Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Geomorphic Position (D2) Shallow Aquitard (D3) Microtopographic Relief (D4) FAC-Neutral Test (D5) Edd Observations: Irrace Water Present? Yes No X Depth (inches): Saturation Present? Yes No X Depth (inches): Saturation Present? Yes No X Depth (inches): Secribe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available					
Surface Soil Cracks (B6) Surface Water (A1) True Aquatic Plants (B14) Sparsely Vegetated Concave Surface (B8) High Water Table (A2) Hydrogen Sulfide Odor (C1) Drainage Patterns (B10) Saturation (A3) Oxidized Rhizospheres on Living Roots (C3) Moss Trim Lines (B16) Water Marks (B1) Presence of Reduced Iron (C4) Dry-Season Water Table (C2) Sediment Deposits (B2) Recent Iron Reduction in Tilled Soils (C6) Crayfish Burrows (C8) Drift Deposits (B3) Thin Muck Surface (C7) Saturation Visible on Aerial Imagery (C9) Algal Mat or Crust (B4) Other (Explain in Remarks) Stunted or Stressed Plants (D1) Iron Deposits (B5) Geomorphic Position (D2) Inundation Visible on Aerial Imagery (B7) Shallow Aquitard (C3) Water-Stained Leaves (B9) Aquatic Fauna (B13) FAC-Neutral Test (D5) eld Observations: urface Water Present? Yes No X Depth (inches): cater Table P	/DROLOGY				
Surface Water (A1)	/etland Hydrology Indicators:			Secondary India	ators (minimum of two required)
High Water Table (A2) Saturation (A3) Saturation (A3) South Marks (B1) Sediment Deposits (B2) Sediment Deposits (B3) Thin Muck Surface (C7) Algal Mat or Crust (B4) Inundation Visible on Aerial Imagery (B7) Water-Stained Leaves (B9) Aquatic Fauna (B13) Sediment Deposits (B3) Sediment Deposits (B3) Drift Deposits (B4) Second Iron Reduction in Tilled Soils (C6) Crayfish Burnows (C8) Crayfish Burnows (C8) Crayfish Burnows (C8) Saturation Visible on Aerial Imagery (C9) Saturation Visible on Aerial Imagery (C9) Shallow Aquitard (D1) Shallow Aquitard (D3) Microtopographic Relief (D4) FAC-Neutral Test (D5) FAC-Neutral Test (D5) Fater Table Present? Yes No X Depth (inches): Secribe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available		required; check all that apply)			
Saturation (A3)					
Water Marks (B1)					
Sediment Deposits (B2)					
Drift Deposits (B3)					
Algal Mat or Crust (B4)Other (Explain in Remarks)Stunted or Stressed Plants (D1)Iron Deposits (B5)Geomorphic Position (D2)					
Iron Deposits (B5) Geomorphic Position (D2)					
Water-Stained Leaves (B9) Microtopographic Relief (D4) Aquatic Fauna (B13) FAC-Neutral Test (D5) led Observations: urface Water Present? Yes No _X Depth (inches): laturation Present? Yes No _X Depth (inches): laturation Present? Yes No _X Depth (inches): leduces capillary fringe) escribe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available	_ Iron Deposits (B5)			Geomorphi	c Position (D2)
		ery (B7)			1
eld Observations: Urface Water Present? Yes No _X Depth (inches): Vater Table Present? Yes No _X Depth (inches): Baturation Present? Yes No _X Depth (inches): Wetland Hydrology Present? Yes No _X Depth (inches): Baturation Present? Yes No _X Depth (inches):					
urface Water Present? Yes No _X Depth (inches): fater Table Present? Yes No _X Depth (inches): aturation Present? Yes No _X Depth (inches): ucludes capillary fringe) escribe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available				FAC-Neutra	al Test (D5)
fater Table Present? Yes No X Depth (inches): aturation Present? Yes No X Depth (inches): wetland Hydrology Present? Yes No X cludes capillary fringe) escribe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available		Mar war 15 of 11 of 12 o			
aturation Present? Yes No X Depth (inches): Wetland Hydrology Present? Yes No X ncludes capillary fringe) escribe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available					
actudes capillary fringe) escribe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available				Lhudrala mu Braad	mt2 Vac Na Y
	rcludes capillary fringe)				ent? FesNo_X
emarks:	escribe Recorded Data (stream gaug	ge, monitoring well, aerial photos	s, previous inspections), if av	ailable	
	emarks:				
					(J)

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

Sampling Point: Upland DD - DP#18A

Number of Dominant Species That Are OBL, FACW, or FAC: Total Number of Dominant Species Across All Strata: Percent of Dominant Species That Are OBL, FACW, or FAC: Prevalence Index worksheet;
Total Number of Dominant Species Across All Strata: Percent of Dominant Species That Are OBL, FACW, or FAC: (A
Species Across All Strata: 5 (B Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A.)
Percent of Dominant Species That Are OBL, FACW, or FAC. (A
That Are OBL, FACW, or FAC. (A.
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)(E
(1)
Prevalence Index = B/A =
Hydrophytic Vegetation Indicators:
1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
3 - Prevalence Index is ≤3.01
4 - Morphological Adaptations1 (Provide support
data in Remarks or on a separate sheet)
Problematic Hydrophytic Vegetation¹ (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)
more in diameter at breast height (DBH), regardless
height
Sapling/Shrub - Woody plants, excluding vines, les
than 3 in, DBH and greater than or equal to 3 28 ft (1
m) tall
Herb - All herbaceous (non-woody) plants, regardles
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 X No No

Depth	Matrix			dox Feature		. 2		
(inches)	Color (moist)	%	Color (moist)	%	Type ¹	_Loc ²		
0-2	2.5 YR 3/3	100		_			Clay loam	
2-13	7.5 Y 5/6	80	5 YR 4/6		C	PL	SCL	
13-20	10 YR 5/3	33	7.5 YR 5/4	33	C	_M	SCL	
			7.5 YR 5/1	33	D	M		
					1	-	-	
	-					-		
T		-1-1-1 Fil I	B. Brooker	10.14			3 2. 2	_
type. C≃t tydric Soi	Concentration, D=De I Indicators:	epletion, RM	=Reduced Matrix, N	viS=Maskec	d Sand Gr	ains	² Location: PL=Pore Lining, M=Matrix Indicators for Problematic Hydric So	ile ³ ,
Histoso			Dark Surfac	ce (S7)			2 cm Muck (A10) (MLRA 147)	, ,
	Epipedon (A2)			Below Surfa	ce (S8) (N	ILRA 147		
	Histic (A3)		Thin Dark S	Surface (S9)	(MLRA		(MLRA 147, 148)	
	gen Sulfide (A4)			yed Matrix (I	F2)		Piedmont Floodplain Soils (F19)	
	ed Layers (A5) fuck (A10) (LRR N)		Depleted M		ren		(MLRA 136, 147)	
	ed Below Dark Surfa	ace (A11)	Redox Dark Depleted D	k Sunace (F ark Surface			Very Shallow Dark Surface (TF12)Other (Explain in Remarks)	
	Dark Surface (A12)	()	Redox Dep					
	Mucky Mineral (S1)	(LRR N,	Iron-Manga		es (F12) (LRR N,		
	RA 147, 148)		MLRA 1		NI DA 40		31 15 4 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
	Gleyed Matrix (S4) Redox (S5)		Umbric Sur	τace (Ε13) (Toodplain Si			 ³Indicators of hydrophytic vegetation a 48) wetland hydrology must be present, 	and
	ed Matrix (S6)		Red Parent					
	Layer (if observed	l):		, , , , , , , , , , , , , , , , , , ,			1	
Туре:								
Depth (ir	nches):		_				Hydric Soil Present? Yes No _	<u>X</u>
Remarks:								
Hydric	soil not identified wit	thin Upland D	D.					
•		1						

Applicant/Owner: Triangle Transit State: NC Sampling Point Wetland DDD - Diversitigator(s): Brandon Phillips, CHMM Section, Township, Range: Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): Concave Slope (%): 0 Subregion (LRR or MLRA): LRR P Lat: 35.913420 Long: -78.99822 Datum; NAD 83 Soil Map Unit Name Chewacia loam, 0 to 2% slopes, frequently flooded NWI classification: PF01 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.) Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No Are Vegetation 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 X No Is the Sampled Area within a Wetland? Yes X No Wetland Hydrology Present? Yes X No DP#34 (Wetland DDD) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#34	Project/Site: TTA Light Rail Transit	City/County: Durham		Sampling Date: 12-09-13
Section, Township, Ranges Section, Range	Applicant/Owner: Triangle Transit			
Landform fillsloppe, terrace, etc.) Lerace Local relief (concave, convex, none) Concave Concave Datum NAD 83	Investigator(s): Brandon Phillips, CHMM	Section, Township, Range:		
Chewacia loam, 0 to 2% slopes, frequently flooded New Iclassification PF01				
Chewacia loam, 0 to 2% slopes, frequently flooded New Iclassification PF01	Subregion (LRR or MLRA): LRR P	at: _35.913420 Long:7	78.999822	Datum: NAD 83
Are climatic / hydrologic conditions on the ster typical for this time of year? Yes X No (If no, explain in Remarks.) Are Vegetation Sol or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No Are Vegetation Sol 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 X No Within a Wetland? Yes X No Wetland Hydrology Present? Yes X No Wetland Hydrology Present? Yes X No Wetland Hydrology Indicators: DP#34 (Wetland DDD) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#34 HYDROLOGY Wetland Hydrology Indicators: Primary indicators (minimum of one is required; check all that apply) Surface Water (A1) The Aquatic Plants (B14) Sparsely Vegetated Concave Surface (B8) Surface Water (A1) The Aquatic Plants (B14) Sparsely Vegetated Concave Surface (B8) X High Water Table (A2) Hydrogon Sulfide Odor (C1) Drainage Patterns (B16) X Saturation (A3) Oxidized Rhizospheres on Livring Roots (C3) Moss Trim Lines (B16) X Water Marks (B1) Presence of Reduced Iron (C4) Drainage Patterns (B16) Sediment Deposits (B2) Recent Iron Reduction in Titled Soils (C8) Craftish Burrows (C8) Drift Deposits (B3) Thin Muck Surface (C7) Saturation Visible on Aerial Imagery (C9) Algal Mat or Crust (B4) Other (Explain in Remarks) Shallow Aquatic (D3) Microtopographic Position (D2) Included Hydrology Present? Yes X No Depth (Inches) Wetland Hydrology Present? Yes X No Depth (Inche				
Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No 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 X No Is the Sampled Area within a Wetland? Yes X No Wetland Hydrology Present? Yes X No Wetland Hydrology Present? Yes X No Sufface Soil Present? Yes X No Sufface Water (A1) True Aquatic Plants (B14) Secondary Indicators (Iminimum of one is required; check all that apply) Surface Water (A1) True Aquatic Plants (B14) Secondary Indicators (B16) Surface Water (A1) True Aquatic Plants (B14) Secondary Indicators (B16) Surface Water (A1) True Aquatic Plants (B14) Sparsely Vegetated Concave Surface (B8) Wetland Hydrology Indicators (B16) Secondary Indicators (B16) Surface Water (A1) True Aquatic Plants (B14) Sparsely Vegetated Concave Surface (B8) Surface (A1) Secondary Indicators (B16) Surface Water (A1) Sparsely Vegetated Concave Surface (B8) Surface (A1) Sparsely Vegetated Concave Surface (B8) Secondary Indicators (Iminimum of two required) Surface (B16) Surface Water (A1) Sparsely Vegetated Concave Surface (B8) Surface (B16) Secondary Indicators (Iminimum of two required) Surface (B16) Surface (B17) Sparsely Vegetated Concave Surface (B8) Surface (B16) Surface (B17) Sparsely Vegetated Concave Surface (B18) Surface (B17) Sparsely Vegetated Concave Surface (B18) Drainage Patterns (B10) D				
Are Vegetation Soll 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 X No Within a Wetland? Yes X No Wetland Hydrology Present? Yes X No Wetland Hydrology indicators: DP#34 (Wetland DDD) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#34 HYDROLOGY Wetland Hydrology indicators: Secondary Indicators (minimum of two required) Surface Soil Cracks [88] Yes X No Surface Soil Cracks [88] Yes Water (A1) Surface Soil Cracks [88] Yes Water (A2) Hydrology Indicators (minimum of two required) Yes X Surface Soil Cracks [88] Yes X No Surface Soil Cracks				
### Summary OF FINDINGS — Attach site map showing sampling point locations, transects, important features, etc. ###################################				
Hydric Soil Present? Wetland Hydrology Present? Wetland Hydrology Present? DP#34 (Wetland DDD) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#34 Wetland Hydrology Indicators: Secondary Indicators (minimum of two required) Surface Soil Cracks (B6) Surface Soil Cracks (B6) Surface Water (A1) Frue Aquatic Plents (B14) Seturation (A3) Oxidized Rhizospheres on Living Roots (C3) Wetland Risk (B1) Presence of Reduced Iron (C4) Drift Deposits (B2) Recent Iron Reduction in Tilled Soils (C6) Till Deposits (B3) Thin Muck Surface (C7) Algal Mat or Crust (B4) In Oxidized Rhizospheres on Living Roots (C3) Algal Mat or Crust (B4) In Oxidized Rhizospheres (C7) Algal Mat or Crust (B4) In Oxidized Rhizospheres (C7) Algal Mat or Crust (B4) In Oxidized Rhizospheres (C7) Algal Mat or Crust (B4) In Oxidized Rhizospheres (C7) Algal Mat or Crust (B4) In Oxidized Rhizospheres (C7) Algal Mat or Crust (B4) In Oxidized Rhizospheres (C7) Algal Mat or Crust (B4) In Oxidized Rhizospheres (C7) Algal Mat or Crust (B4) Alg				
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Wetland Hydrology Present? PP#34 (Wetland DDD) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#34 PP#34 (Wetland DDD) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#34 PP#34 (Wetland DDD) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#34 PP#34 (Wetland DDD) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#34 PP#34 (Wetland DDD) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#34 PP#34 (Wetland DDD) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#34 PP#34 (Wetland DDD) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#34 PP#34 (Wetland DDD) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#34 PP#34 (Wetland Hydrology Indicators (minimum of two required)		is the Sampled Area	Vaa V	Ma
HYDR OLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one is required, check all that apply) Surface Water (A1) Surface Water (A1) Surface Water (A1) Surface Water (A1) Surface Water (A2) Hydrogen Sulfide Odor (C1) Surface Water (A2) Hydrogen Sulfide Odor (C1) Surface Water (A2) Hydrogen Sulfide Odor (C1) Surface Water (A2) Surface Water (A2) Surface Water (A2) Surface Water (A2) Hydrogen Sulfide Odor (C1) Surface Water (A2) Surface Water (A3) Surface Water (A4) Surface Water (A5) Surface (A5) Surfac		within a wetland:	Yes A	No
Primary Indicators (minimum of one is required; check all that appty) Surface Water (A1) True Aquatic Plants (B14) Sparsely Vegetated Concave Surface (B8) X High Water Table (A2) Hydrogen Sulfide Odor (C1) Drainage Patterns (B10) X Saturation (A3) Oxidized Rhizospheres on Living Roots (C3) Moss Trim Lines (B16) X Water Marks (B1) Presence of Reduced Iron (C4) Sediment Deposits (B2) Prift Deposits (B3) Thin Muck Surface (C7) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B7) X Water-Stained Leaves (B9) Aquatic Fauna (B13) Field Observations: Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B8) Microtopographic Relief (D4) FAC-Neutral Test (D5) Wetland Hydrology Present? Yes X No Depth (inches): 2" Saturation Present? Yes X No Depth (inches): 0" Wetland Hydrology Present? Yes X No Remarks:	HYDROLOGY			/4- 5
Surface Water (A1)			Secondary Indica	tors (minimum of two required)
X High Water Table (A2) Hydrogen Sulfide Odor (C1) Drainage Patterns (B10) X Saturation (A3) Oxidized Rhizospheres on Living Roots (C3) Moss Trim Lines (B16) X Water Marks (B1) Presence of Reduced Iron (C4) Dry-Season Water Table (C2) Sediment Deposits (B2) Recent Iron Reduction in Tilled Soils (C6) Crayfish Burrows (C8) Drift Deposits (B3) Thin Muck Surface (C7) Saturation Visible on Aerial Imagery (C9) Algal Mat or Crust (B4) Other (Explain in Remarks) Stunted or Stressed Plants (D1) Iron Deposits (B5) Geomorphic Position (D2) Inundation Visible on Aerial Imagery (B7) Shailow Aquitard (D3) X Water-Stained Leaves (B9) Microtopographic Relief (D4) Aquatic Fauna (B13) FAC-Neutral Test (D5) Field Observations: Surface Water Present? Yes X No Depth (inches): Water Table Present? Yes X No Depth (inches): O'' Wetland Hydrology Present? Yes X No (includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available Remarks:	Primary Indicators (minimum of one is required, che	ck all that apply)	Surface Soil	Cracks (B6)
X Saturation (A3)				
X Water Marks (B1) Presence of Reduced Iron (C4) Dry-Season Water Table (C2) Sediment Deposits (B2) Recent Iron Reduction in Tilled Soils (C6) Crayfish Burrows (C8) Drift Deposits (B3) Thin Muck Surface (C7) Saturation Visible on Aerial Imagery (C9) Algal Mat or Crust (B4) Other (Explain in Remarks) Stunted or Stressed Plants (D1) Iron Deposits (B5) Geomorphic Position (D2) Inundation Visible on Aerial Imagery (B7) Shailow Aquitard (D3) X Water-Stained Leaves (B9) Microtopographic Relief (D4) Aquatic Fauna (B13) FAC-Neutral Test (D5) Field Observations: Surface Water Present? Yes X No Depth (inches): 2" Saturation Present? Yes X No Depth (inches): 0" Wetland Hydrology Present? Yes X No (includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available				` '
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Drift Deposits (B3) Thin Muck Surface (C7) Saturation Visible on Aerial Imagery (C9) Algal Mat or Crust (B4) Other (Explain in Remarks) Stunted or Stressed Plants (D1) Geomorphic Position (D2) Shailow Aquitard (D3) Shailow Aquitard (D3) Microtopographic Relief (D4) Aquatic Fauna (B13) FAC-Neutral Test (D5) Sturface Water Present?				
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X Water-Stained Leaves (B9) Microtopographic Relief (D4) Aquatic Fauna (B13) FAC-Neutral Test (D5) Factorial Constructions: Surface Water Present?	Iron Deposits (B5)			
Aquatic Fauna (B13)				
Field Observations: Surface Water Present? Yes No _x _ Depth (inches): Water Table Present? Yes _x _No Depth (inches): _2" Saturation Present? Yes _x _No Depth (inches): _0" Wetland Hydrology Present? Yes _x No (includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available Remarks:	- , ,			
Surface Water Present? Yes No X Depth (inches):			FAC-Neutrai	Test (D5)
Water Table Present? Yes X No Depth (inches): 2" Saturation Present? Yes X No Depth (inches): 0" Wetland Hydrology Present? Yes X No Depth (includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available Remarks:		Denth (inches):		
Saturation Present? Yes X No Depth (inches): 0" Wetland Hydrology Present? Yes X No Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available Remarks:				
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available Remarks:	Saturation Present? Yes X No		Hydrology Presen	nt? Yes_X No
Remarks:	(includes capillary fringe)			
	Describe Recorded Data (Silean gauge, monitoring	well, aenai priotos, previous inspections), il ava	allable	
Water-stained leaves and other indicators of surface water influence were observed within Wetland DDD.				
	Water-stained leaves and other indicators of	surface water influence were observed within Wetle	and DDD.	1
				4
				1
				1

tumber of Dominant Species hat Are OBL, FACW, or FAC:3
otal Number of Dominant pecies Across All Strata: gercent of Dominant Species hat Are OBL, FACW, or FAC: Total % Cover of: Multiply by: BL species ACW species AC species ACU species ACU species Y 4 = PL species Y 5 = Solumn Totals: (A) Prevalence Index = B/A = Mydrophytic Vegetation Y 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3 0¹
pecies Across All Strata: 3 (B) ercent of Dominant Species hat Are OBL, FACW, or FAC: 100 (A/B) revalence Index worksheet:
pecies Across All Strata: 3 (B) ercent of Dominant Species hat Are OBL, FACW, or FAC: 100 (A/B) revalence Index worksheet:
hat Are OBL, FACW, or FAC:
hat Are OBL, FACW, or FAC:
revalence Index worksheet: Total % Cover of: Multiply by: BL species x 1 = ACW species x 2 = AC species x 4 = PL species x 5 = folumn Totals: (A) (B) Prevalence Index = B/A = Mydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3 0¹
Total % Cover of: Multiply by: BL species x 1 =
Total % Cover of: Multiply by: BL species x 1 =
BL species
ACW species
AC species x 3 = ACU species x 4 = PL species x 5 = folumn Totals: (A) (B) Prevalence Index = B/A = ydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3 0¹
ACU species x 4 = PL species x 5 = (A) (B) Prevalence Index = B/A = ydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3 0¹
PL species x 5 =
olumn Totals:(A)(B) Prevalence Index = B/A =
olumn Totals:(A)(B) Prevalence Index = B/A =
Prevalence Index = B/A = ydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3 0 ¹
ydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3 0¹
ydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3 0¹
1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3 0¹
2 - Dominance Test is >50% 3 - Prevalence Index is ≤3 0 ¹
3 - Prevalence Index is ≤3 0¹
_ 4 - Morphological Adaptations¹ (Provide supportin
data in Remarks or on a separate sheet)
Problematic Hydrophytic Vegetation ¹ (Explain)
_ 1 Toblematic Flydrophytic Vegetation (Explain)
ndicators of hydric soil and wetland hydrology must e present, unless disturbed or problematic
efinitions of Four Vegetation Strata:
ree - Woody plants, excluding vines, 3 in (7.6 cm) or
nore in diameter at breast height (DBH), regardless of
eight
andinationals NACe ask allegate evaluations since lead
apling/Shrub - Woody plants, excluding vines, less an 3 in DBH and greater than or equal to 3 28 ft (1
n) tall
erb - All herbaceous (non-woody) plants, regardless
f size, and woody plants less than 3 28 ft tall
loody vine - All woody vines greater than 3.28 ft in
eight.
ydrophytic
egetation
resent? Yes X No
4

Depth (in sheet)	Matrix	%	Redo Color (moist)	x Features	S Type ¹	_Loc ²	Texture	Remarks
inches)	Color (moist)			%			,	Remarks
0-20	10 YR 6/1	85	7.5 YR 4/6	15	C	PL_	Clay	-
				_			-	-
	- 1-10		-		-		-	
		-		_			-	-
				-		_	-	-
ype: C=Co		letion, RM=	Reduced Matrix, MS	S=Masked	Sand Gra	ains.	² Location:	PL=Pore Lining, M=Matrix. icators for Problematic Hydric Soils ³ :
_ Histosol (Dark Surface	(S7)				2 cm Muck (A10) (MLRA 147)
	ipedon (A2)		Polyvalue Be		ce (S8) (N	ILRA 147.		Coast Prairie Redox (A16)
_ Black His			Thin Dark Su				. —	(MLRA 147, 148)
	Sulfide (A4)		Loamy Gleye		F2)		_	Piedmont Floodplain Soils (F19)
	Layers (A5)		x Depleted Ma					(MLRA 136, 147)
	ck (A10) (LRR N)	- (444)	Redox Darks	,			_	Very Shallow Dark Surface (TF12)
	Below Dark Surfac rk Surface (A12)	e (ATT)	Depleted Dar X Redox Depre				_	Other (Explain in Remarks)
_	ucky Mineral (S1) (L	RR N	Iron-Mangan			I RR N		
	147, 148)	-131314,	MLRA 13		OS (1 12) (
	eyed Matrix (S4)		Umbric Surfa	-	MLRA 13	6, 122)	3 1	ndicators of hydrophytic vegetation and
_ Sandy Re	edox (S5)		Piedmont Flo	odplain S	oils (F19)	(MLRA 14		wetland hydrology must be present,
_ Stripped	Matrix (S6)		Red Parent N	1aterial (F	21) (MLR	A 127, 147	7)	unless disturbed or problematic
estrictive L	ayer (if observed):							
Depth (inc	hes):		_				Hydric S	oil Present? Yes XNo
emarks:								
Hydric	soil identified within	Wetland DD	DD.					

Project/SiteTTA Light Rail Transit	City/County:Durham		Sampling Date: 06-06-13
Applicant/Owner: Triangle Transit		State: NC	Sampling Point: Wetland E - DP#
	Section, Township, Range:		
Landform (hillslope, terrace, etc.). terrace			
Subregion (LRR or MLRA): LRRP Lat 35.96069	D7 Long:	78.972118	Datum; NAD 83
Soil Map Unit Name: Chewacla loam, 0 to 2% slopes, frequently	/ flooded	NWI classif	cation: PF01
Are climatic / hydrologic conditions on the site typical for this time			
Are Vegetation, Soil, or Hydrology signific			
Are Vegetation, Soil, or Hydrology natura			
SUMMARY OF FINDINGS – Attach site map show	wing sampling point locati	ons, transect	s, important reatures, etc.
Hydrophytic Vegetation Present? Yes X No	Is the Sampled Area		
Hydric Soil Present? Yes X No	within a Wetland?	Yes X	No
Wetland Hydrology Present? Yes X No Remarks: Page 400 at 120 at 1			
HYDROLOGY			
Wetland Hydrology Indicators;		Secondary Indic	ators (minimum of two required)
Primary Indicators (minimum of one is required; check all that a	(ylgo	Surface Soi	l Cracks (B6)
Surface Water (A1) True Aqua	atic Plants (B14)	Sparsely Ve	getated Concave Surface (B8)
	Sulfide Odor (C1)	Drainage Pa	
	Rhizospheres on Living Roots (C3)	Moss Trim l	
	of Reduced Iron (C4)		Water Table (C2)
	on Reduction in Tilled Soils (C6)	Crayfish Bu	
	(Surface (C7)		/isible on Aerial Imagery (C9)
Algal Mat or Crust (B4) Other (Ex	plain in Remarks)	Stanted or s	Stressed Plants (D1)
Inundation Visible on Aerial Imagery (B7)		Shallow Aqu	
X Water-Stained Leaves (B9)			aphic Relief (D4)
Aquatic Fauna (B13)		FAC-Neutra	
Field Observations:			
Surface Water Present? Yes No _x _ Depth (in	iches):		
Water Table Present? Yes X No Depth (in	ches); <u>1"</u>		
Saturation Present? Yes X No Depth (in	ches):0" Wetland I	Hydrology Prese	nt? Yes X No
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial	photos, previous inspections), if av-	ailable	
Remarks: Water-stained leaves and other indicators of surface water	er influence were observed within Weti	and F	
White-statuted to aves and other indicators of surface was	a unidence were observed within wen	and E.	

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

Sampling	Point:	Wetland E	- DP#5
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CVI	Absolute	Dominant		Dominance Test worksheet:
Tree Stratum (Plot size:)	<u>% Cover</u>	Species?	Status	Number of Dominant Species
1 Acer rubrum	_40	Yes	FAC_	That Are OBL, FACW, or FAC: 4 (A)
2 Fraxinus pennsylvanica 3	25		FACW	Total Number of Dominant Species Across All Strata: (B)
				Species Across Air Strata. (D)
5				Percent of Dominant Species That Are OBL_FACW_or FAC:
6			_	Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
		= Total Cove		OBL species x 1 =
50% of total cover: <u>32.5</u>	20% of	total cover:	13	FACW species x 2 =
Sapling/Shrub Stratum (Plot size: 10')				
1				FAC species x 3 =
2				FACU species x4 =
3	_			UPL species x 5 =
4				Column Totals: (A) (E
5				Prevalence Index = B/A =
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
8				X 2 - Dominance Test is >50%
9,				3 - Prevalence Index is ≤3 01
EON of total carren	200/ -6	= Total Cove	r	4 - Morphological Adaptations1 (Provide supporti
50% of total cover:	20% 01	total cover.	_	data in Remarks or on a separate sheet)
Herb Stratum (Plot size: 1.5 m	20	V	OBL	Problematic Hydrophytic Vegetation ¹ (Explain)
1 Saururus cernuus 2 Dichanthelium clandestinum		Yes Yes		
	15		FAC	Indicators of hydric soil and wetland hydrology must
3 Persicaria maculosa	10	No	FACW	be present, unless disturbed or problematic
4 Carex sp.	10	No	_v	Definitions of Four Vegetation Strata:
5				The Manth plants evaluating since 2 in 17 C and
6,				Tree – Woody plants, excluding vines, 3 in. (7 6 cm) more in diameter at breast height (DBH), regardless
7				height
8				Sapling/Shrub - Woody plants, excluding vines, les
9				than 3 in DBH and greater than or equal to 3 28 ft (1
10				m) tall_
11				Herb - All herbaceous (non-woody) plants, regardles
	55	= Total Cove	r	of size, and woody plants less than 3.28 ft tall
50% of total cover:	20% of	total cover:_	11	Washing All woods win as greater than 2.30 ft in
Woody Vine Stratum (Plot size: 1 m				Woody vine - All woody vines greater than 3 28 ft in height.
1				
2				
3				
4				
5				Hydrophytic Vegetation
		= Total Cove	r	Present? Yes X No
50% of total cover:				
Remarks: (Include photo numbers here or on a separate s				
Hydrophytic vegetation identified within Wetland l	E. A variable	indicator ratio	ng "V" is fo	or the unidentified species.

Depth	Matrix			x Features			nthe abs		
nches)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	<u>Textu</u>	<u>e</u>	Remarks
-20	10 YR 5/2	_70	5 YR 4/4		C	PL	Clay		
							_		
					-	_		_	
					7				
	opposite the Deliver		the second Kitaboo Kit	C Made d		(4.5)	21 4: -	DI David	manage has harman
	oncentration, D=Deple Indicators:	etion, RIVI=Re	duced Matrix, M	>=Masked	Sand Gra	ins.			ining, M=Matrix Problematic Hydric Soils
_ Histosol			Dark Surface	e (S7)					(A10) (MLRA 147)
	oipedon (A2)	-	Dark Surrace Polyvalue Be		e (S8) (M	LRA 147			irie Redox (A I6)
_ Black Hi		_	Thin Dark St				1 _		147, 148)
	n Sulfide (A4)		Loamy Gley			. ,	_		Floodplain Soils (F19)
	d Layers (A5)		Depleted Ma						136, 147)
	ck (A10) (LRR N)		_ Redox Dark				_		ow Dark Surface (TF12)
	d Below Dark Surface	(A11) _	_ Depleted Da				_	_ Other(Exp	olain in Remarks)
	ark Surface (A12) flucky Mineral (S1) (Ll	RR N	Redox Depre Iron-Mangan			PP N			
	147, 148)		ITOH-Wangan		:5 (F IZ) (L	.1717 14,			
	leyed Matrix (S4)	_	Umbric Surfa		MLRA 136	5, 122)		3Indicators of	f hydrophytic vegetation and
_ Sandy R	edox (S5)	_	Piedmont Flo				8)		drology must be present,
	Matrix (S6)		_ Red Parent N	√aterial (F2	21) (MLR /	127, 147	')	unless distu	rrbed or problematic
	aver (if observed)								
Туре							Hydric	Soil Present	? Yes <u>X</u> No
Туре									
Type Depth (inc			0				1		
Type Depth (inc							1		
Type Depth (inc									
Type Depth (inc	ches):		F						
Type Depth (inc			Е.						
Type Depth (inc	ches):		Е.						
Type Depth (inc	ches):		E.						
Type Depth (inc	ches):		Е.						
Type Depth (inc	ches):		Е.						
Type Depth (inc	ches):		Е.						
Type Depth (inc	ches):		Е.						
Type Depth (inc	ches):		Е.						
Type Depth (inc	ches):		E.						
Type Depth (inc	ches):		Е.						
Type Depth (inc	ches):		E.						
	ches):		Е.						
Type Depth (inc	ches):		Е.						
Type Depth (inc	ches):		E.						
Type Depth (inc	ches):		E.						
Type Depth (inc	ches):		E.						
Type Depth (inc	ches):		Е.						

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: TTA Light Rail Transit	City/County: Durham		Sampling Date: 08-14-13
Applicant/Owner Triangle Transit			Sampling Point: Wetland EE - DP#2
D 1 DI'II' CID O	Section, Township, Rang		
andform (hillslope, terrace, etc.): _terrace			
	at: 35.905509 Long:		
Soil Map Unit Name Chewacla loam, 0 to 2% slop	es, frequently flooded	NVVI classifi	cation: PF01
Are climatic / hydrologic conditions on the site typical			
re Vegetation, Soil, or Hydrology			
Are Vegetation, Soil, or Hydrology			
SUMMARY OF FINDINGS – Attach site	map showing sampling point lo	cations, transects	s, important features, etc.
Hydrophytic Vegetation Present? Yes X	No		
	is the Sampled A	Area I? Yes_X_	No
	NoNo	1: 165 <u>A</u>	
HYDROLOGY			
Wetland Hydrology Indicators:		Cocondon, India	otoro (reinireuro of tuo required)
Primary Indicators (minimum of one is required; che	ck all that applied		ators (minimum of two required)
Surface Water (A1)	_ True Aquatic Plants (B14)		getated Concave Surface (B8)
High Water Table (A2)	_ Hydrogen Sulfide Odor (C1)		atterns (B10)
Saturation (A3)	Oxidized Rhizospheres on Living Roots		
X Water Marks (B1)	Presence of Reduced Iron (C4)		Water Table (C2)
Sediment Deposits (B2)	Recent Iron Reduction in Tilled Soils (C6		
Drift Deposits (B3)	_ Thin Muck Surface (C7)	Saturation V	risible on Aerial Imagery (C9)
Algal Mat or Crust (B4)	Other (Explain in Remarks)		Stressed Plants (D1)
Iron Deposits (B5)			: Position (D2)
Inundation Visible on Aerial Imagery (B7) X Water-Stained Leaves (B9)		Shallow Aqu	
Aquatic Fauna (B13)		Microtopogr FAC-Meutra	aphic Relief (D4)
Field Observations:		TAC-Neulla	r rest (DO)
	Depth (inches):		
	Depth (inches):		
		and Hydrology Prese	nt? Yes_X No
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring		if available	
Boschibe (Cocorded Batta (Stroath gattige, Monitoring	жен, аенагрногоз, ргемоца тареспопа <u>),</u>	II avallable	
Remarks:	f surface water influence were observed within	Watland EE	
water-stanted leaves and other indicators o	surface water influence were observed within	Welland EE,	
			[X

Tues Stratum (Plot size 30	Tana Chartaga (District 20)	Absolute	Dominant		Dominance Test worksheet:
30 Yes FAC Total Number of Dominant 7 (B)	Tree Stratum (Plot size: 30'		Species?		
30 Yes FACU Species Trial Cover	1_Ulmus americana	40	Yes		That Are OBL, FACW, or FAC:
Secretar subsection	2. Acer rubrum			FAC	Total Number of Dominant
Second S	3 <u>Quercus rubra</u>	30	Yes	FACU	
That Are OBL, FACW, or FAC 71 (A/B)	4				Develope of Developer Consider
Prevalence Index worksheet: Total & Cover	5				
Tree					
100					
Solks of total cover			= Total Cov	er	
Septinal/Shrub Stratum (Plot size 10" 15	50% of total cover: <u>50</u>				OBL species x 1 =
	I and the second				FACW species x 2 =
FACU species		15	Yes	FACW	FAC species x 3 =
A					
Column Totals:					
Provalence index = B/A = Hydrophytic Vegetation Indicators: Hydrophytic Vegetation Indicators: 1-Rapid Test for Hydrophytic Vegetation X 2-Dominance Test is >50%					
Second Process Seco					() ()
### 1. Rapid Test for Hydrophytic Vegetation Second Control Cover 1.5 m 1.5 m 5.0% of total cover 7.5 miles rotal cover 3 miles rotal dispatce 1.5 m 1.5 m 5.0% of total cover 3 miles rotal dispatce 1.5 m 5.0% of total cover 3 miles rotal dispatce 1.5 m 5.0% of total cover 3 miles rotal dispatce 1.5 m 5.0% of total cover 5.0% of total					Prevalence Index = B/A =
8 9 15 = Total Cover 2.50% of total cover 3.5 15 = Total Cover 2.0% of total cover 3.5 2.5					Hydrophytic Vegetation Indicators:
8					
3. Prevalence Index is \$3.0¹ 4. Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) 7. Sow of total cover	8				
Solve of total cover 7.5 20% of total cover 3 20% of total cover 4 20% of total cover 4 20% of total cover 50% of total cover 50% of total cover 20% of total cover 3 20% of total cover 3 20% of total cover 3 20% of total cover 4 20% of total cover 50% of total cover 50% of total cover 50% of total cover 20% of total cover 3 20% of total cover 3 20% of total cover 4 20% of total cover 50% of total cover 50	9				_
data in Remarks or on a separate sheet) Arundinaria gigantea 5 Yes FACW Smilax rotundifolia 5 Yes FACY Ligustrum sinense 5 Yes FACY Ligustrum sinense 5 Yes FACY 6 FACY 8 SALE 9 FACY 10 Definitions of Four Vegetation Stratus 10 Sapling/Shrub – Woody plants, excluding vines, a in (7.6 cm) or more in diameter at breast height (DBH), regardless of height 11 Sapling/Shrub – Woody plants, excluding vines, a sapling stratum or equal to 3.28 ft (1 m) tall 11 Samilax rotundifolia 5 Yes FACY Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, a in (7.6 cm) or more in diameter at breast height (DBH), regardless of height Sapling/Shrub – Woody plants, excluding vines, a sapling/Shrub – Woody vines of size, and woody plants excludi					
Arundinaria gigantea 5 Yes FACW	50% of total cover: <u>7.5</u>	20% of	total cover:	3	1
Arthundard graphed S Yes FAC	Herb Stratum (Plot size: 1.5 m)				1 2
Smilax rotundifolia Toxicodendron radicans Toxicoden	1Arundinaria gigantea	5	Yes	FACW	Problematic Hydrophytic Vegetation* (Explain)
Traincators of nyaric soil and wetland hydrology must be present, unless disturbed or problematic. Ligustrum sinense Ligustru				FAC	
4 Ligustrum sinense 5 Yes FACU 5 6 7 7 8 9 9 9 9 10 11 11 11 11 11 11 11 11 11 11 11 11				FAC	
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, 2 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 or equal to 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 Stratum (Plot size: 1 m) Lesson of total cover. 10 20% of total cover. 4 Woody vine – All woody vines greater than 3.28 ft in height Hydrophytic Vegetation Present? Yes X No Remarks: (Include photo numbers here or on a separate sheet.)				FACU	
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 or equal to 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 Stratum (Plot size: 1 m					Definitions of Four Vegetation Strata:
height					
8					
9					neignt
than 3 in DBH and greater than or equal to 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 Stratum (Plot size: 1 m) 1					Sapling/Shrub - Woody plants, excluding vines, less
Herb – All herbaceous (non-woody) plants, regardless of size, and woody vines greater than 3.28 ft tall. Woody Vine Stratum (Plot size: 1 m) 2					
20 = Total Cover 50% of total cover: 10 20% of total cover: 4 Woody Vine Stratum (Plot size: 1 m) 1					m) tall
So% of total cover: 10 20% of total cover: 4 Woody Vine Stratum (Plot size: 1 m) 1	11,				Herb - All herbaceous (non-woody) plants, regardless
Woody Vine Stratum (Plot size: 1 m) 1					of size, and woody plants less than 3.28 ft tall.
Nemarks: (Include photo numbers here or on a separate sheet.) height height height Hydrophytic Vegetation Present? Yes X No		20% of	total cover:	4	Woody vine - All woody vines greater than 3.28 ft in
2	Woody Vine Stratum (Plot size: 1 m				
3	1,				
4	2				
4	3				
5 = Total Cover = Total Cover 20% of total cover: 20% of total cover: = Total Cover Yes _X No Remarks: (Include photo numbers here or on a separate sheet.)					
= Total Cover 50% of total cover: 20% of total cover: Remarks: (Include photo numbers here or on a separate sheet.)					
50% of total cover: 20% of total cover: Remarks: (Include photo numbers here or on a separate sheet.)			- Total Cove	or.	_
Remarks: (Include photo numbers here or on a separate sheet)	50% of total cover:				
			total covor.		
Hydrophytic vegetation identified within Wetland EE.	Remarks. (include prioto numbers here or on a separate s	neer)			
	Hydrophytic vegetation identified within Wetland F	EE.			
					41

	Matrix	0/		x Features	т 1	12	T	B. 335.63	
(inches)	Color (moist)	%	Color (moist)		Type ¹	_Loc²	Texture	Remarks	
0-6	10 YR 4/3	90	7.5 YR 4/6		С	PL	Clay loam		
6-20	10 YR 6/2		7.5 YR 5/6		С	PL	Clay		
		_							
Tyne: C=Co	ncentration D=De	letion RM:		S=Maskert S	and Gra		2 ocation: PI =Pr	ore Lining, M=Matrix	
ydric Soil Ir		SIOLIOIT, TRIVI-	-reduced Man is, 191	3-Maskou 3	and Ore	1115		for Problematic Hydric	Soils3:
Black His Hydroger	ipedon (A2) stic (A3) 1 Sulfide (A4)		Dark Surface Polyvalue Be Thin Dark Su Loamy Gleye	low Surface Irface (S9) (N ed Matrix (F2)	ILRA 1		148) Coast (ML Piedm	Muck (A10) (MLRA 147) Prairie Redox (A16) -RA 147, 148) nont Floodplain Soils (F19	9)
	Layers (A5) ck (A10) (LRR N)		X Depleted Ma Redox Dark				•	.RA 136, 147) Shallow Dark Surface (TF	:12\
_ Depleted	Below Dark Surfac	e (A11)	Depleted Da	rk Surface (F	7)			(Explain in Remarks)	;
	rk Surface (A12) ucky Mineral (S1) (LRR N,	X Redox Depre		(F12) (I	RR N.			
MLRA	147, 148)	,	MLRA 13	6)					
Sandy Gl Sandy Re	eyed Matrix (S4)		Umbric Surfa Piedmont Flo					ors of hydrophytic vegetat	
	Matrix (S6)		Red Parent N					d hydrology must be pres disturbed or problematic	ent,
estrictive L	ayer (if observed)	:							
			_						
Depth (incl	hes):		_				Hydric Soil Pres	sent? Yes X N	lo
emarks:									
H	ydric soil identified v	vithin Wetlar	id EE.						

Project/Site: TTA Light Rail Transit	City/County: Durham		Sampling Date: 06-18-13	
Investigator(s): Brandon Fulton, LSS, PWS	Section, Township, Range;			
Landform (hillslope, terrace, etc.) <u>terrace</u>	Local relief (concave, convex,	none): _Concave	Slope (%):_0	
Subregion (LRR or MLRA) <u>LRR P</u> Lat:	35.957872 Long:	-78.972752	Datum: NAD 83	
Soil Map Unit Name: Chewacla loam, 0 to 2% slopes, fi			cation: PEM	
Are climatic / hydrologic conditions on the site typical for t				
Are Vegetation, Soil, or Hydrology				
Are Vegetation, Soil, or Hydrology				
SUMMARY OF FINDINGS – Attach site ma				
Hydrophytic Vegetation Present? Yes X Hydric Soil Present? Yes X	is the Sampled Are			
Wetland Hydrology Present? Yes X		Yes X	No	
Domorko:	Wetland, See Approximate Waters of the U S			
HYDROLOGY				
Wetland Hydrology Indicators:		Secondary Indic	ators (minimum of two required)	
Primary Indicators (minimum of one is required: check a	ill that apply)			
	ue Aquatic Plants (B14)		getated Concave Surface (B8)	
	ydrogen Sulfide Odor (C1)	Drainage Patterns (B10)		
	xidized Rhizospheres on Living Roots (C			
X Water Marks (B1) Pr	resence of Reduced Iron (C4)	Dry-Season	Water Table (C2)	
	ecent Iron Reduction in Tilled Soils (C6)	Crayfish Bui		
	nin Muck Surface (C7)		risible on Aerial Imagery (C9)	
	ther (Explain in Remarks)		Stressed Plants (D1)	
Iron Deposits (B5) Inundation Visible on Aerial Imagery (B7)		Geomorphic Shallow Aqu		
X_ Water-Stained Leaves (B9)		Microtopogr	1	
Aquatic Fauna (B13)		FAC-Neutra	The state of the s	
Field Observations:				
Surface Water Present? Yes _ X No D	Depth (inches): 0.5"			
Water Table Present? Yes X No D	Pepth (inches):0"		- 1	
Saturation Present? Yes X No D	Depth (inches):0" Wetland	d Hydrology Prese	nt? Yes X No	
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring wel	L aerial photos previous inspections) if a	available:		
December 1991 and Data (all calls gadge, membering non	, dana proces, promode mepodeone, in e	a, andoro.		
Remarks:	: d			
Saturation and other indicators of surface water	influence were observed within Wetland F.			
			1	
			- F	

	Absolute D	ominant Ir	ndicator	Dominance Test worksheet:
Tree Stratum (Plot size:30')	% Cover	<u>Species?</u>	Status	Number of Dominant Species
1,				That Are OBL, FACW, or FAC: (A)
2				Total Number of Dominant
3				Species Across All Strata: (B)
4				Description Consider
5				Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)
6				That his obe, the vi of the (NB)
7				Prevalence Index worksheet:
				Total % Cover of:Multiply by:
50% of total cover:				OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')				FACW species x 2 =
1				FAC species x 3 =
				FACU species x 4 =
2				UPL species x 5 =
3				Column Totals: (A) (B)
4				Column Fotols
5				Prevalence Index = B/A =
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
8				X 2 - Dominance Test is >50%
9				
	= 1			3 - Prevalence Index is ≤3 0 ¹
50% of total cover:	20% of to	tal cover:_		4 - Morphological Adaptations (Provide supporting
Herb Stratum (Plot size:1.5 m)				data in Remarks or on a separate sheet)
1. Smilax rotundifolia	20	Yes	FAC	Problematic Hydrophytic Vegetation ¹ (Explain)
2. Carex sp				
3. Juncus effusus				¹ Indicators of hydric soil and wetland hydrology must
				be present, unless disturbed or problematic
4,				Definitions of Four Vegetation Strata:
5				Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or
6,				more in diameter at breast height (DBH), regardless of
7				height
8		-		Sapling/Shrub - Woody plants, excluding vines, less
9				than 3 in. DBH and greater than or equal to 3 28 ft (1
10				m) tall.
11				Herb - All herbaceous (non-woody) plants, regardless
		Total Cover		of size, and woody plants less than 3 28 ft tall
50% of total cover;15	20% of to	tal cover:	6	
Woody Vine Stratum (Plot size: 1 m)		_		Woody vine – All woody vines greater than 3.28 ft in height.
1,				Height.
2			_	
3				
			_	
4				Hydrophytic
5				Vegetation
		Fotal Cover		Present? Yes <u>X</u> No
50% of total cover:		tal cover:		
Remarks: (Include photo numbers here or on a separate	sheet.)			
Watland is an inundated basin watland, year, fave n	lants identified y	uithin Watle	nd E: hou	wever, hydrophytic vegetation was identified within Wetland F.
A variable indicator rating "V" is for the unidentif	ied species	within wetia	ina r; nov	wever, nydrophytic vegetation was identified within wetland F
	-F			

Depth	Color (moist)	%		x Features	Tup a1	Loc ²	Toytura	Domorto
inches)	Color (moist)		Color (moist)	%	Type ¹	LUC	Texture	Remarks
)-6	7.5 YR 3/1	100					SiCL	
5-20	7.5 YR 6/I	90	2.5 YR 4/6	10	<u> </u>	PL	CL	
	-	_		-	_	-		
		_						
	-			\equiv	=	_		
	oncentration, D=Dep	Metion PM-	Peduced Matrix M	S-Mackad	Sand Gra	inc	2 ocation: DI	=Pore Lining, M=Matrix.
	ndicators:	netion, raivi-	-reduced Matrix, M	J-Iviaskeu .	Sand Gra	1115		ors for Problematic Hydric Soils ³ :
Black Hi Hydroge Stratified 2 cm Mu Depleted Thick Da Sandy M MLRA Sandy G Sandy R	ipedon (A2) stic (A3) n Sulfide (A4) I Layers (A5) ck (A10) (LRR N) I Below Dark Surfac rk Surface (A12) lucky Mineral (S1) (I 147, 148) leyed Matrix (S4) edox (S5) Matrix (S6)		— Polyvalue Be — Thin Dark SI — Loamy Gley X Depleted Ma — Redox Dark — Depleted Da — Redox Depri — Iron-Mangar MLRA 13 — Umbric Surfa — Piedmont Fle — Red Parent I	urface (S9) ed Matrix (F strix (F3) Surface (F6 Ik Surface (essions (F8) ese Masse: 16) ace (F13) (N podplain So	(MLRA 14 2) 5) F7)) s (F12) (L (ILRA 136 ils (F19) (47, 148) .RR N, 6, 122) MLRA 141	— Pie — Ve — Oth 3Indic 8) wetl	east Prairie Redox (A16) (MLRA 147, 148) Edmont Floodplain Soils (F19) (MLRA 136, 147) ry Shallow Dark Surface (TF12) her (Explain in Remarks) eators of hydrophytic vegetation and and hydrology must be present, less disturbed or problematic.
	ayer (if observed):		_		, ,			
	:hes):						Hydric Soil F	Present? Yes X No
emarks:								
Hydric :	soil identified within N	Wetland F						

Project/Site TTA Light Rai	Transit	City/Cou	nty: Durham		Sampling Date 08-14-13
Applicant/Owner: Triangle 1					Sampling Point: Wetland FF - DP#20
nvestigator(s) Brandon Ph		Section,			
_andform (hillslope, terrace,					Slope (%):_0
Subregion (LRR or MLRA); _		Lat 35.905049			
					cation PF01/PEM
		al for this time of year? Yes			
					·
					present? Yes X No
		naturally problematio			
SUMMARY OF FINDI	NGS – Attach sit	e map showing samp	ing point location	ons, transects	, important features, etc.
Hydrophytic Vegetation Pre	sent? Yes_X	No	Man Oamenhad Anna		
Hydric Soil Present?	Yes_X		the Sampled Area ithin a Wetland?	Yes X	No
Wetland Hydrology Present	? Yes_ X	No	itimi a metana:	103_1	_ 140
HYDROLOGY					
Wetland Hydrology Indica					tors (minimum of two required)
Primary Indicators (minimur	m of one is required; c			Surface Soil	
Surface Water (A1)		True Aquatic Plants (B14			getated Concave Surface (B8)
High Water Table (A2)Saturation (A3)		Hydrogen Sulfide Odor (Oxidized Rhizospheres		Drainage Pat	
X Water Marks (B1)		— Oxidized Killzospheres of Presence of Reduced Inc		Moss Trim Li	Mater Table (C2)
Sediment Deposits (B2)	Recent Iron Reduction in		Crayfish Burn	
Drift Deposits (B3)	,	Thin Muck Surface (C7)			sible on Aerial Imagery (C9)
Algal Mat or Crust (B4)		Other (Explain in Remai	ks)		ressed Plants (D1)
Iron Deposits (B5)				Geomorphic	Position (D2)
Inundation Visible on A				Shallow Aqui	
X Water-Stained Leaves	(B9)				phic Relief (D4)
Aquatic Fauna (B13) Field Observations:				FAC-Neutral	Test (Db)
Surface Water Present?	Yes No. 🗴	Depth (inches):			
Water Table Present?		Depth (inches):			
Saturation Present?		Depth (inches):		lydrology Presen	t? Yes X No
(includes capillary fringe)		ng well, aerial photos, previou			
Describe Recorded Data (st	ream gauge, monitorii	ig well, aerial priotos, previol	us irispections), ir ava	lilable	
Remarks					
Water-stained lea	aves and other indicators	of surface water influence were	e observed within Wetle	and FF.	
					· V
					The state of the s

Torre Stratum (St. 1 i and	Absolute	Dominant		Dominance Test worksheet:
Tree Stratum (Plot size)		Species?	<u>Status</u>	Number of Dominant Species
1 Pinus taeda	30	Yes	FAC	That Are OBL_FACW, or FAC (A)
2 Ulmus americana		<u>Yes</u>	FACW	Total Number of Dominant
3 Acer rubrum		Yes	FAC	Species Across All Strata: 7 (B)
5				Percent of Dominant Species That Are OBL, FACW, or FAC:
6				Prevalence Index worksheet:
7,				Total % Cover of: Multiply by:
F000 (1.1.1		= Total Cov		OBL species x 1 =
50% of total cover: 35	20% of	total cover:	14	
Sapling/Shrub Stratum (Plot size: 10'				FACW species x 2 =
1 Carpinus caroliniana		Yes	FAC	FAC species x 3 =
2Ligustrum sinense	0	Yes	FACU	FACU species x 4 =
3				UPL species x 5 =
4				Column Totals: (A) (B)
5				Prevalence Index = B/A =
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
8				X 2 - Dominance Test is >50%
9				
	25	= Total Cove	er	3 - Prevalence Index is ≤3 0 ¹
50% of total cover; _ 12.5	20% of	total cover	5	4 - Morphological Adaptations¹ (Provide supporting
Herb Stratum (Plot size;1.5 m)				data in Remarks or on a separate sheet)
1 Carex sp.	60	Yes	V	Problematic Hydrophytic Vegetation¹ (Explain)
2 Nasturtium officinale		Yes	OBL	
3 Phalaris arundinacea			FACW	¹ Indicators of hydric soil and wetland hydrology must
d C I I I		N.T.		be present, unless disturbed or problematic
			NL	Definitions of Four Vegetation Strata:
5			$\overline{}$	Tree - Woody plants, excluding vines, 3 in (7.6 cm) or
6				more in diameter at breast height (DBH), regardless of height
8				Sapfing/Shrub - Woody plants, excluding vines, less
9				than 3 in DBH and greater than or equal to 3 28 ft (1
10				m) tall
11	100	_	-	Herb - All herbaceous (non-woody) plants, regardless
50% of total cover: 50		: Total Cove total cover_		of size, and woody plants less than 3 28 ft tall
Woody Vine Stratum (Plot size: 1 m)	20 78 01	wtar cover_		Woody vine - All woody vines greater than 3 28 ft in
				height
1				
2				
3				
4				Hydrophytic
5				Vegetation
50% of total cover:		Total Cove		Present? Yes X No
Remarks. (Include photo numbers here or on a separate si				
Hydrophytic vegetation identified within Wetland F	F. A variable	rating indica	ator "V" is	for the unidentified species. A not listed rating indicator "NL"
is for the unlisted species.				

Depth	Matrix		Redo	x Features	3			
(inches)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	<u>Texture</u>	Remarks
0-3	7.5 YR 3/3	100					SCL	-
3-20	7.5 YR 4/1		5 YR 4/6			PL	Clay	
				=				
	Concentration, D=Dep	pletion, RM	=Reduced Matrix, MS		Sand Gra	ains		L=Pore Lining, M=Matrix ators for Problematic Hydric Soils ³ :
_ Histoso	l (A1) pipedon (A2)		Dark Surface		0 /00\ /#4	II DA 447		cm Muck (A10) (MLRA 147)
_ Histic E _ Black H			Polyvalue Be Thin Dark Su				, 148) (oast Prairie Redox (A16) (MLRA 147, 148)
	en Sulfide (A4)		Loamy Gleye	. ,		→r, 1 40 j	P	iedmont Floodplain Soils (F19)
Stratifie	d Layers (A5)		X Depleted Mat					(MLRA 136, 147)
2 cm Mi	uck (A10) (LRR N)		Redox Dark S					ery Shallow Dark Surface (TF12)
	d Below Dark Surfac	e (A11)	Depleted Dar				_ 0	ther (Explain in Remarks)
	ark Surface (A12) Mucky Mineral (S1) (I	I RR N	X Redox Depre			RR N		
	миску мішегаг (Зт) (. А 147, 148)	L: XI X 1 V,	Iron-Mangane MLRA 136		73 (⊏ 14) (1	-INFX IN,		
	Gleyed Matrix (S4)		Umbric Surfa	-	MLRA 13	6, 122)	³ Ind	icators of hydrophytic vegetation and
_ Sandy F	Redox (S5)		Piedmont Flo	odplain Sc	oils (F19)	(MLRA 14	18) we	tland hydrology must be present,
	d Matrix (S6)		Red Parent M	faterial (F2	21) (MLR .	A 127, 147		ess disturbed or problematic
estrictive	Layer (if observed):	:						
Type:			_					
Depth (in	ches):						Hydric Soil	Present? Yes X No
emarks	Hydric soil identified w	vithin Wetlar	nd FF.					
1	Hydric soil identified w	vithin Wetlar	nd FF.					

Project/Site: TTA Light Rail Transit	City/C	ounty: Durham		Sampling Date: 06-18-13
Applicant/Owner: Triangle Transit				Sampling Point Wetland G - DP#
Investigator(s): Brandon Fulton, LSS, PWS	Section			
Landform (hillslope, terrace, etc.): terrace				
				Datum; NAD 83
Soil Map Unit Name: Chewacla loam, 0 to 2% slop				
Are climatic / hydrologic conditions on the site typica				
Are Vegetation, Soil, or Hydrology _				
Are Vegetation, Soil, or Hydrology _	naturally problems	itic? (If needed, a	explain any answe	rs in Remarks)
SUMMARY OF FINDINGS – Attach site	map showing sam	pling point location	ons, transects	, important features, etc.
Hydrophytic Vegetation Present? Yes X	No			
Hydric Soil Present? Yes X	No	Is the Sampled Area within a Wetland?	Van V	No
Wetland Hydrology Present? Yes X	No	within a wetrantr	res_A_	
HYDROLOGY				
Wetland Hydrology Indicators:			Secondary Indica	ators (minimum of two required)
Primary Indicators (minimum of one is required, ch	eck all that apply)		Surface Soil	
Surface Water (A1)	True Aquatic Plants (E	314)		getated Concave Surface (B8)
	Hydrogen Sulfide Odd		Drainage Pa	
X Saturation (A3)	Oxidized Rhizosphere	es on Living Roots (C3)	Moss Trim L	
X Water Marks (B1)	Presence of Reduced			Water Table (C2)
Sediment Deposits (B2)	_ Recent Iron Reduction		Crayfish Bur	
Drift Deposits (B3)	Thin Muck Surface (C			isible on Aerial Imagery (C9)
Algal Mat or Crust (B4) Iron Deposits (B5)	Other (Explain in Rem	rarks)	Geomorphic	tressed Plants (D1)
Inundation Visible on Aerial Imagery (B7)			Shallow Aqu	
X Water-Stained Leaves (B9)			Microtopogra	
Aquatic Fauna (B13)			FAC-Neutral	
Field Observations:				
	Depth (inches):			
	Depth (inches): 14"			
Saturation Present? Yes X No (includes capillary fringe)	Depth (inches):0"	Wetland F	lydrology Preser	nt? Yes X No
Describe Recorded Data (stream gauge, monitorin	g well, aerial photos, pre	vious inspections), if ava	ilable:	
Remarks.				
Water-stained leaves and other indicators	of surface water influence v	vere observed within Wetl	and G.	

	Absolute	Dominant		Dominance Test worksheet:
Tree Stratum (Flot size 30')		Species?	<u>Status</u>	Number of Dominant Species
Acer rubrum	70	Yes	FAC	That Are OBL, FACW, or FAC:4 (A)
2 Pinus taeda		Yes	<u>FAC</u>	Total Number of Dominant
3,				Species Across All Strata:4(B)
4				December 1 December 1 Committee
5			_	Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)
6				That Are CBE, I AGW, OF AG.
7				Prevalence Index worksheet:
·		= Total Cov	er	Total % Cover of: Multiply by:
50% of total cover: <u>45</u>				OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')		20101 00101.		FACW species x 2 =
C : 1::	35	Yes	FAC	FAC species x 3 =
2 Liquidambar styraciflua	15	Yes	FAC	FACU species x 4 =
			-	UPL species x 5 =
3 Ligustrum sinense		No	FACU	Column Totals: (A) (B)
4 Ilex opaca		No	FACU	Columnit rotals(A)(B)
5Ulmus rubra		No	FAC	Prevalence Index = B/A =
6 Elaeagnus angustifolia	10	No	FACU	Hydrophytic Vegetation Indicators:
7				
8				1 - Rapid Test for Hydrophytic Vegetation
9				X 2 - Dominance Test is >50%
V		= Total Cov	~r	3 - Prevalence Index is ≤3 0 ¹
50% of total cover: _45				4 - Morphological Adaptations (Provide supporting
	20 /0 01	total cover	-	data in Remarks or on a separate sheet)
Herb Stratum (Plot size1.5 m)				Problematic Hydrophytic Vegetation¹ (Explain)
1				
2				1 s dio store of bushing and and contained bushes on contain
3				Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
4				Definitions of Four Vegetation Strata:
5				Definitions of Four Vegetation Strata.
				Tree - Woody plants, excluding vines, 3 in (7.6 cm) or
6,				more in diameter at breast height (DBH), regardless of
7				height
8			_	Sapling/Shrub - Woody plants, excluding vines, less
9				than 3 in DBH and greater than or equal to 3 28 ft (1
10				m) tall
11				Herb - All herbaceous (non-woody) plants, regardless
		= Total Cov	er	of size, and woody plants less than 3 28 ft tall:
50% of total cover:				
Woody Vine Stratum (Plot size: 1 m)				Woody vine - All woody vines greater than 3:28 ft in
				height
1				
2			_	
3				
4				Hydrophytic
5				Vegetation
		= Total Cov	er	Present? Yes X No
50% of total cover:	20% of	total cover.		
Remarks: (Include photo numbers here or on a separate s	sheet)			
Hydrophytic vegetation identified within Wetland	G.			

Depth	Matrix			x Feature				
(inches)	Color (moist)	%	Color (moist)	%	Type ¹	Loc²	Texture	Remarks Remarks
0-3	7.5 YR 4/3			_	-		SCL	
3-6	10 YR 5/4	100					Sand	
6-20	7.5 YR 5/1	70	10 YR 5/4	30	C	PL	CL	
		_			_	_		
				_	_			
	oncentration, D=Dep	oletion, RM:	Reduced Matrix, M	S=Maske	d Sand Gra	ins		: PL=Pore Lining, M=Matrix
lydric Soil Histosol	Indicators:		Dark Surface					dicators for Problematic Hydric Soils ³ : _ 2 cm Muck (A10) (MLRA 147)
Histic E _J Black Hi Hydroge Stratified 2 cm ML Depleted Thick De Sandy M MLRA Sandy G Sandy F Stripped	pipedon (A2) istic (A3) en Sulfide (A4) d Layers (A5) uck (A10) (LRR N) d Below Dark Surface ark Surface (A12) Mucky Mineral (S1) (I A 147, 148) Eleyed Matrix (S4) Redox (S5) I Matrix (S6) Layer (if observed)	LRR N,	Polyvalue Be Thin Dark Su Loamy Gleye X Depleted Ma Redox Dark: Depleted Dai Redox Depre Iron-Mangan MLRA 13 Umbric Surfa Piedmont Flo	How Surface (S9 ed Matrix trix (F3) Surface (F4 Surface essions (Fees Mass 6) codplain Sentace (F13)	(MLRA 1: (F2) (F3) (F7) (F12) (L (MLRA 136 (MLRA 136)	47, 148) .RR N, 6, 122) MLRA 14	148)	Coast Prairie Redox (A16) (MLRA 147, 148) Piedmont Floodplain Soils (F19) (MLRA 136, 147) Very Shallow Dark Surface (TF12) Other (Explain in Remarks) Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic
Туре:			_					
Depth (indemarks:	ches):		_				Hydric	Soil Present? Yes X No
Hydric	soil identified within	Wetland G,						

Project/SiteTTA Light Rail ?	Transit	City/	County: Orange		Sampling Date: 11-05-13
Applicant/Owner Triangle Tr					Sampling Point: Wetland GG - DP#
Investigator(s): Brandon Phill	lips, CHMM	Sect			
Landform (hillslope, terrace, e	tc) terrace	Local re	elief (concave, conv	ex, none): Concave	Slope (%): 0
Subregion (LRR or MLRA):	LRR P	at: 35.904593	Lone	-79.017924	Datum: NAD 83
Soil Map Unit Name Whi				NWI clas	
Are climatic / hydrologic condi					
					es" present? Yes X No
Are Vegetation, Soil _					
					ects, important features, etc.
			1		
Hydrophytic Vegetation Pres Hydric Soil Present?		No	Is the Sampled		
Wetland Hydrology Present?			within a Wetland	d? Yes _	X No
Domorlio:					Exhibit for Location of DP#17
HYDROLOGY					
Wetland Hydrology Indicat	ors;			Secondary In	dicators (minimum of two required)
Primary Indicators (minimum	of one is required; che				Soil Cracks (B6)
Surface Water (A1)	_	_ True Aquatic Plants			Vegetated Concave Surface (B8)
High Water Table (A2) Saturation (A3)	_	_ Hydrogen Sulfide Od _ Oxidized Rhizosphei			e Patterns (B10) m Lines (B16)
X Water Marks (B1)	_	_ Oxidized Knizosphel _ Presence of Reduce			son Water Table (C2)
Sediment Deposits (B2)	-	Recent Iron Reduction			Burrows (C8)
Drift Deposits (B3)	_	- _ Thin Muck Surface (•		on Visible on Aerial Imagery (C9)
Algai Mat or Crust (B4)	gumen	Other (Explain in Re	marks)		or Stressed Plants (D1)
Iron Deposits (B5)	-i-1(phic Position (D2)
Inundation Visible on Ae X_ Water-Stained Leaves (E					Aquitard (D3) ographic Relief (D4)
Aquatic Fauna (B13)	23)				utral Test (D5)
Field Observations:					star root (20)
Surface Water Present?	Yes No _X	Depth (inches):			
Water Table Present?		Depth (inches):			
Saturation Present?	Yes No X	Depth (inches):	Wet	land Hydrology Pre	esent? Yes X No
(includes capillary fringe) Describe Recorded Data (stre	eam daude, monitoring	well aerial photos pre	evious inspections)	if available:	
Descript (tost) do 3 Data (offi	oani gaage, mentering	won, dorial priotos, pri	ovious inspections,	, il dvelidesto.	
Remarks:	ves and other indicators of	f au-face mater influer e-		Waster J.C.C.	
Water-stattled leav	ves and odier indicators of	surface water influence	were observed within	ii welland GG.	
					1

	Absolute	Dominant		Dominance Test worksheet:
Tree Stratum (Plot size 30')		Species?	<u>Status</u>	Number of Dominant Species
Acer rubrum	60	Yes	<u>FAC</u>	That Are OBL, FACW, or FAC: (A)
2 <u>Liquidambar styraciflua</u>	40	Yes	_FAC_	Total Number of Dominant
3		-		Species Across All Strata: 7 (B)
4				
5				Percent of Dominant Species That Are OBL, FACW, or FAC 71 (A/B)
6				THAT NO SEC, TROVY, OF THE
7				Prevalence Index worksheet:
		= Total Cov	er	Total % Cover of: Multiply by:
50% of total cover: 50				OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')				FACW species x 2 =
A Ligaratura ainanaa	25	Yes	FACU	FAC species x 3 =
2. Quercus phellos	10	Yes	FAC	FACU species x 4 =
3 Fraxinus pennsylvanica		Yes	FACW	UPL species x 5 =
3 Fraxinus pennsyivanica		1 es	FACW	Column Totals: (A) (B)
4,				Column Fotals. (A)
5	_			Prevalence Index = B/A =
δ				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
8				
9				X 2 - Dominance Test is >50%
	45	= Total Cove	er	3 - Prevalence Index is ≤3 0 ¹
50% of total cover: 22.5				4 - Morphological Adaptations ¹ (Provide supporting
Herb Stratum (Plot size: 1.5 m)				data in Remarks or on a separate sheet)
1 Lonicera japonica	20	Yes	FAC	Problematic Hydrophytic Vegetation ¹ (Explain)
2 Fragaria virginiana	20	Yes	FACU	
0 C	10			¹ Indicators of hydric soil and wetland hydrology must
		No	FAC	be present, unless disturbed or problematic
4 Gaultheria procumbens	5		FACU	Definitions of Four Vegetation Strata:
5				Tree - Woody plants, excluding vines, 3 in (7.6 cm) or
6				more in diameter at breast height (DBH), regardless of
7				height
8				Sapling/Shrub - Woody plants, excluding vines, less
9				than 3 in DBH and greater than or equal to 3 28 ft (1
10				m) tall,
11.				Herb – All herbaceous (non-woody) plants, regardless
	55	= Total Cove	or .	of size, and woody plants less than 3.28 ft tall.
50% of total cover:27.5				
Woody Vine Stratum (Plot size _ 1 m)				Woody vine - All woody vines greater than 3.28 ft in
1				height
2				
			_	
3	_	_		
4	_			Hydrophytic
5				Vegetation
	:	= Total Cove	er	Present? Yes X No
50% of total cover:	20% of	total cover		
Remarks: (Include photo numbers here or on a separate s	neet.)			
Midweller and the sweet of the sweet of	300			
Hydrophytic vegetation identified within Wetland C	ıŭ.			

	Color (moist) 10 YR 3/2 10 YR 5/2	100 85	Color (moist) 	15	C	Loc ²	Clay Clay	Remarks
			7.5 YR 4/6	15	С	PL		
9-20	10 YR 5/2	85	7.5 YR 4/6	15	<u>C</u>	PL	Clay	
					_			
		_			_	=		
ydric Soil Indi	cators:	oletion, RM	=Reduced Matrix, M		d Sand Gra	ains.	Indicator	ore Lining, M=Matrix s for Problematic Hydric Soils ³ :
_ Thick Dark S	don (A2) (A3) ulfide (A4) yers (A5) (A10) (LRR N) elow Dark Surfac Gurface (A12) cy Mineral (S1) (I		Dark Surface Polyvalue Be Thin Dark Surface Loamy Gleye X Depleted Ma Redox Dark Depleted Da Redox Depre Iron-Mangan	elow Surfa urface (S9 ed Matrix trix (F3) Surface (I rk Surface essions (F ese Mass) (MLRA 1 (F2) F6) e (F7) 8)	47, 148)	148) Coas (M Piedr (M Very	Muck (A10) (MLRA 147) t Prairie Redox (A16) LRA 147, 148) nont Floodplain Soils (F19) LRA 136, 147) Shallow Dark Surface (TF12) r (Explain in Remarks)
_ Sandy Redo _ Stripped Mai			Umbric Surfa Piedmont Flo Red Parent I	oodplain S	oils (F19)	(MLRA 14	8) wetlan	ors of hydrophytic vegetation and d hydrology must be present, disturbed or problematic.
_	er (ii observed)							
	6):						Hydric Soil Pre	sent? Yes X No
Hydric soil	l identified within	Wetland Go	3.					

Project/Site TTA Light Rail Tra	ansit	City/C	County: Durham		Sampling Date: 06-18-13
Applicant/Owner Triangle Tran					Sampling Point Wetland H - DP#
Investigator(s): Brandon Phillip		Secti			
					Slope (%):_ 0
Subregion (LRR or MLRA):					Datum: NAD 83
Soil Map Unit Name: Chewa					
Are climatic / hydrologic conditic					
					present? Yes X No
Are Vegetation, Soil	, or Hydrology	naturally problem	atic? (If needo	ed, explain any answ	ers in Remarks)
SUMMARY OF FINDING	S – Attach site n	nap showing san	npling point loc	ations, transect	s, important features, etc.
I budu au budia Manatatura Duaran	No. Vo. V	No			
Hydrophytic Vegetation Preser Hydric Soil Present?		No	Is the Sampled Ar		
Wetland Hydrology Present?	Yes X	No	within a Wetland?	Yes X	No
Remarks: DP#7 (Wetlan	nd H) is representative of	a Wetland. See Approxi	imate Waters of the U.S	S Boundary map Exhib	it for Location of DP#7
					- 1
HYDROLOGY					
Wetland Hydrology Indicator	rs:			Secondary India	ators (minimum of two required)
Primary Indicators (minimum o		k all that apply)			
Surface Water (A1)		True Aquatic Plants (egetated Concave Surface (B8)
High Water Table (A2)	_	Hydrogen Sulfide Od		Drainage P	
Saturation (A3)		Oxidized Rhizospher			
X Water Marks (B1)		Presence of Reduce			Water Table (C2)
Sediment Deposits (B2)		Recent Iron Reduction	n in Tilled Soils (C6)		
Drift Deposits (B3)	_	Thin Muck Surface (0	27)	Saturation \	/isible on Aerial Imagery (C9)
Algal Mat or Crust (B4)	t-mail-19	Other (Explain in Rer	marks)		Stressed Plants (D1)
Iron Deposits (B5)				Geomorphi	
Inundation Visible on Aeria				Shallow Aq	
X Water-Stained Leaves (B9))				aphic Relief (D4)
Aquatic Fauna (B13)				FAC-Neutra	al Test (D5)
Field Observations:					
Surface Water Present?		_ Depth (inches):			
Water Table Present?		Depth (inches):			
Saturation Present? (includes capillary fringe)	Yes No X	Depth (inches):	Wetlar	nd Hydrology Prese	nt? Yes X No
Describe Recorded Data (strea	am gauge, monitoring	well, aerial photos, pre	vious inspections), if	available	
Remarks.	es and other indicators of	surface water influence	were observed within V	Watland U	
Water-Stattled leave	s and other indicators of	surface water infruence	were observed within t	Welland 11.	
					1

	Absolute Dominant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 30')	<u> % Cover Species? Status</u>	Number of Dominant Species
1		That Are OBL, FACW, or FAC: (A)
2		Total Number of Dominant
3		Species Across All Strata: 2 (B)
4		
5		Percent of Dominant Species That Are OBL, FACW, or FAC:
6		That Are OBE, FACIN, OF FAC. (A/B)
		Prevalence Index worksheet:
7		Total % Cover of: Multiply by:
500% of total cover	= Total Cover 20% of total cover:	OBL species x 1 =
		FACW species x 2 =
Sapling/Shrub Stratum (Plot size: 10')		FAC species x 3 =
1,		
2		FACU species x 4 =
3		UPL species x 5 =
4,		Column Totals: (A) (B)
5		Draudana Inday - DIA -
6,		Prevalence Index = B/A =
7		Hydrophytic Vegetation Indicators:
8		1 - Rapid Test for Hydrophytic Vegetation
		X 2 - Dominance Test is >50%
9,		3 - Prevalence Index is ≤3.01
FOW of hotal acres	= Total Cover 20% of total cover:	4 - Morphological Adaptations ¹ (Provide supporting
	20% of total cover	data in Remarks or on a separate sheet)
Herb Stratum (Plot size: 1.5 m)	5 Yes FAC	Problematic Hydrophytic Vegetation¹ (Explain)
1 Lonicera japonica		
2 Smilax rotundifolia	5 Yes FAC	Indicators of hydric soil and wetland hydrology must
3,		be present, unless disturbed or problematic
4		Definitions of Four Vegetation Strata:
5		Definitions of Four Vegetation Strata.
6		Tree – Woody plants, excluding vines, 3 in. (7_6 cm) or
		more in diameter at breast height (DBH), regardless of
7		height
8		Sapling/Shrub - Woody plants, excluding vines, less
9,		than 3 in DBH and greater than or equal to 3 28 ft (1
10		m) tall
11		Herb - All herbaceous (non-woody) plants, regardless
	= Total Cover	of size, and woody plants less than 3 28 ft tall
50% of total cover:5	20% of total cover: 2	Woody vine – All woody vines greater than 3.28 ft in
Woody Vine Stratum (Plot size 1 m		height
1,		
2		
3		
4		
		Hydrophytic
5		Vegetation Present? Yes X No
EOOK of total squar	= Total Cover 20% of total cover:	100 <u>121</u> 100 <u></u>
Remarks: (Include photo numbers here or on a separate	sheet)	
Hydrophytic vegetation identified within Wetland	Н.	
, , , , , , , , , , , , , , , , , , , ,		
		4
		a
		4.4

inches)	Matrix			x Features	_ 1	. 2	_	
	Color (moist)	%	Color (moist)		Type ¹	<u>Loc²</u>	<u>Texture</u>	Remarks
0-5	10 YR 6/4	100			_		Sand	
5-20	7.5 YR 4/1	80	7.5 YR 4/4		С	PL	Clay	
						-		
						=		
						_		
		_		_		_		
		oletion, RM:	Reduced Matrix, M	S=Masked S	Sand Gra	nins		Pore Lining, M=Matrix
ydric Soil li	ndicators:						Indicate	ors for Problematic Hydric Soils ³ :
_ Histosol (Dark Surface	(S7)			2 cr	m Muck (A10) (MLRA 147)
	ipedon (A2)		Polyvalue Be					ast Prairie Redox (A16)
_ Black His			Thin Dark Su			47, 148)		MLRA 147, 148)
	n Sulfide (A4)		Loamy Gleye		2)			dmont Floodplain Soils (F19)
	Layers (A5)		x Depleted Ma					MLRA 136, 147)
	ck (A10) (LRR N)		Redox Dark					y Shallow Dark Surface (TF12)
	Below Dark Surfac	ce (A11)	Depleted Da				Oth	er (Explain in Remarks)
	rk Surface (A12)		Redox Depre			DD N		
	ucky Mineral (S1) (. 147, 148)	LRR N,	Iron-Mangan MLRA 13		6 (F12) (I	LRR N,		
	leyed Matrix (S4)		Umbric Surfa	-	II RA 13	5. 122)	³ Indica	ators of hydrophytic vegetation and
	edox (S5)		Piedmont Flo	odplain Soi	ls (F19)	(MLRA 14		and hydrology must be present,
Stripped			Red Parent N					ss disturbed or problematic
	ayer (if observed)	1						
Depth (inc	hes):						Hydric Soil P	resent? Yes <u>X</u> No
emarks:								
Hydric	soil identified within	wetland H.						
,								

Project/Site TTA Light Rail Transit	City/County: Durham	Sampling Date: 12-10-13
Applicant/Owner Triangle Transit		State: NC Sampling Point: Wetland HHH -
D I DI'II' CID D	Section, Township, Range:	
Landform (hillslope, terrace, etc.) terrace		
		78.996505 Datum: NAD 83
Soil Map Unit Name: Cartecay and Chewacla soils,	0 to 2% slopes, frequently flooded	NIVA/I classification PEM
Are climatic / hydrologic conditions on the site typical		
Are Vegetation, Soil, or Hydrology		
Are Vegetation, Soil, or Hydrology	naturally problematic? (If needed,	explain any answers in Remarks)
SUMMARY OF FINDINGS – Attach site	map showing sampling point locati	ons, transects, important features, etc.
Hydrophytic Vegetation Present? Yes X	No	
	is the Sampled Area	Vac V No
	No Within a Wetland?	Yes <u>X</u> No
HYDROLOGY		
Wetland Hydrology Indicators:		Cocondany Indicators Iminimum of two requireds
Primary Indicators (minimum of one is required; che	ack all that apply?	Secondary Indicators (minimum of two required) Surface Soil Cracks (B6)
	True Aquatic Plants (B14)	Sparsely Vegetated Concave Surface (B8)
X High Water Table (A2)	_ Hydrogen Sulfide Odor (CI)	Drainage Patterns (B10)
X Saturation (A3)	Oxidized Rhizospheres on Living Roots (C3)	Moss Trim Lines (B16)
X Water Marks (B1)	Presence of Reduced Iron (C4)	Dry-Season Water Table (C2)
Sediment Deposits (B2)	Recent fron Reduction in Tilled Soils (C6)	Crayfish Burrows (C8)
Drift Deposits (B3)	_ Thin Muck Surface (C7)	Saturation Visible on Aerial Imagery (C9)
	Other (Explain in Remarks)	Stunted or Stressed Plants (D1)
Iron Deposits (B5) Inundation Visible on Aerial Imagery (B7)		Geomorphic Position (D2)
X Water-Stained Leaves (B9)		Shallow Aquitard (D3) Microtopographic Relief (D4)
Aquatic Fauna (B13)		FAC-Neutral Test (D5)
Field Observations:		
Surface Water Present? Yes No x	Depth (inches):	
Water Table Present? Yes X No	Depth (inches):2"	
	Depth (inches);0" Wetland	Hydrology Present? Yes X No
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring	well, aerial photos, previous inspections), if av	ailable:
Remarks: Water-stained leaves and other indicators of	f surface water influence were observed within Wet	and HHH.
THE SHALLOW TO THE SHALL SHALL THE SHALLOW O	Total and the second se	

	Absolute	Dominant I		Dominance Test worksheet:
Tree <u>Stratum</u> (Plot size:) 1		Species?		Number of Dominant Species That Are OBL, FACW, or FAC: (A)
2 3				Total Number of Dominant Species Across All Strata: 2 (B)
4 5				Percent of Dominant Species That Are OBL, FACW, or FAC:100 (A/B)
6				
7.:				Prevalence Index worksheet:
		= Total Cove		
50% of total cover:	20% of	total cover:_		FACW species x 2 =
Sapling/Shrub Stratum (Plot size: 10'				FAC species x 3 =
1				FACU species x 4 =
2				UPL species x 5 =
3,				
4				Column Totals (A) (B)
5,				Prevalence Index = B/A =
6	-			Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
8				X 2 - Dominance Test is >50%
9				3 - Prevalence Index is ≤3 0 ¹
		= Total Cove		4 - Morphological Adaptations ¹ (Provide supporting
50% of total cover:	20% of	total cover:_	_	data in Remarks or on a separate sheet)
Herb Stratum (Plot size: 1.5 m)				Problematic Hydrophytic Vegetation¹ (Explain)
1 Carex stricta			OBL	
2 Juncus effusus		Yes	FACW	¹ Indicators of hydric soil and wetland hydrology must
3 Lonicera japonica	10	<u>No</u>	FAC	be present, unless disturbed or problematic
4				Definitions of Four Vegetation Strata:
5		انست		
6				Tree - Woody plants, excluding vines, 3 in (7.6 cm) or more in diameter at breast height (DBH), regardless of
7				height
8				Sapling/Shrub - Woody plants, excluding vines, less
9	-			than 3 in DBH and greater than or equal to 3 28 ft (1 m) tall
11				Herb - All herbaceous (non-woody) plants, regardless
50% of total cover: 45	90	= Total Cove		of size, and woody plants less than 3 28 ft tall
Woody Vine Stratum (Plot size: 1 m)		total cover.		Woody vine - All woody vines greater than 3 28 ft in height.
1				
2		-		
3				
4				Hydrophytic
5,			_	Vegetation
50% of total cover:		= Total Cover total cover		rieseit! Ies A Ivo
Remarks: (Include photo numbers here or on a separate		total covol.		
Hydrophytic vegetation identified within Wetland				

-20	Color (moist) 7.5 YR 3/1		Color (moist)	<u>%</u>	Type'	_Loc²	Texture Clay	-	Remark	3
-20	7.5 YR 3/1		-	_			Clay			
							_			
								-		
					_			-		
							-			
ne C=Con	centration_D=Depl	etion RM=Re	duced Matrix, MS	= =Masked	Sand Gra	eins	² Location:	- Pl≃Pore Lin	ing, M=Matri	ìx
dric Soil In		otion, ravi–reo	daced Williams, Wie	- Masked	Ourid Oil	ano				Hydric Soils ³
Histosol (A	(1)	_	Dark Surface	(S7)				2 cm Muck (A10) (MLRA	\ 147)
Histic Epip			Polyvalue Bel		ce (S8) (M	LRA 147,		,	e Redox (A1	
Black Histi			Thin Dark Sur			47, 148)		(MLRA 14		
Hydrogen			Loamy Gleyed		=2)		_		oodplain Soi	ls (F19)
	ayers (A5)		X Depleted Mati		e)			(MLRA 1		(TE42)
	c(A10) (LRR N) Below Dark Surface		Redox Dark S Depleted Dark						v Dark Surfa ain in Remar	
	: Surface (A12)		Redox Depres				_	Other (Expid	mii iii romai	rcs)
	cky Mineral (S1) (L		Iron-Mangane			RR N,				
	47, 148)		MLRA 136							
	yed Matrix (S4)		Umbric Surfac	ce (F13) (I	MLRA 13	6, 122)				egetation and
Sandy Red			Piedmont Floo						ology must b	
Stripped M		-	Red Parent M	laterial (F2	21) (MLR	A 127, 147	') u	nless disturb	ed or proble	ematic
	yer (if observed):									
	`									
	es):		•				Hydric So	II Present?	Yes X	No
marks:										
Hydric se	oil identified within V	Wetland HHH.								
•										

Project/Site: TTA Light Rail To	ransit	City/C	County: Durham		Sampling Date: 01-21-14
Applicant/Owner: Triangle Tran	nsit			State: NC	Sampling Point: Wetland I - DP#4
Investigator(s): Brandon Phillip		Secti	on, Township, Range:		
Landform (hillslope, terrace, etc					Slope (%): 0
Subregion (LRR or MLRA):	LRR P La	35.954986	Long: -7	8.975612	
Soil Map Unit Name: Chew					
Are climatic / hydrologic condition					
		,			present? Yes X No
Are Vegetation, Soil					
SUMMARY OF FINDING		nap snowing san	npling point location	ons, transects	, important features, etc.
Hydrophytic Vegetation Prese	nt? Yes X	No	is the Sampled Area		
Hydric Soil Present?	Yes X	No	within a Wetland?	Yes X	No
Wetland Hydrology Present?	Yes X	No			
HYDROLOGY					
Wetland Hydrology Indicato	re.			Secondary Indica	ators (minimum of two required)
Primary Indicators (minimum o		k all that annly)		Surface Soil	
X Surface Water (A1)	or orie is required, chec	True Aquatic Plants (B14)		getated Concave Surface (B8)
X High Water Table (A2)	_	Hydrogen Sulfide Od		Drainage Pa	
X Saturation (A3)			es on Living Roots (C3)	Moss Trim L	
X Water Marks (B1)		Presence of Reduced			Water Table (C2)
Sediment Deposits (B2)	_	Recent Iron Reduction	n in Tilled Soils (C6)	Crayfish Bur	rows (C8)
Drift Deposits (B3)	_	Thin Muck Surface (0		Saturation V	isible on Aerial Imagery (C9)
Algal Mat or Crust (B4)	_	Other (Explain in Rer	narks)		tressed Plants (D1)
<pre>Iron Deposits (B5) Inundation Visible on Aeri</pre>	iol Impagary (P7)			Geomorphic	
X Water-Stained Leaves (B				Shallow Aqu Microtopogra	
Aquatic Fauna (B13)	5)			FAC-Neutral	
Field Observations:					1001 (20)
Surface Water Present?	Yes <u>X</u> No	Depth (inches): 3	п		
Water Table Present?		Depth (inches): 0	n		1
Saturation Present?		Depth (inches): 0		- - - - - - - - - - - - - - - - - - -	nt? Yes X No
(includes capillary fringe) Describe Recorded Data (stre	am daude monitoring	well aerial photos pre	vious inspections) if ava	ailahlo:	
2000 NO TOCOTAGA DATA (SEO	ant gaage, montoning	vvoir, dorrai priocos, pro	modes mopocardina), ii dve	indoto.	
Remarks:	4		1 1 141 387 4	17	
water-stained leave	es and other indicators of	surface water influence	were observed within Wetl	and I.	

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

Sampling Point: Wetland I - DP#46

ee Stratum (Plot size:30')			Indicator	Dominance Test worksheet:
Acer negundo		Species?	FAC	Number of Dominant Species That Are OBL, FACW, or FAC: (A)
Acer rubrum	40	Yes	FAC	Total Number of Dominant Species Across All Strata: 2 (B)
				Percent of Dominant Species That Are OBL, FACW, or FAC:
			_	Prevalence Index worksheet:
		= Total Cov	er	Total % Cover of:Multiply by:
50% of total cover: 40 _	_			OBL species x 1 =
pling/Shrub Stratum (Plot size: 10')				FACW species x 2 =
				FAC species x 3 =
				FACU species x 4 =
				UPL species x 5 =
				Column Totals: (A) (E
				Prevalence Index = B/A =
				Hydrophytic Vegetation Indicators:
				1 - Rapid Test for Hydrophytic Vegetation
				X 2 - Dominance Test is >50%
				3 - Prevalence Index is ≤3 0 ¹
50% of total cover:	20% of	= Total Cover	er	4 - Morphological Adaptations (Provide supporti
erb Stratum (Plot size: 1.5 m)	20 70 01	total cover.		data in Remarks or on a separate sheet)
y Stratum (Flot 5126.				Problematic Hydrophytic Vegetation¹ (Explain)
				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
				Definitions of Four Vegetation Strata:
				Demilitions of Four Vegetation Strata.
		_		Tree – Woody plants, excluding vines, 3 in. (7.6 cm) of more in diameter at breast height (DBH), regardless of height.
				Sapling/Shrub - Woody plants, excluding vines, less
				than 3 in DBH and greater than or equal to 3.28 ft (1
				m) tall
				Herb - All herbaceous (non-woody) plants, regardles
		= Total Cove		of size, and woody plants less than 3.28 ft tall
50% of total cover:) <u>body Vine Stratum</u> (Plot size: <u>1 m</u>)		total cover:	_	Woody vine - All woody vines greater than 3 28 ft in height
		_		
				Hydrophytic
	-	Total Cove		Vegetation Present? Yes X No
50% of total cover:				
marks: (Include photo numbers here or on a separate s	sheet.)			
Hydrophytic vegetation identified within Wetland	Ι.			

inches) 0-20	Matrix	01		<u>x Features</u>		1 2	- .	
0-20	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	Remarks
5-20	7.5 YR 5/2	60	5 YR 4/4	40	_ <u>C</u>	PL_	Clay	
						-		
		_		_				
une C-Con	centration D-Den	lotion DM-0	Reduced Matrix, MS	S-Mackod	Sand Gra	inc	² Location: DI:	=Pore Lini ng, M=Matri x
ydric Soil Inc		IGHOLL' KINI-L	reduced ividual, ivi	3-Maskeu	Sanu Gra	IIIIS		ors for Problematic Hydric Soils ³ :
_ Histosol (A			Dark Surface	e (S7)				m Muck (A10) (MLRA 147)
_ Histic Epip			Polyvalue Be		e (S8) (M	LRA 147,		ast Prairie Redox (A16)
_ Black Histi			Thin Dark Su					(MLRA 147, 148)
_ Hydrogen			Loamy Gleye	ed Matrix (F				edmont Floodplain Soils (F19)
_ Stratified L			x Depleted Ma					(MLRA 136, 147)
	(A10) (LRR N)	- (0.44)	Redox Dark					ry Shallow Dark Surface (TF12)
	Below Dark Surfac (Surface (A12)	e (A11)	Depleted Date				Oth	ner (Explain in Remarks)
_	cky Mineral (S1) (L	RR N	X Redox Depre			RR N		
	47, 148)	-1 (1 (1)	MLRA 13		5 (1 12) (1			
	yed Matrix (S4)		Umbric Surfa		MLRA 136	6, 122)	³Indic	ators of hydrophytic vegetation and
_ Sandy Red			Piedmont Flo					and hydrology must be present,
_ Stripped M			Red Parent N	/laterial (F2	21) (MLR /	127, 147) unle	ss disturbed or problematic
	yer (if observed):							
			-					
Depth (inche	es):		_				Hydric Soil F	Present? Yes X No
e marks :								
Hydric soil	identified within W	etland I.						
,								

Project/Site TTA Light Rail Transit	City/County:	Durham	Sampling Date 12-10-13
Applicant/Owner Triangle Transit		State: NC	Sampling Point: Wetland III - DP#3
	Section, Towns		
_andform (hillslope, terrace, etc.):terrace			
Subregion (LRR or MLRA): LRR P			
Soil Map Unit Name: Cartecay and Chewac			
Are climatic / hydrologic conditions on the site			
Are Vegetation, Soil, or Hydrol			
Are Vegetation, Soil, or Hydrol			
SUMMARY OF FINDINGS – Attach			
			1
	S X No Is the S	ampled Area	
Hydric Soil Present? Ye Wetland Hydrology Present? Ye		a Wetland? Yes X	No
Domorles:	sentative of a Wetland. See Approximate Wa		W
HYDROLOGY			
Wetland Hydrology Indicators:			cators (minimum of two required)
Primary Indicators (minimum of one is require		Surface So	
Surface Water (A1)	True Aquatic Plants (B14)		egetated Concave Surface (B8)
X High Water Table (A2) X Saturation (A3)	Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Livi	Drainage P ng Roots (C3) Moss Trim	
X Water Marks (B1)	Presence of Reduced Iron (C4		1 Water Table (C2)
Sediment Deposits (B2)	Recent Iron Reduction in Tilled		
Drift Deposits (B3)	Thin Muck Surface (C7)	Saturation	Visible on Aerial Imagery (C9)
Algal Mat or Crust (B4)	Other (Explain in Remarks)		Stressed Plants (D1)
Iron Deposits (B5)			c Position (D2)
 Inundation Visible on Aerial Imagery (B7X_ Water-Stained Leaves (B9))	Shallow Aq	uitard (D3) raphic Relief (D4)
Aquatic Fauna (B13)		FAC-Neutra	
Field Observations:			., , , , , , , , , , , , , , , , , , ,
Surface Water Present? Yes N	lo X Depth (inches):		
	lo Depth (inches): 2"		
	lo Depth (inches):0"	Wetland Hydrology Prese	ent? Yes X No
(includes capillary fringe) Describe Recorded Data (stream gauge, mor	nitoring well, aerial photos, previous insr		-
Remarks:	cators of surface water influence were obser	ved within Wetland III	
Water-standed leaves and outer inter-	butors of surface water infraence were observed	YOU WIGHT WOULDED.	
			1
			-

T 0: 1 (5) 1 : 20	Absolute	Dominant		Dominance Test worksheet:
Tree Stratum (Plot size: 30') 1 Fraxinus pennsylvanica	<u>% Cover</u>	Species? Yes	Status	Number of Dominant Species
			FACW	That Are OBL, FACW, or FAC: 4 (A)
Acer rubrum		Yes	FAC	Total Number of Dominant
<u> </u>				Species Across All Strata: 4 (B)
				Percent of Dominant Species
				That Are OBL, FACW, or FAC: 100 (A/B
				Prevalence Index worksheet:
	50	= Total Cove	er	Total % Cover of: Multiply by:
50% of total cover: 25	20% of	total cover_	10	OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')				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
			_	X 2 - Dominance Test is >50%
				3 - Prevalence Index is ≤3 0¹
50% of total cover:	20% of	= Total Cove	et.	4 - Morphological Adaptations (Provide supporting
	20 /0 01	total cover.		data in Remarks or on a separate sheet)
Course stuists	30	37	OBL	Problematic Hydrophytic Vegetation (Explain)
T	20	Yes Yes	FACW	
Juncus effusus		-		¹ Indicators of hydric soil and wetland hydrology must
Lonicera japonica		No		be present, unless disturbed or problematic
				Definitions of Four Vegetation Strata:
				Tree Monday plants evaluating vince 2 in 77 8 cm o
				Tree – Woody plants, excluding vines, 3 in (7 6 cm) o more in diameter at breast height (DBH), regardless of
				height
		-		Sapling/Shrub - Woody plants, excluding vines, less
		-		than 3 in DBH and greater than or equal to 3.28 ft (1
0				m) tall
1				Herb - All herbaceous (non-woody) plants, regardless
	60	= Total Cove	er	of size, and woody plants less than 3.28 ft tall
50% of total cover30	20% of	total cover:_	12	Marchanian Allangasharings greater then 2.39 ft in
Voody Vine Stratum (Plot size: 1 m				Woody vine – All woody vines greater than 3 28 ft in height.
				Hydrophytic Vegetation
		= Total Cove	er	Present? Yes X No
50% of total cover:				
temarks: (Include photo numbers here or on a separate s				
Camaria. (massas prists numbers here or on a sopulate s				
Hydrophytic vegetation identified within Wetland I	П.			

Depth Matrix	Redox Features	1 . 2 -	
inches) Color (moist) %	Color (moist) % Typ		
0-20 7.5 YR 3/1 100			<u> </u>
vpe: C=Concentration D=Depletion RM	Reduced Matrix, MS=Masked Sand	Grains ² Locat	tion: PL=Pore Lining, M=Matrix
ydric Soil Indicators:			Indicators for Problematic Hydric Soils ³ :
_ Histosol (A1)	Dark Surface (S7)	0.041.05.447.440	2 cm Muck (A10) (MLRA 147)
_ Histic Epipedon (A2)	Polyvalue Below Surface (S8		Coast Prairie Redox (A16)
_ Black Histic (A3) _ Hydrogen Sulfide (A4)	Thin Dark Surface (S9) (MLF Loamy Gleyed Matrix (F2)	(A 147, 148)	(MLRA 147, 148) Piedmont Floodplain Soils (F19)
Hydrogen Sunde (A4) Stratified Layers (A5)	X Depleted Matrix (F3)		(MLRA 136, 147)
2 cm Muck (A10) (LRR N)	Redox Dark Surface (F6)		Very Shallow Dark Surface (TF12)
_ Depleted Below Dark Surface (A11)	Depleted Dark Surface (F7)		Other (Explain in Remarks)
_ Thick Dark Surface (A12)	Redox Depressions (F8)		
Sandy Mucky Mineral (S1) (LRR N,	Iron-Manganese Masses (F1	2) (LRR N,	
MLRA 147, 148)	MLRA 136)		
_ Sandy Gleyed Matrix (S4)	Umbric Surface (F13) (MLRA		³ Indicators of hydrophytic vegetation and
_ Sandy Redox (S5)	Piedmont Floodplain Soils (F		wetland hydrology must be present,
_ Stripped Matrix (S6)	Red Parent Material (F21) (N	ILRA 127, 147)	unless disturbed or problematic
estrictive Layer (if observed):			
Type:	_		
Depth (inches):		Hydr	ic Soil Present? Yes <u>X</u> No
emarks:			
Hydric soil identified within Wetland III			
riyunc son identined within wettand in			

Applicant/Owner	Project/Site: TTA Light Rail T	.alisit	City/C	Dounty: Durham		Sampling Date: 06-18-13
Andform (hillslope, terrace, etc.): terrace Concar Elef (concave, convex, none) Concave	Applicant/Owner: Triangle Tran	ısit				
Subminimation (LRR or MLRA) LRR P	nvestigator(s): Brandon Phillip	ps, CHMM	Secti			
Are climate Unit Name Chewacia loam. 0 to 2% slopes, frequently flooded New Climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.) Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X No Is the Sampled Area within a Wetland? Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present?	andform (hillslope, terrace, etc					
Are climate Unit Name Chewacia loam. 0 to 2% slopes, frequently flooded New Climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.) Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X No Is the Sampled Area within a Wetland? Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present? Yes X No Is the Sampled Area within a Wetland? Wetland Hydrology Present?						
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no explain in Remarks.) Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No (If needed, explain any answers in Remarks.) SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, ethydrophytic Vegetation Present? Yes X No Within a Wetland? Yes X No Within a Wetland? Yes X No Within a Wetland? Yes X No Wetland Hydrology Present? Yes X No Yes X Yes X No Yes X X No Yes X Yes X X Yes X Yes X No Yes X Yes X X Yes						
Are Vegetation						
Are Vegetation						
Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present? Wetland Hydrology Present at two fa Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#8 Surface Soil Cracks (B6)						
Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present? Wetland Hydrology Present						
Hydric Soil Present? Wetland Hydrology Present? Wetland Hydrology Presents PP#8 (Wetland J) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#8 Py#8 (Wetland J) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#8 Py#8 (Wetland J) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#8 Py#8 (Wetland J) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#8 Py#8 (Wetland J) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#8 Py#8 (Wetland J) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#8 Py#8 (Wetland J) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#8 Py#8 (Wetland J) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#8 Py#8 (Wetland J) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#8 Py#8 (Wetland J) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#8 Py#8 (Wetland J) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#8 Py#8	- INDING	- Attach site ii	Tap showing san	point rocati	ons, transect	s, important reatures, etc.
Hydric Soil Present? Yes X No within a Wetland? Yes X No DP#8 (Wetland J) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#8 HYDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one is required, check all that apply) Surface Water (A1) Surface Soil Cracks (B6) Surface Water (A1) Hydrogen Sulfide Odor (C1) Drainage Patterns (B10) X Saturation (A3) Oxidized Rhizospheres on Living Roots (C3) Water Marks (B1) Presence of Reduced Iron (C4) Sediment Deposits (B3) Prith Muck Surface (C7) Algal Mat or Crust (B4) Iron Deposits (B3) Thin Muck Surface (C7) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B7) Water-Stained Leaves (B9) Aquatic Fauna (B13) Field Observations: Surface Water Present? Yes No Depth (inches): Water Table Present? Yes No Depth (inches): Water Table Present? Yes X No Depth (inches): Water Table Present?				Is the Sampled Area		
Permarks DP#8 (Wetland J) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#8 HYDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that appty) Surface Soil Cracks (B6) Surface Water (A1) True Aquatic Plants (B14) Sparsely Vegetated Concave Surface (B8) Hydrogen Sulfide Odor (C1) Saturation (A3) Water Table (A2) Hydrogen Sulfide Odor (C1) Sediment Deposits (B1) Presence of Reduced Iron (C4) Dry-Season Water Table (C2) Sediment Deposits (B2) Recent Iron Reduction in Tilled Soils (C6) Trin Muck Surface (C7) Saturation Visible on Aerial Imagery (B7) Magal Mat or Crust (B4) Inundation Visible on Aerial Imagery (B7) Water-Stained Leaves (B9) Aquatic Fauna (B13) Field Observations: Surface Water Present? Yes No Depth (inches): Water Table Present? Yes No Depth (inches): Water Table Present? Yes No Depth (inches): Water Table Present? Yes No Depth (inches): Becondary Indicators (minimum of two requires Secondary Indicators (B14) Sparsely Vegetated Concave (B8) Sparsely Vegetated Concave (B8) Moss Trim Lines (B16) Sparsely Vegetated Concave (B8) Moss Trim Lines (B16) Dry-Season Water Table (C2) Crayfish Bur					Yes X	No
HYDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) Surface Water (A1) True Aquatic Plants (B14) Spansely Vegetated Concave Surface (B8) X High Water Table (A2) Hydrogen Sulfide Odor (C1) Saturation (A3) Oxidized Rhizospheres on Living Roots (C3) Moss Trim Lines (B16) X Water Marks (B1) Presence of Reduced Iron (C4) Drainage Patterns (B10) Crayfish Burrows (C8) Prift Deposits (B2) Recent Iron Reduction in Titled Soils (C6) Thin Muck Surface (C7) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B7) Water-Stained Leaves (B9) Aquatic Fauna (B13) Field Observations: Surface Water Present? Yes No Depth (inches): Water Table Present? Yes No Depth (inches): "Secondary Indicators (minimum of two required Secondary Indicators (minimum of Iwo required Secondary Indicators (Indicators Indicators		Y es X	No			
Primary Indicators (minimum of one is required; check all that apply) Surface Water (A1) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) 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) Field Observations: Surface Water (A1) Surface Water (A1) True Aquatic Plants (B14) Drainage Patterns (B16) Drainage Patterns (B10) Moss Trim Lines (B16) Drainage Patterns (B10) Moss Trim Lines (B16) Dray-Season Water Table (C2) Crayfish Burrows (C8) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Saturation Visible on Aerial Imagery (C9) Shallow Aquitard (D3) Microtopographic Relief (D4) FAC-Neutral Test (D5) Field Observations: Surface Water Present? Yes No Depth (inches): Water Table Present? Yes X No Depth (inches): 6"	HYDROLOGY					
Surface Water (A1)	Wetland Hydrology Indicator	rs:			Secondary Indic	ators (minimum of two required)
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) Field Observations: Surface Water Table (A2) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Roots (C3) Moss Trim Lines (B16) Dry-Season Water Table (C2) Crayfish Burrows (C8) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Saturation Visible on Aerial Imagery (B7) Shallow Aquitard (D3) Microtopographic Relief (D4) FAC-Neutral Test (D5) Field Observations: Surface Water Present? Yes No Depth (inches): Gement Living Roots (C3) Moss Trim Lines (B10) Moss Trim Lines (B10) Moss Trim Lines (B10) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Saturation Visible on Aerial Imagery (C9) Saturation Visible on Aerial Imagery (D1) Saturation Visible on Aerial Imagery (D2) Saturation Visible on Aerial Imagery (D1) Saturation Visible on Aerial Imagery (D2) Saturatio	Primary Indicators (minimum o	of one is required, chec	k all that apply)		Surface Soi	Cracks (B6)
X Saturation (A3)	Surface Water (A1)		True Aquatic Plants (B14)	Sparsely Ve	getated Concave Surface (B8)
X Water Marks (B1) Presence of Reduced Iron (C4) Dry-Season Water Table (C2) Sediment Deposits (B2) Recent Iron Reduction in Tilled Soils (C6) Crayfish Burrows (C8) Drift Deposits (B3) Thin Muck Surface (C7) Saturation Visible on Aerial Imagery (C9) Algal Mat or Crust (B4) Other (Explain in Remarks) Stunted or Stressed Plants (D1) Iron Deposits (B5) Geomorphic Position (D2) Inundation Visible on Aerial Imagery (B7) Shallow Aquitard (D3) X Water-Stained Leaves (B9) Microtopographic Relief (D4) Aquatic Fauna (B13) FAC-Neutral Test (D5) Field Observations: Water Table Present? Yes No Depth (inches): Water Table Present? Yes No Depth (inches):						
Sediment Deposits (B2) Recent Iron Reduction in Tilled Soils (C6) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Algal Mat or Crust (B4) Other (Explain in Remarks) Stunted or Stressed Plants (D1) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B7) Shallow Aquitard (D3) Shallow Aquitard (D3) Aquatic Fauna (B13) FAC-Neutral Test (D5) FAC-Neutral Test (D5) Start on Visible on Aerial Imagery (B7) Shallow Aquitard (D3) Shallow Aquitard (D3) Shallow Aquitard (D4) FAC-Neutral Test (D5) FAC-Neutral Test (D5) FAC-Neutral Test (D5) Shallow Aquitard (D3) Shallow Aquitard (D3) Shallow Aquitard (D3) Shallow Aquitard (D3) Shallow Aquitard (D4) Shallow Aquitard (D5) Shallow Aquitard (D4) Shallow Aquitard (D5)						
Drift Deposits (B3)						
Algal Mat or Crust (B4) Other (Explain in Remarks) Stunted or Stressed Plants (D1) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B7) Shallow Aquitard (D3) Microtopographic Relief (D4) Aquatic Fauna (B13) FAC-Neutral Test (D5) Surface Water Present?						
Inundation Visible on Aerial Imagery (B7) X Water-Stained Leaves (B9) Aquatic Fauna (B13) Field Observations: Surface Water Present? Yes No _X Depth (inches): Water Table Present? Yes _X No _Depth (inches):						
X Water-Stained Leaves (B9) Microtopographic Relief (D4) Aquatic Fauna (B13) FAC-Neutral Test (D5) Factor (D5) Factor	Iron Deposits (B5)				Geomorphic	: Position (D2)
Aquatic Fauna (B13) FAC-Neutral Test (D5) Field Observations: Surface Water Present?						
Field Observations: Surface Water Present? Yes No Depth (inches): Water Table Present? Yes No Depth (inches):		9)				
Surface Water Present? Yes No _x Depth (inches): Water Table Present? Yes _x No Depth (inches):					FAC-Neutra	Litest (D2)
Water Table Present? Yes X No Depth (inches): 6"		Yes No x	Depth (inches):			
	Saturation Present?				Hydrology Prese	nt? Yes X No
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:						

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

Sampling Point: Wetland J - DP#8

5 O (D	Absolute	Dominant		Dominance Test worksheet:
Tree Stratum (Plot size: 30')		Species?		Number of Dominant Species
Acer rubrum Fraxinus pennsylvanica		Yes	FACW	That Are OBL, FACW, or FAC: Total Number of Dominant Species Across All Strata: 3 (B)
				Percent of Dominant Species
				That Are OBL, FACW, or FAC: 100 (A/I
				Prevalence Index worksheet:
		= Total Cov	er	Total % Cover of: Multiply by:
50% of total cover: 50 _	20% of	total cover:	20	OBL species x 1 =
apling/Shrub Stratum (Plot size: 10')				FACW species x 2 =
Acer rubrum				FAC species x 3 = FACU species x 4 =
				UPL species x 5 =
				Column Totals: (A) (E
				Prevalence Index = B/A =
				Hydrophytic Vegetation Indicators:
				1 - Rapid Test for Hydrophytic Vegetation
			_	x 2 - Dominance Test is >50%
	4	T-1-1-0		3 - Prevalence Index is ≤3 0¹
50% of total cover: _5		= Total Covi total cover:	2 2	4 - Morphological Adaptations¹ (Provide supporti
erb Stratum (Plot size:1.5 m)		202011 00 7 01.		data in Remarks or on a separate sheet)
Lonicera japonica	10	Yes	FAC	Problematic Hydrophytic Vegetation ¹ (Explain)
				4
				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) more in diameter at breast height (DBH), regardless cheight
				Sapling/Shrub - Woody plants, excluding vines, less
				than 3 in DBH and greater than or equal to 3 28 ft (1 m) tall
	10 :	Total Cov		Herb – All herbaceous (non-woody) plants, regardles of size, and woody plants less than 3 28 ft tall
50% of total cover: 5 600dy Vine Stratum (Plot size: 1 m)				Woody vine - All woody vines greater than 3.28 ft in height.
				Hydrophytic
				Vegetation
50% of total cover:		= Total Covi total cover:		Present? Yes <u>X</u> No
emarks: (Include photo numbers here or on a separate s	sheet)			
Hydrophytic vegetation identified within Wetland	J.			

DepthMatrix			oth needed to document the indicator or confirm Redox Features					
inches)	Color (moist)	%	Color (moist)	%	Type ¹	_Loc ²	<u>Texture</u>	Remarks
0-3	10 YR 5/6	75	10 YR 5/2	25	C	PL_	Sandy clay	
3-20	10 YR 4/2		10 YR 5/2	50	RM		Clay	
		letion, RM	=Reduced Matrix, MS	S=Maskec	Sand Gra	ins		e Lining, M=Matrix
ydric Soil I _ Histosol	ndicators:		Dark Surface					for Problematic Hydric Soils ³ : luck (A10) (MLRA 147)
Black Hi Hydroge Stratified 2 cm Mu Depleted Thick Da Sandy M MLRA Sandy G Sandy R Stripped	pipedon (A2) stic (A3) n Sulfide (A4) I Layers (A5) ck (A10) (LRR N) I Below Dark Surface irk Surface (A12) lucky Mineral (S1) (L 147, 148) leyed Matrix (S4) edox (S5) Matrix (S6) ayer (if observed):	.RR N,	Polyvalue Be Thin Dark Su Loamy Gleye X Depleted Ma Redox Dark S Depleted Dar Redox Depre Iron-Mangan WIRA 13 Umbric Surfa Piedmont Flo	rface (S9) od Matrix (trix (F3) Surface (F k Surface essions (F) ese Masse 6) ce (F13) (odplain S	(MLRA 14 F2) 6) (F7) 3) es (F12) (L MLRA 136 bils (F19) (47, 148) .RR N, 6, 122) MLRA 14	(MLF Piedmo (MLF Very SI Other (i	Prairie Redox (A16) RA 147, 148) ant Floodplain Soils (F19) RA 136, 147) hallow Dark Surface (TF12) Explain in Remarks) s of hydrophytic vegetation and hydrology must be present, isturbed or problematic.
Type	ayer (ii observed).							
	:hes);						Hydric Soil Press	ent? Yes X No
emarks							Thyunto con Trock	one. 100 <u>21</u> 110
Hydric sc	il identified within Wo	etland J,						

Project/Site TTA Light Rail Transit	City/County: Durha n	n	Sampling Date 06-18-13
Applicant/Owner: Triangle Transit		State: NC	Sampling Point: Wetland K - DP#
	Section, Township, F		
Landform (hillslope, terrace, etc.): <u>terrace</u>	Local relief (concave, co	onvex, none); Concave	Slope (%)
Subregion (LRR or MLRA); LRR P Lat	35.955265	ong: -78.976843	Datum: NAD 83
Soil Map Unit Name: Chewacla loam, 0 to 2% slope	s, frequently flooded	NWI classif	ication: PF01
Are climatic / hydrologic conditions on the site typical f			
Are Vegetation, Soil, or Hydrology	significantly disturbed? Ar	e "Normal Circumstances"	present? Yes X No
Are Vegetation, Soil, or Hydrology			
SUMMARY OF FINDINGS – Attach site n			
Attail site ii	Tap showing bankping point	- Toodtollo, trailocot	o, important router oo, oto
Hydrophytic Vegetation Present? Yes X	Is the Samoi	ed Area	
	within a Wet	land? Yes X	No
Box orly	a Wetland. See Approximate Waters of t		
HYDROLOGY			
Wetland Hydrology Indicators:		Secondary Indic	ators (minimum of two required)
Primary Indicators (minimum of one is required, chec	k all that apply)	Surface Soi	
	True Aquatic Plants (B14)		egetated Concave Surface (B8)
	Hydrogen Sulfide Odor (C1)	Drainage Pa	
X Saturation (A3)	Oxidized Rhizospheres on Living Ro		
	Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils		Water Table (C2)
Sediment Deposits (B2) Drift Deposits (B3)	Thin Muck Surface (C7)		/isible on Aerial Imagery (C9)
	Other (Explain in Remarks)		Stressed Plants (D1)
Iron Deposits (B5)		Geomorphic	
Inundation Visible on Aerial Imagery (B7)		Shallow Aqu	
X Water-Stained Leaves (B9)			raphic Relief (D4)
Aquatic Fauna (B13)		FAC-Neutra	al Test (D5)
Field Observations:			
Surface Water Present? Yes No _X			- 1
	Depth (inches):		
Saturation Present? Yes X No (includes capillary fringe)	Depth (inches): 0"	Wetland Hydrology Prese	ent? Yes X No
Describe Recorded Data (stream gauge, monitoring)	well, aerial photos, previous inspectio	ns), if available:	
Remarks: Water-stained leaves and other indicators of	surface water influence were observed w	ithin Wetland K.	
1.00			
			1
			4

		Dominant		Dominance Test worksheet:
Tree Stratum (Plot size: 30')	<u>% Cover</u>	<u>Species?</u>	Status	Number of Dominant Species
1 Liquidambar styraciflua	40	Yes	FAC	That Are OBL, FACW, or FAC: (A)
2				Total Number of Dominant
3				Species Across All Strata:
4				Species Advess All Strate.
				Percent of Dominant Species
5			_	That Are OBL, FACW, or FAC: (A/B)
6				Prevalence Index worksheet:
7,				Total % Cover of: Multiply by:
	_40 =	Total Cove	er	
50% of total cover: <u>20</u>	20% of	total cover:	88	OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')				FACW species x 2 =
1				FAC species x 3 =
2				FACU species x 4 =
				UPL species x 5 =
3				Column Totals: (A) (B)
4				Column Fotals. (A)
5				Prevalence Index = B/A =
6				Hydrophytic Vegetation Indicators:
7				
8				1 - Rapid Test for Hydrophytic Vegetation
			_	X 2 - Dominance Test is >50%
9				3 - Prevalence Index is ≤3 0¹
500/ Ch + 1		Total Cove		4 - Morphological Adaptations ¹ (Provide supporting
50% of total cover:	20% of 1	total cover:		data in Remarks or on a separate sheet)
Herb Stratum (Plot size 1.5 m)				Problematic Hydrophytic Vegetation (Explain)
Saururus cernuus	10	Yes	OBL	Problematic Hydrophytic vegetation (Exprain)
2 Smilax rotundifolia	10	Yes	FAC	
3 Aster divaricatus		Yes	NL	¹ Indicators of hydric soil and wetland hydrology must
4 Persicaria hydropiper	4.0	Yes	OBL	be present, unless disturbed or problematic
				Definitions of Four Vegetation Strata:
5			_	Tree - Woody plants, excluding vines, 3 in (7 6 cm) or
6	-			more in diameter at breast height (DBH), regardless of
7				height
8,				Sapling/Shrub - Woody plants, excluding vines, less
9,				than 3 in DBH and greater than or equal to 3 28 ft (1
10				m) tall
			_	
11,	40			Herb – All herbaceous (non-woody) plants, regardless
50%		Total Cove		of size, and woody plants less than 3 28 ft tall
50% of total cover:	20% of t	total cover:_	8	Woody vine – All woody vines greater than 3,28 ft in
Woody Vine Stratum (Plot size: 1 m				height
1				
2,				
3				
			_	
4,			_	Hydrophytic
5				Vegetation
	=	Total Cove	er	Present? Yes X No
50% of total cover:		total cover:_		
	20% of t			
Remarks: (Include photo numbers here or on a separate				
Remarks: (Include photo numbers here or on a separate				
Remarks: (Include photo numbers here or on a separate separate within Wetland	sheet)	dicator of "N	L" is for th	ne unlisted species.
	sheet)	dicator of "N	L" is for th	ne unlisted species.
	sheet)	dicator of "N	L" is for th	ne unlisted species.
	sheet)	dicator of "N	L" is for th	ne unlisted species.
	sheet)	dicator of "N	L" is for th	ne unlisted species.
	sheet)	dicator of "N	L" is for th	ne unlisted species.
	sheet)	dicator of "N	L" is for th	ne unlisted species.

ches)	Color (moist)	%	Color (moist)	%	Type1	1.004	Texture	Characteristics
20						Loc ²		Remarks
	7.5 YR 5/2	60	5 YR 4/4	40		PL	Clay	
				_	_	_		
						_		
					_			
				=	_	\equiv		
	centration, D=Deple	tion, RM=R	educed Matrix, M	S=Masked	Sand Gra	nins		=Pore Lining, M=Matrix
dric Soil Ind							Indicat	ors for Problematic Hydric Soils ³ :
Histosol (A	· ·		Dark Surfac					m Muck (A10) (MLRA 147)
Histic Epipe			Polyvalue Be					ast Prairie Redox (A16)
Black Histic	• •		Thin Dark Si			47, 148)		(MLRA 147, 148)
Hydrogen S			Loamy Gley		-2)			edmont Floodplain Soils (F19)
Stratified La			X Depleted Ma		(n)			(MLRA 136, 147)
	(A10) (LRR N) elow Dark Surface i	(841)	Redox Dark					ry Shallow Dark Surface (TF12) ner (Explain in Remarks)
	Surface (A12)	(ATT)	Depleted Da Redox Depre				00	rer (⊏xprain in Remarks)
	ky Mineral (S1) (LR	R N	Tron-Mangar			RR N		
MLRA 14		11,	MLRA 13		12) (r 12) (i	-1313 14,		
	ed Matrix (S4)		Umbric Surfa		VILRA 130	5 122)	³ India	ators of hydrophytic vegetation and
Sandy Red			Piedmont Fl					and hydrology must be present,
Stripped Ma			Red Parent I					ss disturbed or problematic
	er (if observed):							·
Гуре								
Depth (inche	98)						Hydric Soil F	Present? Yes X No
narks:							Tiyani con i	100 <u>A.</u> 10
	identified within Wet	land K.						

Project/Site TTA Light Rail	Transit	City/	County Durham		Sampling Date 07-16-13
Applicant/Owner Triangle T					Sampling Point: Wetland N - DP#1
_andform (hillslope, terrace,					Slope (%):_0
Subregion (LRR or MLRA): _					Datum: NAD 83
Soil Map Unit Name Ch					
Are climatic / hydrologic conc					
					present? Yes X No
Are Vegetation, Soil _					
					s, important features, etc.
SOMMAR TOP FINDI	105 - Attach site	map snowing sai	Inpling point rocal	tions, transect	s, important reatures, etc.
Hydrophytic Vegetation Pre		No	Is the Sampled Are	a	
Hydric Soil Present?		No	within a Wetland?		No
Wetland Hydrology Present Remarks:	? Yes X	No			
HYDROLOGY					
Wetland Hydrology Indica	ators:			Secondary Indic	ators (minimum of two required)
Primary Indicators (minimur		eck all that apply)		Surface Soi	
X Surface Water (A1)		_ True Aquatic Plants			egetated Concave Surface (B8)
X High Water Table (A2)		Hydrogen Sulfide O			atterns (B10)
X Saturation (A3)			resion Living Roots (C3		
X Water Marks (B1)	_	_ Presence of Reduce			Water Table (C2)
Sediment Deposits (B2) _		on in Tilled Soils (C6)	Crayfish Bu	
Drift Deposits (B3)	_	_ Thin Muck Surface (/isible on Aerial Imagery (C9)
Algal Mat or Crust (B4) Iron Deposits (B5)		_ Other (Explain in Re	marks)		Stressed Plants (D1) : Position (D2)
Inundation Visible on A	erial Imagery (B7)			Shallow Aq	
X Water-Stained Leaves					raphic Relief (D4)
Aquatic Fauna (B13)				FAC-Neutra	
Field Observations:					
Surface Water Present?					
Water Table Present?		Depth (inches):			
Saturation Present? (includes capillary fringe)	Yes X No	Depth (inches):	Wetland	d Hydrology Prese	nt? Yes X No
Describe Recorded Data (st	tream gauge, monitoring	well, aerial photos, pr	evious inspections), if a	vailable:	
Description					
Remarks: Water-stained le	eaves and other indicators of	of surface water influence	were observed within W	etland N.	

	Absolute			Dominance Test worksheet:
Tree Stratum (Plot size 30')		Species?		Number of Dominant Species
Celtis occidentalis				That Are OBL, FACW, or FAC3 (A)
2 Ulmus americana				Total Number of Dominant
3				Species Across All Strata: (B)
4,				Percent of Dominant Species
5				That Are OBL, FACW, or FAC: (A/B)
6				
7				Prevalence Index worksheet:
	55	= Total Cove	r	Total % Cover of: Multiply by:
50% of total cover: <u>27.5</u>	20% of	total cover_	11	OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')				FACW species x 2 =
1 Ligustrum sinense	25	Yes	FACU	FAC species x 3 =
2				FACU species x 4 =
3				UPL species x 5 =
4				Column Totals: (A) (B)
5				
				Prevalence Index = B/A =
6				Hydrophytic Vegetation Indicators:
8				1 - Rapid Test for Hydrophytic Vegetation
8				X 2 - Dominance Test is >50%
9				3 - Prevalence Index is ≤3 0 ¹
12.5		= Total Cove		4 - Morphological Adaptations (Provide supporting
50% of total cover: 12.5	20% of	total cover:_		data in Remarks or on a separate sheet)
Herb Stratum (Plot size 1.5 m)		37	ODI	Problematic Hydrophytic Vegetation¹ (Explain)
1 Saururus cernuus		Yes	OBL	
2 Smilax rotundifolia	10	Yes	FAC	¹ Indicators of hydric soil and wetland hydrology must
3				be present, unless disturbed or problematic
4				Definitions of Four Vegetation Strata:
5				Definitions of Four Fogetation Strata.
6				Tree – Woody plants, excluding vines, 3 in (7.6 cm) or
7				more in diameter at breast height (DBH), regardless of height
8				
9				Sapling/Shrub – Woody plants, excluding vines, less
10				than 3 in DBH and greater than or equal to 3 28 ft (1 m) tall.
11				
1.5	20	T		Herb - All herbaceous (non-woody) plants, regardless
50% of total cover:10		= Total Cove		of size, and woody plants less than 3 28 ft tall
	20% 01	total cover_		Woody vine - All woody vines greater than 3 28 ft in
Woody Vine Stratum (Plot size 1 m				height
1				
2				
3		_		
4				Hydrophytic
5				Vegetation
		= Total Cove	r	Present? Yes X No
50% of total cover:	20% of	total cover		
Remarks: (Include photo numbers here or on a separate s	heet)			
	T			
Hydrophytic vegetation identified within Wetland N	٧.			

Depth	Matrix			ox Feature:	5			
inches)	Color (moist)	%	Color (moist)	%	Type ¹	_Loc ²	<u>Texture</u>	Remarks
0-9	7.5 YR 4/2	80	2.5 YR 3/6		_C	PL	Clay	
9-20	7.5YR 4/3	100		_			Clay	
						_		
				_				<u></u>
				_	_	_		
				-		_		
	oncentration, D=De Indicators:	pletion, RM=	Reduced Matrix, M	S=Maskec	Sand Gra	ains		=Pore Lining, M=Matrix_ tors for Problematic Hydric Soils ³ :
Black Hi Hydroge Stratified 2 cm ML Depleted Thick Da Sandy N MLRA Sandy G Sandy R Stripped	pipedon (A2) stic (A3) stric (A3) stric (A4) d Layers (A5) lock (A10) (LRR N) d Below Dark Surface ark Surface (A12) ducky Mineral (S1) (A 147, 148) Sleyed Matrix (S4) tedox (S5)	LRR N,	Polyvalue Born Thin Dark Single Born Dark Single Born Depleted Mark Depleted Dark Redox Depriment Iron-Mangar MLRA 13 Umbric Surfa Piedmont Flagrand Red Parent I	urface (S9) ed Matrix (atrix (F3) Surface (F ark Surface essions (F6) ace (F13) (oodplain S	(MLRA 1 F2) (6) (F7) 8) es (F12) (I MLRA 13 oils (F19)	47, 148) LRR N, 6, 122) (MLRA 14	Pio Ve Ot Ot 3Indio 8) wet	past Prairie Redox (A16) (MLRA 147, 148) edmont Floodplain Soils (F19) (MLRA 136, 147) ery Shallow Dark Surface (TF12) her (Explain in Remarks) cators of hydrophytic vegetation and land hydrology must be present, ess disturbed or problematic.
	_ayer (if observed)							
	choc):						Lhydria Cail I	Brananta Van V
emarks:	ches):		_				Hydric Soil i	Present? Yes X No
Hydric s	oil identified within V	Vetland N.						

Project/Site: TTA Light Rail Transit	City/County Durham		Sampling Date: 12-11-13
Applicant/Owner: Triangle Transit		State: NC	Sampling Point: Wetland NNN - DP#3
Investigator(s): Brandon Phillips, CHMM			
Landform (hillslope, terrace, etc.): terrace			
Subregion (LRR or MLRA): LRR P Lat: _3			
Soil Map Unit Name: White Store sandy loam, 6 to 10%			
Are climatic / hydrologic conditions on the site typical for the			
Are Vegetation, Soil, or Hydrology			
Are Vegetation, Soil, or Hydrology			
SUMMARY OF FINDINGS – Attach site map	showing sampling point locati	ons, transects	, important features, etc.
Hydrophytic Vegetation Present? Yes X	No		
Hydric Soil Present? Yes X			No
Wetland Hydrology Present? Yes X	Within a Welland:	163	
HYDROLOGY			
Wetland Hydrology Indicators:		Socondary Indica	ators (minimum of two required)
Primary Indicators (minimum of one is required; check al	(I that anniv)	Surface Soil	
	ue Aquatic Plants (B14)		getated Concave Surface (B8)
_	vdrogen Sulfide Odor (C1)	Drainage Pa	
	kidized Rhizospheres on Living Roots (C3)		
	esence of Reduced Iron (C4)		Water Table (C2)
Sediment Deposits (B2) Re	ecent Iron Reduction in Tilled Soils (C6)	Crayfish Bur	
	in Muck Surface (C7)		sible on Aerial Imagery (C9)
	her (Explain in Remarks)		tressed Plants (D1)
Iron Deposits (B5)		Geomorphic	The state of the s
Inundation Visible on Aerial Imagery (B7) X_ Water-Stained Leaves (B9)		Shallow Aqu Microtopogra	
Aquatic Fauna (B13)		FAC-Neutral	
Field Observations:			
Surface Water Present? Yes No _x_ D	epth (inches):		
Water Table Present? Yes No _X D	epth (inches):		
Saturation Present? Yes X No D	epth (inches):0" Wetland	Hydrology Preser	nt? Yes_X No
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well	, aerial photos, previous inspections), if av	ailable:	
Remarks: Water-stained leaves and other indicators of surf	face water influence were observed within Wet	tland NNN.	

	Absolute Dominant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 30')	% Cover Species? Status	Number of Dominant Species
1		That Are OBL, FACW, or FAC:(A)
2		Total Number of Dominant
3		Species Across All Strata: (B)
4		Percent of Dominant Species
5,		That Are OBL, FACW, or FAC: (A/B)
6		Prevalence Index worksheet:
T ₂		Total % Cover of:Multiply by:
500	= Total Cover	OBL species x 1 =
	20% of total cover:	FACW species x 2 =
Sapling/Shrub Stratum (Plot size: 10')		FAC species x 3 =
1		FACU species x 4 =
2		UPL species x 5 =
3		Column Totals: (A) (B)
4		Column Fotals(A)(B)
5		Prevalence Index = B/A =
6		Hydrophytic Vegetation Indicators:
7		X 1 - Rapid Test for Hydrophytic Vegetation
8		2 - Dominance Test is >50%
9		3 - Prevalence Index is ≤3.01
	= Total Cover	4 - Morphological Adaptations (Provide supporting
	20% of total cover:	data in Remarks or on a separate sheet)
Herb Stratum (Plot size: 1,5 m)	0.01	Problematic Hydrophytic Vegetation ¹ (Explain)
1_Carex stricta	70 Yes OBL	
2 Juncus effusus	30 Yes FACW	¹ Indicators of hydric soil and wetland hydrology must
3		be present, unless disturbed or problematic.
4		Definitions of Four Vegetation Strata:
5		
6		Tree – Woody plants, excluding vines, 3 in [7.6 cm] or more in diameter at breast height (DBH), regardless of
7		height.
8		Sanling/Chrub Moody plants excluding vines loss
9		Sapling/Shrub – Woody plants, excluding vines, less than 3 in DBH and greater than or equal to 3 28 ft (1
10		m) tall
11		Herb – All herbaceous (non-woody) plants, regardless
	100 = Total Cover	of size, and woody plants less than 3 28 ft tall
50% of total cover:50	20% of total cover: 20	Manda sina All woods win on greater then 2.39 ft in
Woody Vine Stratum (Plot size: 1 m		Woody vine - All woody vines greater than 3.28 ft in height.
1		
2		
3		
4		
5		Hydrophytic Vegetation
	= Total Cover	Present? Yes <u>X</u> No
50% of total cover:	20% of total cover:	
Remarks: (Include photo numbers here or on a separate		I.
() and a coparation of the coparation		
Hydrophytic vegetation identified within Wetland	NNN	

epth	Matrix			(Features				
nches)	Color (moist)	%(Color (moist)	%	Type ¹	Loc ²	Texture	e Remarks
)-20	7.5 YR 5/2	80	5 YR 5/6	20	C	PL_	Clay	_
							_	_
							-	
				$\overline{}$		_	-	
			-				-	_
							-	
							-	
ype: C=Con vdric Soil In	centration, D=Depl	etion, RM=Red	luced Matrix, MS	=Masked	Sand Gra	ins		: PL=Pore Lining, M=Matrix dicators for Problematic Hydric Soils ³
			Davida Constant	(07)				
_ Histosol (# _ Histic Epip		_	_ Dark Surface _ Polyvalue Bel		~ (CO) /M	I DA 147		_ 2 cm Muck (A10) (MLRA 147) _ Coast Prairie Redox (A16)
. Filsuc Epip . Black Histi		_	_ Polyvalue Bel _ Thin Dark Sur				140)	(MLRA 147, 148)
	Sulfide (A4)		_ Loamy Gleye			-7, 1-10 <i>j</i>		Piedmont Floodplain Soils (F19)
Stratified L			Depleted Mati		-,		_	(MLRA 136, 147)
	(A10) (LRR N)		 _ Redox Dark S		6)			_ Very Shallow Dark Surface (TF12)
	Below Dark Surface		Depleted Dark					Other (Explain in Remarks)
	Surface (A12)		_ Redox Depres					
	cky Mineral (S1) (L	RR N, _	_ Iron-Mangane		s (F12) (I	RR N,		
	147, 148)		MLRA 136				,	3
	yed Matrix (S4)	_	_ Umbric Surfac					Indicators of hydrophytic vegetation and
Sandy Red Stripped M		_	Piedmont FlooRed Parent M					wetland hydrology must be present, unless disturbed or problematic_
	yer (if observed):		_ Tred Falentivi	ateriai (F2	z I) (IVILIXA	127, 147	1	unless distarbed of problematic
	yor (ii oboorrou).							
	es)						Lh relation 6	Sail Bragant2 Van V No
	es)						Hyunes	Soil Present? Yes X No
marks:								
Hydric so	oil identified within V	Wetland NNN						
,								

Project/Site: TTA Light Rail Transit	City/County	Durham		Sampling Date: 07-17-13
Applicant/Owner Triangle Transit			State: NC	Sampling Point: Wetland O - DP#11
D 1 DINI CTT D 5	Section, Tow			
Landform (hillslope, terrace, etc.) <u>terrace</u>	Local relief (con	cave, convex, nor	ne): Concave	Slope (%):_ 0
				Datum: NAD 83
Soil Map Unit Name: Chewacla loam, 0 to 2% slopes, fre				
Are climatic / hydrologic conditions on the site typical for th				
Are Vegetation, Soil, or Hydrology				
Are Vegetation, Soil, or Hydrology				
SUMMARY OF FINDINGS – Attach site map				
Attach site map		point rocutic	ins, transcott	, important reatures, etc.
Hydrophytic Vegetation Present? Yes X	I IS THE	Sampled Area		
Hydric Soil Present? Wetland Hydrology Present? Yes X	44171111	a Wetland?	Yes X	No
Remarks: DP#11 (Wetland O) is representative of a V				
HYDROLOGY				
Wetland Hydrology Indicators:			Secondary Indica	ators (minimum of two required)
Primary Indicators (minimum of one is required, check all	that apply)		Surface Soil	
	e Aquatic Plants (B14)			getated Concave Surface (B8)
	drogen Sulfide Odor (C1)		Drainage Pa	
X Saturation (A3) Oxi	dized Rhizospheres on Li	ving Roots (C3)	Moss Trim L	
	sence of Reduced Iron (C			Water Table (C2)
	cent Iron Reduction in Tille	ed Soils (C6)	Crayfish Bur	
	n Muck Surface (C7)			sible on Aenal Imagery (C9)
Algal Mat or Crust (B4) Oth Oth Oth	er (Explain in Remarks)			tressed Plants (D1)
Inundation Visible on Aerial Imagery (B7)			GeomorphicShallow Aqu	
X Water-Stained Leaves (B9)			Microtopogra	
Aquatic Fauna (B13)			FAC-Neutral	
Field Observations:				
Surface Water Present? Yes No _X De	epth (inches):			
Water Table Present? Yes X No De				
Saturation Present? Yes X No De (includes capillary fringe)	epth (inches): 5"	Wetland H	ydrology Preser	t? Yes_X No
Describe Recorded Data (stream gauge, monitoring well,	aerial photos, previous in	spections), if ava	ilable:	
Remarks: Water-stained leaves and other indicators of surfa	ce water influence were obs	erved within Wetla	ınd O.	

	Absolute	Dominant		Dominance Test worksheet:
Tree Stratum (Plot size: 30'		Species?	Status	Number of Dominant Species That Are ORL EACING or EAC. 4 (A)
		Yes		That Are OBL, FACW, or FAC: 4 (A)
2 Liquidambar styraciflua 3.	35		FAC	Total Number of Dominant Species Across All Strata: 5 (B)
5				Percent of Dominant Species That Are OBL, FACW, or FAC: 80 (A/B)
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
500		= Total Cov		OBL species x 1 =
50% of total cover: <u>50</u>	20% of	total cover:	20	FACW species x 2 =
Sapling/Shrub Stratum (Plot size: 10') 1 Acer rubrum	1.5	V	EAC	FAC species x 3 =
12	15	Yes	FACW	FACU species x 4 =
2. Ulmus americana		Yes	FACW	UPL species x 5 =
3		7		
4				Column Totals: (A) (B)
5			_	Prevalence Index = B/A =
6				Hydrophytic Vegetation Indicators:
7,				1 - Rapid Test for Hydrophytic Vegetation
8,				X 2 - Dominance Test is >50%
9				3 - Prevalence Index is ≤3 0 ¹
		= Total Cov		4 - Morphological Adaptations ¹ (Provide supporting
50% of total cover: 15	20% of	total cover:	6	data in Remarks or on a separate sheet)
Herb Stratum (Plot size: 1.5 m				Problematic Hydrophytic Vegetation¹ (Explain)
1_Smilax rotundifolia	5	Yes	_FAC_	Problematic Hydrophytic Vegetation (Explain)
2. Carex sp.	5	Yes	V	The first constitution of the state of the s
3				Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
4				Definitions of Four Vegetation Strata:
5				Deminions of Four Vegetation Strata.
6				Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or
7				more in diameter at breast height (DBH), regardless of height
8				
9				Sapling/Shrub - Woody plants, excluding vines, less than 3 in DBH and greater than or equal to 3 28 ft (1
10				m) tall
11.		= Total Cov	er	Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
50% of total cover: 5	20% of	total cover:	2	Woody vine - All woody vines greater than 3.28 ft in
Woody Vine Stratum (Plot size: 1 m				height.
1				
2				
3				
4				Hydrophytic
5				Vegetation
		= Total Cov	er	Present? Yes X No
50% of total cover:	20% of	total cover:		
Remarks: (Include photo numbers here or on a separate	sheet)			
Hydrophytic vegetation identified within Wetland	O. A variable	indicator rat	ing "V" is f	or the unidentified species.
			<i>U</i>	

epth	Matrix			x Features		-		
nches)	Color (moist)	%	Color (moist)	%	_Type ¹	Loc ²	Texture	Remarks
0-10	2.5 YR 5/2	80	10 YR 4/6		C	PL	Clay	
10-20	10 YR 4/1	60	10 YR 4/4	40		PL	Clay	
					\equiv	\equiv		
		letion, RM	=Reduced Matrix, MS	S=Masked	Sand Gra	ins.		Pore Lining, M=Matrix
ydric Soil I _ Histosol	ndicators:		Dark Surface	(07)				ors for Problematic Hydric Soils ³ ; n Muck (A10) (MLRA 147)
Histic Ep Black Hi Hydroge Stratified 2 cm Mu Depleted Thick Da Sandy M MLRA Sandy G Sandy R Stripped	pipedon (A2)	_RR N,	Polyvalue Be Thin Dark St Loamy Gleye X Depleted Ma Redox Dark: Depleted Dai X Redox Depre Iron-Mangan MLRA 13 Umbric Surfa Piedmont Flo	How Surface (S9) and Matrix (F atrix (F3) Surface (F6) A Surface assions (F8) asse Masse boodplain So	(MLRA 1 F2) 6) (F7) 8) 9s (F12) (I MLRA 13 bils (F19)	47, 148) LRR N, 3, 122) (MLRA 14	148) Coa (I)	ast Prairie Redox (A16) MLRA 147, 148) dmont Floodplain Soils (F19) MLRA 136, 147) y Shallow Dark Surface (TF12) er (Explain in Remarks) ators of hydrophytic vegetation and hydrology must be present, as disturbed or problematic
Туре:								
Depth (ind	ches):		_				Hydric Soil P	resent? Yes <u>X</u> No
Tiyun	c soil identified withir	Wolland	•					

Project/Site: TTA Light Rail Transit	City/County:	Durham		Sampling Date: 1-22-14
Applicant/Owner: Triangle Transit			State: NC	Sampling Point Wetland OOO - DP#45
Investigator(s): Brandon Phillips, CHMM				
Landform (hillslope, terrace, etc.): basin				
				Datum: NAD 83
Soil Map Unit Name: White Store clay loam, 2 to 10%				
Are climatic / hydrologic conditions on the site typical fo				
Are Vegetation, Soil, or Hydrology				
Are Vegetation, Soil, or Hydrology	naturally problematic?	(If needed, e	xplain any answe	ers in Remarks.)
SUMMARY OF FINDINGS – Attach site m	ap showing sampling	point locatio	ns, transects	s, important features, etc.
Hydrophytic Vegetation Present? Yes X	No to the			
	is trie	Sampled Area	Van V	No
	No	i a vvetiand r	res_A	No
LIVER OLOGY				
HYDROLOGY Western Hydrology Indicators			Secondary India	ators /minimum of two required)
Wetland Hydrology Indicators:	all that apply			ators (minimum of two required)
Primary Indicators (minimum of one is required, check X Surface Water (A1)			Surface Soil	getated Concave Surface (B8)
	True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1)		Spailsely vei	
	Oxidized Rhizospheres on Li		Moss Trim L	, , ,
	Presence of Reduced Iron (0			Water Table (C2)
	Recent Iron Reduction in Till		Crayfish Bur	
	Thin Muck Surface (C7)		Saturation V	isible on Aerial I magery (C9)
	Other (Explain in Remarks)			tressed Plants (D1)
Iron Deposits (B5)				Position (D2)
Inundation Visible on Aerial Imagery (B7) X_ Water-Stained Leaves (B9)			Shallow Aqu	aphic Relief (D4)
Aquatic Fauna (B13)			FAC-Neutral	
Field Observations:				1001 (20)
Surface Water Present? YesX No	Depth (inches): 1"			
Water Table Present? Yes X No				
Saturation Present? Yes X No		Wetland H	ydrology Presei	nt? Yes X No
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring w	all aprial photos provious in	enactions) if avai	ilahla:	
Describe Recorded Data (stream gauge, monitoring w	eli, aeriai pilotos, pilevious li	spections), ii avai	liable.	
Remarks	C	1 1411 337 4	1000	
Water-stained leaves and other indicators of s	urface water influence were obs	served within Wetla	ind OOO.	
				1

	Absolute Dominant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 30')	<u> % Cover Species? Status</u>	Number of Dominant Species
1		That Are OBL, FACW, or FAC:(A)
2		Total Number of Dominant
3		Species Across All Strata: (B)
		Specification of the strate.
4		Percent of Dominant Species
5		That Are OBL, FACW, or FAC:(A/B)
6		Prevalence Index worksheet:
7		
	= Total Cover	Total % Cover of: Multiply by:
50% of total cover:	20% of total cover:	OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')		FACW species x 2 =
1		FAC species x 3 =
		FACU species x 4 =
2		UPL species x 5 =
3		
4		Column Totals: (A) (B)
5,		Prevalence Index = B/A =
6,		Hydrophytic Vegetation Indicators:
7		
8		X 1 - Rapid Test for Hydrophytic Vegetation
		2 - Dominance Test is >50%
9		3 - Prevalence Index is ≤3 01
50%	= Total Cover	4 - Morphological Adaptations¹ (Provide supporting
	20% of total cover:	data in Remarks or on a separate sheet)
Herb Stratum (Plot size: 1.5 m		Problematic Hydrophytic Vegetation ¹ (Explain)
1Typha latifolia	100 Yes OBL	i Tobiematic Hydrophytic Vegetation (Explain)
2		4
3		¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
4		
		Definitions of Four Vegetation Strata:
5		Tree - Woody plants, excluding vines, 3 in (7.6 cm) or
6		more in diameter at breast height (DBH), regardless of
7		height
8		Sapling/Shrub - Woody plants, excluding vines, less
9		than 3 in DBH and greater than or equal to 3 28 ft (1
10		m) tall
11		Herb - All herbaceous (non-woody) plants, regardless
***	100 = Total Cover	of size, and woody plants less than 3.28 ft tall
50% of total cover 50	20% of total cover: 20	or size, and woody plants loss than 6-20 train
Woody Vine Stratum (Plot size: 1 m	20 % of total cover	Woody vine - All woody vines greater than 3 28 ft in
		height
1,		
2		
3		
4		Hydrophytic
5		Vegetation
	= Total Cover	Present? Yes <u>X</u> No
50% of total cover:		
Remarks: (Include photo numbers here or on a separate :		
Tromains. Iniciado prioto numbera nere or on a separate :	SHOOL)	
Hydrophytic vegetation identified within Wetland	000.	

epth Matrix		x Features	2	
nches) Color (moist) %	Color (moist)	%Type ¹ L	oc² Textur	e Remarks
0-20 10 YR 5/2 60	10 YR 5/8		L Clay	
				WE 100
			_	
pe: C=Concentration, D=Depletion,	RM=Reduced Matrix, MS	S=Masked Sand Grains		: PL=Pore Lining, M=Matrix.
dric Soil Indicators:		(27)		dicators for Problematic Hydric Soils
Histosol (A1) Histic Epipedon (A2)	Dark Surface	e (S7) Flow Surface (S8) (MLR 4		_ 2 cm Muck (A10) (MLRA 147) _ Coast Prairie Redox (A16)
Black Histic (A3)		irface (S9) (MLRA 147 ,		(MLRA 147, 148)
Hydrogen Sulfide (A4)	Loamy Gleye			Piedmont Floodplain Soils (F19)
Stratified Layers (A5)	X Depleted Ma			(MLRA 136, 147)
2 cm Muck (A10) (LRR N)	Redox Dark	Surface (F6) 'k Surface (F7)		Very Shallow Dark Surface (TF12)
Depleted Below Dark Surface (A11 Thick Dark Surface (A12)	<u>X</u> Redox Depre	· ·	_	_ Other (Explain in Remarks)
Sandy Mucky Mineral (S1) (LRR N		ese Masses (F12) (LRR	N,	
MLRA 147, 148)	MLRA 13	6)		
Sandy Gleyed Matrix (S4)		ce (F13) (MLRA 136, 12		³ Indicators of hydrophytic vegetation and
Sandy Redox (S5) Stripped Matrix (S6)		odplain Soils (F19) (ML Material (F21) (MLRA 12		wetland hydrology must be present, unless disturbed or problematic.
		richeridi (i 21) (MEIVA 12	7, 147)	unless disturbed of problematic.
trictive Laver (if observed):				
ype:			Hydric	Soil Present? Yes <u>X</u> No
ype: Depth (inches):			Hydric	Soil Present? Yes <u>X</u> No
ype: Depth (inches): narks:			Hydric	Soil Present? Yes <u>X</u> No
ype: lepth (inches):			Hydric	Soil Present? Yes <u>X</u> No
ype: Depth (inches): narks:			Hydric	Soil Present? Yes <u>X</u> No
ype: Depth (inches): narks:			Hydric	Soil Present? Yes <u>X</u> No
ype: Depth (inches): narks:			Hydric	Soil Present? Yes <u>X</u> No
ype: Depth (inches): narks:			Hydric	Soil Present? Yes <u>X</u> No
ype:epth (inches):earks:			Hydric	Soil Present? Yes <u>X</u> No
ype: Pepth (inches): parks:			Hydric	Soil Present? Yes <u>X</u> No
ype: Depth (inches): narks:			Hydric	Soil Present? Yes <u>X</u> No
ype: depth (inches): darks:			Hydric	Soil Present? Yes <u>X</u> No
ype: Pepth (inches): parks:			Hydric	Soil Present? Yes <u>X</u> No
ype: Pepth (inches): parks:			Hydric	Soil Present? Yes <u>X</u> No
ype: Depth (inches): narks:			Hydric	Soil Present? Yes <u>X</u> No
Type:			Hydric	Soil Present? Yes <u>X</u> No
Fype: Depth (inches): narks:			Hydric	Soil Present? Yes <u>X</u> No
Strictive Layer (if observed): Type: Depth (inches): narks: Hydric soil identified within Wetlar			Hydric	Soil Present? Yes <u>X</u> No
Type:			Hydric	Soil Present? Yes <u>X</u> No
Type:			Hydric	Soil Present? Yes <u>X</u> No

Project/Site: TTA Light Rail Transit		City/C	County: Durham		Sampling Date: 07-17-13
Applicant/Owner Triangle Transit					Sampling Point: Wetland P - DP#
nvestigator(s): Brandon Phillips, CHM	М	Section	on, Township, Range		
_andform (hillslope, terrace, etc.) terra					
Subregion (LRR or MLRA): LRR P					Datum NAD 83
Soil Map Unit Name Chewacla loan					
Are climatic / hydrologic conditions on th					
Are Vegetation, Soil, or					
Are Vegetation, Soil, or					
SUMMARY OF FINDINGS – A	ttach site ma	p snowing san	ipiing point iocatio	ons, transect	s, important reatures, etc.
Hydrophytic Vegetation Present?	Yes X	No	Is the Sampled Area		
Hydric Soil Present?	Yes X		within a Wetland?	Yes X	No
Wetland Hydrology Present?	Yes X	No			
HYDROLOGY					
Wetland Hydrology Indicators:				Secondary India	cators (minimum of two required)
Primary Indicators (minimum of one is	required; check হ	ill that apply)		Surface So	
Surface Water (A1)	1T	ue Aquatic Plants (B14)		egetated Concave Surface (B8)
High Water Table (A2)		ydrogen Sulfide Od		Drainage P	atterns (B10)
X Saturation (A3)			es on Living Roots (C3)	Moss Trim	
X Water Marks (B1)		resence of Reduced			1 Water Table (C2)
Sediment Deposits (B2)			n in Tilled Soils (C6)	Crayfish Bu	
Drift Deposits (B3) Algal Mat or Crust (B4)		nin Muck Surface (C			Visible on Aerial Imagery (C9) Stressed Plants (D1)
Algal Mat of Crust (B4) Iron Deposits (B5)	_ 0	ther (Explain in Rer	Haliks)		c Position (D2)
Inundation Visible on Aerial Image	ery (B7)			Shallow Aq	
X Water-Stained Leaves (B9)	, ,				aphic Relief (D4)
Aquatic Fauna (B13)				FAC-Neutra	al Test (D5)
Field Observations:					
Surface Water Present? Yes					
		Depth (inches):			40.34
Saturation Present? Yes (includes capillary fringe)	No L	Depth (inches):0"	Wetland	Hydrology Prese	ent? Yes X No
Describe Recorded Data (stream gaug	je, monitoring wel	l, aerial photos, pre	vious inspections), if ava	ailable:	
Remarks:					
Water-stained leaves and oth	er indicators of sur	face water influence	were observed within Wetl	and P.	
					0 0

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

Sampling Point: Wetland P - DP#12

	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum (Plot size:30')	<u>% Cover</u>	Species?	Status	Number of Dominant Species
1Acer rubrum		Yes	FAC	That Are OBL, FACW, or FAC:4 (A)
2,				Total Number of Dominant
3				Species Across All Strata: 4 (B)
4				(2)
5				Percent of Dominant Species That Are OBL FACW or FAC: 100 (A/B)
				That Are OBL, FACW, or FAC: 100 (A/B)
6				Prevalence Index worksheet:
7-			$\overline{}$	Total % Cover of: Multiply by:
		= Total Cove		OBL species x 1 =
50% of total cover: <u>10</u>	20% of	total cover:	4	
Sapling/Shrub Stratum (Plot size: 10')				FACW species x 2 =
1 Fraxinus pennsylvanica	10	Yes	FACW	FAC species x 3 =
2				FACU species x 4 =
3				UPL species x 5 =
4				Column Totals: (A) (B)
5				5 4 4 4 5 6 6
6				Prevalence Index = B/A =
				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
8				x 2 - Dominance Test is >50%
9				3 - Prevalence Index is ≤3 01
		= Total Cove		4 - Morphological Adaptations (Provide supporting
50% of total cover: _5_	20 % of	total cover:		data in Remarks or on a separate sheet)
Herb Stratum (Plot size: 1.5 m)		••		Problematic Hydrophytic Vegetation¹ (Explain)
1_Lonicera japonica	5	Yes	FAC	Problematic Hydrophytic Vegetation (Explain)
2. Campsis radicans	5	Yes	FAC	1
3				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
4				
5				Definitions of Four Vegetation Strata:
				Tree – Woody plants, excluding vines, 3 in (7.6 cm) or
6				more in diameter at breast height (DBH), regardless of
7				height
8				Sapling/Shrub - Woody plants, excluding vines, less
9				than 3 in DBH and greater than or equal to 3 28 ft (1
10				m) tall
11,				Herb - All herbaceous (non-woody) plants, regardless
	10 =	= Total Cove	er	of size, and woody plants less than 3 28 ft tall.
50% of total cover:5	20% of	total cover:	2	Woody vine - All woody vines greater than 3.28 ft in
Woody Vine Stratum (Plot size 1 m				height
1				
2				
3				
4				Hydrophytic
5				Vegetation
500 61 11		= Total Cove		Fresent: Tes A NO
50% of total cover:		total cover:_	-	
Remarks: (Include photo numbers here or on a separate s	sheet)			
Hydrophytic vegetation identified within Wetland l	p			
Tryotophytic regention fuelitation within wettaild i				
l/				

	Matrix			x Features				
iches)	Color (moist)	%	Color (moist)	%	Type ¹	Loc²	Texture	Remarks
-7	10 YR 5/2	75	5 YR 4/6	25		PL_	SCL	
-11	10 YR 5/2	70	2.5 YR 3/6	30	C	PL	Clay	
1-20	10 YR 4/3		5 YR 3/4		C	PL	SCL	
				=				
pe: C=Con dric Soil In		pletion RM	=Reduced Matrix, M	S=Masked	Sand Gra	ins		PL=Pore Lining, M=Matrix icators for Problematic Hydric Soils ³ ;
Black Hist Hydrogen Stratified L 2 cm Mucl Depleted B Thick Dark Sandy Mu MLRA 1 Sandy Gle Sandy Red	pedon (A2) tic (A3) Sulfide (A4) Layers (A5) k (A10) (LRR N) Below Dark Surfack k Surface (A12) ticky Mineral (S1) (147, 148) eyed Matrix (S4) dox (S5)		Dark Surface Polyvalue Be Thin Dark Su Loamy Gleye X Depleted Ma Redox Dark Depleted Da Redox Depre Iron-Mangan MLRA 13 Piedmont Flo	elow Surface (S9) ed Matrix (I eltrix (F3) Surface (F rk Surface essions (F8 ese Massa 6) codplain So	(MLRA 1-6) 6) (F7) 8) 9s (F12) (L MLRA 136 bils (F19) (47, 148) .RR N, 6, 122) MLRA 14	148)	2 cm Muck (A10) (MLRA 147) Coast Prairie Redox (A16) (MLRA 147, 148) Piedmont Floodplain Soils (F19) (MLRA 136, 147) Very Shallow Dark Surface (TF12) Other (Explain in Remarks)
Stripped M	//atrix (S6) ayer (if observed)	,	Red Parent N	/laterial (F:	21) (MLR /	127, 147	') i	unless disturbed or problematic
	., ., (11 00001100)							
	es):						Hydric Sc	oil Present? Yes X No
Hydric soil	identified within W	etland P.						

Section Township Range Randon Phillips CHMM Section Township Range Randon (hillslope, terrace, etc.) terrace Local relief (concave, convex, none) Concave Slope (%) Outbregion (LRR or MLRA) LRR P	Project/Site: TTA Light Rail Transit	City	County Durham		Sampling Date: 07-17-13
Section, Township, Range Standor Phillips, CHMM Section, Township, Range Standorm (Phillips, CHMM) Section, Township, Range Standorm (Phillips, CHMM) Stando	Applicant/Owner			State: NC	Sampling Point: Wetland Q - DP#
which control to the plant tham is the plant tham is the store sand yours. 10 to 25% stopes NWI classification PF01	nvestigator(s): Brandon Phillips, CHMM	Sec			
white Store sandy Loam, 10 to 25% alopes New Classification PF01	_andform (hillslope, terrace, etc.): _terrace	Local r	elief (concave, convex, no	one): Concave	Slope (%):_0
white Store sandy Loam, 10 to 25% alopes New Classification PF01	Subregion (LRR or MLRA): LRR P	Lat: _35.952475	Long: - 7	78.983613	Datum: NAD 83
re climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.) re Vegetation Soil or Hydrology significantly disturbed? Are 'Normal Circumstances' present? Yes X No re Vegetation Soil or Hydrology neturally problematic? (If needed, explain any answers in Remarks.) SUMMARY OF FINDINGS — Attach site map showing sampling point locations, transects, important features, etc Hydrology (Present? Yes X No		10 to 25% slopes		NWI classif	ication PF01
re Vegetation Soil or Hydrology significantly disturbed?	Are climatic / hydrologic conditions on the site typ	pical for this time of year?			
SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc Hydrophytic Vegetation Present? Yes X No					
SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc. Hydrophytic Vegetation Present? Yes X No Within a Wetland? Yes X No Wetland Hydrology Present? Yes X No Wetland Hydrology Indicators: DP#13 (Wetland Q) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#13 PD#13 (Wetland Q) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#13 PD#13 (Wetland Q) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#13 PD#13 (Wetland Q) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#13 PD#13 (Wetland Q) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#13 PD#13 (Wetland Q) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#13 PD#13 (Wetland Q) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#13 PD#13 (Wetland Q) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#13 PD#13 (Wetland Q) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#13 PD#13 (Wetland Q) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#13 PD#13 (Wetland Q) is representative of a Wetland. See Approximate Waters of the U.S Boundary map Exhibit for Location of DP#13 PD#13 (Wetland Present? Yes X No Depth (inches)					
Average Present? Yes X No within a Wetland? Yes X No wetland Haders of the U.S Boundary map Exhibit for Location of DP#13					
YDROLOGY Wetland Hydrology Indicators: Firmary Indicators (minimum of two required) Surface Soil Cracks (B6) Surface Soil Cracks (B6) Surface Water (A1) True Aquatic Plants (B14) Presence of Reduced Iron (C4) Dry-Season Water Table (C2) Sediment Deposits (B1) Presence of Reduced Iron (C4) Algal Mat or Crust (B4) Indicator (B4) Other (Explain in Remarks) Thin Muck Surface (C7) Surface Water Present? Aquatic Plants (B10) Wetland Hydrology Present? FAC-Neutral Test (D5) Wetland Hydrology Present? Yes X No Depth (inches): Oescribe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks.	Hydric Soil Present? Yes _ Wetland Hydrology Present? Yes _	X No	The state of the s	Yes X	No
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) Surface Water (A1) X High Water Table (A2) X High Water Table (A2) X Saturation (A3) X Water Marks (B1) Drift Deposits (B2) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B7) X Water-Stained Leaves (B9) Aquatic Fauna (B13) Field Observations: Surface Water (A1) Sparsely Vegetated Concave Surface (B8) Moss Trim Lines (B10) Moss Trim Lines (B16) Driy-Season Water Table (C2) Crayfish Burrows (C8) Crayfish Burrows (C8) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Saturation Visible on Aerial Imagery (C9) Shallow Aquitard (D3) Microtopographic Relief (D4) Aquatic Fauna (B13) FAC-Neutral Test (D5) Saturation Present? Yes X No Depth (inches): 9" Saturation Present? Yes X No Depth (inches): 0" Wetland Hydrology Present? Yes X No Depth (inch					
Primary Indicators (minimum of one is required: check all that apply) Surface Water (A I) True Aquatic Plants (B14) High Water Table (A2) Hydrogen Sulfide Odor (CI) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Algal Mat or Crust (B4) In Deposits (B5) In Deposits (B5) Water-Stained Leaves (B9) Aquatic Fauna (B13) Water Stained Leaves (B9) Aquatic Fauna (B13) Field Observations: Surface Water Present? Yes X No Depth (inches): Oescribe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B8) Moss Trim Lines (B10) Drinnage Patterns (B10) Moss Trim Lines (B10) M	HYDROLOGY				
Surface Water (A1) X High Water Table (A2) X High Water Table (A2) X Saturation (A3) X Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B7) X Water Stained Leaves (B9) Aquatic Fauna (B13) Field Observations: Surface Water Present? Wetland Hydrology Present? Yes X No Depth (inches): 0" Wetland Hydrology Present? Yes X No Depth (inches): 0" Wetland Hydrology Present? Yes X No Depth (inches): 0" Remarks: Remarks: Remarks:	Wetland Hydrology Indicators:			Secondary India	cators (minimum of two required)
 X High Water Table (A2) X Saturation (A3) Avidized Rhizospheres on Living Roots (C3) Moss Trim Lines (B16) X Water Marks (B1) Presence of Reduced Iron (C4) Dry-Season Water Table (C2) Sediment Deposits (B2) Recent Iron Reduction in Tilled Soils (C6) Crayfish Burrows (C8) Drift Deposits (B3) Thin Muck Surface (C7) Saturation Visible on Aerial Imagery (C9) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B7) X Water-Stained Leaves (B9) Aquatic Fauna (B13) Fac-Neutral Test (D5) Field Observations: Surface Water Present? Yes No Depth (inches): Oberth (inches): Oberth (inches): Oberth (inches): Oberthe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: 	Primary Indicators (minimum of one is required;	check all that apply)		Surface Soi	l Cracks (B6)
X Saturation (A3)	Surface Water (A1)				
X Water Marks (B1) Presence of Reduced Iron (C4) Dry-Season Water Table (C2) Sediment Deposits (B2) Recent Iron Reduction in Tilled Soils (C6) Crayfish Burrows (C8) Drift Deposits (B3) Thin Muck Surface (C7) Saturation Visible on Aerial Imagery (C9) Algal Mat or Crust (B4) Other (Explain in Remarks) Stunted or Stressed Plants (D1) Iron Deposits (B5) Geomorphic Position (D2) Inundation Visible on Aerial Imagery (B7) Shallow Aquitard (D3) K Water-Stained Leaves (B9) Microtopographic Relief (D4) Aquatic Fauna (B13) FAC-Neutral Test (D5) Field Observations: Surface Water Present? Yes X No Depth (inches): 9" Saturation Present? Yes X No Depth (inches): 0" Wetland Hydrology Present? Yes X No Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks: **Remarks** **Recent Iron Reduction in Tilled Soils (C6) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Saturation Present? Yes X No Depth (inches): 9" Wetland Hydrology Present? Yes X No Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: **Remarks** **Remarks** **Remarks** **Present Propertion (C2) Saturation Visible on Aerial Imagery (C9) **Saturation Present? Yes X No Depth (inches): 9" Wetland Hydrology Present? Yes X No Security Present? Yes X No Se					
Sediment Deposits (B2)					
Algal Mat or Crust (B4) Other (Explain in Remarks) Stunted or Stressed Plants (D1) Iron Deposits (B5) Geomorphic Position (D2) Shallow Aquitard (D3) Shallow Aquitard (D3) Microtopographic Relief (D4) Aquatic Fauna (B13) FAC-Neutral Test (D5) Sturface Water Present?					
Inundation Visible on Aerial Imagery (B7) Microtopographic Position (D2) Shallow Aquitard (D3) Microtopographic Relief (D4) FAC-Neutral Test (D5) Field Observations: Surface Water Present? Ves No Depth (inches): Water Table Present? YesX No Depth (inches): Saturation Present? YesX No Depth (inches): Sometimation Present? YesX No Depth (inches): Seturation Present? YesX No Depth (inches): Seturation Present? YesX No Depth (inches): Seturation Present? YesX No Depth (inches): Seturation Present? YesX No Depth (inches): Seturation Present? YesX No Depth (inches): Seturation Present? YesX No Depth (inches): Seturation Present? YesX No Depth (inches): Seturation Present? YesX No Depth (inches): Seturation Present? YesX No Depth (inches): Seturation Present? YesX No Depth (inches): Seturation Present? YesX No					
Inundation Visible on Aerial Imagery (B7) Water-Stained Leaves (B9) Aquatic Fauna (B13) FAC-Neutral Test (D5) Field Observations: Surface Water Present? Water Table Present? Yes X No Depth (inches): 9" Saturation Present? Yes X No Depth (inches): 0" Wetland Hydrology Present? Yes X No Depth (inches): 0" Wetland Hydrology Present? Yes X No Secribe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			orran to j		
Aquatic Fauna (B13) FAC-Neutral Test (D5) Field Observations: Surface Water Present?					
Field Observations: Surface Water Present? Yes No _X _ Depth (inches): Water Table Present? Yes _X No Depth (inches): _9" Saturation Present? Yes _X No Depth (inches): _0"	X Water-Stained Leaves (B9)				
Surface Water Present? Yes No X Depth (inches):	Aquatic Fauna (B13)			FAC-Neutra	al Test (D5)
Water Table Present? Yes X No Depth (inches): 9" Saturation Present? Yes X No Depth (inches): 0" Wetland Hydrology Present? Yes X No Depth (inches): 0" includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks:	Field Observations:				
Saturation Present? Yes X No Depth (inches): 0" Wetland Hydrology Present? Yes X No includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks:					
includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks:					
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks:	Saturation Present? Yes X No _ (includes capillary fringe)	Depth (inches):	0" Wetland I	Hydrology Prese	ent? Yes <u>X</u> No
		ring well, aerial photos, pi	revious inspections), if ava	ailable:	
		ors of surface water influenc	e were observed within Wetl	and O.	
					1
					1
					1

	Absolute	Dominant		Dominance Test worksheet:
Tree Stratum (Plot size: 30'		Species?	<u>Status</u>	Number of Dominant Species That Are ORL FACIAL or FAC: 7
1 Salix nigra	40	Yes	OBL	That Are OBL, FACW, or FAC:(A)
2 Platanus occidentalis		Yes	FACW	Total Number of Dominant
3 Acer rubrum	30	Yes	FAC	Species Across All Strata:8 (B)
4				
5				Percent of Dominant Species That Are OBL, FACW, or FAC: 87.5 (A/B)
				That Are OBL, FACW, or FAC: 87.5 (A/B)
5		-		Prevalence Index worksheet:
-		T		Total % Cover of: Multiply by:
		= Total Cov		OBL species x 1 =
50% of total cover: <u>50</u>	20% of	total cover:		
Sapling/Shrub Stratum (Plot size: 10')				FACW species x 2 =
Liquidambar styraciflua	15	Yes	FAC	FAC species x 3 =
Ulmus americana	10	Yes	FACW	FACU species x 4 =
	,			UPL species x 5 =
				Column Totals: (A) (B)
•				
1				Prevalence Index = B/A =
·			_	Hydrophytic Vegetation Indicators:
P ₂				1 - Rapid Test for Hydrophytic Vegetation
				X 2 - Dominance Test is >50%
			السي	3 - Prevalence Index is ≤3 0 ¹
	25	= Total Cov	er	
50% of total cover: 12.5	20% of	total cover:	5	4 - Morphological Adaptations ¹ (Provide supportin
Herb Stratum (Plot size: 1.5 m)				data in Remarks or on a separate sheet)
Boehmeria cylindrica	15	Yes	FACW	Problematic Hydrophytic Vegetation ¹ (Explain)
	10			
Nasturtium officinale	· -	Yes	OBL	¹ Indicators of hydric soil and wetland hydrology must
Carex sp.	10	Yes	V	be present, unless disturbed or problematic
k				Definitions of Four Vegetation Strata:
0				
				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
4	-	_		than 3 in DBH and greater than or equal to 3.28 ft (1
0,				m) tall
1				Herb - All herbaceous (non-woody) plants, regardless
	35	= Total Cov	er	of size, and woody plants less than 3 28 ft tall.
50% of total cover:17.5	20% of	total cover:	7	
Voody Vine Stratum (Plot size: 1 m)				Woody vine - All woody vines greater than 3.28 ft in height.
				Height
			_	
		,		
to.		_		
-				Hydrophytic
v				Vegetation
		= Total Cov	er	Present? Yes X No
50% of total cover:				
Remarks: (Include photo numbers here or on a separate :				
terraines. (melade prioto numbers nore or on a separate	JIIOOL)			
Hydrophytic vegetation identified within Wetland	Q. A variable	indicator rat	ing "V" is fo	or the unidentified species.
-				

(inches)	Matrix			ox Features	31	. 2				
Or and	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture		Remark	KS
0-4	7.5 YR 3/2	100					SCL			
4-20	7.5 YR 3/2	80	5 YR 4/6			PL	Clay	-		
		-	_		_					
					_			-		
		-			-	-		-		
	-		-	-	-			-		
				-				-		
	oncentration, D=Der	oletion, RM	=Reduced Matrix, M	IS=Masked	Sand Gra	ins	² Location: F			
•	Indicators:		5 1 6 6	(0.7)						Hydric Soils ³ :
Histosol	(A1) pipedon (A2)		Dark Surfac Polyvalue B		ne (98) /M	I RΔ 147			(A10) (MLR , e Redox (A1	
	istic (A3)		Thin Dark S					(MLRA 1		10)
	en Sulfide (A4)		Loamy Gley	ed Matrix (_ F		loodplain So	ils (F19)
	d Layers (A5)		X Depleted Ma		.01			(MLRA 1		(TE40)
	ick (A10) (LRR N) d Below Dark Surfac	re (A11)	Redox Dark Depleted Da						w Dark Surfa ain in Remai	
	ark Surface (A12)	(/ \ / 1)	X Redox Depr					saloi (Expl	ant in Romai	,,,,
Sandy M	/lucky Mineral (S1) (I	LRR N,	Iron-Mangar	nese Masse		.RR N,				
	A 147, 148)		MLRA 13				3.			
	Gleyed Matrix (S4) Redox (S5)		Umbric Surfa Piedmont FI	ace (F13) (codplain Si	MLRA 13	5,122) (MIDA 14:			nydrophytic v ology must b	regetation and
	Matrix (S6)		Red Parent						bed or proble	
	Layer (if observed)	:			, ,	-				
Туре:										
Depth (inc	ches)		_				Hydric Soi	l Present?	Yes X	No
Remarks:										
Hydric	soil identified within	Wetland Q.								

Project/Site; TTA Light Rail 1	[ransit	City/Co	Durham Durham		Sampling Date: 07-17-13
Applicant/Owner: Triangle Tra					Sampling Point: Wetland R - DP#14
Investigator(s): Brandon Phill					
					Slope (%):_0
Subregion (LRR or MLRA):					Datum: NAD 83
Soil Map Unit Name Web	nadkee silt loam, 0 to 2%:				
Are climatic / hydrologic condit					
·					present? Yes X No
Are Vegetation, Soil					
SUMMARY OF FINDIN	GS – Attach site i	nap snowing sam	pling point location	ons, transect	s, important features, etc.
Hydrophytic Vegetation Pres	ent? Yes_X_	No	Is the Sampled Area		
Hydric Soil Present?	Yes X	No	within a Wetland?	Yes X	No
Wetland Hydrology Present?	Yes X	No			
LIVAR OL COV					
HYDROLOGY				5 1 1 5	
Wetland Hydrology Indicat		-111 11			cators (minimum of two required)
Primary Indicators (minimum			14.43	Surface Soi	
Surface Water (A1) X High Water Table (A2)	_	True Aquatic Plants (E Hydrogen Sulfide Odo			egetated Concave Surface (B8) atterns (B10)
X Saturation (A3)		Oxidized Rhizosphere		Moss Trim	
X Water Marks (B1)		Presence of Reduced			n Water Table (C2)
Sediment Deposits (B2)	_	Recent Iron Reduction	in Tilled Soils (C6)	Crayfish Bu	rrows (C8)
Drift Deposits (B3)	_	Thin Muck Surface (C			Visible on Aerial Imagery (C9)
Algal Mat or Crust (B4)		Other (Explain in Rem	arks)		Stressed Plants (D1)
Iron Deposits (B5) Inundation Visible on Ae	rial Imageny (R7)			Geomorphis	c Position (D2)
X Water-Stained Leaves (E					aphic Relief (D4)
Aquatic Fauna (B13)	,			FAC-Neutra	
Field Observations:					
Surface Water Present?	Yes No <u>X</u>	_ Depth (inches):			
Water Table Present?		_ Depth (inches):0"			
Saturation Present? (includes capillary fringe)	Yes X No	_ Depth (inches):0"	Wetland H	lydrology Prese	ent? Yes X No
Describe Recorded Data (stre		well, aerial photos, prev	ious inspections), if ava	ilable:	7
Remarks: Water-stained leav	ves and other indicators of	surface water influence w	ere observed within Wetla	and R.	

	Absolute	Dominant		Dominance Test worksheet:
Tree Stratum (Plot size: 30')		Species?	<u>Status</u>	Number of Dominant Species
1 Acer rubrum		Yes_	FAC	That Are OBL, FACW, or FAC:6 (A)
2 Salix nigra	25	Yes_	OBL	Total Number of Dominant
3 Liquidambar styraciflua	25	Yes	FAC	Species Across All Strata:8 (B)
4. Pinus taeda 5.	25	Yes	FAC	Percent of Dominant Species That Are OBL, FACW, or FAC:
6				That Are Obe, I Activ, of I Ac (NB)
7				Prevalence Index worksheet:
-		= Total Cov	er	Total % Cover of: Multiply by:
50% of total cover: <u>50</u>				OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')	20 70 01	total corol.		FACW species x 2 =
1 Morella cerifera	15	Yes	EAC	FAC species x 3 =
	15	Yes	FAC	FACU species x 4 =
2 Acer rubrum			FAC_	UPL species x 5 =
3			_	
4				Column Totals: (A) (B)
5				Prevalence Index = B/A =
6				Hydrophytic Vegetation Indicators:
7				
8				1 - Rapid Test for Hydrophytic Vegetation
9.				X 2 - Dominance Test is >50%
9	30	= Total Cov	or	3 - Prevalence Index is ≤3,0 ¹
50% of total cover: _15				4 - Morphological Adaptations (Provide supporting
	20 70 01	total cover,		data in Remarks or on a separate sheet)
Herb Stratum (Plot size: 1.5 m	5		EAG	Problematic Hydrophytic Vegetation ¹ (Explain)
1. <u>Campsis radicans</u>	- 5	Yes		
2. Carex sp.		Yes	<u>v</u>	¹ Indicators of hydric soil and wetland hydrology must
3				be present, unless disturbed or problematic
4				Definitions of Four Vegetation Strata:
5				Deminions of Four Vogotation Strata.
6				Tree – Woody plants, excluding vines, 3 in (7.6 cm) or
7				more in diameter at breast height (DBH), regardless of height
				Height
8,			_	Sapling/Shrub - Woody plants, excluding vines, less
9			_	than 3 in DBH and greater than or equal to 3 28 ft (1
10			-	m) tall
11,				Herb - All herbaceous (non-woody) plants, regardless
	10	= Total Cov	er	of size, and woody plants less than 3 28 ft tall
50% of total cover:5_	20% of	total cover:		Woody vine - All woody vines greater than 3 28 ft in
Woody Vine Stratum (Plot size: 1 m)				height
1. Vitis aestivalis	5	Yes	FACU	
2				
3				
4,	-			Hydrophytic
5	5	_		Vegetation Present? Yes X No
25		= Total Cov		riesenti ies <u>A</u> no
50% of total cover:		total cover:		
Remarks: (Include photo numbers here or on a separate	sheet)			
TT-db-d	D. A sussibility	. :- 4:	in all \$78 in £a	on the unidentified emerica
Hydrophytic vegetation identified within Wetland	K. A Variable	muicator rat	mig v 18 fc	л ше иниениней species.

(inches)	Matrix Color (moist)	%	Color (moist)	x Features %	Type ¹	Loc ²	Texture	Remarks
0.00				10	C	PL		. Remarks
0-20	5 Y 5/1	90	7.5 YR 4/6	10			Clay	
						-		
							-	
							-	
	-							
							2,	
Type: C=Cd lydric Soil I	oncentration, D=Depl	letion, RM=R	educed Matrix, MS	S=Masked S	Sand Grai	ns		PL=Pore Lining, M=Matrix icators for Problematic Hydric Soils3:
-			Davida Constant	(0.7)				
Histosol	, ,		Dark Surface Polyvalue Be		5 / COV /MI	DA 147		2 cm Muck (A10) (MLRA 147) Coast Prairie Redox (A16)
Histic Ep Black Hi	oipedon (A2)		Polyvalue be Thin Dark Su				148)	(MLRA 147, 148)
	en Sulfide (A4)		Loamy Gleye			7, 140)		Piedmont Floodplain Soils (F19)
	d Layers (A5)		X Depleted Mar		-,			(MLRA 136, 147)
	ick (A 10) (LRR N)		Redox Dark S)		_	Very Shallow Dark Surface (TF12)
Depleted	d Below Dark Surface		Depleted Dar				_	Other (Explain in Remarks)
	ark Surface (A12)		Redox Depre					
	łucky Mineral (S1) (L	.RR N,	Iron-Mangan		(F12) (L i	RR N,		
	A 147, 148)		MLRA 13	-		4001	3,	
	Bleyed Matrix (S4) Redox (S5)		Umbric Surfa Piedmont Flo	08 (F13) (M Iodelais Sai	ILRA 136	, 122) MLDA 44		ndicators of hydrophytic vegetation and wetland hydrology must be present.
Stripped			Red Parent N					unless disturbed or problematic
	Layer (if observed):			ratoricii (i 2	T) (IVILITY)	121, 141		amous distances of prostomedie
							Hydric S	oil Present? Yes X No
	chael:						Tiyane o	511116361R; 163 <u>A</u> 140
Depth (inc	ches):							
Depth (inc	ches):							
Depth (ind emarks:	ches):soil identified within W	etland R.						
Depth (ind Remarks:		etland R.						
Depth (ind Remarks:		etland R.						
Depth (ind Remarks:		etland R.						
Depth (ind emarks:		etland R.						
Depth (ind emarks:		etland R.						
Depth (inc emarks:		etland R.						
Depth (ind emarks:		etland R.						
Depth (ind emarks:		etland R.						
Depth (inc emarks:		etland R.						
Depth (inc emarks:		etland R.						
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Depth (ind Remarks:		etland R.						
Depth (ind Remarks:		etland R.						
Depth (ind emarks:		etland R.						

Project/Site: TTA Light Rail Transit	City/County: Durham		Sampling Date: 07-17-13
Applicant/Owner: Triangle Transit		State: NC	Sampling Point: Wetland S - DP#1
nvestigator(s): Brandon Phillips, CHMM	Section, Township, Ra	nge:	
_andform (hillslope, terrace, etc.)terrace			
Subregion (LRR or MLRA): LRR P Lat:			
Soil Map Unit Name White Store sandy loam, 6-10%	slopes	NWI classific	eation PF01
Are climatic / hydrologic conditions on the site typical for			
Are Vegetation, Soil, or Hydrology			
Are Vegetation, Soil, or Hydrology			
SUMMARY OF FINDINGS – Attach site ma			
Odminant of Findings - Attach site in	th allowing sampling bollici	ocations, transects	, important reatures, etc.
	No Is the Sample of	l Area	
	No within a Wetlar		No
Wetland Hydrology Present? Yes X Remarks: PRUIS OV 4 100	No		
HYDROLOGY			
Wetland Hydrology Indicators:		Secondary Indica	tors (minimum of two required)
Primary Indicators (minimum of one is required, check)	all that apply)		
		getated Concave Surface (B8)	
	rue Aquatic Plants (B14) lydrogen Sulfide Odor (C1)	Drainage Pa	
X Saturation (A3)	xidized Rhizospheres on Living Root	s (C3) Moss Trim L	nes (B16)
	resence of Reduced Iron (C4)		Water Table (C2)
	ecent Iron Reduction in Tilled Soils (
	hin Muck Surface (C7)		sible on Aerial Imagery (C9)
Algal Mat or Crust (E4) C Iron Deposits (B5)	rther (Explain in Remarks)		tressed Plants (D1)
Inundation Visible on Aerial Imagery (B7)		Geomorphic Shallow Aqu	Position (D2)
X Water-Stained Leaves (B9)			aphic Relief (D4)
Aquatic Fauna (B13)		FAC-Neutral	
Field Observations:			
Surface Water Present? Yes No _x (Depth (inches):		
Water Table Present? Yes X No 1	Depth (inches):11"		
Saturation Present? Yes X No [Depth (inches):10" We	tland Hydrology Preser	t? Yes <u>X</u> No
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring we	ll, aerial photos, previous inspections), if available:	
		,,	
Remarks: Water-stained leaves and other indicators of su	rfuce water influence were observed with	in Watland S	
water-stanted leaves and other indicators of su	trace water influence were observed with	in wenand s.	

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

Sampling Point: Wetland S - DP#15

7 0 4 5	Absolute Dominant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 30')	% Cover Species? Status	Number of Dominant Species
Ulmus americana	40 Yes FACW	That Are OBL, FACW, or FAC:3 (A)
2. Quercus rubra		Total Number of Dominant
3 Fraxinus pennsylvanica	20 Yes FACW	Species Across All Strata:5 (B)
4		Percent of Dominant Species
5		That Are OBL, FACW, or FAC: 60 (A/B)
6		
7		Prevalence Index worksheet:
	90 = Total Cover	Total % Cover of: Multiply by:
50% of total cover 45	20% of total cover:18	OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')		FACW species x 2 =
1 Viburnum prunifolium		FAC species x 3 =
		FACU species x 4 =
2		UPL species x 5 =
3		
4		Column Totals: (A) (B)
5		Prevalence Index = B/A =
6		
7		Hydrophytic Vegetation Indicators:
8		1 - Rapid Test for Hydrophytic Vegetation
		X 2 - Dominance Test is >50%
9	15 = Total Cover	3 - Prevalence Index is ≤3 0 ¹
50% of total cover: 7.5	20% of total cover: 3	4 - Morphological Adaptations (Provide supporting
	20 % Of total cover	data in Remarks or on a separate sheet)
Herb Stratum (Plot size 1.5 m	10 Vec FAC	Problematic Hydrophytic Vegetation¹ (Explain)
Toxicodendron radicans		
2		¹ Indicators of hydric soil and wetland hydrology must
3		be present, unless disturbed or problematic.
4		Definitions of Four Vegetation Strata:
5		Demittions of Four Vegetation Strata.
6		Tree – Woody plants, excluding vines, 3 in (7 6 cm) or
		more in diameter at breast height (DBH), regardless of
7		height
8,		Sapling/Shrub - Woody plants, excluding vines, less
9		than 3 in DBH and greater than or equal to 3 28 ft (1
10		m) tall
11,		Herb - All herbaceous (non-woody) plants, regardless
	= Total Cover	of size, and woody plants less than 3 28 ft tall
50% of total cover:5	20% of total cover: 2	Wands size All woods wines greater than 2.30 ft in
Woody Vine Stratum (Plot size: 1 m)		Woody vine – All woody vines greater than 3.28 ft in height
1,		
2		
3	V	
4		Hydrophytic
5		Vegetation
	= Total Cover	Present? Yes X No
50% of total cover:	20% of total cover:	
Remarks: (Include photo numbers here or on a separate	sheet)	
Hydrophytic vegetation identified within Wetland	g	
riyotophyne vegetation identified within wettand	э.	

Profile Desc	cription: (Describe	to the dept	th needed to docur	nent the i	ndicator	or confirm	n the absence o	f indicators.)
Depth	Matrix	0/		x Feature:		1 2	- .	
(inches)	Color (moist)	%	Color (moist)	%	Type ¹	Loc²	Texture	Remarks
0-3	7.5 YR 3/2	100		-	-		SCL	
3-20	10 YR 5/2	80	7.5 YR 3/2		C	PL_	SCL	
-					\rightarrow			
		_		_				
	-							
	oncentration, D=Dep	letion, RM=	Reduced Matrix, MS	S=Maskec	f Sand Gra	ins.		Pore Lining, M=Matrix
Hydric Soil								ors for Problematic Hydric Soils ³ ;
Histosol			Dark Surface		(00: #:	I DA 445		m Muck (A10) (MLRA 147)
	oipedon (A2) stic (A3)		Polyvalue Be Thin Dark Su					ast Prairie Redox (A16) MLRA 147, 148)
	n Sulfide (A4)		Loamy Gleys			41, 140)		dmont Floodplain Soils (F19)
	d Layers (A5)		X Depleted Ma		,			MLRA 136, 147)
	ck (AT0) (LRR N)		Redox Dark					ry Shallow Dark Surface (TF12)
	d Below Dark Surface	e (A11)	Depleted Dar				Oth	ner (Explain in Remarks)
	ark Surface (A12) fucky Mineral (S1) (L	DD N	Redox Depre Iron-Mangan			DD NI		
	147, 148)	.IXIX IV,	MLRA 13		≎2 (⊏ 1∠) (∟	-IXIX IN,		
	Reyed Matrix (S4)		Umbric Surfa	-	MLRA 130	6, 122)	³Indic	ators of hydrophytic vegetation and
	tedox (S5)		Piedmont Flo					and hydrology must be present,
	Matrix (S6)		Red Parent N	/laterial (F	21) (MLR /	4 127, 147	7) unle	ss disturbed or problematic
	_ayer (if observed):							
1			_				1	
	ches):		_				Hydric Soil F	Present? Yes X No
Remarks								
Undeia a	oil identified within W	atland S						
nyuncs	on identified within w	etiand 5.						

Project/Site:TTA Light Rail Tr	ansit	City/C	ounty: Durham		Sampling Date: 07-17-13
Applicant/Owner Triangle Tran	ısit			State NC	Sampling Point: Wetland T - DP#10
Investigator(s) Brandon Phillip					
					Slope (%);_0
					Datum; NAD 83
Soil Map Unit Name: White	Store sandy loam, 6-10				
					ation: PSS1
Are climatic / hydrologic condition					
					resent? Yes X No
Are Vegetation, Soil	, or Hydrology	naturally problems	atic? (If needed, e	xplain any answe	rs in Remarks.)
SUMMARY OF FINDING	S – Attach site n	nap showing sam	pling point locatio	ns, transects	, important features, etc.
Library levels - Managerian Charac	ntO Van V	NIs			
Hydrophytic Vegetation Preser Hydric Soil Present?		No	Is the Sampled Area		
Wetland Hydrology Present?		No No	within a Wetland?	Yes X	No
Remarks DP#16 (Wetla	and T) is representative (of a Wetland. See Approx	imate Waters of the U.S Bo	oundary map Exhibi	t for Location of DP#16
21,10 (,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	ind 1) is representative c	A Woulder See Lippion			
					41.
HYDROLOGY					
Wetland Hydrology Indicator	rs:			Secondary Indica	tors (minimum of two required)
Primary Indicators (minimum c	of one is required, chec	ck all that apply)		Surface Soil	Cracks (B6)
Surface Water (A1)	Surface Water (A1) True Aquatic Plants (B14)				getated Concave Surface (B8)
High Water Table (A2)	_	Hydrogen Sulfide Od	or (C1)	Drainage Pat	tterns (B10)
X Saturation (A3)	_			Moss Trim Li	
X Water Marks (B1)		Presence of Reduced			Water Table (C2)
Sediment Deposits (B2)		Recent Iron Reductio		Crayfish Buri	
Drift Deposits (B3)	_	Thin Muck Surface (C			sible on Aerial Imagery (C9)
Algal Mat or Crust (B4)		Other (Explain in Ren	narks)		tressed Plants (D1)
Iron Deposits (B5)	-1.1 n-n (DZ)				Position (D2)
Inundation Visible on Aeric				Shallow AquiMicrotopogra	
X Water-Stained Leaves (B9Aquatic Fauna (B13)	a)			Microtopogra FAC-Neutral	
				i Ac-Neutral	1 631 (D3)
Field Observations: Surface Water Present?	Vac No v	_ Depth (inches):			
Water Table Present?		_ Depth (inches):			
Saturation Present?		_ Depth (inches):12		vdrology Preser	nt? Yes X No
(includes capillary fringe)	165 <u>A</u> NO	_ Deptil (Illiches)12	Wedandin	yarology r reser	it: 165 X NO
Describe Recorded Data (strea	am gauge, monitoring	well, aerial photos, pre	vious inspections), if avai	lable:	
De an entre					
Remarks: Water-stained leave	es and other indicators of	surface water influence	were observed within Wetla	and T.	
					1

T. Outbook (Disheims 20)	Absolute	Dominant		Dominance Test worksheet:
Tree Stratum (Plot size:30') 1)		Species?		Number of Dominant Species That Are OBL, FACW, or FAC:3(A)
2				
3				Total Number of Dominant Species Across All Strata:
4				Percent of Dominant Species
5				That Are OBL, FACW, or FAC: 60 (A/B)
6	-			Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
50% of total cover:	_	= Total Cov fitotal cover		OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10'	2070 0	r total cover.		FACW species x 2 =
Baccharis halimifolia	20	Yes	FACW	FAC species x 3 =
Rubus allegheniensis	15	Yes	FACU	FACU species x 4 =
3 Liquidambar styraciflua	15	Yes	FAC	UPL species x 5 =
Tilia americana	10	No	FACU	Column Totals: (A) (B)
5				Providence la dec. D/A
0				Prevalence Index = B/A =
7				Hydrophytic Vegetation Indicators:
3				1 - Rapid Test for Hydrophytic Vegetation
				X 2 - Dominance Test is >50%
		= Total Cov	er	3 - Prevalence Index is ≤3 0 ¹
50% of total cover: <u>30</u>	20% of	f total cover:	12	4 - Morphological Adaptations ¹ (Provide supporting
Herb Stratum (Plot size: 1.5 m)				data in Remarks or on a separate sheet)
Microstegium vimineum	30	Yes	FAC	Problematic Hydrophytic Vegetation ¹ (Explain)
Carex sp.	30	Yes		The discharge of heading and south and heading to the second
3				Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
4				Definitions of Four Vegetation Strata:
5				Tree – Woody plants, excluding vines, 3 in: (7.6 cm) or
6 7				more in diameter at breast height (DBH), regardless of height
			_	Sapling/Shrub - Woody plants, excluding vines, less
0				than 3 in DBH and greater than or equal to 3 28 ft (1 m) tall
11,				Herb - All herbaceous (non-woody) plants, regardless
	60	= Total Cov		of size, and woody plants less than 3 28 ft tall
50% of total cover: 30 Noody Vine Stratum (Plot size: 1 m)				Woody vine - All woody vines greater than 3 28 ft in height.
3,				
4				Hydrophytic
D,				Vegetation
50% of total cover:		= Total Cov f total cover:		Present? Yes X No
Remarks: (Include photo numbers here or on a separate				I.
				a sa sama a
Hydrophytic vegetation identified within Wetland	II. A variable	indicator rat	ing "V" is f	or the unidentified species.

Sampling Point: Wetland T - DP#16

Depth	Matrix			x Feature				
inches)	Color (moist)	%	Color (moist)	%	_Type1_	_Loc ²	Texture	Remarks
0-2	7.5 YR 3/2	100		_	-		SCL	
2-20	2.5 Y 5/2	85	7.5 YR 4/6		C	PL	SCL	
				Ξ	=			
	oncentration, D=De Indicators:	pletion, RM	1=Reduced Matrix, M	S=Masked	- d Sand Gra	ains		ore Lining, M=Matrix s for Problematic Hydric Soils ³ :
Black H Hydroge Stratifie 2 cm Mi Deplete Thick D Sandy N MLR Sandy F	pipedon (A2) istic (A3) en Sulfide (A4) d Layers (A5) uck (A10) (LRR N) d Below Dark Surfac ark Surface (A12) Mucky Mineral (S1) (A 147, 148) Eleyed Matrix (S4) Redox (S5)		Dark Surface Polyvalue Be Thin Dark Surface Loamy Gleye Depleted Ma Redox Dark Depleted Da Redox Depre Iron-Mangan MLRA 13 Umbric Surfa Piedmont Flo	ollow Surfa priface (S9 ed Matrix (trix (F3) Surface (F rk Surface essions (F ese Mass 6) ace (F13) bodplain S) (MLRA 1 (F2) F6) e (F7) 8) es (F12) ((MLRA 13 Goils (F19)	47, 148) LRR N, 6, 122) (MLRA 14	148) Coast (MI Piedm (MI Very S Other	Muck (A10) (MLRA 147) Prairie Redox (A16) RA 147, 148) Pont Floodplain Soils (F19) RA 136, 147) Shallow Dark Surface (TF12) (Explain in Remarks) Pors of hydrophytic vegetation and thydrology must be present, disturbed or problematic
estrictive	Layer (if observed)		Red Farenti	riateriai (F	ZI) (WILK	A 127, 147) unless	disturbed of problematic
	ob oo?:						Hydric Soil Pres	sent? Yes X No
emarks:	ches):						Hydric 30ii Fres	sent: 1es <u>A</u> No
Hydri	c soil identified within	a Wetland T						

roject/Site: TTA Light Rail Transit	City/County:	Durham		Sampling Date: 12-11-13
pplicant/Owner: Triangle Transit		St	ate: NC	Sampling Point Wetland TTT - DP
D I DIN CIDA	Section, Tov			
andform (hillslope, terrace, etc.) terrace	Local relief (cor	icave, convex, none):	Concave	Slope (%): 0
ubregion (LRR or MLRA): LRR P	Lat: _35.981822			
oil Map Unit Name: Urban Land				
re climatic / hydrologic conditions on the site				
re Vegetation, Soil, or Hydro				
re Vegetation, Soil, or Hydro				
SUMMARY OF FINDINGS – Attacl	1 site map snowing sampling	point locations,	transects	, important reatures, etc.
Hydrophytic Vegetation Present? Y	es X No ls the	Sampled Area		
	es X No within	n a Wetland?	Yes X	No
Wetland Hydrology Present? Y	es_X No			
YDROLOGY				
Wetland Hydrology Indicators:		Sac	ondary Indica	tors (minimum of two required)
Primary Indicators (minimum of one is requi	red check all that apply)		Surface Soil	
Surface Water (A I)	True Aquatic Plants (B14)			jetated Concave Surface (B8)
High Water Table (A2)	Hydrogen Sulfide Odor (C1)		Drainage Pat	1
Saturation (A3)	Oxidized Rhizospheres on L		Moss Trim Li	
X_ Water Marks (B1)	Presence of Reduced Iron (Water Table (C2)
Sediment Deposits (B2)	Recent Iron Reduction in Til	led Soils (C6)	Crayfish Burr	
Drift Deposits (B3)	Thin Muck Surface (C7)	_		sible on Aerial Imagery (C9)
Algal Mat or Crust (B4)	Other (Explain in Remarks)			ressed Plants (D1)
Iron Deposits (B5) Inundation Visible on Aerial Imagery (B'	7)		Geomorphic	
✓ Water-Stained Leaves (B9)	')		Shallow Aquil Microtopogra	phic Relief (D4)
Aquatic Fauna (B13)			FAC-Neutral	
Field Observations:				
Surface Water Present? Yes	No X Depth (inches):			
Vater Table Present? Yes I	No X Depth (inches):			
	No Depth (inches):0"	Wetland Hydro	ology Presen	t? Yes_XNo
Includes capillary fringe) Describe Recorded Data (stream gauge, mo		nspections), if available		
Remarks: Water-stained leaves and other ind	icators of surface water influence were ob	served within Wetland T	TT.	

T. O	Absolute Dominant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size 30')	% Cover Species? Status 30 Ves FAC	Number of Dominant Species
-	100	That Are OBL, FACW, or FAC (A)
2_Acer rubrum	30 Yes FAC	Total Number of Dominant
3		Species Across All Strata: 2 (B)
4		Percent of Dominant Species
5		That Are OBL, FACW, or FAC:100(A/B)
6		
7		Prevalence Index worksheet:
	= Total Cover	Total % Cover of: Multiply by:
50% of total cover:30	20% of total cover:12	OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')		FACW species x 2 =
1_ Acer rubrum	60 Yes FAC	FAC species x 3 =
2		FACU species x 4 =
3		UPL species x 5 =
4		Column Totals: (A) (B)
5		Prevalence Index = B/A =
6		Hydrophytic Vegetation Indicators:
7		1 - Rapid Test for Hydrophytic Vegetation
8,		X 2 - Dominance Test is >50%
9		
	60 = Total Cover	3 - Prevalence Index is ≤3.01
50% of total cover:30	20% of total cover: 12	4 - Morphological Adaptations¹ (Provide supporting
Herb Stratum (Plot size: 1.5 m)		data in Remarks or on a separate sheet)
1		Problematic Hydrophytic Vegetation (Explain)
2		
3		¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
4		Definitions of Four Vegetation Strata:
5		Definitions of Four Vegetation Strata.
6		Tree - Woody plants, excluding vines, 3 in (7.6 cm) or
7,		more in diameter at breast height (DBH), regardless of height
3		
9		Sapling/Shrub - Woody plants, excluding vines, less than 3 in DBH and greater than or equal to 3 28 ft (1
10		m) tall
11		Have All have account than the other negatives
	= Total Cover	Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3 28 ft tall
50% of total cover:		
Woody Vine Stratum (Plot size: 1 m)		Woody vine – All woody vines greater than 3 28 ft in height.
1		Holghe
2.		
3		
4		1
5		Hydrophytic Vegetation
	= Total Cover	Present? Yes X No
	20% of total cover:	
Remarks: (Include photo numbers here or on a separate s		
Hydrophytic vegetation identified within Wetland	TT.	
l'		
Y.		

Depth	Matrix			x Features		1 2				
inches)	Color (moist)	%	Color (moist)	%	Type ¹	Loc²	Texture	9	Remarks	5
0-20	7.5 YR 3/2		10 YR 4/6			PL	Clay	_		
							-			
					_		-			
							_			
							_			
	ncentration, D=Depl	etion, RM=F	Reduced Matrix, MS	S=Masked	l Sand Grai	ns	² Location	: PL=Pore Lir	ning, M=Matri	Х
dric Soil Ir	ndicators:						In	dicators for F	Problematic I	Hydric Soils
_ Histosol (Dark Surface					_ 2 cm Muck		
	pedon (A2)		Polyvalue Be				148) _	_ Coast Prairi		0)
_ Black His Hydrogen	itic (A3) i Sulfide (A4)		Thin Dark Su Loamy Gleye			17, 148)		(MLRA 1 Piedmont F	47, 148) Ioodplain Soil	s (F19)
	Layers (A5)		x Depleted Ma		1 2)		_	(MLRA 1	,	(1 10)
- _ 2 cm Muc	ck (A10) (LRR N)		Redox Dark		6)		_	_ Very Shallo		ce (TF12)
Depleted	Below Dark Surface	e (A11)	Depleted Dai				_	_ Other (Expl	ain in Rem <mark>a</mark> rl	KS)
	k Surface (A12)		Redox Depre							
	ucky Mineral (S1) (L	RR N,	Iron-Mangan		es (F12) (L	RR N,				
	147 , 148) eyed Matrix (S4)		MLRA 13 Umbric Surfa		MI RA 136	122)		³ Indicators of h	avdronhytic vi	edetation and
_ Sandy On _ Sandy Re			Piedmont Flo					wetland hydr		
Stripped N			Red Parent N					unless distur		
strictive La	ayer (if observed):									
Туре:			_							
Depth (inch	nes):						Hydric	Soil Present?	Yes X	No
emarks:										
Hydric s	soil identified within V	Vetland TTT.								
11,4110	John Romania William	7011110 1111								

Project/Site: TTA Light Rail Transit	City/County: Durham		Sampling Date: 07-18-13
Applicant/Owner: Triangle Transit			Sampling Point: Wetland U - DP#2:
	Section, Township, Range:		
Landform (hillslope, terrace, etc.) basin			
Subregion (LRR or MLRA): LRR P	Lat: <u>35.959323</u> Long		Datum: NAD 83
Soil Map Unit Name: Chewacla loam, 0 to		NVVI classif	
	e typical for this time of year? Yes X No		
	ology significantly disturbed? Are "Norr		
	ology naturally problematic? (If needed		
SUMMARY OF FINDINGS – Attac	h site map showing sampling point loca	tions, transect	s, important reatures, etc.
Hydrophytic Vegetation Present? Y	es X No Is the Sampled Are		
	es X No within a Wetland?		No
Wetland Hydrology Present? Y	es X No		
HYDROLOGY			
Wetland Hydrology Indicators:		Secondary India	ators (minimum of two required)
Primary Indicators (minimum of one is requi	ired check all that apply)	Surface Soi	
Surface Water (A1)	True Aquatic Plants (B14)		egetated Concave Surface (B8)
High Water Table (A2)	Hydrogen Sulfide Odor (C1)		atterns (B10)
X Saturation (A3)	Oxidized Rhizospheres on Living Roots (C3		
X Water Marks (B1)	Presence of Reduced Iron (C4)		Water Table (C2)
Sediment Deposits (B2)	Recent from Reduction in Tilled Soils (C6)	Crayfish Bu	rrows (C8)
Drift Deposits (B3)	Thin Muck Surface (C7)		/isible on Aerial Imagery (C9)
Algal Mat or Crust (B4)	Other (Explain in Remarks)		Stressed Plants (D1)
Iron Deposits (B5)	7	Geomorphi	
Inundation Visible on Aerial Imagery (B X Water-Stained Leaves (B9)	t)	Shallow Aq	aphic Relief (D4)
Aquatic Fauna (B13)		FAC-Neutra	
Field Observations:		17101104110	ii rost (20)
	No x Depth (inches):		
	No X Depth (inches):		
		d Hydrology Prese	nt? Yes X No
(includes capillary fringe)	onitoring well, aerial photos, previous inspections), if a	a railable	
Describe Recorded Data (Stream gauge, mi	onitoring well, aerial priotos, previous inspections), il a	available.	
Remarks:			
Water-stained leaves and other ind	dicators of surface water influence were observed within Wo	etland U.	

	Absolute Dominant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 30')	% Cover Species? Status	Number of Dominant Species
1 Acer rubrum	80 Yes FAC	That Are OBL, FACW, or FAC: 2 (A)
2		Total Number of Dominant
3		Species Across All Strata: (B)
4		
5		Percent of Dominant Species
		That Are OBL, FACW, or FAC: 100 (A/B)
6		Prevalence Index worksheet:
7		Total % Cover of: Multiply by:
	80 = Total Cover	OBL species x 1 =
and the same of th	20% of total cover: 16	FACW species x 2 =
Sapling/Shrub Stratum (Plot size: 10'		
1		FAC species x 3 =
2		FACU species x 4 =
3		UPL species x 5 =
4		Column Totals: (A) (B)
5		Enguelance Index = P/A =
6		Prevalence Index = B/A =
7		Hydrophytic Vegetation Indicators:
		X 1 - Rapid Test for Hydrophytic Vegetation
8		X 2 - Dominance Test is >50%
9		3 - Prevalence Index is ≤3 0 ¹
	= Total Cover	4 - Morphological Adaptations¹ (Provide supporting
50% of total cover:	20% of total cover	data in Remarks or on a separate sheet)
Herb Stratum (Plot size: 1.5 m)		Problematic Hydrophytic Vegetation ¹ (Explain)
Saururus cernuus		
2		¹ Indicators of hydric soil and wetland hydrology must
3		be present, unless disturbed or problematic
4		Definitions of Four Vegetation Strata:
5		Deminions of Four Vegetation Strata.
6		Tree - Woody plants, excluding vines, 3 in (7.6 cm) or
7		more in diameter at breast height (DBH), regardless of height.
8		noight.
		Sapling/Shrub - Woody plants, excluding vines, less
9		than 3 in DBH and greater than or equal to 3 28 ft (1 m) tall
10		inj tan
11		Herb – All herbaceous (non-woody) plants, regardless
	= Total Cover	of size, and woody plants less than 3.28 ft tall
	20% of total cover:4	Woody vine – All woody vines greater than 3.28 ft in
Woody Vine Stratum (Plot size: 1 m		height
1		
2		
3		
4		The decorate Ale
5		Hydrophytic Vegetation
	= Total Cover	Present? Yes X No
	20% of total cover:	
Remarks: (Include photo numbers here or on a separate si		
	,	
Hydrophytic vegetation identified within Wetland U	т.	4.41
		4

dric Soil Ind Histosol (A Histic Epip Black Histi Hydrogen : Stratified L 2 cm Muck Depleted E Thick Dark	dicators: (1) edon (A2) c (A3) Sulfide (A4)	90 80 etion, RM=	Color (moist) 10 YR 4/6 10 YR 5/8 10 YR 2/1 Reduced Matrix, MS Dark Surface Polyvalue Be Thin Dark Su	(S7)	C C D	PL PL M		Remarks The Lining, M=Matrix The Froblematic Hydric Soils (1) is the second control of
pe: C=Condric Soil Ind Histosol (A Histic Epip Black Histi Hydrogen: Stratified L 2 cm Muck Depleted E Thick Dark	centration, D=Depleticators: (1) edon (A2) c (A3) Sulfide (A4) ayers (A5) (A10) (LRR N)	80	10 YR 5/8 10 YR 2/1 Reduced Matrix, MS Dark Surface Polyvalue Be	10 10 ==Maskec		PL M	Clay 2Location: PL=Por	
pe: C=Condric Soil Ind Histosol (A Histic Epip Black Histi Hydrogen: Stratified L 2 cm Muck Depleted E Thick Dark	centration, D=Depl dicators: .1) edon (A2) c (A3) Sulfide (A4) ayers (A5) : (A10) (LRR N)		Reduced Matrix, MS Dark Surface Polyvalue Be	10 ————————————————————————————————————		M	² Location: PL=Por	
dric Soil Ind Histosol (A Histic Epip Black Histi Hydrogen : Stratified L 2 cm Muck Depleted E Thick Dark	dicators: (1) edon (A2) c (A3) Sulfide (A4) ayers (A5) (A10) (LRR N)	etion, RM=	Reduced Matrix, MS Dark Surface Polyvalue Be	G=Maskec (S7)				
dric Soil Ind Histosol (A Histic Epip Black Histi Hydrogen : Stratified L 2 cm Muck Depleted E Thick Dark	dicators: (1) edon (A2) c (A3) Sulfide (A4) ayers (A5) (A10) (LRR N)	etion, RM=	Dark Surface Polyvalue Be	(S7)	Sand Gra	ains		
dric Soil Ind Histosol (A Histic Epip Black Histi Hydrogen : Stratified L 2 cm Muck Depleted E Thick Dark	dicators: (1) edon (A2) c (A3) Sulfide (A4) ayers (A5) (A10) (LRR N)	etion, RM=	Dark Surface Polyvalue Be	(S7)	d Sand Gra	ains		
dric Soil Ind Histosol (A Histic Epip Black Histi Hydrogen : Stratified L 2 cm Muck Depleted E Thick Dark	dicators: (1) edon (A2) c (A3) Sulfide (A4) ayers (A5) (A10) (LRR N)	etion, RM=	Dark Surface Polyvalue Be	(S7)	d Sand Gra	ains		
dric Soil Ind Histosol (A Histic Epip Black Histi Hydrogen : Stratified L 2 cm Muck Depleted E Thick Dark	dicators: (1) edon (A2) c (A3) Sulfide (A4) ayers (A5) (A10) (LRR N)	etion, RM=	Dark Surface Polyvalue Be	(S7)	d Sand Gra	ains		
dric Soil Ind Histosol (A Histic Epip Black Histi Hydrogen : Stratified L 2 cm Muck Depleted E Thick Dark	dicators: (1) edon (A2) c (A3) Sulfide (A4) ayers (A5) (A10) (LRR N)	etion, RM=	Dark Surface Polyvalue Be	(S7)	Sand Gra	ains		
dric Soil Ind Histosol (A Histic Epip Black Histi Hydrogen : Stratified L 2 cm Muck Depleted E Thick Dark	dicators: (1) edon (A2) c (A3) Sulfide (A4) ayers (A5) (A10) (LRR N)	etion, RM=	Dark Surface Polyvalue Be	(S7)	Sand Gra	ains		
dric Soil Ind Histosol (A Histic Epip Black Histi Hydrogen : Stratified L 2 cm Muck Depleted E Thick Dark	dicators: (1) edon (A2) c (A3) Sulfide (A4) ayers (A5) (A10) (LRR N)	etion, RM=	Dark Surface Polyvalue Be	(S7)	d Sand Gra	ains		
dric Soil Ind Histosol (A Histic Epip Black Histi Hydrogen : Stratified L 2 cm Muck Depleted E Thick Dark	dicators: (1) edon (A2) c (A3) Sulfide (A4) ayers (A5) (A10) (LRR N)	etion, RM=	Dark Surface Polyvalue Be	(S7)	d Sand Gra	ains		
dric Soil Ind Histosol (A Histic Epip Black Histi Hydrogen : Stratified L 2 cm Muck Depleted E Thick Dark	dicators: (1) edon (A2) c (A3) Sulfide (A4) ayers (A5) (A10) (LRR N)	5.1011, 1.111	Dark Surface Polyvalue Be	(S7)	a dana die	into		
Histic Epip Black Histi Hydrogen 3 Stratified L 2 cm Muck Depleted E Thick Dark	edon (A2) c (A3) Sulfide (A4) ayers (A5) : (A10) (LRR N)		Polyvalue Be				iliaicarol 2	ioi cropiematic mydfic Solls 🖫
Black Histi Hydrogen : Stratified L 2 cm Muck Depleted E Thick Dark	c (A3) Sulfide (A4) ayers (A5) (A10) (LRR N)						2 cm N	luck (A10) (MLRA 147)
Hydrogen: Stratified L 2 cm Muck Depleted E Thick Dark	Sulfide (A4) ayers (A5) : (A10) (LRR N)		Thin Dark Su					Prairie Redox (A16)
Stratified L 2 cm Muck Depleted E Thick Dark	ayers (A5) (A10) (LRR N)					47, 148)	•	RA 147, 148)
2 cm Muck Depleted E Thick Dark	(A10) (LRR N)		Loamy Gleye		F2)			ont Floodplain Soils (F19) RA 136, 147)
Depleted E Thick Dark			X Depleted Mat Redox Dark S		-6)			hallow Dark Surface (TF12)
Thick Dark		(A11)	Depleted Dar					Explain in Remarks)
	Surface (A12)		Redox Depre					,
	cky Mineral (S1) (L l	RR N,	Iron-Mangan	ese Masse	es (F12) (l	RR N,		
MLRA 1			MLRA 136	-			2	
	yed Matrix (S4)		Umbric Surfa					s of hydrophytic vegetation and
Sandy Red Stripped M			Piedmont Flo Red Parlent M					hydrology must be present, listurbed or problematic
	yer (if observed):		Red rai entity	idreiidi (i	ZT) (WILIO	127, 147	T unless u	isturbed or problematic
	, (0200,,							
	es)						Hydric Soil Pres	ent? Yes X No
marks:							1.7	
Hydric soil	identified within We	etland U.						
•								

Project/Site: TTA Light Rail Transit	City/County: Durham		Sampling Date 1-21-14
Applicant/Owner: Triangle Transit		State: NC	Sampling Point: Wetland UUU - DP#41
Investigator(s): Brandon Phillips, CHMM			
Landform (hillslope, terrace, etc.): _terrace			
	829 Long:		
Soil Map Unit Name: Chewacla loam, 0 to 2% slopes, frequent			
Are climatic / hydrologic conditions on the site typical for this time		•	
Are Vegetation, Soil, or Hydrology signi			
Are Vegetation, Soil, or Hydrology natur	ally problematic? (If needed,	explain any answe	rs in Remarks)
SUMMARY OF FINDINGS – Attach site map she	wing sampling point locati	ions, transects	, important features, etc.
Hydrophytic Vegetation Present? Yes X No_			
Hydric Soil Present? Yes X No			No
Wetland Hydrology Present? Yes X No		res_A_	
HYDROLOGY Western Uterland and Indicators		Coopedon Indiad	tors (minimum of two required)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that	apple		tors (minimum of two required)
	uatic Plants (B14)	Surface Soil	petated Concave Surface (B8)
	n Sulfide Odor (C1)	Sparsely veg	
	d Rhizospheres on Living Roots (C3)		
	e of Reduced Iron (C4)		Water Table (C2)
	ron Reduction in Tilled Soils (C6)	Crayfish Burr	
	ck Surface (C7)	Saturation Vi	sible on Aerial Imagery (C9)
Algal Mat or Crust (B4) Other (B	xplain in Remarks)		ressed Plants (D1)
Iron Deposits (B5)		Geomorphic	
Inundation Visible on Aerial Imagery (B7)		Shallow Aqui	
X Water-Stained Leaves (B9) Aquatic Fauna (B13)			phic Relief (D4)
Field Observations:		FAC-Neutral	Test (Db)
Surface Water Present? Yes No_x Depth (inches):		
Water Table Present? Yes X No Depth (
Saturation Present? Yes X No Depth (Hydrology Presen	t? Yes_XNo
(includes capillary fringe)			1100 <u>A</u> 110
Describe Recorded Data (stream gauge, monitoring well, aeria	il photos, previous inspections), if av	allable:	1
Remarks:			
Water-stained leaves and other indicators of surface w	ater influence were observed within Wet	tland UUU.	

	Absolute Dominant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 30')	% Cover Species? Status	Number of Dominant Species
	80 Yes FACW	That Are OBL, FACW, or FAC:3 (A)
2 Acer rubrum	20 Yes FAC	Total Number of Dominant
3		Species Across All Strata:4(B)
4		Percent of Dominant Species
5		That Are OBL, FACW, or FAC: 75 (A/B)
6		
7		Prevalence Index worksheet:
	100 = Total Cover	Total % Cover of: Multiply by:
50% of total cover: 50	20% of total cover: 20	OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')	20 % of total cover.	FACW species x 2 =
	20 V EAC	FAC species x 3 =
1_Acer rubrum		
2		FACU species x 4 =
3,		UPL species x 5 =
4		Column Totals (A) (B)
5,		Decorded as Index 540
6,		Prevalence Index = B/A =
		Hydrophytic Vegetation Indicators:
7		1 - Rapid Test for Hydrophytic Vegetation
8		X 2 - Dominance Test is >50%
9		3 - Prevalence Index is ≤3 0 ¹
	= Total Cover	4 - Morphological Adaptations (Provide supporting
50% of total cover:10	20% of total cover: 4	data in Remarks or on a separate sheet)
Herb Stratum (Plot size: 1.5 m)		
Lonicera japonica	10 Yes FAC	Problematic Hydrophytic Vegetation ¹ (Explain)
2. Carex sp.		
		¹ Indicators of hydric soil and wetland hydrology must
3		be present, unless disturbed or problematic
4		Definitions of Four Vegetation Strata:
5		The Market when the south of the moving of the (7.6 and an
6		Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of
7		height
8		
		Sapling/Shrub - Woody plants, excluding vines, less
9		than 3 in DBH and greater than or equal to 3.28 ft (1 m) tall
10		inj tan
11		Herb – All herbaceous (non-woody) plants, regardless
	= Total Cover	of size, and woody plants less than 3 28 ft tall
50% of total cover:10	20% of total cover:4	Woody vine - All woody vines greater than 3 28 ft in
Woody Vine Stratum (Plot size: 1 m		height.
1		
2		
3		
4		Hydrophytic
5		Vegetation
	= Total Cover	Present? Yes <u>X</u> No
50% of total cover:	20% of total cover:	
Remarks: (Include photo numbers here or on a separate s		
Training, (make a process raining at a major a) of a cooperator of		
Hydrophytic vegetation identified within Wetland U	JUU. A variable indicator rating "V"	is for the unidentified species.
	Ç	-

inches)	Matrix		Redo	x Features	_ 1	. 2		
	Color (moist)		olor (moist)	<u>%</u>	_Type1	Loc²	Textur	re Remarks
0-20	10 YR 4/2		10 YR 5/8		C	PL	Clay	-
						_	_	
							_	
					_		_	
							-	
								-
	5.5.4	No. DI D. I	1 1 4 4 1 1 1 1 1 1				3	and the state of t
ydric Soil Indi	entration, D=Deple	ation, RM=Real	iced Matrix, Ms	5≐Masked	Sand Gra	ins.		n: PL=Pore Lining, M=Matrix. ndicators for Problematic Hydric Soils ³ :
			Davidor f	(07)			- 1	
_ Histosol (A1)		_	_ Dark Surface		~ (CO) (5:	L DA 447	4.40)	2 cm Muck (A10) (MLRA 147)
_ Histic Epiped			Polyvalue Be				148) _	Coast Prairie Redox (A16)
_ Black Histic		_	Thin Dark Su			47, 148)		(MLRA 147, 148)
_ Hydrogen St			Loamy Gleye		-2)		-	Piedmont Floodplain Soils (F19)
_ Stratified Lay			Depleted Mat		51			(MLRA 136, 147)
_ 2 cm Muck ((A 10) (LRR N) Flow Dark Surface		Redox Dark : Depleted Dar				-	Very Shallow Dark Surface (TF12) Other (Explain in Remarks)
_ Depreted Be _ Thick Dark S			_ Depleted Dal _ Redox Depre				-	Other (Explain in Remarks)
	surface (A12) ky Mineral (S1) (L I		_ Redox Depre _ Iron-Mangan			DD N		
_ Sandy Muck			MLRA 13		5 (F IZ) (I	LICITY,		
	ed Matrix (S4)		Umbric Surfa		/II DA 13	3 122)		³ Indicators of hydrophytic vegetation and
_ Sandy Cleye _ Sandy Redo:		_	Piedmont Flo				81	wetland hydrology must be present,
Stripped Mat			Red Parent N					unless disturbed or problematic
	er (if observed):	_		ratorial (1 2	, (141=14		1	amos distance of problematic
							Lhadria	Sail Bresanto Ves V No
Depth (inches))						Hydric	Soil Present? Yes X No
emarks:								
Hydric soil	l identified within V	Wetland LIUU						
119 0110 3011	racinitica winini v	venuna 000						

Project/Site: TTA Light Rail Transit		City/County: Durham		Sampling Date 07-18-13
Applicant/Owner: Triangle Transit			State: NC	Sampling Point Wetland V - DP#2
D 1 DI'II' GID O (Section, Township, Range:_		
Landform (hillslope, terrace, etc.) basin	Lo-	cal relief (concave, convex, n	one): Concave	Slope (%); 0
Subregion (LRR or MLRA): LRR P				
Soil Map Unit Name: Chewacla loam, 0 to				
Are climatic / hydrologic conditions on the sit				
Are Vegetation, Soil, or Hydr				,
Are Vegetation, Soil, or Hydr				
SUMMARY OF FINDINGS – Attac				
			ono, nanovo	o, important routuros, oto,
	es X No	is the Sampled Area		
Hydric Soil Present? Y Wetland Hydrology Present? Y	es X No No	within a Wetland?	Yes X	No
Domarko:		Approximate Waters of the U.S.		
HYDROLOGY Wetlend blidelegat Indicators:			Sadan Jan Ja T	
Wetland Hydrology Indicators:	S 6 6 1 10 10 1 1 1 1 1		-	ators (minimum of two required)
Primary Indicators (minimum of one is requ Surface Water (A1)	ired; check all that apply) True Aquatic PI		Surface Soi	
High Water Table (A2)		de Odor (C1)	Spansely ve	egetated Concave Surface (B8)
X Saturation (A3)		spheres on Living Roots (C3)		
X Water Marks (B1)	Presence of Re			Water Table (C2)
Sediment Deposits (B2)		duction in Tilled Soils (C6)	Crayfish Bu	rrows (C8)
Drift Deposits (B3)	Thin Muck Surfa			/isible on Aerial Imagery (C9)
Algal Mat or Crust (B4)	Other (Explain i	in Remarks)		Stressed Plants (D1)
Iron Deposits (B5) Inundation Visible on Aerial Imagery (B	R7)		Geomorphic	C Position (D2)
X Water-Stained Leaves (B9)	. ,			aphic Relief (D4)
Aquatic Fauna (B13)			FAC-Neutra	
Field Observations:				
	No X Depth (inches)			
	No X Depth (inches)			
Saturation Present? Yes X (includes capillary fringe)	No Depth (inches)	:3" Wetland	Hydrology Prese	nt? Yes X No
Describe Recorded Data (stream gauge, ma	onitoring well, aerial photo	s, previous inspections), if av	ailable:	
Remarks:				
Water-stained leaves and other inc	licators of surface water influ	zence were observed within Wet	land V.	
				1
				1.

	Absolute Dominant Indicato	
Tree Stratum (Plot size: 30')	% Cover Species? Status	Number of Dominant Species
1 Acer rubrum	35 Yes FAC	That Are OBL, FACW, or FAC: (A)
2. Platanus occidentalis		W
3. Fraxinus pennsylvanica		Total Number of Dominant Y Species Across All Strata: 6 (B)
		Species Across Air Strata. (b)
4		Percent of Dominant Species
5		That Are OBL, FACW, or FAC: 83 (A/B)
6		Prevalence Index worksheet:
7		
	= Total Cover	Total % Cover of: Multiply by:
50% of total cover: <u>50</u>	20% of total cover: 20	OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')		FACW species x 2 =
1 Asimina triloba	20 Yes FAC	FAC species x 3 =
-		FACU species x 4 =
2		UPL species x 5 =
3		
4		Column Totals: (A) (B)
5		Prevalence Index = B/A =
6		
7		Hydrophytic Vegetation Indicators:
8		1 - Rapid Test for Hydrophytic Vegetation
		X 2 - Dominance Test is >50%
9		— 3 - Prevalence Index is ≤3 0 ¹
500/ 25424-1 10	20 = Total Cover 20% of total cover: 4	4 - Morphological Adaptations (Provide supporting
	20% of total cover•	data in Remarks or on a separate sheet)
Herb Stratum (Plot size 1.5 m)		Problematic Hydrophytic Vegetation ¹ (Evplain)
Smilax rotundifolia		- Troblematic Hydrophytic Vegetation (Explain)
2 Eurybia divaricata	5 Yes NL	
3		Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
4		
5		Definitions of Four Vegetation Strata:
		Tree – Woody plants, excluding vines, 3 in (7.6 cm) or
6		more in diameter at breast height (DBH), regardless of
7		
8		Sapling/Shrub - Woody plants, excluding vines, less
9		than 3 in DBH and greater than or equal to 3 28 ft (1
10,		m) tall
11		Herb - All herbaceous (non-woody) plants, regardless
· ·	= Total Cover	of size, and woody plants less than 3 28 ft tall
50% of total cover:	20% of total cover:	
Woody Vine Stratum (Plot size: 1 m)	20 % 01 total 00 (01.	Woody vine – All woody vines greater than 3.28 ft in
		height
1.,		-
2,		-
3		4 0
4		Lh (duamh) éig
5		Hydrophytic Vegetation
	= Total Cover	Present? Yes <u>X</u> No
50% of total cover;		-
Remarks: (Include photo numbers here or on a separate s	oneer)	
Hydrophytic vegetation identified within Wetland	V. A rating indicator or "NL" is for	the unlisted species.
· · · · · ·	•	

	cription: (Describe Matrix			x Feature					
(inches)	Color (moist)	- %	Color (moist)		_Type1	Loc ²	<u>Texture</u>	Remarks	
0-6	10 YR 5/2		7.5 YR 4/4		C	PL	SCL		-
6-20	10 YR 5/2	90	7.5 YR 4/6		<u>C</u>	PL_	Clay		
	-				_				
					-				
				_					
vpe C=C	oncentration, D=Dep	eletion RM=	Reduced Matrix MS			ains	²Location: Pl =	Pore Lining, M=Matrix	
ydric Soil I	Indicators:	zioanoci, i kivi	Troduced William N. 1416	D - 14(G3/(QC	ound on	an i		ors for Problematic Hydric Sc	oils ³ :
_ Histosol			Dark Surface	(S7)				m Muck (A10) (MLRA 147)	
	pipedon (A2)		Polyvalue Be	low Surfa				ast Prairie Redox (A 16)	
_ Black Hi			Thin Dark Su			47, 148)		MLRA 147, 148)	
	n Sulfide (A4) I Layers (A5)		Loamy Gleye		F2)			dmont Floodplain Soils (F19)	
	ck (A10) (LRR N)		X Depleted Ma Redox Darks		6)			MLRA 136, 147) y Shallow Dark Surface (TF12)	
	d Below Dark Surfac	e (A11)	Depleted Dark					y Shallow Dark Suhace (1612) Ier (Explain in Remarks)	
	rk Surface (A12)	- (,	Redox Depre				0111	or (explain in remains)	
_ Sandy M	lucky Mineral (S1) (I	_RR N,	Iron-Mangan			RR N,			
	\ 147, 148)		MLRA 13						
	leyed Matrix (S4)		Umbric Surfa					ators of hydrophytic vegetation	
	edox (S5)		Piedmont Flo					and hydrology must be present,	
	Matrix (S6) ayer (if observed):		Red Parent N	rlaterial (F	21) (MLR	4 127, 147	') unles	ss disturbed or problematic	
Type:	-ayer (II Observed)								
	thes):		_				11	10 V V	
emarks							Hydric Soil P	resent? Yes X No _	
Hydric	soil identified within	Wetland V.							

	City/County:			Sampling Date: 11-05-13
plicant/Owner Triangle Transit				Sampling Point: Wetland VV - I
estigator(s): Brandon Phillips, CHMM				
ndform (hillslope, terrace, etc.): basin				
bregion (LRR or MLRA); LRR P Lat 35.9				Datum: NAD 83
I Map Unit Name Chewacla loam, 0 to 2% slopes, frequ			NWI classifica	
climatic / hydrologic conditions on the site typical for this				
Vegetation, Soil, or Hydrologysi				
vegetation, Soil, or Hydrology no			explain any answer	
UMMARY OF FINDINGS – Attach site map s	snowing sampling p	oint locatio	ns, transects,	important reatures, etc.
ydrophytic Vegetation Present? Yes_X No	Ole the S	ampled Area		
ydric Soil Present? Yes X No		Wetland?	Yes X	No
/etland Hydrology Present? Yes X No				
/DROLOGY			Speandony budicat	are festing in of his keep for di
/etland Hydrology Indicators:	la anti-arabid			ors (minimum of two required)
imary Indicators (minimum of one is required; check all the			Surface Soil C	· · ·
	· Aquatic Plants (BT4) ·ogen Sulfide Odor (C1)		Spansely vege Drainage Patt	etated Concave Surface (B8)
	lized Phizospheres on Livir	na Roots (C3)	Moss Trim Lir	
	ence of Reduced Iron (C4)			√ater Table (C2)
Sediment Deposits (B2) Rece	ent Iron Reduction in Tilled	l Soils (C6)	Crayfish Burio	
	Muck Surface (C7)			ible on Aerial Imagery (C9)
	er (Explain in Remarks)			essed Plants (D1)
_ Iron Deposits (B5) _ Inundation Visible on Aerial Imagery (B7)			Geomorphic F Shallow Aquit	
_ Mater-Stained Leaves (B9)				ohic Relief (D4)
_ Aquatic Fauna (B13)			FAC-Neutral 1	The state of the s
eld Observations:				
rface Water Present? Yes No <u>x</u> Dep	oth (inches):			
ater Table Present? Yes No _X Dep				
ituration Present? Yes No _X Depicludes capillary fringe)	oth (inches):0"	Wetland H	ydrology Present	? Yes <u>X</u> No
ictudes capillary fiffige) escribe Recorded Data (stream gauge, monitoring well, a	aerial photos, previous insp	pections), if ava	ilable:	
water-stained leaves and other indicators of surface	e water influence were obser	ved within Wetls	and VV	
water-stained leaves and other indicators of surface	e water influence were ooser	ved within went	aid V V.	

	Absolute Dominant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 30')	% Cover Species? Status	Number of Dominant Species That Are OBL, FACW, or FAC
2,		
3		Total Number of Dominant Species Across All Strata: 3 (B)
5		
6,		
7		Prevalence Index worksheet:
	= Total Cover	Total % Cover of: Multiply by:
50% of total cover:	20% of total cover:	OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')		FACW species x 2 =
1,		FAC species x 3 =
2		FACU species x 4 =
3		UPL species x 5 =
4		Column Totals: (A) (B)
5		B 1 1 1 B/A
6		Trovalence mask Birt
7		Hydrophytic Vegetation Indicators:
8		1 - Rapid Test for Hydrophytic Vegetation
		X 2 - Dominance Test is >50%
9	= Total Cover	3 - Prevalence Index is ≤3 0¹
50% of total cover:		4 - Morphological Adaptations (Provide supporting
Herb Stratum (Plot size: 1.5 m)		data in Remarks or on a separate sheet)
I I I I I I I I I I I I I I I I I I I	50 Yes FACW	Problematic Hydrophytic Vegetation¹ (Explain)
2 Phalaris arundinacea	30 Yes FACV	•
	105 11101	¹ Indicators of hydric soil and wetland hydrology must
3. Carex sp.		be present, unless disturbed or problematic
4		Definitions of Four Vegetation Strata:
5		Tree - Woody plants, excluding vines, 3 in (7.6 cm) or
6		more in diameter at breast height (DBH), regardless of
7		
8		- Babillusaliub - Woody Dialia excluding Villea 1855
9		than 3 in DBH and greater than or equal to 3 28 ft (1
10,		m) tall
11,		Herb - All herbaceous (non-woody) plants, regardless
	100 = Total Cover	of size, and woody plants less than 3 28 ft tall
50% of total cover: 50 _	20% of total cover: 20	Woody vine - All woody vines greater than 3 28 ft in
Woody Vine Stratum (Plot size: 1 m		height.
1,		
2		
3		
4		1 bulana butia
5,		Hydrophytic Vegetation
	= Total Cover	Present? Yes X No
50% of total cover:	20% of total cover:	
Remarks: (Include photo numbers here or on a separate s	neet)	
Hydrophytic vegetation identified within Wetland V	V. A variable rating indicator "V"	is for the unidentified species.

inches)	Matrix	Redox Features	1 , 2	- .	
	Color (moist)		vpe ¹ Loc ²	Texture	Remarks
0-20	5 YR 6/1 8	0 7.5 YR 5/8 20	C PL _	SCL	
		n, RM=Reduced Matrix, MS=Masked Sa	nd Grains ²	Location: PL=Pore Lining	
ydric Soil I		D-44-00-4 (07)			olematic Hydric Soils ³ :
_ Histosol Histor En	(A1) ipedon (A2)	Dark Surface (S7) Polyvalue Below Surface (S8) (M) RA 147 1.	2 cm Muck (A1 Coast Prairie R	
_ Histic Ep _ Black His		Polyvalue Below Surface (S9) (Mi		(MLRA 147,	
	n Sulfide (A4)	Loamy Gleyed Matrix (F2)	2101147, 1407	Piedmont Floor	
	Layers (À5)	X Depleted Matrix (F3)		(MLRA 136,	
	ck (A10) (LRR N)	Redox Dark Surface (F6)			ark Surface (TF12)
	Below Dark Surface (A		")	Other (Explain	in Remarks)
	rk Surface (A12)	Redox Depressions (F8)	E4017LDD N		
	lucky Mineral (S1) (LRR 147, 148)	N, Iron-Manganese Masses (I MLRA 136)	F12) (LKK N,		
	leyed Matrix (S4)	Umbric Surface (F13) (MLI	RA 136, 122)	3Indicators of hyd	rophytic vegetation and
	edox (S5)	Piedmont Floodplain Soils			gy must be present,
	Matrix (S6)	Red Parent Material (F21)		unless disturbed	
estrictive L	.ayer (if observed):		1		
Туре					
	hes):			Hydric Soil Present?	Yes <u>X</u> No
Depth (inc					
Depth (inc emarks:					
emarks:	soil identified within Wetl	and VV.			
emarks:	soil identified within Wetl	and VV.			
emarks:	soil identified within Wetl	and VV.			
emarks:	soil identified within Wetl	and VV.			
emarks:	soil identified within Wetl	and VV.			
emarks:	soil identified within Wetl	and VV.			
emarks:	soil identified within Wetl	and VV.			
emarks:	soil identified within Wetl	and VV.			
emarks:	soil identified within Wetl	and VV.			
emarks:	soil identified within Wetl	and VV.			
emarks:	soil identified within Wetl	and VV.			
emarks:	soil identified within Wetl	and VV.			
emarks:	soil identified within Wetl	and VV.			

Project/Site:TTA Light Rail Transit	City/County: Durham	Sampling Date: 1-21-14
Applicant/Owner: Triangle Transit		State: NC Sampling Point: Wetland VVV - DP#
Landform (hillslope, terrace, etc.): _terrace		
	7	78.973797 Datum: NAD 83
Soil Map Unit Name: Chewacla loam, 0 to 2% slopes, frequently		NWI classification: PF01
Are climatic / hydrologic conditions on the site typical for this time		
Are Vegetation, Soil, or Hydrology signific		
Are Vegetation, Soil, or Hydrology natural		
SUMMARY OF FINDINGS – Attach site map show	ving sampling point locati	ons, transects, important features, etc.
Hydrophytic Vegetation Present? Yes X No		
Hydric Soil Present? Yes X No	is the Sampred Area	Vac V Ne
Wetland Hydrology Present? Yes X No		Yes _X No
HYDROLOGY		
Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that an	nnka)	Surface Soil Cracks (B6)
	itic Plants (B14)	Sparsely Vegetated Concave Surface (B8)
	Sulfide Odor (C1)	Drainage Patterns (B10)
	Rhizospheres on Living Roots (C3)	
X Water Marks (B1) Presence	of Reduced Iron (C4)	Dry-Season Water Table (C2)
Sediment Deposits (B2) Recent Iro	n Reduction in Tilled Soils (C6)	Crayfish Burrows (C8)
	Surface (C7)	Saturation Visible on Aerial Imagery (C9)
	plain in Remarks)	Stunted or Stressed Plants (D1)
Iron Deposits (B5) Inundation Visible on Aerial Imagery (B7)		Geomorphic Position (D2) Shallow Aquitard (D3)
X Water-Stained Leaves (B9)		Microtopographic Relief (D4)
Aquatic Fauna (B13)		FAC-Neutral Test (D5)
Field Observations:		
Surface Water Present? Yes No _x _ Depth (in		
Water Table Present? Yes X No Depth (in		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
Saturation Present? Yes X No Depth (in (includes capillary fringe)	ches):0" Wetland I	Hydrology Present? Yes <u>X</u> No
Describe Recorded Data (stream gauge, monitoring well, aerial	ohotos, previous inspections), if av	ailable:
Develop		
Remarks: Water-stained leaves and other indicators of surface water	er influence were observed within Wet	land VVV

	Absolute Dominant Indicat	
Tree Stratum (Plot size: 30')	% Cover Species? Statu	- I Number of Dominant Species
1. Acer rubrum		
2 Fraxinus pennsylvanica	30 Yes FA	Total Number of Dominant
3 Acer negundo	20 Yes FA	C Species Across All Strata: 3 (B)
4		Percent of Dominant Species
5		— That Are OBL, FACW, or FAC: 100 (A/B)
6		(10)
7		Prevalence Index worksheet:
	100 = Total Cover	Total % Cover of: Multiply by:
50% of total cover:50		OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')	20 % of total cover	FACW species x 2 =
	50	
2		FACU species x 4 =
3		UPL species x 5 =
4		Column Totals: (A) (B)
5		
6		Prevalence Index = B/A =
		Hydrophytic Vegetation Indicators:
7		1 - Rapid Test for Hydrophytic Vegetation
8		X 2 - Dominance Test is >50%
9		3 - Prevalence Index is ≤3.01
	50 = Total Cover	4. Morphological &daptations 1 / Drovido cupporting
50% of total cover:25	20% of total cover 10	
Herb Stratum (Plot size: 1.5 m)		data in Remarks or on a separate sheet)
1,		Problematic Hydrophytic Vegetation ¹ (Explain)
		7
2		Indicators of hydric soil and wetland hydrology must
3		be present, unless disturbed or problematic.
4		Definitions of Four Vegetation Strata:
5		
6		Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or
7		more in diameter at breast height (DBH), regardless of height.
8		_ Invigine
		Sapling/Shrub - Woody plants, excluding vines, less
9		than 3 in DBH and greater than or equal to 3 28 ft (1
10		m) tall.
11,		- Herb - All herbaceous (non-woody) plants, regardless
	= Total Cover	of size, and woody plants less than 3.28 ft tail.
50% of total cover:		— Manatantan Allumaturian matantan 2006 in
Woody Vine Stratum (Plot size: 1 m)		Woody vine – All woody vines greater than 3.28 ft in height.
1		neight.
		-
2		-
3		-
4		- Hydrophytic
5		Vegetation
	= Total Cover	Present? Yes X No
50% of total cover:	20% of total cover:	
Remarks: (Include photo numbers here or on a separate s		
rtemarks. (melade prote numbers here or on a separate s	11001.)	
Hydrophytic vegetation identified within Wetland V	VV.	

Depth	Matrix		Redd	x Feature				
(inches)	Color (moist)	%	Color (moist)	%	_Tvpe1	_Loc ²	<u>Texture</u>	Remarks
0-8	10 YR 3/2	100		_			Clay	Q
8-20	10 YR 3/2		10 YR 4/6	30		PL	Clay	
				Ξ				
Type: C≃Co Hydric Soil I	oncentration, D=Dep	oletion, RM	=Reduced Matrix, M	S=Maske	d Sand Gra	ains		_=Pore Lining, M=Matrix. ttors for Problematic Hydric Soils³
_ Histosol			Dark Surface				2	cm Muck (A10) (MLRA 147)
Histic Ep Black His Hydroger Stratified 2 cm Mu Depleted Thick Da Sandy M	ipedon (A2)		Polyvalue Be Thin Dark St Loamy Gleye X Depleted Ma Redox Dark Depleted Dal X Redox Depre Iron-Mangan	elow Surfa erface (S9 ed Matrix (trix (F3) Surface (F rk Surface essions (F ese Mass) (MLRA 1 (F2) F6) e (F7) 8)	47, 148)	148) Ci Pi Ve	const Prairie Redox (A16) (MLRA 147, 148) edmont Floodplain Soils (F19) (MLRA 136, 147) ery Shallow Dark Surface (TF12) ther (Explain in Remarks)
Sandy Re	leyed Matrix (S4) edox (S5) Matrix (S6)		Umbric Surfa Piedmont Flo Red Parent N	odplain S	oils (F19)	(MLRA 148	B) wet	cators of hydrophytic vegetation and land hydrology must be present, ess disturbed or problematic
Restrictive L	ayer (if observed):					,		The second secon
			_					
Depth (incl Remarks:	hes):		_				Hydric Soil i	Present? Yes <u>X</u> No
Hydrie	soil identified within	Wetland VV	'V.					

Project/Site TTA Light Rail T	ransit	City/County	Durham		Sampling Date 07-30-13		
Applicant/Owner: Triangle Tra					Sampling Point: Wetland W - DP#22		
		Section, Tov					
Landform (hillslope, terrace, et-							
Subregion (LRR or MLRA):		at: _35.958192					
Soil Map Unit Name: Chev							
Are climatic / hydrologic conditi							
					present? Yes X No No		
Are Vegetation, Soil							
SUMMARY OF FINDING	GS – Attach site	map showing sampling	g point location	ns, transects	s, important features, etc.		
Hydrophytic Vegetation Prese		N I o	e Sampled Area				
Hydric Soil Present? Wetland Hydrology Present?		No withi	n a Wetland?	Yes X	No		
Pomarke:		re of a Wetland. See Approximate	Waters of the U.S B	oundary map Exhi	bit for Location of DP#22.		
HYDROLOGY							
Wetfand Hydrology Indicato		and cell the et annului			ators (minimum of two required)		
Primary Indicators (minimum Surface Water (A1)	or one is required, cri	eck an mat apply) True Aquatic Plants (B14)		Surface Soil	' '		
X High Water Table (A2)	-	Hydrogen Sulfide Odor (C1)		Sparsely Vegetated Concave Surface (B8) Drainage Patterns (B10)			
X Saturation (A3)	_	Oxidized Rhizospheres on L		Moss Trim L			
X Water Marks (B1)	_	Presence of Reduced Iron (Water Table (C2)		
Sediment Deposits (B2)	_	Recent fron Reduction in Til		Crayfish Bui			
Drift Deposits (B3)	_	Thin Muck Surface (C7)		Saturation V	isible on Aerial Imagery (C9)		
Algal Mat or Crust (B4)	_	Other (Explain in Remarks)		Stunted or S	Stressed Plants (D1)		
Iron Deposits (B5)	N.				Position (D2)		
Inundation Visible on Aer				Shallow Aqu			
X Water-Stained Leaves (B	.9)				aphic Relief (D4)		
Aquatic Fauna (B13) Field Observations:				FAC-Neutra	Flest (LID)		
Surface Water Present?	Yee No V	Depth (inches):					
Water Table Present?		Depth (inches): 12"					
Saturation Present?		Depth (inches):9"	Wetland H	vdrology Prese	nt? Yes X No		
(includes capillary fringe)				•	nt: res_ANo		
Describe Recorded Data (stre	am gauge, monitorin	g well, aerial photos, previous i	nspections), if avai	ilable:			
Remarks:							
	es and other indicators	of surface water influence were ob	served within Wetla	and W.			

	Absolute	Dominant		Dominance Test worksheet:
Tree Stratum (Plot size 30'		Species?	<u>Status</u>	Number of Dominant Species
1 Quercus phellos		Yes	FAC	That Are OBL, FACW, or FAC: 3 (A)
2. Quercus alba		Yes	FACU	Total Number of Dominant
3			_	Species Across All Strata:
4				Percent of Dominant Species That Are OBL, FACW, or FAC. 60 (A/B)
6				
7				Prevalence Index worksheet:
		= Total Cov	er	Total % Cover of: Multiply by:
50% of total cover: 25				OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')				FACW species x 2 =
Betula nigra	20	Yes	FACW	FAC species x 3 =
2				FACU species x 4 =
3				UPL species x 5 =
4				Column Totals: (A) (B)
5				Prevalence Index = B/A =
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
8				X 2 - Dominance Test is >50%
9				3 - Prevalence Index is ≤3 0 ¹
		= Total Cov		4 - Morphological Adaptations (Provide supporting
50% of total cover:10	20% of	total cover:	4	data in Remarks or on a separate sheet)
Herb Stratum (Plot size: 1.5 m)				Problematic Hydrophytic Vegetation¹ (Explain)
1 Carex sp.	30	Yes	v	Problematic Hydrophytic Vegetation (Explain)
2 Lonicera japonica	20	Yes	FAC_	1
3 Juncus effusus	10	No	FACW	Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic
4 Typha latifolia	10	No	OBL	Definitions of Four Vegetation Strata:
5. Bidens frondosa		No	FACW	Definitions of Four Vegetation Strata.
6				Tree – Woody plants, excluding vines, 3 in: (7.6 cm) or
7				more in diameter at breast height (DBH), regardless of height
				nogn
8				Sapling/Shrub – Woody plants, excluding vines, less
9				than 3 in DBH and greater than or equal to 3 28 ft (1 m) tall
10		_		
11	80			Herb – All herbaceous (non-woody) plants, regardless
50% - 64-4-1		= Total Cove		of size, and woody plants less than 3 28 ft tall
50% of total cover:	20% or	total cover:		Woody vine - All woody vines greater than 3.28 ft in
Woody Vine Stratum (Plot size: 1 m				height
1			_	
2				
3				
4				Hydrophytic
5				Vegetation
		= Total Cove	∍r	Present? Yes X No
50% of total cover:	20% of	total cover:		
Remarks: (Include photo numbers here or on a separate s	sheet)			
Hydrophytic vegetation identified within Wetland	W. A variabl	e indicator ra	ting "V" is	for the unidentified species.

Depth	Matrix	- 01	Redo	x Feature:				
inches)	Color (moist)	%%	Color (moist)	%	_Type1	Loc ²	Texture	Remarks
0-3	10 YR 5/3	100			_		Sandy clay	
3-9	10 YR 5/3	100					Clay	
9-20	2.5 Y 5/2	90	7.5 YR 3/4	10		PL	Clay	
				\equiv	=	=		
	oncentration, D=Dep	oletion, RM=	Reduced Matrix, MS	S=Masked	I Sand Gra	ııns		Pore Lining, M=Matrix
ydric Soil _ Histosol	Indicators:		Dark Surface	1071				's for Problematic Hydric Soils ³ : Muck (A10) (MLRA 147)
Histic E ₁ Black Hi Hydroge Stratified 2 cm ML Deplete Thick De Sandy N MLRA Sandy G Sandy F Stripped	pipedon (A2) sistic (A3) en Sulfide (A4) d Layers (A5) uck (A10) (LRR N) d Below Dark Surface ark Surface (A12) Mucky Mineral (S1) (LA 147, 148) Gleyed Matrix (S4) Redox (S5) Matrix (S6)	LRR N,	Polyvalue Be Thin Dark Su Loamy Gleye X Depleted Ma Redox Dark S Depleted Dar Redox Depre Iron-Mangan MLRA 130 Umbric Surfa Piedmont Flo	low Surface (S9) ad Matrix (I trix (F3) Surface (F6 k Surface essions (F8 ese Massa 6) ce (F13) (addplain Sa	(MLRA 1: F2) 6) (F7) 3) es (F12) (L MLRA 136 bils (F19) (47, 148) .RR N, 6, 122) MLRA 14	148) Coas (N Pied (N Very Othe	st Prairie Redox (A16) ILRA 147, 148) mont Floodplain Soils (F19) ILRA 136, 147) Shallow Dark Surface (TF12) r (Explain in Remarks) fors of hydrophytic vegetation and and hydrology must be present, a disturbed or problematic
	Layer (if observed):							
Type:			_					
Depth (in emarks:	ches)						Hydric Soil Pre	esent? Yes X No
Hydric s	soil identified within W	vetiand W.						

Project/Site: TTA Light Rail Transit	City	//County: Orange		Sampling Date 11-05-13		
Applicant/Owner Triangle Transit				Sampling Point Wetland WW - DP#3		
Investigator(s) Brandon Phillips, CHMM	Se	ction, Township, Range				
Landform (hillslope, terrace, etc.) <u>terrace</u>						
				Datum: NAD 83		
Soil Map Unit Name White Store sandy loam.						
		V				
Are climatic / hydrologic conditions on the site ty						
Are Vegetation, Soil, or Hydrolog						
Are Vegetation, Soil, or Hydrolog	y naturally proble	matic? (If needed,	explain any answ	ers in Remarks)		
SUMMARY OF FINDINGS – Attach s	ite map showing sa	mpling point location	ons, transect	s, important features, etc.		
Livelyophysic Magazetica Dyspant O. M	V bl-					
	X No No	Is the Sampled Area				
Wetland Hydrology Present? Yes		within a Wetland?	Yes X	No		
Remarks: DP#31 (Wetland WW) is represe						
HYDROLOGY						
Wetland Hydrology Indicators:			Secondary Indic	ators (minimum of two required)		
Primary Indicators (minimum of one is required	check all that apply)		Surface Soil	Cracks (B6)		
Surface Water (A1)	True Aquatic Plants	6 (B14)	Sparsely Ve	getated Concave Surface (B8)		
High Water Table (A2)	Hydrogen Sulfide C		Drainage Patterns (B10)			
Saturation (A3)		eres on Living Roots (C3)	Moss Trim L			
X Water Marks (B1)	Presence of Reduc			Water Table (C2)		
Sediment Deposits (B2) Drift Deposits (B3)	Recent from Reduct Thin Muck Surface	tion in Tilled Soils (C6)	Crayfish Bui	` '		
Algal Mat or Crust (B4)	Other (Explain in R			fisible on Aerial Imagery (C9) Stressed Plants (D1)		
Iron Deposits (B5)	out (Explain in te	ornarra)	Geomorphic			
Inundation Visible on Aerial Imagery (B7)			Shallow Aqu			
X Water-Stained Leaves (B9)			Microtopogr			
Aquatic Fauna (B13)			FAC-Neutra	Test (D5)		
Field Observations:						
	x Depth (inches):					
	X Depth (inches);					
Saturation Present? Yes No (includes capillary fringe)	X Depth (inches):	Wetland H	Hydrology Presei	nt? Yes X No		
Describe Recorded Data (stream gauge, monito	ring well, aerial photos, p	revious inspections), if ava	ailable.			
Remarks.						
Water-stained leaves and other indicate	ors of surface water influenc	e were observed within Wetla	and WW.			

	Absolute	Dominant		Dominance Test worksheet;
Tree Stratum (Flot size 30') Acer rubrum		Species? Yes		Number of Dominant Species
	60		FAC	That Are OBL, FACW, or FAC: (A)
2. <u>Liquidambar styraciflua</u> 3.	40		FAC	Total Number of Dominant Species Across All Strata; 7 (B)
4				(-)
5			_	Percent of Dominant Species That Are OBL, FACW, or FAC
6	_			Prevalence Index worksheet:
	100	= Total Cove	ar a	Total % Cover of Multiply by_
50% of total cover:				OBL species x 1 =
Sapling/Shrub Stratum (Plot size10')				FACW species x 2 =
1 Ligustrum sinense	25	Yes	FACU	FAC species x 3 =
2 Quercus phellos	10	Yes	FAC	FACU species x 4 =
3 Fraxinus pennsylvanica	10	Yes	FACW	UPL species x 5 =
4,	-			Column Totals: (A) (B)
5			_	Prevalence Index = B/A =
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
8				X 2 - Dominance Test is >50%
9	15		_	3 - Prevalence Index is ≤3 01
50% of total cover: 22.5		= Total Cove total cover		4 - Morphological Adaptations¹ (Provide supporting
	20% 01	roral coveu		data in Remarks or on a separate sheet)
Herb Stratum (Plot size1.5 m) 1. Lonicera japonica	20		FAC	Problematic Hydrophytic Vegetation (Explain)
	20	Yes	-	
2 Fragaria virginiana		Yes	FACU	Indicators of hydric soil and wetland hydrology must
3 Smilax rotundifolia		No	FAC_	be present, unless disturbed or problematic
4 <u>Gaultheria procumbens</u>			FACU	Definitions of Four Vegetation Strata:
5				Tree - Woody plants, excluding vines, 3 in (7.6 cm) or
6				more in diameter at breast height (DBH), regardless of
7				height
8				Sapling/Shrub - Woody plants, excluding vines, less
9				than 3 in DBH and greater than or equal to 3 28 ft (1
10				m) tall
11				Herb - All herbaceous (non-woody) plants, regardless
	55 :	= Total Cove	er	of size, and woody plants less than 3 28 ft tall
50% of total cover: <u>27.5</u>	5 20% of	total cover:_	11	Woody vine - All woody vines greater than 3 28 ft in
Woody Vine Stratum (Plot size: 1 m				height
1				
2				
3				
4				Library to at
5				Hydrophytic Vegetation
		= Total Cove	r	Present? Yes X No
50% of total cover:	20% of	total cover:_		
Remarks: (Include photo numbers here or on a separate s	heet)			
				_
Hydrophytic vegetation identified within Wetland \	WW.			1.1

Depth (inches)	Matrix Color (moist)	%		x Features	_Type ¹ _	_Loc ²	Toyatura	Damarka
(inches)			Color (moist)	%		_Loc-	Texture	Remarks
0-9	10 YR 3/2	100					Clay	
9-20	10 YR 5/2	85	7.5 YR 4/6	15		PL	Clay	
	+			_	_			
	_							
	-	-				_		
Type: C=Co lydric Soil I		pletion, RM	=Reduced Matrix, MS	=Masked	Sand Gra	ins.		Pore Lining, M=Matrix rs for Problematic Hydric Soils³;
Black His Hydrogel Stratified 2 cm Mu Depleted Thick Da Sandy M MLRA Sandy G Sandy R	pipedon (A2)	, ,	Dark Surface Polyvalue Be Thin Dark Su Loamy Gleye X Depleted Mat Redox Dark S Depleted Dar Redox Depre Iron-Mangane MLRA 136 Umbric Surfa Piedmont Flo Red Parent N	low Surface (S9) d Matrix (F3) Surface (F6) k Surface (F8 ssions (F8 ese Masse 6) ce (F13) (N	(MLRA 1 6) (F7)) s (F12) (L MLRA 136	47, 148) LRR N, 6, 122) (MLRA 14	148) Coa (f) Piec (f) Very Other all (a) wetla	n Muck (A10) (MLRA 147) st Prairie Redox (A16) //LRA 147, 148) //Imont Floodplain Soils (F19) //LRA 136, 147) // Shallow Dark Surface (TF12) er (Explain in Remarks) tors of hydrophytic vegetation and hydrology must be present, is disturbed or problematic
estrictive L	.ayer (if observed)			,				
Туре								
Depth (inc	thes):		_				Hydric Soil Pr	esent? Yes <u>X</u> No
Hydric	soil identified within	n Wetland W	W.					

Project/Site: TTA Light Rail Transit	City/County: Du	rham	Sampling Date 1-22-14
Applicant/Owner:Triangle Transit			Sampling Point Wetland WWW - DP#44
B. I. BUILL GIVE		ip, Range:	
Landform (hillslope, terrace, etc.): terrace			
Subregion (LRR or MLRA): LRR P Lat: 3.			
Soil Map Unit Name: Chewacla loam, 0 to 2% slopes, fre			
Are climatic / hydrologic conditions on the site typical for th			
Are Vegetation, Soil, or Hydrology			
Are Vegetation, Soil, or Hydrology			
SUMMARY OF FINDINGS – Attach site map	showing sampling po	oint locations, transect	s, important features, etc.
Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present? Remarks: DP#44 (Wetland WWW) is representative	within a \		No
HYDROLOGY Wetland Hydrology Indicators:		Secondary Indi	cators (minimum of two required)
Primary Indicators (minimum of one is required, check all	that apply)	Surface So	
	e Aquatic Plants (B14)		egetated Concave Surface (B8)
I 	drogen Sulfide Odor (C1)		atterns (B10)
X Saturation (A3) Oxi	dized Rhizospheres on Living		
	sence of Reduced Iron (C4)		n Water Table (C2)
	cent Iron Reduction in Tilled S		
	n Muck Surface (C7)		Visible on Aerial Imagery (C9)
Algal Mat or Crust (B4) Oth Iron Deposits (B5)	ier (Explain in Remarks)	Stunted or Geomorphi	Stressed Plants (D1)
Inundation Visible on Aerial Imagery (B7)		Shallow Ac	· · ·
X Water-Stained Leaves (B9)			raphic Relief (D4)
Aquatic Fauna (B13)		FAC-Neutra	
Field Observations:			
Surface Water Present? Yes _x_ No De	epth (inches)		
Water Table Present? Yes X No De			
Saturation Present? Yes X No De (includes capillary fringe)	epth (inches):0"	Wetland Hydrology Pres	ent? Yes X No
Describe Recorded Data (stream gauge, monitoring well,	aerial photos, previous inspe	ctions), if available:	
Remarks: Water-stained leaves and other indicators of surfa	ace water influence were observe	d within Wetland WWW.	

	Absolute	Dominant		Dominance Test worksheet:
Tree Stratum (Plot size: 30')		Species?		Number of Dominant Species
1Ulmus americana		Yes	FACW	That Are OBL, FACW, or FAC:4(A)
2	-	-		Total Number of Dominant
3				Species Across All Strata:4 (B)
4				B
5				Percent of Dominant Species That Are OBL, FACW, or FAC:
				THAT AIR OBL, FACW, OF FAC (A/B)
6				Prevalence Index worksheet:
7			-	Total % Cover of: Multiply by:
50		= Total Cov		OBL species x 1 =
50% of total cover:50	20% of	total cover:		The state of the s
Sapling/Shrub Stratum (Plot size: 10')				FACW species x 2 =
1. Carpinus caroliniana	25	Yes	FAC	FAC species x 3 =
2				FACU species x 4 =
3				UPL species x 5 =
				Column Totals: (A) (B)
4				
5				Prevalence Index = B/A =
6,				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
8				
9				X 2 - Dominance Test is >50%
v		= Total Cov	0.5	3 - Prevalence Index is ≤3.01
50% of total cover12				4 - Morphological Adaptations (Provide supporting
	20% UI	total cover.		data in Remarks or on a separate sheet)
Herb Stratum (Plot size: 1.5 m)				Problematic Hydrophytic Vegetation¹ (Explain)
1. Smilax rotundifolia	10	Yes	<u>FAC</u>	
2 Lonicera japonica	10	Yes	_FAC_	1
3				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
4				
				Definitions of Four Vegetation Strata:
5				Tree - Woody plants, excluding vines, 3 in. (7.6 cm) or
6				more in diameter at breast height (DBH), regardless of
7,				height.
8				Sapling/Shrub Woody plants, excluding vines, less
9				than 3 in DBH and greater than or equal to 3.28 ft (1
10				m) tall
				1
11				Herb – All herbaceous (non-woody) plants, regardless
F00/ - f + - + -		= Total Cov		of size, and woody plants less than 3 28 ft tall
50% of total cover:5	20% or	total cover.	2	Woody vine - All woody vines greater than 3.28 ft in
Woody Vine Stratum (Plot size: 1 m)				height.
1,				
2.				
3				
4				1
			_	Hydrophytic
5				Vegetation
		= Total Cov		Present? Yes X No
50% of total cover:	20% of	total cover:		
50% of total cover:	20% or sheet.)	total cover:		

Depth	Matrix (maint)	%		x Features		_Loc ²	T			
	(moist)	<u> </u>	Color (moist)	%	Type ¹		Textu		Rem	narks
0-20 10 YR	4/2	60	10 YR 4/6	40		PL	Clay	_		
				-						
			-		-	+	-			
 /							-			
							_			
Type: C=Concentration	on, D=Deplet	ion, RM=R	educed Matrix, M	S=Masked	Sand Gra	ains	² Locatio	n: PL=Pore	Lining, M=N	/latrix
lydric Soil Indicators										atic Hydric Soils ³ :
_ Histosol (A1)			Dark Surface					2 cm Mu		
_ Histic Epipedon (A	2)		Polyvalue Be				, 148)	Coast Pr		(A16)
_ Black Histic (A3)	8.4)		Thin Dark Su			47, 148)			147, 148)	Soile /E40\
_ Hydrogen Sulfide (_ Stratified Layers (A			Loamy Gleye X Depleted Ma		-2)		-		. +100aprain \ 136, 147)	Soils (F19)
2 cm Muck (A10) (Redox Dark		6)					urface (TF12)
_ Depleted Below Da		A11)	Depleted Da				-		oplain in Rei	
_ Thick Dark Surface	e (A12)		X Redox Depre							
_ Sandy Mucky Mine		RN,	Iron-Mangan		s (F12) (I	LRR N,				
MLRA 147, 148			MLRA 13		=			3		
 Sandy Gleyed Mate Sandy Redox (S5) 			Umbric Surfa Piedmont Flo				(0)			tic vegetation and st be present,
Sandy Redox (SS) Stripped Matrix (S6			Red Parent N						urbed or pr	
estrictive Layer (if o				, , , , , , , , , , , , , , , , , , ,	, (1	4111000 410		0.0101110210
Type:	-									
Depth (inches):			_				Hvdrid	Soil Preser	t? Yes	X No
emarks:							1.9			
Hydric soil identif	ied within We	etland WW	W.							

plicant/Owner Triangle Transit	City/County: Durham		Sampling Date 09-18-13	
		State: NC	Sampling Point Wetland XX - DP	
estigator(s): Brandon Fulton, LSS, PWS	Section, Township, Range:			
ndform (hillslope, terrace, etc.); <u>basin</u>	Local relief (concave, convex, no	ne): Concave	Slope (%): <u>0</u>	
bregion (LRR or MLRA): LRR P Lat 35.954826	Long:7	8.977794	Datum: NAD 83	
Map Unit Name: Chewacla loam, 0 to 2% slopes, frequently flo	ooded	NWI classific	ation PF01	
e climatic / hydrologic conditions on the site typical for this time of	year? Yes X No	(If no, explain in R	emarks)	
e Vegetation, Soil, or Hydrology significan	itly disturbed? Are "Norma	l Circumstances" p	resent? Yes X No	
e Vegetation, Soil, or Hydrology naturally		explain any answe		
UMMARY OF FINDINGS – Attach site map showin		ons, transects	, important features, etc.	
lydrophytic Vegetation Present? Yes_XNo	La Har Committed America			
ydrıc Soil Present? Yes X No	Is the Sampled Area within a Wetland?	Yes X	No	
Vetland Hydrology Present? Yes X No				
/DROLOGY				
/etland Hydrology Indicators:			tors (minimum of two required)	
rimary Indicators (minimum of one is required; check all that appl				
	Plants (B14)		jetated Concave Surface (B8)	
	ulfide Odor (C1)	Drainage Patterns (B10)		
	izospheres on Living Roots (C3) Reduced Iron (C4)	Moss Trim Li	nes (B16) Water Table (C2)	
	Reduction in Tilled Soils (C6)	Crayfish Burr		
Drift Deposits (B3) Thin Muck S			sible on Aerial Imagery (C9)	
Algai Mat or Crust (B4) Other (Expla			ressed Plants (D1)	
_ Iron Deposits (B5)		Geomorphic		
Inundation Visible on Aerial Imagery (B7)		Shallow Aqui		
Water-Stained Leaves (B9)			phic Relief (D4)	
Aquatic Fauna (B13) ield Observations:		FAC-Neutral	Test (Do)	
urface Water Present? Yes NoX_ Depth (inch	P5).			
/ater Table Present? Yes X No Depth (inch				
		Hvdrology Presen	t? Yes_X No	
aturation Present? Yes X No Depth (inches				

	Absolute Dominant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 30')	% Cover Species? Status	Number of Dominant Species
- v v v v v v v v.	15 Yes FACW	That Are OBL, FACW, or FAC: 3 (A)
2_ Acer rubrum		Total Number of Dominant
3		Species Across All Strata:3 (B)
4		Percent of Dominant Species
5		That Are OBL, FACVV, or FAC:(A/B)
6		
7,		Prevalence Index worksheet:
	25 = Total Cover	Total % Cover of: Multiply by:
50% of total cover. <u>12.5</u>	20% of total cover: 5	OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')		FACW species x 2 =
1_Ulmus americana	10 Yes FACW	FAC species x 3 =
2		FACU species x 4 =
3		UPL species x 5 =
		Column Totals: (A) (B)
4		
5		Prevalence Index = B/A =
6		Hydrophytic Vegetation Indicators:
7		1 - Rapid Test for Hydrophytic Vegetation
8		X 2 - Dominance Test is >50%
9		3 - Prevalence Index is ≤3 0 ¹
	= Total Cover	4 - Morphological Adaptations ¹ (Provide supporting
	20% of total cover: 2	data in Remarks or on a separate sheet)
Herb Stratum (Plot size: 1.5 m)		
1		Problematic Hydrophytic Vegetation ¹ (Explain)
2		
3		Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
4		
5		Definitions of Four Vegetation Strata:
		Tree - Woody plants, excluding vines, 3 in (7.6 cm) or
6		more in diameter at breast height (DBH), regardless of
7-		height
8		Sapling/Shrub - Woody plants, excluding vines, less
9		than 3 in DBH and greater than or equal to 3 28 ft (1
10		m) tall
11		Herb - All herbaceous (non-woody) plants, regardless
	= Total Cover	of size, and woody plants less than 3 28 ft tall
50% of total cover:	20% of total cover:	Woody vine - All woody vines greater than 3 28 ft in
Woody Vine Stratum (Plot size: 1 m)		height
1		
2		
3,		
4		
5		Hydrophytic
		Vegetation Present? Yes X No
E00/ of total cover	= Total Cover 20% of total cover:	
Remarks: (Include photo numbers here or on a separate s	sneet)	
Hydrophytic vegetation identified within Wetland	XX.	

Depth	Matrix	0/		<u>x Feature</u>		, 2	_	
(inches)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	Remarks
0-2	7.5 YR 3/1	100		_	_			
2-20	10 YR 7/2	80	7.5 YR 5/6		C	PL_	SCL	
					-			
				-				
Tuno: C=Co	ncontration D=Dor	plotion DM:		S=Maskas			² Location: DL=	Pore Lining, M=Matrix
ydric Soil Ir		pietion, Rivi-	-Reduced Matrix, M	3-IVIASKEC	ı Sanu Gir	31115		ors for Problematic Hydric Soils ³ :
_ Histosol (Dark Surface	(97)				n Muck (A10) (MLRA 147)
	ipedon (A2)		Polyvalue Be		ce (S8) (N	LRA 147		est Prairie Redox (A16)
Black His			Thin Dark St					MLRA 147, 148)
	Sulfide (A4)		Loamy Gley			,,		dmont Floodplain Soils (F19)
Stratified			X Depleted Ma		•			MLRA 136, 147)
	k (A10) (LRR N)		Redox Dark		6)			y Shallow Dark Surface (TF12)
	Below Dark Surface	ce (A11)	Depleted Da					er (Explain in Remarks)
	rk Surface (A12)		X Redox Depre	essions (F	8)		_	
	ucky Mineral (S1) (LRR N,	Iron-Mangan		es (F12) (I	LRR N,		
	147, 148)		MLRA 13		MI DA 42	C 400\	31 m ali a a	stava of budy autoria in autorian and
	eyed Matrix (S4)		Umbric Surfa					ators of hydrophytic vegetation and
Sandy Re	Matrix (S6)		Piedmont Flo					ind hydrology must be present,
	ayer (if observed)		Red Parent N	viateriai (F	Z I) (IVILITA	H 121, 141) unles	s disturbed or problematic
	h).						11	
Depth (incl	nes):		_				Hydric Soil Pr	resent? Yes X No
Remarks:								
Hydric so	oil identified within V	Wetland XX.						

Project/Site TTA Light Rail Transit	City/C	County: Durham		Sampling Date: 07-31-13
Applicant/Owner: Triangle Transit				Sampling Point: Wetland Y - DP#4
nvestigator(s): Brandon Phillips, CHMM	Section Section			
Landform (hillslope, terrace, etc.) basin	Local rel	ief (concave, convex, nor	e) Concave	Slope (%):_0
Subregion (LRR or MLRA): LRR P	Lat: 35.914784	Long: -78	3.995006	Datum: NAD 83
Soil Map Unit Name: White Store sandy loan				cation: PF01
Are climatic / hydrologic conditions on the site ty				
Are Vegetation, Soil, or Hydrolo				
Are Vegetation, Soil, or Hydrolo				
SUMMARY OF FINDINGS – Attach				
Attach :	nte map snowing san	ipinig point rocatro	no, transcott	s, important reatures, etc.
	X No	Is the Sampled Area		
	X No	within a Wetland?	Yes X	No
Wetland Hydrology Present? Yes Remarks: DP#40 (Wetland Y) is represent	X No			
HYDROLOGY				
Wetland Hydrology Indicators:				ators (minimum of two required)
Primary Indicators (minimum of one is required			Surface Soil	
X Surface Water (A1)	True Aquatic Plants (getated Concave Surface (B8)
X High Water Table (A2)	Hydrogen Sulfide Odd		Drainage Pa	
X Saturation (A3) X Water Marks (B1)	Oxidized Rnizosphere Presence of Reduced		Moss Trim L	Water Table (C2)
Sediment Deposits (B2)	Recent Iron Reductio		Crayfish Bur	
Drift Deposits (B3)	Thin Muck Surface (C			isible on Aerial Imagery (C9)
Algal Mat or Crust (B4)	Other (Explain in Ren			stressed Plants (D1)
Iron Deposits (B5)			Geomorphic	Position (D2)
Inundation Visible on Aerial Imagery (B7)			Shallow Aqu	
X Water-Stained Leaves (B9)			Microtopogra	
Aquatic Fauna (B13) Field Observations:			FAC-Neutral	Test (D5)
Surface Water Present? Yes X No	Depth (inches): 3"			- 1
	Depth (inches): 0"			- 1
Saturation Present? Yes X No	Depth (inches)0"		ydrology Presei	nt? Yes XNo
(includes capillary fringe) Describe Recorded Data (stream gauge, monit	toring wall, gorial photoc, pro	vious inspositions), if over	labla:	
Describe recorded Data (stream gauge, month	oring well, dendi priotos, pre	rioda irrapectiona), ir avai	ICIDIO.	
Remarks:		4 14 1 WE 4	137	
Water-stained leaves and other indica	tors of surface water influence v	were observed within Wella	nd Y.	

	Absolute	Dominant		Dominance Test worksheet:
Tree Stratum (Plot size:)	% Cover	Species?	<u>Status</u>	Number of Dominant Species
1. Acer rubrum	60	Yes	FAC	That Are OBL, FACW, or FAC: 3 (A)
2				Total Number of Dominant
3				Species Across All Strata: 5 (B)
4				(B)
				Percent of Dominant Species
5				That Are OBL, FACW, or FAC: (A/B)
6				Prevalence Index worksheet:
7			_	Total % Cover of: Multiply by:
		= Total Cov		
50% of total cover: 30 _	20% of	total cover:	12	OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10'				FACW species x 2 =
1 Liquidambar styraciflua	15	Yes	FAC	FAC species x 3 =
2 Acer rubrum	15	Yes	FAC	FACU species x 4 =
				UPL species x 5 =
3,			_	Column Totals: (A) (B)
4				(1)
5				Prevalence Index = B/A =
6,				Hydrophytic Vegetation Indicators:
7				
8				1 - Rapid Test for Hydrophytic Vegetation
			_	X 2 - Dominance Test is >50%
9	20		_	3 - Prevalence Index is ≤3 0 ¹
50% (1.1.) 15		= Total Cov		4 - Morphological Adaptations (Provide supporting
50% of total cover: 15	20% of	total cover:	-	data in Remarks or on a separate sheet)
Herb Stratum (Plot size: 1.5 m)				,
1 Campsis radicans	5	Yes	FAC	Problematic Hydrophytic Vegetation ¹ (Explain)
2 Carex sp.	5	Yes	v	
				¹Indicators of hydric soil and wetland hydrology must
3				be present, unless disturbed or problematic
4				Definitions of Four Vegetation Strata:
5				
6				Tree – Woody plants, excluding vines, 3 in (7.6 cm) or more in diameter at breast height (DBH), regardless of
7				height
				noight.
8,				Sapling/Shrub - Woody plants, excluding vines, less
9				than 3 in DBH and greater than or equal to 3.28 ft (1
10				m) tall
11,				Herb - All herbaceous (non-woody) plants, regardless
	10	= Total Cove	er	of size, and woody plants less than 3,28 ft tall.
50% of total cover: 5				
Woody Vine Stratum (Plot size: 1 m)				Woody vine – All woody vines greater than 3.28 ft in
1 Vitis aestivalis	5	Yes	FACU	height
Y-	-			
2			_	
3				
4				
5				Hydrophytic
·	5	T-4-1 O		Vegetation
25		= Total Cove		100 <u>1</u>
50% of total cover:	2U% of	total cover:	_	
Remarks: (Include photo numbers here or on a separate s	sheet)			
Hydrophytic vegetation identified within Wetland	Y. A variable	indicator rat	ing"V" is fo	or the unidentified species.

Histosol (A1) Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Below Dark Surface (A11) Thick Dark Surface (A12) Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) Sandy Redox (S5) Stripped Matrix (S4) Stripped Matrix (S6) Restrictive Layer (if observed): Type:	Develop
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains *Location: PL=Po ydric Soil Indicators: Histosol (A1) Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) 2 cm N Depleted Matrix (F2) Depleted Matrix (F2) Depleted Below Dark Surface (F6) Depleted Below Dark Surface (A11) Depleted Dark Surface (F6) Sandy Mucky Mineral (S1) (LRR N) MLRA 147, 148) Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) Sandy Gleyed Matrix (S4) Sandy Gleyed Matrix (S4) Sandy Redox Cark Surface (F13) (MLRA 136, 122) Sandy Redox (S5) Piedmont Floodplain Soils (F19) (MLRA 148) Stripped Matrix (S6) Red Parent Material (F21) (MLRA 127, 147) welland #Hydric Soil Presentars:	Remarks
Histosol (A1)	
Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Matrix (F2) Depleted Below Dark Surface (A11) Thin Dark Surface (F6) Depleted Below Dark Surface (A11) Thick Dark Surface (A12) Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) Sandy Gleyed Matrix (S4) Sandy Redox (S5) Stripped Matrix (S6) Stripped Matrix (S6) Depleted Below Dark Surface (A12) Sandy Redox (S5) Stripped Matrix (S6) Depleted Dark Surface (F13) (MLRA 136, 122) Jandicato Wetland Stripped Matrix (S6) Red Parent Material (F21) (MLRA 127, 147) Hydric Soil Presenances:	ore Lining, M=Matrix. s for Problematic Hydric Soils ³ :
Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Matrix (F2) Depleted Below Dark Surface (A11) Thin Dark Surface (F6) Depleted Below Dark Surface (A11) Thick Dark Surface (A12) Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) Sandy Gleyed Matrix (S4) Sandy Redox (S5) Stripped Matrix (S6) Stripped Matrix (S6) Depleted Below Dark Surface (A12) Sandy Redox (S5) Stripped Matrix (S6) Depleted Dark Surface (F13) (MLRA 136, 122) Jandicato Wetland Stripped Matrix (S6) Red Parent Material (F21) (MLRA 127, 147) Hydric Soil Presenances:	Muck (A10) (MLRA 147)
Black Histic (A3)	Prairie Redox (A16)
Stratified Layers (A5) 2 cm Muck (A10) (LRR N) Depleted Below Dark Surface (A11) Thick Dark Surface (A12) Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) Sandy Gleyed Matrix (S4) Sandy Redox (S5) Stripped Matrix (S6) Estrictive Layer (if observed): Type: Depth (inches): MLRA 136) Stripped Matrix (S4) Depleted Matrix (F3) Redox Dark Surface (F6) Depleted Dark Surface (F7) Medicate (F7) Type: Depth (inches): MERA 136) Stripped Matrix (S4) Red Parent Material (F21) (MLRA 127, 147) Hydric Soil Presentables Hydric Soil Presentables MINA 136) Stripped Matrix (S6) Red Parent Material (F21) (MLRA 127, 147) MINA 127, 147) MINA 136, Sandy Redox (S6) Piedmont Floodplain Soils (F19) (MLRA 127, 147) MINA 136, MINA 136, Sandy Mucky Mineral (F21) (MLRA 127, 147) MINA 136, Sandy Redox Dark Surface (F13) (MLRA 136, 122) Piedmont Floodplain Soils (F19) (MLRA 127, 147) MINA 136, MI	-RA 147, 148)
2 cm Muck (A10) (LRR N)	nont Floodplain Soils (F19)
Depleted Below Dark Surface (A11) Thick Dark Surface (A12) Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) Sandy Gleyed Matrix (S4) Sandy Redox (S5) Stripped Matrix (S6) Stripped Matrix (S6) Strictive Layer (if observed): Type: Depth (inches) Depleted Dark Surface (F7) Redox Depressions (F8) Iron-Manganese Masses (F12) (LRR N, MLRA 136) Umbric Surface (F13) (MLRA 136, 122) Piedmont Floodplain Soils (F19) (MLRA 148) Wetland Unless of the strictive Layer (if observed): Type: Depth (inches) Hydric Soil Preserved):	RA 136, 147)
Thick Dark Surface (A12) Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) Sandy Gleyed Matrix (S4) Sandy Redox (S5) Stripped Matrix (S6) MLRA 136, 122) Piedmont Floodplain Soils (F19) (MLRA 148) Wetland Unless of Stripped Matrix (S6) Wetland Unless of Stripped Matrix (S6) Wetland Unless of Stripped Matrix (S6) Type: Depth (inches) Hydric Soil Presentable Control of Stripped Matrix (S6) Hydric Soil Presentable Control of Stripped Matrix (S6)	Shallow Dark Surface (TF12)
Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) Sandy Gleyed Matrix (S4) Sandy Redox (S5) Stripped Matrix (S6) Stripped Matrix (S6) Stripped Matrix (S6) Depth (inches): Iron-Manganese Masses (F12) (LRR N, MLRA 136, 122) MLRA 136) Umbric Surface (F13) (MLRA 136, 122) Piedmont Floodplain Soils (F19) (MLRA 148) wetland unless of the strictive Layer (if observed): Type: Depth (inches): Hydric Soil Presentation	(Explain in Remarks)
MLRA 147, 148) Sandy Gleyed Matrix (S4) Sandy Redox (S5) Stripped Matrix (S6) Red Parent Material (F21) (MLRA 127, 147) Strictive Layer (if observed): Type: Depth (inches): Hydric Soil Presentable August (S6) MLRA 136, 122) Piedmont Floodplain Soils (F19) (MLRA 148) Wetland unless of the second sec	
Sandy Gleyed Matrix (S4) Umbric Surface (F13) (MLRA 136, 122)	
Sandy Redox (S5) Piedmont Floodplain Soils (F19) (MLRA 148) wetland stripped Matrix (S6) Red Parent Material (F21) (MLRA 127, 147) unless of estrictive Layer (if observed): Type: Depth (inches): Hydric Soil Presenances:	ors of hydrophytic vegetation and
Sestrictive Layer (if observed); Type: Depth (inches): Hydric Soil Presemarks:	hydrology must be present,
Type: Hydric Soil Presents:	disturbed or problematic
Depth (inches): Hydric Soil Presemarks:	
emarks:	
	sent? Yes <u>X</u> No
Hydric soil identified within Wetland Y.	

Project/SiteTTA Light Rail Transit	City/Co	ounty Orange		Sampling Date: 09-19-13
Applicant/Owner Triangle Transit			State: NC	Sampling Point Wetland YY - DP#
Investigator(s): Brandon Fulton, LSS, PWS	Section			
Landform (hillslope, terrace, etc.): Toe slope	Local relie	f (concave, convex, n	one): Concave	Slope (%):_ 0
				Datum: NAD 83
Soil Map Unit Name: White Store sandy loam, 2				
Are climatic / hydrologic conditions on the site typic				
Are Vegetation, Soil, or Hydrology _				•
Are Vegetation, Soil, or Hydrology _				
SUMMARY OF FINDINGS – Attach site				
		amig point rocati	oris, trainscett	, important reatures, etc.
	No	is the Sampled Area		
	No	within a Wetland?	Yes X	No
Remarks DP#27 (Wetland YY) is representation				
HYDROLOGY				
Wetland Hydrology Indicators:		-0,	Secondary Indica	ators (minimum of two required)
Primary Indicators (minimum of one is required, ch			Surface Soil	
Surface Water (A1)	True Aquatic Plants (B			getated Concave Surface (B8)
X High Water Table (A2) X Saturation (A3)	Hydrogen Sulfide OdorOxidized Rhizospheres		Drainage Pa	
X Water Marks (B1)	Oxidized Rhizospheres Presence of Reduced I		Moss Trim L	Mater Table (C2)
Sediment Deposits (B2)	Recent Iron Reduction		Crayfish Bur	
Drift Deposits (B3)	Thin Muck Surface (C7	, ,		sible on Aerial Imagery (C9)
Algal Mat or Crust (B4)	Other (Explain in Rema	arks)	Stunted or S	tressed Plants (D1)
Iron Deposits (B5)				Position (D2)
Inundation Visible on Aerial Imagery (B7) Water-Stained Leaves (B9)			Shallow Aqu	
Aquatic Fauna (B13)			Microtopogra	aphic Relief (D4) Test (D5)
Field Observations:				1001(150)
Surface Water Present? Yes No _ X	Depth (inches)			
Water Table Present? Yes <u>X</u> No	Depth (inches);10"_			
Saturation Present? Yes <u>X</u> No (includes capillary fringe)	Depth (inches)3"	Wetland I	Hydrology Preser	t? Yes X No
De scribe Recorded Data (stream gauge, monitorin	g well, aerial photos, previ-	ous inspections), if av	ailable:	
D) and the				
Remarks: Saturation and other indicators of surface	water influence were observe	d within Wetland YY.		

T 0: 1 (0: 1) 20!	Absolute Dominant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 30')		Number of Dominant Species That Are OBL, FACW, or FAC: (A)
3		Total Number of Dominant Species Across All Strata:(B)
5		Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B)
6		Prevalence Index worksheet:
7		Total % Cover of: Multiply by:
	= Total Cover	OBL species x 1 =
	20% of total cover:	FACW species x 2 =
Sapling/Shrub Stratum (Plot size: 10'		
1		FACUlar region x 3 =
2,		FACU species x 4 =
3		UPL species x 5 =(D)
4		Column Totals: (A) (B)
5		Prevalence Index = B/A =
6		Hydrophytic Vegetation Indicators:
7		X 1 - Rapid Test for Hydrophytic Vegetation
.8		2 - Dominance Test is >50%
9		3 - Prevalence Index is ≤3 0 ¹
	= Total Cover	4 - Morphological Adaptations ¹ (Provide supporting
	20% of total cover:	data in Remarks or on a separate sheet)
Herb Stratum (Plot size 1.5 m)		Problematic Hydrophytic Vegetation ¹ (Explain)
1 Juncus effusus		
2 Carex stricta		¹ Indicators of hydric soil and wetland hydrology must
3		be present, unless disturbed or problematic.
4		Definitions of Four Vegetation Strata:
5		-
6		Tree - Woody plants, excluding vines, 3 in (7.6 cm) or more in diameter at breast height (DBH), regardless of
7		height.
8		Sapling/Shrub - Woody plants, excluding vines, less
9		than 3 in DBH and greater than or equal to 3 28 ft (1
10,		m) tall_
11		Herb - All herbaceous (non-woody) plants, regardless
	= Total Cover	of size, and woody plants less than 3 28 ft tall
50% of total cover: 40	20% of total cover: <u>16</u>	Woody vine - All woody vines greater than 3.28 ft in
Woody Vine Stratum (Plot size: 1 m)		height
1		
2		
3		
4		Lik (dinamb) dia
5,		Hydrophytic Vegetation
	= Total Cover	Present? Yes X No
50% of total cover:	20% of total cover:	
Remarks: (Include photo numbers here or on a separate s	sheet)	
The described and a second as the self of the term of the self of	1777	
Hydrophytic vegetation identified within Wetland	11.	

Hydric Soil I Histosol Histic Ep Black His Hydroge Stratified	(A1) ipedon (A2) stic (A3)	% 	Color (moist) 7.5 YR 5/8 Reduced Matrix, Ms	10 10 S=Masked \$	C C	PL PL	SCL CL	Remarks
Fype: C=Cc lydric Soil I Histosol Histic Ep Black His Hydroge Stratified	ncentration, D=Deplendicators: (A1) ipedon (A2) stic (A3)	90				PL		
Type: C=Cc Tydric Soil I Histosol Histic Ep Black His Hydroge Stratified	incentration, D=Deple ndicators: (A1) ipedon (A2) stic (A3)					PL		
Hydric Soil I Histosol Histic Ep Black His Hydroge Stratified	ndicators: (A1) ipedon (A2) stic (A3)	etion, RM=	Reduced Matri x, M:	S=Masked \$				
Hydric Soil I Histosol Histic Ep Black His Hydroge Stratified	ndicators: (A1) ipedon (A2) stic (A3)	etion, RM=	Reduced Matrix , M	S=Masked \$	= = =			
lydric Soil I Histosol Histic Ep Black His Hydroge Stratified	ndicators: (A1) ipedon (A2) stic (A3)	etion, RM=	Reduced Matrix , M	S=Masked \$	<u>=</u>			
Mydric Soil I Histosol Histic Ep Black His Hydroge Stratified	ndicators: (A1) ipedon (A2) stic (A3)	etion, RM=	Reduced Matri x, M:	S=Masked (= = =		\equiv	
ydric Soil I Histosol Histic Ep Black His Hydroge Stratified	ndicators: (A1) ipedon (A2) stic (A3)	etion, RM=	Reduced Matri x, M:	S=Masked S			=	
ydric Soil I Histosol Histic Ep Black His Hydroge Stratified	ndicators: (A1) ipedon (A2) stic (A3)	etion, RM=	Reduced Matrix , M:	S=Masked S				
ydric Soil I Histosol Histic Ep Black His Hydroge Stratified	ndicators: (A1) ipedon (A2) stic (A3)	etion, RM=	Reduced Matri x, M	S=Masked S	<u> </u>			
ydric Soil I Histosol Histic Ep Black His Hydroge Stratified	ndicators: (A1) ipedon (A2) stic (A3)	etion, RM=	Reduced Matri k, M	S=Masked S	_			
Mydric Soil I Histosol Histic Ep Black His Hydroge Stratified	ndicators: (A1) ipedon (A2) stic (A3)	etion, RM=	Reduced Matrix, M	S=Masked S			-	
Mydric Soil I Histosol Histic Ep Black His Hydroge Stratified	ndicators: (A1) ipedon (A2) stic (A3)	etion, RM=	Reduced Matrix, M	S=Masked S				
ydric Soil I Histosol Histic Ep Black His Hydroge Stratified	ndicators: (A1) ipedon (A2) stic (A3)				Sand Gra	ins	Location: Pl	L=Pore Lining, M=Matrix
Histic Ep Black His Hydroge Stratified	ipedon (A2) stic (A3)							ators for Problematic Hydric Soils
Black His Hydroge Stratified	stic (A3)		Dark Surface	e (S7)			2	cm Muck (A10) (MLRA 147)
_ Hydroge _ Stratified			Polyvalue Be		e (S8) (M	LRA 147,		oast Prairie Redox (A16)
_ Stratified	Cultida (A.4)		Thin Dark Su			47, 148)		(MLRA 147, 148)
			Loamy Gleye		-2)		_ P	iedmont Floodplain Soils (F19)
2 cm Mu	Layers (A5)		X Depleted Ma					(MLRA 136, 147)
	ck (A10) (LRR N)	(044)	Redox Dark					ery Shallow Dark Surface (TF12)
	Below Dark Surface rk Surface (A12)	(ATT)	Depleted Date				_ °	ther (Explain in Remarks)
	ucky Mineral (S1) (LF	R N	Redox Depre Iron-Mangan			DD N		
	147, 148)	XIX 14,	MLRA 13		5 (F 12) (L	.rr iv,		
	eyed Matrix (S4)		Umbric Surfa	-	VLRA 136	5. 122}	3lndi	cators of hydrophytic vegetation ar
	edox (S5)		Piedmont Flo					tland hydrology must be present.
_ Stripped			Red Parent N					ess disturbed or problematic_
estrictive L	ayer (if observed):							
Туре:			_					
Depth (inc	hes):		_				Hydric Soil	Present? Yes X No
emarks:								
Hydric so	il identified within We	tland YY.						

Project/Site: TTA Light Rail Transit	City/County:	rham	Sampling Date 1-22-14
Applicant/Owner: Triangle Transit			Sampling Point: Wetland YYY - DP#
	Section, Townsh		
Landform (hillslope, terrace, etc.): terrace			
	at: 35.953209		
Soil Map Unit Name: Chewacla loam, 0 to 2% slop			
Are climatic / hydrologic conditions on the site typical			
Are Vegetation, Soil, or Hydrology _			
Are Vegetation, Soil, or Hydrology	naturally problematic?	(If needed, explain any answe	ers in Remarks)
SUMMARY OF FINDINGS – Attach site	map showing sampling po	oint locations, transects	s, important features, etc.
Hydrophytic Vegetation Present? Yes X	No Is the Sa		
	is the sa	mpled Area	No
	No Within a	Wetland? Yes X	No
HYDROLOGY			
Wetland Hydrology Indicators:		Secondary Indic	ators (minimum of two required)
Primary Indicators (minimum of one is required; che	eck all that apply)	Surface Soil	Cracks (B6)
X Surface Water (A1)	_ True Aquatic Plants (B14)	Sparsely Ve	getated Concave Surface (B8)
X High Water Table (A2)	_ Hydrogen Sulfide Odor (C1)		atterns (B10)
X Saturation (A3)	_ Oxidized Rhizospheres on Living		
X Water Marks (B1)	Presence of Reduced Iron (C4)		Water Table (C2)
Sediment Deposits (B2) Drift Deposits (B3)	_ Recent Iron Reduction in Tilled S _ Thin Muck Surface (C7)		risible on Aerial Imagery (C9)
	_ Other (Explain in Remarks)		Stressed Plants (D1)
Iron Deposits (B5)		Geomorphic	
Inundation Visible on Aerial Imagery (B7)		Shallow Aqu	
X Water-Stained Leaves (B9)			aphic Relief (D4)
Aquatic Fauna (B13)		FAC-Neutra	I Test (D5)
Field Observations: Surface Water Present? Yes X No	Depth (inches):1"		
	Depth (inches):0"		
	Depth (inches):0"	Wetland Hydrology Prese	nt? Yes_X_ No
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring		octions) if available:	
Describe Recorded Data (stream gauge, monitoring) well, aeriai priotos, previous ilispe	ctions), ii available.	
Remarks: Water-stained leaves and other indicators of	of aurface water influence ware charge	ad within Watland VVV	
water-stanted leaves and other indicators of	n surface water infractice were observ	ed within wettand 111.	1
			. 4
			1
			1
			1
			1

	Absolute	Dominant		Dominance Test worksheet:
Tree Stratum (Plot size: 30')	% Cover	Species?	Status	Number of Dominant Species
1 Acer rubrum	70	Yes	FAC	That Are OBL, FACW, or FAC:4(A)
2Ulmus americana		Yes		
				Total Number of Dominant
3				Species Across All Strata:4 (B)
4				Percent of Dominant Species
5				That Are OBL, FACW, or FAC: 100 (A/B)
6				
				Prevalence Index worksheet:
7			_	Total % Cover of: Multiply by:
		= Total Cove		OBL species x 1 =
50% of total cover: <u>50</u>	20% of	total cover:_	20	The street was a street with the street was a street was a street with the street was a street was a street was a street with the street was a
Sapling/Shrub Stratum (Plot size: 10')				FACW species x 2 =
1Carpinus caroliniana	30	Yes	FAC	FAC species x 3 =
				FACU species x 4 =
2				UPL species x 5 =
3				Control of the contro
4				Column Totals: (A) (B)
5				Developed to the DM
6				Prevalence Index = B/A =
				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
8				X 2 - Dominance Test is >50%
9				Control of the Contro
		= Total Cove	r	3 - Prevalence Index is ≤3.0 ¹
50% of total cover: 15				4 - Morphological Adaptations¹ (Provide supporting
	2070 01	total cover		data in Remarks or on a separate sheet)
Herb Stratum (Plot size: 1.5 m)				Problematic Hydrophytic Vegetation ¹ (Explain)
1Smilax rotundifolia	10	<u>Yes</u>	<u>FAC</u>	(Explain)
2				4
3				¹Indicators of hydric soil and wetland hydrology must
				be present, unless disturbed or problematic
4				Definitions of Four Vegetation Strata:
5				Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or
6				more in diameter at breast height (DBH), regardless of
7,				height.
8				
				Sapling/Shrub - Woody plants, excluding vines, less
9				than 3 in DBH and greater than or equal to 3 28 ft (1
10,				m) tall
11,				Herb - All herbaceous (non-woody) plants, regardless
		Total Cove	r	of size, and woody plants less than 3.28 ft tall
50% of total cover:5				
Woody Vine Stratum (Plot size: 1 m)		_		Woody vine - All woody vines greater than 3,28 ft in
				height.
1				
2		_		
3				
4				
				Hydrophytic
5			_	Vegetation Present? Yes X No
		= Total Cove		Present? Yes X No
50% of total cover:	20% of	total cover:_		
Remarks: (Include photo numbers here or on a separate s	heet.)			
Hydrophytic vegetation identified within Wetland Y	YY.			
				<u> </u>
				1

Depth (in sheet)	Matrix	0/		Features		Loc²	T = , -1	Demonstra
inches)	Color (moist)	%	Color (moist)	%	Type ¹	Loc	<u>Texture</u>	Remarks
0-20	10 YR 4/2	80	10 YR 5/8		_ <u>C</u>	<u>PL</u>	Clay	
								*\ -
								-
	-			_	_			-
								-
	-			_				-
							2	
	oncentration, D=Deple	etion, RM=Re	duced Matrix, MS	=Masked	Sand Gra	ins		PL=Pore Lining, M=Matrix
lydric Soil								cators for Problematic Hydric Soil
Histosol		-	Dark Surface					2 cm Muck (A10) (MLRA 147)
	pipedon (A2)	-	Polyvalue Bel				148)	Coast Prairie Redox (A16)
Black Hi			Thin Dark Sur			47, 148)		(MLRA 147, 148)
	n Sulfide (A4)	-	Loamy Gleyed		F2)		_	Piedmont Floodplain Soils (F19)
	Layers (A5)		X Depleted Mati					(MLRA 136, 147)
_	ick (A10) (LRR N)		Redox Dark S					Very Shallow Dark Surface (TF12)
	d Below Dark Surface		Depleted Dark				_	Other (Explain in Remarks)
	ark Surface (A12)		X Redox Depres	•	*			
	lucky Mineral (S1) (LI	RRN, _	Iron-Mangane		es (F12) (L	.RR N,		
	\ 147, 148)		MLRA 136	-			2	
	leyed Matrix (S4)	_	Umbric Surfac					dicators of hydrophytic vegetation ar
	tedox (S5)	-	Piedmont Floo					retland hydrology must be present,
	Matrix (S6)		Red Parent M	aterial (F:	21) (MLR A	4 127, 147	') u	nless disturbed or problematic
Restrictive l	ayer (if observed):							
Type:			_					
Depth (ind	ches):						Hydric So	il Present? Yes X No
Remarks:								
	soil identified within V	Vetland YYY						
11, 411								

Project/Site: TTA Light Rail Transit	City/County Durham		Sampling Date: 7-31-13
Applicant/Owner: Triangle Transit			Sampling Point; Wetland Z - DP#3
	Section, Township, Range:		
Landform (hillslope, terrace, etc.): terrace			
Subregion (LRR or MLRA): LRR P Lat:			Datum: NAD 83
Soil Map Unit Name Chewacla loam, 0 to 2% slopes,			
Are climatic / hydrologic conditions on the site typical fo			
Are Vegetation, Soil, or Hydrology			,
Are Vegetation, Soil, or Hydrology			
SUMMARY OF FINDINGS – Attach site m	ap snowing sampling point loca	tions, transect	s, important reatures, etc.
Hydrophytic Vegetation Present? Yes X	No Is the Sampled Are	2	
	- No within a Wetland?		No
Wetland Hydrology Present? Yes X	No		
HYDROLOGY			
Wetland Hydrology Indicators:		Secondary Indic	ators (minimum of two required)
Primary Indicators (minimum of one is required; check		Surface Soi	
	True Aquatic Plants (B14)		egetated Concave Surface (B8)
	Hydrogen Sulfide Odor (C1)		atterns (B10)
	Oxidized Rhizospheres on Living Roots (C3 Presence of Reduced Iron (C4)		Lines (B16) Water Table (C2)
	Recent Iron Reduction in Tilled Soils (C6)	Crayfish Bu	
	Thin Muck Surface (C7)		/isible on Aerial Imagery (C9)
	Other (Explain in Remarks)		Stressed Plants (D1)
Iron Deposits (B5)		Geomorphic	
Inundation Visible on Aerial Imagery (B7)		Shallow Aqı	
X Water-Stained Leaves (B9) Aquatic Fauna (B13)		Microtopogr FAC-Neutra	aphic Relief (D4)
Field Observations:			ii rest (DO)
Surface Water Present? Yes No X	Depth (inches):		
Water Table Present? Yes X No			
Saturation Present? Yes X No	Depth (inches): 0" Wetland	d Hydrology Prese	nt? Yes <u>X</u> No
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring w	ell aerial photos previous inspections) if a	vailable:	
	sur dental priested, provided indipodustroy, in a	Transfer S.	
Remarks: Water-stained leaves and other indicators of si	urface water influence were observed within We	etland 7	
William States and States Indicated by St	arace water initiative were conserved within the	onard 23.	
			B

	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 30')		Species?	<u>Status</u>	Number of Dominant Species
1 Liquidambar styraciflua	60	Yes	FAC	That Are OBL, FACW, or FAC:3 (A)
2 Acer rubrum	40	Yes	FAC	Total Number of Dominant
3				Species Across All Strata: 3 (B)
4				Percent of Dominant Species
5				That Are OBL, FACW, or FAC: 100 (A/B)
6				
7				Prevalence Index worksheet:
*		= Total Cov	er	Total % Cover of: Multiply by:
50% of total cover: 50				OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')				FACW species x 2 =
1				FAC species x 3 =
				FACU species x 4 =
2				UPL species x 5 =
3				Column Totals: (A) (B)
4				Column Fotals. (A) (B)
5				Prevalence Index = B/A =
6				Hydrophytic Vegetation Indicators:
7				
8				1 - Rapid Test for Hydrophytic Vegetation
9				X 2 - Dominance Test is >50%
* 		= Total Cove		3 - Prevalence Index is ≤3 0 ¹
50% of total cover:				4 - Morphological Adaptations (Provide supporting
	2078 01	total covor.	\rightarrow	data in Remarks or on a separate sheet)
	60	**	FAC	Problematic Hydrophytic Vegetation1 (Explain)
Microstegium vimineum	60	Yes		
2 Boehmeria cylindrica	10	No	FACW	Indicators of hydric soil and wetland hydrology must
3 Lonicera japonica	10	No	FAC	be present, unless disturbed or problematic
4				Definitions of Four Vegetation Strata:
5				Dominion of Four Pogetation Strata.
6,				Tree - Woody plants, excluding vines, 3 in (7.6 cm) or
7				more in diameter at breast height (DBH), regardless of height
				Hoight
8				Sapling/Shrub - Woody plants, excluding vines, less
9				than 3 in DBH and greater than or equal to 3 28 ft (1
10			_	m) tall
11		_		Herb - All herbaceous (non-woody) plants, regardless
		= Total Cove		of size, and woody plants less than 3 28 ft tall
50% of total cover: 40 _	20% of	total cover:_	16	Woody vine - All woody vines greater than 3.28 ft in
Woody Vine Stratum (Plot size: 1 m				height
1,				
2				
3				
4				
E	_		_	Hydrophytic
0			-	Vegetation Present?
F00/ - 5 - 1		= Total Cove		Tresent: Tes X (VO
50% of total cover:		total cover.		
Remarks: (Include photo numbers here or on a separate si	neet)			
Hydrophytic vegetation identified within Wetland Z				
Try or open year to go a do in the interest within we traine Z	•			

			Features	- 1	1 2	T		D	
nches) Color (moist)		lor (moist)	%	Type ¹	Loc²	Textu	<u>e</u>	Remarks	
10 YR 6/1	85 7.	5 YR 4/6	15	C	PL_	Clay			
							7 -		
		_				-	_		
pe: C=Concentration, D=Dep	letion, RM=Redu	ced Matrix, MS	=Masked S	Sand Grai	ins			ining, M=Matrix.	
dric Soil Indicators:								Problematic Hyd	
Histosol (A1)		Dark Surface				_		(A10) (MLRA 14)	7)
Histic Epipedon (A2)	_	Polyvalue Bel				148) _		rie Redox (A16)	
Black Histic (A3) Hydrogen Sulfide (A4)	_	Thin Dark Sur Loamy Gleyed			17, 148)			147, 148)	-101
Stratified Layers (A5)		Depleted Matr		2]		-		Floodplain Soils (F 136, 147)	19)
2 cm Muck (A10) (LRR N)	<u>A</u>	Redox Dark S		3				ow Dark Surface (TE12)
Depleted Below Dark Surface	e (A11)	Depleted Dark				-		olain in Remarks)	11 12)
Thick Dark Surface (A12)		Redox Depres				-		,	
Sandy Mucky Mineral (S1) (L	_RR N,	Iron-Mangane	se Masses	s (F12) (L	RR N,				
MLRA 147, 148)		MLRA 136							
Sandy Gleyed Matrix (S4)	_	Umbric Surfac						hydrophytic veget	
Sandy Redox (S5)	_	Piedmont Floo						Irology must be pro	
Stripped Matrix (S6) strictive Layer (if observed):		Red Parent M	atenai (F2	1) (MLRA	127, 147)	uniess distu	rbed or problemat	IC .
Type:							0.11.0	0 V W	
Depth (inches):	-					Hydric	Soil Present	? Yes <u>X</u>	No
marks									
	Wetland Z.								
Hydric soil identified within									
Hydric soil identified within									
Hydric soil identified within									
Hydric soil identified within									
Hydric soil identified within									
Hydric soil identified within									
Hydric soil identified within									
Hydric soil identified within									
Hydric soil identified within									
Hydric soil identified within									
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Hydric soil identified within									
Hydric soil identified within									
Hydric soil identified within									
Hydric soil identified within									
Hydric soil identified within									
Hydric soil identified within									
Hydric soil identified within									

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site:TTA Light Rail Transit	City/County: Orange		Sampling Date 07-17-13
Applicant/Owner Triangle Transit		State: NC	Sampling Point Wetland ZZ - DP#28
nvestigator(s) Brandon Fulton, LSS, PWS	Section, Township, Range:		
andform (hillslope, terrace, etc.): Toe slope	Local relief (concave, convex, no	one): Concave	Slope (%) 0
	at <u>35.905663</u> Long: -7		
Soil Map Unit Name White Store-Urban Land Con			
re climatic / hydrologic conditions on the site typica			
re Vegetation, Soil, or Hydrology _			
re Vegetation, Soil, or Hydrology			
SUMMARY OF FINDINGS – Attach site			
		ono, transcets	, important reatures, etc.
	Is the Sampled Area		
Hydric Soil Present? Yes X Wetland Hydrology Present? Yes X	within a Wetland?	Yes X	No
Domorla	re of a Wetland. See Approximate Waters of the U.S.		
HYDROLOGY			
Wetland Hydrology Indicators:		Secondary Indica	tors (minimum of two required)
Primary Indicators (minimum of one is required, che	ck all that apply)	Surface Soil	Oracks (B6)
Surface Water (A1)	_ True Aquatic Plants (B14)	Sparsely Veg	etated Concave Surface (B8)
X High Water Table (A2)	_ Hydrogen Sulfide Odor (C1)	Drainage Pat	
X Saturation (A3) X Water Marks (B1)	Oxidized Rhizospheres on Living Roots (C3)	Moss Trim Li	
Sediment Deposits (B2)	Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C6)	Dry-Season \ Crayfish Burr	Vater Table (C2)
Drift Deposits (B3)	Thin Muck Surface (C7)		sible on Aerial Imagery (C9)
Algal Mat or Crust (B4)	Other (Explain in Remarks)		ressed Plants (D1)
Iron Deposits (B5)		Geomorphic	Position (D2)
Inundation Visible on Aerial Imagery (B7)		Shallow Aquil	
X Water-Stained Leaves (B9) Aquatic Fauna (B13)			phic Relief (D4)
Field Observations:		FAC-Neutral	Test (LD)
	Depth (inches):		
	Depth (inches):2"		1
	Depth (inches):0" Wetland H	Hydrology Presen	? Yes <u>X</u> No
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring	well, aerial photos, previous inspections), if ava	nilable	
Remarks: Water-stained leaves and other indicators o	f surface water influence were observed within Wetla	and 7.7.	
			1

Trop Stretum (Districts: 20)		Dominant		Dominance Test worksheet:
		Species?		Number of Dominant Species
1 Alnus serrulata				That Are OBL_FACW_or FAC:3 (A)
2 Platanus occidentalis 3				Total Number of Dominant Species Across All Strata:4 (B)
4				Percent of Dominant Species
5				That Are OBL, FACW, or FAC:
6				B 1 11 11 11 11
7				Prevalence Index worksheet:
	=	Total Cove	er	Total % Cover of:Multiply by:
50% of total cover: <u>10</u>				OBL species x 1 =
Sapling/Shrub Stratum (Plot size: 10')				FACW species x 2 =
1 Alnus serrulata	5	Yes	OBL	FAC species x 3 =
2				FACU species x 4 =
3				UPL species x 5 =
				Column Totals: (A) (B)
4				
5				Prevalence Index = B/A =
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
8				X 2 - Dominance Test is >50%
9				3 - Prevalence Index is ≤3.01
		: Total Cove		4 - Morphological Adaptations¹ (Provide supporting
50% of total cover: 2.5	_ 20% of t	total cover:	1	data in Remarks or on a separate sheet)
Herb Stratum (Plot size: 1.5 m)				
1 Juncus effusus	30	Yes	FACW	Problematic Hydrophytic Vegetation ¹ (Explain)
2 Carex sp.	30	Yes	V	
3 Typha latifolia			OBL	Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
4				
5.				Definitions of Four Vegetation Strata:
				Tree - Woody plants, excluding vines, 3 in (7 6 cm) or
6				more in diameter at breast height (DBH), regardless of
7				height
8				Sapling/Shrub - Woody plants, excluding vines, less
9				than 3 in, DBH and greater than or equal to 3.28 ft (1
10				m) tall
11				Herb - All herbaceous (non-woody) plants, regardless
		Total Cove		of size, and woody plants less than 3 28 ft tall
50% of total cover: 32.5	_ 20% of t	otal cover:_	13	Woody vine – All woody vines greater than 3.28 ft in
Woody Vine Stratum (Plot size: 1 m				height.
1,				
2				
3				
4				
5				Hydrophytic Vegetation
		Total Cove	r	Present? Yes X No No
50% of total cover:				
Remarks: (Include photo numbers here or on a separate sh			-	
remarks. (metado prioto numbors noro or on a separate si	ooi)			
Hydrophytic vegetation identified within Wetland Z	Z. A variable	indicator ra	ting "V" is	for the unidentified species.

Color (moist)	Depth	cription: (Describe Matrix		Redo	x Feature				
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains PL=Pore Lining, M=Matrix		Color (moist)	%	Color (moist)	%	Type ¹	<u>Loc²</u>	_ Texture	Remarks
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains -tydric Soil Indicators: Histosol (A1) Histo: Epipedon (A2) Black Histo (A3) Hydrogen Sulfide (A4) Loarny Gleyed Matrix (F2) Stratified Layers (A5) Z cm Muck (A10) (MLRA 147, 148) Loarny Gleyed Matrix (F3) Thin Dark Surface (F6) Depleted Below Dark Surface (A11) Thick Dark Surface (A12) Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) MLRA 147, 148) Sandy Gleyed Matrix (F3) Sandy Gleyed Matrix (F4) Sandy Gleyed Matrix (F4) Sestrictive Layer (if observed): Type Depth (Inches) Permarks:	0-4	10 YR 4/3	100					SCL_	
Hydric Soil Indicators: Histosol (A1) Histosol (A2) Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Loamy Gleyed Matrix (F2) Depleted Below Dark Surface (A10) Thin Dark Surface (S9) (MLRA 147, 148) Depleted Below Dark Surface (A11) Thick Dark Surface (A12) Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) Sandy Gleyed Matrix (S4) Sandy Redox (S5) Sandy Redox (S5) Siripped Matrix (S6) Red Parent Material (F21) (MLRA 136, 122) Depth (inches) Pemarks: Indicators for Problematic Hydric Soils 2 cm Muck (A10) (MLRA 147, 148) (MLRA 147, 148) (MLRA 147, 148) Piedmont Floodplain Soils (F19) (MLRA 136, 147) Very Shallow Dark Surface (TF12) Other (Explain in Remarks) Thick Dark Surface (A12) Set of the Carbon Surface (F13) (MLRA 136, 122) Sandy Mucky Mineral (S1) (LRR N, MLRA 136) Sandy Redox (S5) Sandy Redox (S5) Red Parent Material (F21) (MLRA 127, 147) Type Depth (inches) Pepth (inches) Pepth (inches) Pepth (inches) Pepth (inches)	4-20	10 YR 7/2	90	7.5 YR 5/8	10	C	PL	SCL	
Histosol (A1)						=		<u> </u>	
Histosol (A1)	Funo C-C	presentation Distinct	lation Chil	Postugad Métric M				21	Daniel Linia W. Markey
Histosol (A1) Histic Epipedon (A2) Polyvalue Below Surface (S8) (MLRA 147, 148) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Matrix (F3) Depleted Below Dark Surface (A11) Thick Dark Surface (A12) Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) Sandy Gleyed Matrix (S4) Sandy Redox (S5) Stripped Matrix (S6) Sandy Redox (S5) Piedmont Floodplain Soils (F19) MLRA 136, 147) Very Shallow Dark Surface (TF12) Other (Explain in Remarks) Pindicators of hydrophytic vegetation an wetland hydrology must be present, unless disturbed or problematic Bark Histic (A12) Coast Prairie Redox (A16) (MLRA 147, 148) Piedmont Floodplain Soils (F19) (MLRA 136, 147) Very Shallow Dark Surface (TF12) Other (Explain in Remarks) Pindicators of hydrophytic vegetation an wetland hydrology must be present, unless disturbed or problematic estrictive Layer (if observed): Type Depth (inches) Park Surface (S7) Polyvalue Below Surface (S8) (MLRA 147, 148) Coast Prairie Redox (A16) (MLRA 147, 148) Piedmont Floodplain Soils (F19) (MLRA 136, 147) Very Shallow Dark Surface (TF12) Other (Explain in Remarks) Pindicators of hydrophytic vegetation an wetland hydrology must be present, unless disturbed or problematic estrictive Layer (if observed): Type Depth (inches) Piedmont Floodplain Soils (F19) (MLRA 127, 147)		letion, ravi	-Reduced Matrix, Mi	5-Masket	Janu Gra	11115			
Depth (inches) Hydric Soil Present? Yes X No	Histic Ep. Black Hi Hydroge Stratified 2 cm Mu Depleted Thick Da Sandy M MLRA Sandy G Sandy R Stripped	pipedon (A2) stic (A3) in Sulfide (A4) d Layers (A5) lok (A10) (LRR N) d Below Dark Surface ark Surface (A12) flucky Mineral (S1) (L A 147, 148) eleyed Matrix (S4) leedox (S5) Matrix (S6)	.RR N,	Polyvalue Be Thin Dark Su Loamy Gleye X Depleted Ma Redox Dark: Depleted Dar Redox Depre Iron-Mangan MLRA 13 Umbric Surfa	llow Surfa irface (S9 ed Matrix (trix (F3) Surface (F k Surface essions (F ese Mass 6) ce (F13) (podplain S	(MLRA 1: F2) F6) (F7) 8) es (F12) (L MLRA 136 oils (F19) (47, 148) LRR N, 6, 122) (MLRA 14	148) Co Pie Ve Ot	past Prairie Redox (A16) (MLRA 147, 148) edmont Floodplain Soils (F19) (MLRA 136, 147) ery Shallow Dark Surface (TF12) her (Explain in Remarks) cators of hydrophytic vegetation and land hydrology must be present,
emarks:	Туре								
	Depth (inc	thes)						Hydric Soil F	Present? Yes_XNo
	Hydric so	oil identified within W	etland ZZ.						

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site:TTA Light Rail ?	Γransit	City/C	County: Durham		Sampling Date: 1-22-14
Applicant/Owner: Triangle Tra					Sampling Point: Wetland ZZZ - DP#
nvestigator(s): Brandon Phill		Secti	on, Township, Range:_		
					Slope (%): 0
			•	*	Datum: NAD 83
Soil Map Unit Name:Che					
Are climatic / hydrologic condi					
					present? Yes X No
Are Vegetation, Soil _				explain any answe	
SUMMARY OF FINDIN	GS – Attach site i	nap showing san	npling point locati	ions, transects	, important features, etc.
Hydrophytic Vegetation Pres	ent? Yes X	No			
Hydric Soil Present?		No	Is the Sampled Area within a Wetland?		No
Wetland Hydrology Present?	Yes X	No	Within a Welland	100_11	
HYDROLOGY				O	
Wetland Hydrology Indicat		al all that annly			tors (minimum of two required)
Primary Indicators (minimum X Surface Water (A1)	of one is required, crie			Surface Soil	getated Concave Surface (B8)
X High Water Table (A2)	_	_ True Aquatic Plants (_ Hydrogen Sulfide Od		Spaisely veg	
X Saturation (A3)	_		es on Living Roots (C3)		
X Water Marks (B1)	_	Presence of Reduced			Water Table (C2)
Sediment Deposits (B2)		- _ Recent Iron Reductio		Crayfish Burr	
Drift Deposits (B3)	_	_ _ Thin Muck Surface (0	C7)	Saturation Vi	sible on Aerial Imagery (C9)
Algal Mat or Crust (B4)	_	Other (Explain in Rer	marks)	Stunted or SI	ressed Plants (D1)
Iron Deposits (B5)					Position (D2)
Inundation Visible on Ae				Shallow Aqui	
X Water-Stained Leaves (E	39)			Microtopogra	
Aquatic Fauna (B13) Field Observations:			1	FAC-Neutral	Test (Do)
Surface Water Present?	Yes <u>x</u> No	_ Depth (inches): 2"			
Water Table Present?		Depth (inches): 0"			10
Saturation Present?		Depth (inches): 0"		Hydrology Presen	t? Yes X No
(includes capillary fringe)				•	
Describe Recorded Data (str	eam gauge, monitoring	well, aerial photos, pre	vious inspections), ir av	raliable:	
Remarks:					-
Water-stained lear	ves and other indicators of	f surface water influence	were observed within Wet	tland ZZZ.	- 1
					1
					41
					1.

	Absolute	Dominant		Dominance Test worksheet:
Tree Stratum (Plot size: 30')		Species?		Number of Dominant Species
1. Acer rubrum	40	Yes	FAC	That Are OBL, FACW, or FAC:5 (A)
2. Ulmus americana				Total Number of Dominant
3. Platanus occidentalis			FACW	Species Across Ali Strata:5 (B)
4				Percent of Dominant Species
5				That Are OBL, FACW, or FAC: 100 (A/B)
6			$\overline{}$	Prevalence Index worksheet:
7.,			_	Total % Cover of:Multiply by:
50		= Total Cove		OBL species x 1 =
50% of total cover:50	20% of	total cover:_		FACW species x 2 =
Sapling/Shrub Stratum (Plot size: 10')	20		D. C	FAC species x 3 =
1Carpinus caroliniana				
2. Ulmus americana		Yes		FACU species x 4 =
3		-		UPL species x 5 =
4				Column Totals: (A) (B)
5				Prevalence Index = B/A =
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
8				X 2 - Dominance Test is >50%
9				
		= Total Cove	er	3 - Prevalence Index is ≤3.0¹
50% of total cover17.	5 20% of	total cover:	7	4 - Morphological Adaptations (Provide supporting
Herb Stratum (Plot size: 1.5 m)				data in Remarks or on a separate sheet)
1 Smilax rotundifolia	20	Yes	FAC	Problematic Hydrophytic Vegetation ¹ (Explain)
2				
3				¹ Indicators of hydric soil and wetland hydrology must
				be present, unless disturbed or problematic
4				Definitions of Four Vegetation Strata:
5				Tree - Woody plants, excluding vines, 3 in. (7.6 cm) or
6				more in diameter at breast height (DBH), regardless of
7				height.
8				Sapling/Shrub - Woody plants, excluding vines, less
9				than 3 in. DBH and greater than or equal to 3.28 ft (1
10			_	m) tall
11,				Herb - All herbaceous (non-woody) plants, regardless
		= Total Cove		of size, and woody plants less than 3 28 ft tall
50% of total cover:10_	20% of	total cover:	4	Woody vine - All woody vines greater than 3 28 ft in
Woody Vine Stratum (Plot size: 1 m				height
1				
2				
3				
4				Hydrophytic
5.				Vegetation
		= Total Cove	er	Present? Yes <u>X</u> No
50% of total cover:				
Remarks: (Include photo numbers here or on a separate s	heet.)			
Hydrophytic vegetation identified within Wetland Z	ZZZ.			

Depth	Matrix		Redo	x Feature:	3			
inches)	Color (moist)	%	Color (moist)	%	Type ¹	_Loc ²	Texture	Remarks
0-8	10 YR 4/3	100			_		Clay	
8-20	10 YR 4/2	80	10 YR 5/8	20	С	PL	Clay	
=	-	=		_		_	=	
_		=		\equiv	_	=	\equiv	
				\equiv				
ype: C=Co ydric Soil li	ncentration, D=Depi	etion, RM=	Reduced Matrix, M	S=Maskec	Sand Gr	ains		=Pore Lining, M=Matrix tors for Problematic Hydric Soils ³ :
Black His Hydroger Stratified 2 cm Muc Depleted Thick Da Sandy M MLRA Sandy Gl Sandy Re Stripped	ipedon (A2) stic (A3) in Sulfide (A4) Layers (A5) ck (A10) (LRR N) Below Dark Surface rk Surface (A12) ucky Mineral (S1) (L 147, 148) leyed Matrix (S4) edox (S5) Matrix (S6)		Dark Surface Polyvalue Be Thin Dark Su Loamy Gleye X Depleted Ma Redox Dark Depleted Da X Redox Depre Iron-Mangan MLRA 13 Umbric Surfa Red Parent M	elow Surface (S9) ed Matrix (I trix (F3) Surface (Fr k Surface (Fr ssions (F8 ese Massa 6) codplain Se podplain Se	(MLRA 1 F2) 6) (F7) 3) es (F12) (MLRA 13 bils (F19)	47, 148) LRR N, 6, 122) (MLRA 14	148) Co Pi Ve Ot	cm Muck (A10) (MLRA 147) past Prairie Redox (A16) (MLRA 147, 148) edmont Floodplain Soils (F19) (MLRA 136, 147) ery Shallow Dark Surface (TF12) ther (Explain in Remarks) cators of hydrophytic vegetation and tland hydrology must be present, ess disturbed or problematic
	ayer (if observed):							•
	hoo):		_				I budel e Ocilli	D
Depth (inclemants:	nes)						Hydric Soil i	Present? Yes X No
Hydric	soil identified within V	Vetland ZZZ	Z.					

NCDWQ Stream Identification Forms

Map ID	Map ID
А	MMM
AA	N
В	NN
С	0
CC	00
D	000
DD	Р
E	PP
EE	Q
EEE	QQ
F	QQQ
G	R
GG	RR
GGG	S
Н	SS
НН	Т
I	TT
II	UU
J	UUU
JJ	V
111	W
K	WW
KK	X
KKK	XX
L	XXX
LL	Υ
LLL	YY
M	Z
MM	

RPW Stream A

NC DWO Stream Identification Form Version 4.11

Date: 06/04/2013	Project/Site: TTA	Latitude: 35.976615
Evaluator: Brandon Phillips	County: Durham County	Longitude: -78.957612
Fotal Points: Stream is at least intermittent 37.25 f ≥ 19 or perennial if ≥ 30*	Stream Determination (circle one) Ephemeral Intermitten Perennial	Other SW Durham, NC Quad e.g. Quad Name:

if ≥ 19 or perennial if ≥ 30*	Ephemeral Inte	ermitten Perennia	e.g. Quad Name	:	
A. Geomorphology (Subtotal = 20.0)	Absent	Weak	Moderate	Strong	
1 ^{a.} Continuity of channel bed and bank	0	1	2	3	
2. Sinuosity of channel along thalweg	0	1	2	3	
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3	
4. Particle size of stream substrate	0	1	2	3	
5. Active/relict floodplain	0		2	3	
6. Depositional bars or benches	0	1	2	3	
7. Recent alluvial deposits	0	1	2	3	
8. Headcuts	0		2	3	
9. Grade control	0	0.5	1	1.5	
10. Natural valley	0	0.5	1	1.5	
11. Second or greater order channel	No	o = 0	Yes	es = 3	
^a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 8.5)					
12. Presence of Baseflow	0	1	2	3	
13. Iron oxidizing bacteria	0		2	3	
14. Leaf litter	1.5	1	0.5	0	
15. Sediment on plants or debris	0	0.5	(1)	1.5	
16. Organic debris lines or piles	0	0.5		1.5	
17. Soil-based evidence of high water table?	No	o = 0	Yes	=3	

12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	(1)	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5		1.5
17. Soil-based evidence of high water table?	N	o = 0	Yes =	3
C. Biology (Subtotal = 8.75)				
18. Fibrous roots in streambed	3	2	11	0

3	2	1	0	
3	2	1	0	
0		2	3	
	1	2	3	
	0.5	1	1.5	
0	0.5	1	1.5	
	0.5	1	1.5	
0	0.5	11	1.5	
FACW = 0.75 OBL = 1.5 Other = 0				
	3 3 0 0 0 0	0 0.5 0 0.5 0 0.5	0 0.5 1 0 0.5 1 0 0.5 1	

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

Notes: Stream A was determined to be perennial within project limits. Crayfish also observed.

seasonal RPW Stream AA

NC DWO Stream Identification Form Version 4.11

Date : 08/13/2013	Project/Site:	TTA	Latitude: 35.9	08312	
Evaluator: Brandon Phillips	County: Durhar	m County	Longitude: -78.993569		
Total Points: Stream is at least intermittent 24.25 if \geq 19 or perennial if \geq 30*	Stream Determ Ephemeral Inte	ination (circle one) ermittent Perennial	Other e.g. Quad Name:	ham, NC Quad	
A. Geomorphology (Subtotal = 11)	Absent	Weak	Moderate	Strong	
1ª Continuity of channel bed and bank	0	(1)	2	3	
Sinuosity of channel along thalweg	0	1	2	3	
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3	
Particle size of stream substrate	0	(1)	2	3	
5. Active/relict floodplain	0	1	(2)	3	
6. Depositional bars or benches	0	(1)	2	3	
7. Recent alluvial deposits	0	(1)	2	3	
8. Headcuts	0		2	3	
9. Grade control	0	0.5	1	1.5	
10. Natural valley	0	0.5	1	1.5	
11. Second or greater order channel	NI A		Yes = 3		
11. Cooking of greater order charities	(N	0 = 0	Yes	= 3	
artificial ditches are not rated; see discussions in manual	(N	0=0)	Yes:	= 3	
artificial ditches are not rated; see discussions in manual	0	0=0)	Yes:	3	
artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 6.5) 12. Presence of Baseflow		1			
artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal =6.5)	0	1	2	3	
artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 6.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria	0		2 2	3	
artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 6.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria 14. Leaf litter	0 0 1.5		2 2 0.5	3 3 0	
artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 6.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria 14. Leaf litter 15. Sediment on plants or debris	0 0 1.5 0	1 1 0.5	2 2 0.5	3 0 1.5	
artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 6.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria 14. Leaf litter 15. Sediment on plants or debris 16. Organic debris lines or piles 17. Soil-based evidence of high water table?	0 0 1.5 0	1 1 0.5 0.5	2 2 0.5 1 1	3 0 1.5 1.5	
artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 6.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria 14. Leaf litter 15. Sediment on plants or debris 16. Organic debris lines or piles	0 0 1.5 0	1 1 0.5 0.5	2 2 0.5 1 1	3 0 1.5	
artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 6.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria 14. Leaf litter 15. Sediment on plants or debris 16. Organic debris lines or piles 17. Soil-based evidence of high water table? C. Biology (Subtotal = 6.75) 18. Fibrous roots in streambed	0 0 1.5 0 0	1 1 0.5 0.5 0 = 0	2 2 0.5 1 1	3 3 0 1.5 1.5	
artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 6.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria 14. Leaf litter 15. Sediment on plants or debris 16. Organic debris lines or piles 17. Soil-based evidence of high water table? C. Biology (Subtotal = 6.75) 18. Fibrous roots in streambed 19. Rooted upland plants in streambed	0 0 1.5 0 0 N	1 1 0.5 0.5 0 = 0	2 2 0.5 1 1 Yes:	3 0 1.5 1.5	
artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 6.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria 14. Leaf litter 15. Sediment on plants or debris 16. Organic debris lines or piles 17. Soil-based evidence of high water table? C. Biology (Subtotal = 6.75)	0 0 1.5 0 0 N	1 1 0.5 0.5 0 = 0	2 2 0.5 1 1 (Yes:	3 0 1.5 1.5 = 3	
artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 6.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria 14. Leaf litter 15. Sediment on plants or debris 16. Organic debris lines or piles 17. Soil-based evidence of high water table? C. Biology (Subtotal = 6.75) 18. Fibrous roots in streambed 19. Rooted upland plants in streambed 20. Macrobenthos (note diversity and abundance)	0 0 1.5 0 0 N	1 1 0.5 0.5 0 = 0	2 2 0.5 1 1 Yes:	3 3 0 1.5 1.5 = 3)	
artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 6.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria 14. Leaf litter 15. Sediment on plants or debris 16. Organic debris lines or piles 17. Soil-based evidence of high water table? C. Biology (Subtotal = 6.75) 18. Fibrous roots in streambed 19. Rooted upland plants in streambed 20. Macrobenthos (note diversity and abundance) 21. Aquatic Mollusks	0 0 1.5 0 0 N	1 1 0.5 0.5 0 = 0	2 2 0.5 1 1 1 Yes =	3 3 0 1.5 1.5 =3 0 0 3 3	
artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 6.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria 14. Leaf litter 15. Sediment on plants or debris 16. Organic debris lines or piles 17. Soil-based evidence of high water table? C. Biology (Subtotal = 6.75) 18. Fibrous roots in streambed 19. Rooted upland plants in streambed 20. Macrobenthos (note diversity and abundance) 21. Aquatic Mollusks 22. Fish	0 0 1.5 0 0 N	1 1 0.5 0.5 0 = 0	2 2 0.5 1 1 1 2 2 1	3 3 0 1.5 1.5 1.5 3 3 1.5	

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

Notes: Stream AA was determined to be intermittent within project limits.

Sketch:

26. Wetland plants in streambed

FACW = 0.75 OBL = 1.5 Other = 0

RPW Stream B

Date: 06/04/2013		Project/Site:	Latitude: 35.976339	
Evaluator: Brandon Phillips		County: Durham County	Longitude: -78.957751	
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	32.50	Stream Determination (circle one) Ephemeral Intermittent Perennial	SW Durham, NC Quad Other e.g. Quad Name:	

A. Geomorphology (Subtotal = 16.0)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	(2)	3
2. Sinuosity of channel along thalweg	0	1	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	(1)	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	(1)	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	(No	0=0	Yes =	= 3
a artificial ditches are not rated; see discussions in manual				
B. Hydrology (Subtotal = 8.5)				
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0		2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5		1.5
16. Organic debris lines or piles	0	0.5		1.5
17. Soil-based evidence of high water table?	No	o = 0	Yes =	= 3
C. Biology (Subtotal = 8.00)				
18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0		2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5		1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed		FACW = 0.75; (OBL = 1.6 Other = 0	
20. Wetland plants in streambed				

RPW Stream C

NC DWQ Stream Identification Form Version 4.11

Date : 06/04/2013		Project/Site: TTA	Latitude: 35.975685	
Evaluator: Brandon Phillips		County: Durham County	Longitude: -78.957613	
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	30.50	Stream Determination (circle one) Ephemeral Intermittent Perennial	SW Durham, NC Quad Other e.g. Quad Name:	

≥ 19 or perennial if ≥ 30* Ephemeral Intermittent Perennial e.g. Quad Name:				
A. Geomorphology (Subtotal = 14.0)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	(2)	3
2. Sinuosity of channel along thalweg	0	(1)	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	(1)	2	3
5. Active/relict floodplain	0	11	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0		2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	(1)	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	(N	0=0	Yes:	= 3
^a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 8.5)				
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	(1)	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5		1.5
16. Organic debris lines or piles	0	0.5		1.5
17. Soil-based evidence of high water table?	N	0 = c	Yes	= 3

13. ITOTI OXIGIZING DACTENA	U			3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5		1.5
16. Organic debris lines or piles	0	0.5		1.5
17. Soil-based evidence of high water table?	N	o = 0	Yes:	3
C. Biology (Subtotal = 8.00)				
18. Fibrous roots in streambed	3	2	11	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0		2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5		1.5

0.5

FACW = 0.75; OBL = 1.6 Other = 0

1.5

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

Notes: Stream C was determined to be perennial within project limits. Crayfish also observed.

Sketch.

25. Algae

26. Wetland plants in streambed

RPW Stream CC

NC DWQ Stream Identification Form Version 4.11

Date: 08/13/2013	Project/Site: TTA	Latitude: 35.906210	
Evaluator: Brandon Phillips	County: Durham County	Longitude: -78.995225	
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other SW Durham, NC Quad e.g. Quad Name:	

if ≥ 19 or perennial if ≥ 30*		STITUTE T CICILII	e.g. Quad Name	f a
A. Geomorphology (Subtotal = 18.5)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	(1)	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
3. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	N	o = 0	(Yes = 3)	
^a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal =				
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	(1)	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	(1)	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17 Cail based suidence of high water table?	N.	0	N.	

12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	(1)	1.5
17. Soil-based evidence of high water table?	1	No = 0	Yes	3 = 3
C. Biology (Subtotal = 13.75)				0.
18. Fibrous roots in streambed	3	2	1	0

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0		2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	(1)	1.5
24. Amphibians	0	0.5		1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed		FACW = 0.750	OBL = 1.5 Other =	0

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

Notes: Stream CC was determined to be perennial within project limits.

seasonal RPW Stream D

NC DWQ Stream Identification Form Version 4.11

Date : 06/05/2013	Project/Site: TTA	Latitude: 35.972010 Longitude: -78.956864 Other SW Durham, NC Quade e.g. Quad Name:	
Evaluator: Brandon Phillips	County: Durham County		
Total Points: Stream is at least intermittent if \geq 19 or perennial if \geq 30*	Stream Determination (circle one) Ephemeral Intermittent Perennial		

if \geq 19 or perennial if \geq 30*	Ephemeral Inte	rmitten Perennial	e.g. Quad Name:	
A. Geomorphology (Subtotal = 10.0)	Absent	Weak	Moderate	Strong
1ª Continuity of channel bed and bank	0		2	3
2. Sinuosity of channel along thalweg	0	1)	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	(1)	1.5
10. Natural valley	0	0.5		1.5
11. Second or greater order channel	(No	0=0	Yes = 3	
^a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 6.0)				
12. Presence of Baseflow	0		2	3
13. Iron oxidizing bacteria		1	2	3
14. Leaf litter	1.5		0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No	0 = 0	Yes:	= 3
C. Biology (Subtotal = 5.5)				
18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)		1	2	3
21. Aquatic Mollusks		1	2	3
22 Fich		0.5	4	4 =

10: 1 ibiodo 100to in oticambed	9	2		0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks		1	2	3
22. Fish		0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians		0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed		FACW = 0.75; OF	BL = 1.5 Other =	0
*nerennial streams may also be identified using other moth	ode Soon 35 of manua	-I		

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

Notes: Stream D was determined to be intermittent within project limits.

Sketch:

seasonal RPW Stream DD

NC DWQ Stream Identification Form Version 4.11

Date : 08/14/2013	Project/Site:	Project/Site: TTA		04737	
Evaluator: Brandon Phillips	County: Durhar	County: Durham County		Longitude: -78.998785	
Total Points: Stream is at least intermittent $if \ge 19$ or perennial $if \ge 30^*$	Stream Determ Ephemeral Inte	Stream Determination (circle one) Ephemeral Intermittent Perennial		ham, NC Quad	
A. Geomorphology (Subtotal = 10)	Absent	Weak	Moderate	Strong	
1 ^a Continuity of channel bed and bank	0	(1)	2	3	
2. Sinuosity of channel along thalweg	0	1)	2	3	
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0		2	3	
Particle size of stream substrate	0	(1)	2	3	
5. Active/relict floodplain	0	1	2	3	
6. Depositional bars or benches	0	1	2	3	
7. Recent alluvial deposits	0	1	2	3	
8. Headcuts	0		2	3	
9. Grade control	0	0.5	1	1.5	
10. Natural valley	0	0.5	1	1.5	
11. Second or greater order channel	No = 0		Yes =	= 3	
^a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal =					
12. Presence of Baseflow	0		2	3	
13. Iron oxidizing bacteria	0		2	3	
14. Leaf litter	1.5	1	0.5	0	
15. Sediment on plants or debris	0	0.5	(1)	1.5	
16. Organic debris lines or piles	0	0.5	(1)	1.5	
17. Soil-based evidence of high water table?	N	o = 0	(Yes = 3)		
C. Biology (Subtotal = 6.25)					
18. Fibrous roots in streambed	3	2		0	
19. Rooted upland plants in streambed	3	2	1	0	
20. Macrobenthos (note diversity and abundance)	0		2	3	
21. Aquatic Mollusks	0	1	2	3	
22. Fish	0	0.5	1	1.5	
23. Crayfish	0	0.5	1	1.5	

0

0

0.5

0.5

1.5

1.5

1

FACW = 0.75 OBL = 1.5 Other = 0

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

Notes: Stream DD was determined to be intermittent within project limits.

Sketch:

24. Amphibians

26. Wetland plants in streambed

25. Algae

seasonal RPW Stream E

Evaluator: Brandon Phillips Fotal Points: Stream is at least intermittent f≥ 19 or perennial if ≥ 30* 27.50			Longitude: -7	
Stream is at least intermittent 27.50		ination (circle one)	SW Dur	
E 19 01 pereriman il E 00	Stream Determination (circle one) Ephemera Intermitten Perennial		SW Durham, NC Qua e.g. Quad Name:	
A. Geomorphology (Subtotal = 15.0)	Absent	Weak	Moderate	Strong
a. Continuity of channel bed and bank	0	(1)	2	3
2. Sinuosity of channel along thalweg	0		2	3
3. In-channel structure: ex. riffle-pool, step-pool,	0		2	3
ripple-pool sequence				
Particle size of stream substrate	0	1	2	3
i. Active/relict floodplain	0	1 1	(2)	3
6. Depositional bars or benches	0		2	3
'. Recent alluvial deposits	0	$\bigcirc 1 \bigcirc$	2	3
3. Headcuts	0	9	2	3
. Grade control	0	0.5		1.5
0. Natural valley	0	0.5		1.5
Second or greater order channel	N	o = 0	Yes =	3
artificial ditches are not rated; see discussions in manual	*			
B. Hydrology (Subtotal = 7.0)				
2. Presence of Baseflow	0		2	3
3. Iron oxidizing bacteria	0	$\overline{(1)}$	2	3
4. Leaf litter	1.5		0.5	0
5. Sediment on plants or debris	0	0.5	1	1.5
6. Organic debris lines or piles	0	0.5	1	1.5
7. Soil-based evidence of high water table?		0 = 0	Yes =	
C. Biology (Subtotal = 5.5)			_	
8. Fibrous roots in streambed	3	2	1	0
Rooted upland plants in streambed	3	2	1	0
O. Macrobenthos (note diversity and abundance)		1	2	3
1. Aquatic Mollusks		1	2	3
2. Fish		0.5	1	1.5
3. Crayfish		0.5	1	1.5
4. Amphibians		0.5	1	1.5
5. Algae	0	0.5		1.5
6. Wetland plants in streambed	U	FACW = 0.75; OBI		
o. vveitand plants in streambed *perennial streams may also be identified using other methods	Coop 25 of manus		- 1.0 Other - 0	
lotes: Stream E was determined to be intermitted	nt within project i	imits.		

RPW Stream EE

Date: 08/14/2013	1.10,0000		Latitude: 35.90)4704
Evaluator: Brandon Phillips			Longitude: -78.997698	
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 33.75		am Determination (circle one) emeral Intermittent Perennial e.g. Quad Name:		ham, NC Quad
A. Geomorphology (Subtotal = 14.5)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0		2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	(2)	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0		2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	(No	0=0	Yes =	= 3
B. Hydrology (Subtotal = 9) 12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0		2	3
14. Leaf litter	1.5	\sim	0.5	0
15. Sediment on plants or debris	0	0.5		1.5
16. Organic debris lines or piles	0	0.5	$\frac{1}{2}$	1.5
17. Soil-based evidence of high water table?		o = 0	Yes =	
C. Biology (Subtotal = 10.25)		1	_	
18. Fibrous roots in streambed	3	2		0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0	1	(2)	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	(1)	1.5
23. Crayfish	0	0.5	(1)	1.5
24. Amphibians	0	0.5	(1)	1.5
25. Algae	0	(0.5)	1	1.5
26. Wetland plants in streambed		FACW = 0.75 OBL	= 1.5 Other = 0	
*perennial streams may also be identified using other method	ods. See p. 35 of manua			
Notes: Stream EE was determined to be peren				
Sketch:				

seasonal RPW Stream EEE

NC DWQ Stream Identification Form Version 4.11

Date: 12/10/2013	Project/Site: TTA	Latitude: 35.906472
Evaluator: Brandon Phillips	County: Durham County	Longitude: -79.008771
Total Points: Stream is at least intermittent if \geq 19 or perennial if \geq 30*	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other Chapel Hill, NC Quad e.g. Quad Name:

if ≥ 19 or perennial if ≥ 30*	Epnemeral (Inte	rmittent Perenniai	e.g. Quad Name:			
A. Geomorphology (Subtotal = 9.5	Absent	Weak	Moderate	Strong		
1 ^a Continuity of channel bed and bank	0	1	2	3		
2. Sinuosity of channel along thalweg	0		2	3		
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3		
Particle size of stream substrate	0	1	2	3		
5. Active/relict floodplain	0	1)	2	3		
6, Depositional bars or benches		1	2	3		
7. Recent alluvial deposits		1	2	3		
8. Headcuts	0		2	3		
9. Grade control	0	0.5	1	1.5		
10. Natural valley	0	0.5		1.5		
11, Second or greater order channel	No = 0		Yes	Yes = 3		
artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 7.0)						
12. Presence of Baseflow	0		2	3		
13. Iron oxidizing bacteria	0	1	2	3		
14. Leaf litter	1.5	1	0.5	0		
15. Sediment on plants or debris	0	0.5	(1)	1.5		
16. Organic debris lines or piles	0	0.5	(1)	1.5		
17. Soil-based evidence of high water table?	No	= 0	Yes:	= 3		
C. Biology (Subtotal = 4.75)						
18. Fibrous roots in streambed	3	2		0		
19 Rooted upland plants in streambed	3	2	1	0		
20 Macrobenthos (note diversity and abundance)		1	2	3		
21. Aquatic Mollusks		1	2	3		

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

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

Notes: Stream EEE was determined to be intermittent within project limits.

bsent 0 0 0 0 0 0 0 0 0 0	Weak 1 1 1 1	Moderate 2 2 2	ham, NC Quad
bsent 0 0 0 0 0 0 0 0 0 0	Weak 1 1 1 1	Moderate 2 2 2	Strong 3 3
0 0 0 0 0 0	1 1 1	2 2 2	3
0 0 0 0 0	1 1 1	2 2	3
0 0 0 0	1 1	2	
0 0 0 0	1 1		0
0 0 0 0	1 1		
0 0 0	1		
0		2	3
0		2	3
		2	3
		2	3
0	1	2	3
0	0.5	1	1.5
0	0.5		1.5
No	o = 0	Yes:	= 3
0	1	2	3
0		2	3
1.5		0.5	0
0	0.5	1	1.5
0	0.5	1	1.5
No	o = 0	Yes	=3)
3	2	1	0
3	2	1	0
0	11	2	3
0)	1	2	3
0	0.5	1	1.5
0	0.5	(1)	1.5
0	0.5	1	1.5
0	0.5		1.5
	EACW = 0.75 OBL	= 1.5 Other = (
35 of manua			
	0 0 1.5 0 0 No 3 3 0 0 0 0	No = 0 1 0 1.5 1.5 0 0.5 0 0.5 No = 0 3 2 3 2 0 1 0 1 0 0.5 0 0.5 0 0.5 0 0.5 0 0.5 0 0.5	No = 0 1 2 0 1 2 1.5 1 0.5 0 0.5 1 0 0.5 1 No = 0 3 2 1 No = 0 1 2 0 1 2 1 2 1 3 0 0.5 1 0 0.5 1 0 0 1 2 0 1 2 0 0 1 2 0 0.5 1 0 0 0.5 1

Seasonal RPW Stream G

NC DWQ Stream Identification Form Version 4.11

Date : 06/05/2013	Project/Site: TTA	Latitude: 35.960352
Evaluator: Brandon Phillips	County: Durham County	Longitude: -78.963239
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	Stream Determination (circle one) Ephemeral intermittent Perennial	Other e.g. Quad Name:

if ≥ 19 or perennial if ≥ 30*	Ephemeral	Perennial Perennial	e.g. Quad Name:		
A. Geomorphology (Subtotal = 11.0)	Absent	Weak	Moderate	Strong	
1a. Continuity of channel bed and bank	0	1	2	3	
2. Sinuosity of channel along thalweg	0	(1)	2	3	
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3	
Particle size of stream substrate	0	1	2	3	
5. Active/relict floodplain	0	1	2	3	
6. Depositional bars or benches	0		2	3	
7. Recent alluvial deposits	0		2	3	
3. Headcuts	0		2	3	
9. Grade control	0	0.5	1	1.5	
10. Natural valley	0	0.5	1	1.5	
11. Second or greater order channel	(No = 0)		Yes = 3		
3. Hydrology (Subtotal = 7.0)			2	2	
12. Presence of Baseflow	0	1	2	3	
13. Iron oxidizing bacteria	0		2	3	
14. Leaf litter	1.5	1	0.5	0	
15. Sediment on plants or debris	0	0.5	1	1.5	
16. Organic debris lines or piles	0	0.5		1.5	
17. Soil-based evidence of high water table?	No	o = 0	Yes = 3		
C. Biology (Subtotal = 4.75)					
18. Fibrous roots in streambed	3	2		0	
19. Rooted upland plants in streambed	3	2	1	0	
20. Macrobenthos (note diversity and abundance)	0	1	2	3	
21. Aquatic Mollusks		1	2	3	
22. Fish	0	0.5	1	1.5	
23. Crayfish		0.5	1	1.5	
	0				
24. Amphibians	0	0.5	1	1.5	

EACW = 0.75 OBL = 1.5 Other = 0

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

Notes: Stream G was determined to be intermittent within project limits.

Sketch:

26. Wetland plants in streambed

seasonal RPW Stream GG

Date : 08/15/2013	Project/Site:	TTA	Latitude: 35.98	83044	
Evaluator: Brandon Phillips	County: Durham	n County	Longitude: -78.956850		
Total Points: Stream is at least intermittent 20.5 if ≥ 19 or perennial if $\geq 30^*$		Stream Determination (circle one) Ephemeral Intermittent Perennial		Other e.g. Quad Name:	
A. Geomorphology (Subtotal = 10	Absent	Weak	Moderate	Strong	
1 ^a Continuity of channel bed and bank	0	1	2	3	
2. Sinuosity of channel along thalweg	0	(1)	2	3	
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3	
Particle size of stream substrate	0	1	2	3	
5. Active/relict floodplain	0	(1)	2	3	
6. Depositional bars or benches	0	1	2	3	
7. Recent alluvial deposits	0	1)	2	3	
8. Headcuts	0	1	2	3	
9. Grade control	0	0.5	1	1.5	
10. Natural valley	0	0.5	1	1.5	
11. Second or greater order channel	(No	0=0	Yes =	= 3	
^a artificial ditches are not rated; see discussions in manual					
B. Hydrology (Subtotal = 6.5)					
12. Presence of Baseflow	0		2	3	
13. Iron oxidizing bacteria	0		2	3	
14. Leaf litter	1.5	1	0.5	0	
15. Sediment on plants or debris	0	0.5	1	1.5	
16. Organic debris lines or piles	0	0.5	1	1.5	
17. Soil-based evidence of high water table?		0 = 0	Yes =		
C. Biology (Subtotal = 4)					
18. Fibrous roots in streambed	3	2		0	
19. Rooted upland plants in streambed	3	2	1	0	
20. Macrobenthos (note diversity and abundance)	0	1	2	3	
21. Aquatic Mollusks	0	1	2	3	
22. Fish		0.5	1	1.5	
23. Crayfish	0	0.5	1	1.5	
24. Amphibians	0	0.5	1	1.5	
25. Algae	(0)	0.5	1	1.5	
26. Wetland plants in streambed		FACW = 0.75; OBI	_ = 1.5 Other = 0		
	ds. See p. 35 of manua				
*perennial streams may also be identified using other metho					
*perennial streams may also be identified using other metho Notes: Stream GG was determined to be interm	ittent within project	t limits.			

seasonal RPW Stream GGG

Date: 12/10/2013	Project/Site:	TTA	Latitude: 35.925876			
Evaluator: Brandon Phillips	County: Durhan	n County	Longitude: -78.989128			
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 23.25	Stream Determ Ephemeral (nte	Stream Determination (circle one) Ephemeral (intermittent) Perennial		Other SW Durham, NC Quade e.g. Quad Name:		
A. Geomorphology (Subtotal = 11.5)	Absent	Weak	Moderate	Strong		
1 ^a Continuity of channel bed and bank	0	1	(2)	3		
2. Sinuosity of channel along thalweg	0		2	3		
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3		
Particle size of stream substrate	0		2	3		
5. Active/relict floodplain	0	1	2	3		
6. Depositional bars or benches	0		2	3		
7. Recent alluvial deposits	0		2	3		
8. Headcuts	0		2	3		
9. Grade control	0	0.5	1	1.5		
10. Natural valley	0	0.5	$\bigcirc 1$	1.5		
11. Second or greater order channel	(No	0=0	Yes	= 3		
a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal =6.5)						
12. Presence of Baseflow	0		2	3		
13. Iron oxidizing bacteria		1	2	3		
14. Leaf litter	1.5	1	0.5	0		
15. Sediment on plants or debris	0	0.5	(1)	1.5		
16. Organic debris lines or piles	0	0.5	(1)	1.5		
17. Soil-based evidence of high water table?	No	o = 0	Yes	= 3		
C. Biology (Subtotal = 5.25)						
18. Fibrous roots in streambed	3	2	\bigcirc 1	0		
19. Rooted upland plants in streambed	3	2	1	0		
20. Macrobenthos (note diversity and abundance)		1	2	3		
21. Aquatic Mollusks	0	1	2	3		
22. Fish		0.5	1	1.5		
23. Crayfish	0	0.5	1	1.5		
24. Amphibians	0	0.5	1	1.5		
25. Algae		0.5	1	1.5		
26. Wetland plants in streambed		€ACW = 0.75 OBI	_ = 1.5 Other =	Ö		
*perennial streams may also be identified using other metho	ods. See p. 35 of manua	ıl.				
Notes: Stream GGG was determined to be inter	rmittent within proje	ect limits.				
Sketch:						

seasonal RPW Stream H

NC DWO Stream Identification Form Version 4.11

<u> </u>		Latitude: 35.9	59455
		Longitude: -78.965589	
Stream Determination (circle one) Ephemeral Intermittent Perennial		Other SW Durham, NC Que e.g. Quad Name:	
Absent	Weak	Moderate	Strong
0		2	3
	County: Durhar Stream Determ Ephemeral (nto	County: Durham County Stream Determination (circle one) Ephemeral (intermittent) Perennial	County: Durham County Stream Determination (circle one) Ephemeral Intermittent Perennial County: Durham County Longitude:

if ≥ 19 or perennial if ≥ 30*	Ephemeral with	emiliterit Pereminal	e.g. Quad Name.	
A. Geomorphology (Subtotal = 12.5)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	(1)	2	3
2. Sinuosity of channel along thalweg	0	(1)	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
Particle size of stream substrate	0		2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	No = 0		Yes = 3	
artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 6.5)				
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0		2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	N	o = 0	Yes:	3
C. Biology (Subtotal = 5.75)				
18. Fibrous roots in streambed	3	2	(1)	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22 Fish		0.5	1	1.5

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

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

Notes: Stream H was determined to be intermittent within project limits.

RPW Stream HH

ate: 08/15/2013 Project/Site: TTA		Latitude: 35.983516
Evaluator: Brandon Phillips	County: Durham County	Longitude: -78.956785
Total Points: Stream is at least intermittent if \geq 19 or perennial if \geq 30*	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other SW Durham, NC Quad e.g. Quad Name:

Absent	Weak	Moderate	Strong
0	1	2	3
0		2	3
0	1	2	3
0	1	2	3
0	1	2	3
0	1	2	3
0	(1)	2	3
0	(1)	2	3
0	0.5		1.5
0	0.5		1.5
No	o = 0	(Yes =	
0	1	2	3
0			3
1.5			0
0	0.5		1.5
0			1.5
3	2	1	0
3	2		0
0	$\overline{1}$		3
0	1	-	3
0	0.5		1.5
0		(1)	1.5
0		1	1.5
0		1	1.5
		DBL = 1.5 Other = 0	
ds. See p. 35 of manual			
ial within project lir			
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 1.5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	0 1 2 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 0 1 0

RPW Stream I

NC DWO Stream Identification Form Version 4.11

Date : 06/05/2013	Project/Site: TTA		Project/Site: Latitude: 35.96008		Project/Site: Latitude: 35.960085
Evaluator: Brandon Phillips	Stream Determination (circle one)		Phillips County: Durham County Longitude: -78.96994		78.969946
Total Points: Stream is at least intermittent 32.75 if ≥ 19 or perennial if $\geq 30^*$			Other SW Durham, NC Quare e.g. Quad Name:		
A. Geomorphology (Subtotal = 15.5)	Absent	Weak	Moderate	Strong	
1 ^a Continuity of channel bed and bank	0	1	2	3	
2. Sinuosity of channel along thalweg	0	1	2	3	
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3	
Particle size of stream substrate	0	(1)	2	3	
5. Active/relict floodplain	0	1	2	3	
6. Depositional bars or benches	0	1	2	3	
7. Recent alluvial deposits	0	1	2	3	
8. Headcuts	0	1	2	3	
9. Grade control	0	0.5	1	1.5	
10. Natural valley	0	0.5	1	1.5	
11. Second or greater order channel	N	0=0	Yes	= 3	
^a artificial ditches are not rated; see discussions in manual					
B. Hydrology (Subtotal = 8.0)				A	
12. Presence of Baseflow	0	1	(2)	3	
13. Iron oxidizing bacteria	0	(1)	2	3	
13. Iron oxidizing bacteria 14. Leaf litter	0 1.5	1	_		
14. Leaf litter			2	3	
	1.5	1	2 0.5	3 0	
14. Leaf litter 15. Sediment on plants or debris	1.5 0 0	0.5	2 0.5 1	3 0 1.5 1.5	
14. Leaf litter 15. Sediment on plants or debris 16. Organic debris lines or piles	1.5 0 0	0.5	2 0.5 1	3 0 1.5 1.5	
14. Leaf litter 15. Sediment on plants or debris 16. Organic debris lines or piles 17. Soil-based evidence of high water table?	1.5 0 0	0.5	2 0.5 1	3 0 1.5 1.5	
14. Leaf litter 15. Sediment on plants or debris 16. Organic debris lines or piles 17. Soil-based evidence of high water table? C. Biology (Subtotal = 9.25)	1.5 0 0	1 0.5 0.5 0 = 0	2 0.5 1 1 (Yes	3 0 1.5 1.5	
14. Leaf litter 15. Sediment on plants or debris 16. Organic debris lines or piles 17. Soil-based evidence of high water table? C. Biology (Subtotal = 9.25) 18. Fibrous roots in streambed	1.5 0 0 N	1 0.5 0.5 0 = 0	2 0.5 1 1 Yes	3 0 1.5 1.5 = 3	
14. Leaf litter 15. Sediment on plants or debris 16. Organic debris lines or piles 17. Soil-based evidence of high water table? C. Biology (Subtotal = 9.25) 18. Fibrous roots in streambed 19. Rooted upland plants in streambed	1.5 0 0 N	1 0.5 0.5 0 = 0	2 0.5 1 1 Yes	3 0 1.5 1.5 = 3	
14. Leaf litter 15. Sediment on plants or debris 16. Organic debris lines or piles 17. Soil-based evidence of high water table? C. Biology (Subtotal = 9.25) 18. Fibrous roots in streambed 19. Rooted upland plants in streambed 20. Macrobenthos (note diversity and abundance) 21. Aquatic Mollusks	1.5 0 0 N	1 0.5 0.5 0 = 0	2 0.5 1 1 Yes 1 1 2	3 0 1.5 1.5 = 3	
14. Leaf litter 15. Sediment on plants or debris 16. Organic debris lines or piles 17. Soil-based evidence of high water table? C. Biology (Subtotal = 9.25) 18. Fibrous roots in streambed 19. Rooted upland plants in streambed 20. Macrobenthos (note diversity and abundance)	1.5 0 0 0 N	1 0.5 0.5 0 = 0	2 0.5 1 1 1 1 2 2	3 0 1.5 1.5 = 3	
14. Leaf litter 15. Sediment on plants or debris 16. Organic debris lines or piles 17. Soil-based evidence of high water table? C. Biology (Subtotal = 9.25) 18. Fibrous roots in streambed 19. Rooted upland plants in streambed 20. Macrobenthos (note diversity and abundance) 21. Aquatic Mollusks 22. Fish 23. Crayfish	1.5 0 0 No	1 0.5 0.5 0 = 0	2 0.5 1 1 1 1 2 2 1	3 0 1.5 1.5 = 3 0 0 0 3 3 3 1.5	
14. Leaf litter 15. Sediment on plants or debris 16. Organic debris lines or piles 17. Soil-based evidence of high water table? C. Biology (Subtotal =9.25) 18. Fibrous roots in streambed 19. Rooted upland plants in streambed 20. Macrobenthos (note diversity and abundance) 21. Aquatic Mollusks 22. Fish	1.5 0 0 No	1 0.5 0.5 0 = 0	2 0.5 1 1 1 1 2 2 1	3 0 1.5 1.5 = 3 0 0 0 3 3 1.5 1.5	
14. Leaf litter 15. Sediment on plants or debris 16. Organic debris lines or piles 17. Soil-based evidence of high water table? C. Biology (Subtotal = 9.25) 18. Fibrous roots in streambed 19. Rooted upland plants in streambed 20. Macrobenthos (note diversity and abundance) 21. Aquatic Mollusks 22. Fish 23. Crayfish 24. Amphibians	3 0 0 N	1 0.5 0.5 0 = 0 2 2 1 0.5 0.5 0.5 0.5	2 0.5 1 1 1 2 2 2 1 1 1	3 0 1.5 1.5 = 3 0 0 0 3 3 1.5 1.5 1.5	

seasonal RPW Stream II

NC DWQ Stream Identification Form Version 4.11

Date : 09/16/2013	Project/Site: TTA	Latitude: 35.983516
Evaluator: Brandon Phillips	County: Durham County	Longitude: -78.953951
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other e.g. Quad Name:

II = 19 Or pererman = 30				
A. Geomorphology (Subtotal = 10.5)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	(1)	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	(1)	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0		2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	No = 0		Yes = 3	
^a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 6.5)				
12. Presence of Baseflow	0		2	3
13. Iron oxidizing bacteria	0		2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	(0.5)	1	1.5

	V		
0		2	3
0	1	2	3
1.5	1	0.5	0
0	0.5	1	1.5
0	0.5	1	1.5
- I	Vo = 0	Yes:	= 3
	0	0 1 0 1 1.5 1 0 0.5 0 0.5 No = 0	0 0.5 1 0 0.5 1

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

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

Notes: Stream II was determined to be intermittent within project limits.

Sketch:

RPW Stream J - Sandy Creek

Date: 06/05/2013	Project/Site: TTA	Latitude: 35.956158
Evaluator: Brandon Phillips	County: Durham County	Longitude: -78.975226
Total Points: Stream is at least intermittent 47.25 if ≥ 19 or perennial if ≥ 30*	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other SW Durham, NC Quad e.g. Quad Name:

1ª Continuity of channel bed and bank 2. Sinuosity of channel along thalweg 3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence 4. Particle size of stream substrate 5. Active/relict floodplain 6. Depositional bars or benches 7. Recent alluvial deposits 8. Headcuts 9. Grade control 10. Natural valley 11. Second or greater order channel a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 10.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Weak 1 1 1 1 1 1 1 0.5 0.5 0 = 0	2 2 2 2 2 2 2 2 2 1 1	3 3 3 3 3 3 1.5 1.5 = 3
2. Sinuosity of channel along thalweg 3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence 4. Particle size of stream substrate 5. Active/relict floodplain 6. Depositional bars or benches 7. Recent alluvial deposits 8. Headcuts 9. Grade control 10. Natural valley 11. Second or greater order channel a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 10.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 1 1 1 1 0.5 0.5	2 2 2 2 2 2 2 1 1	3 3 3 3 3 3 3 1.5
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence 4. Particle size of stream substrate 5. Active/relict floodplain 6. Depositional bars or benches 7. Recent alluvial deposits 8. Headcuts 9. Grade control 10. Natural valley 11. Second or greater order channel a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 10.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria	0 0 0 0 0 0 0 0 0 0 No	1 1 1 1 1 0.5 0.5 0.5	2 2 2 2 2 2 2 1 1	3 3 3 3 1.5 1.5
4. Particle size of stream substrate 5. Active/relict floodplain 6. Depositional bars or benches 7. Recent alluvial deposits 8. Headcuts 9. Grade control 10. Natural valley 11. Second or greater order channel a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 10.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria	0 0 0 0 0 0 0 0 0 0 0	1 1 1 0.5 0.5 0 = 0	2 2 2 2 2 1 1	3 3 3 1.5 1.5
6. Depositional bars or benches 7. Recent alluvial deposits 8. Headcuts 9. Grade control 10. Natural valley 11. Second or greater order channel a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 10.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria	0 0 0 0 0 0 0 No	1 1 0.5 0.5 0.5	2 2 2 1 1	3 3 1.5 1.5
7. Recent alluvial deposits 8. Headcuts 9. Grade control 10. Natural valley 11. Second or greater order channel a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 10.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria	0 0 0 0 0 0 No	1 0.5 0.5 0.5	2 2 1 1	3 3 1.5 1.5
8. Headcuts 9. Grade control 10. Natural valley 11. Second or greater order channel a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 10.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria	0 0 0 0 No	0.5 0.5 0 = 0	2 1 1	3 1.5 1.5
9. Grade control 10. Natural valley 11. Second or greater order channel a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 10.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria	0 0 No	0.5 0.5 0 = 0	1 1	1.5
10. Natural valley 11. Second or greater order channel a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 10.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria	0 No	0.5 p = 0	1	1.5
11. Second or greater order channel a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 10.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria	0	o = 0		
a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 10.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria	0		Yes	=3)
a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 10.5) 12. Presence of Baseflow 13. Iron oxidizing bacteria		4		
13. Iron oxidizing bacteria		4		
	0		2	3
14. Leaf litter	U		2	3
	1.5		0.5	0
15. Sediment on plants or debris	0	0.5	$\frac{1}{2}$	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No	0 = 0	Yes	= 3
C. Biology (Subtotal = 12.75)				
18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks		1	2	3
22. Fish	0	0.5	1	(1.5)
23. Crayfish	0	0.5		1.5
24. Amphibians	0	0.5		1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed		(FACW = 0.75)	OBL = 1.5 Other =	0
*perennial streams may also be identified using other methods. See p. 3	5 of manua	L		
Notes: Stream J (Sandy Creek) was determined to be per	ennial wi	thin project limits		

RPW Stream JJ

Date : 09/17/2013	Project/Site: TTA	Latitude: 35.999698
Evaluator: Brandon Phillips	County: Durham County	Longitude: -78.952907
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other SW Durham, NC Quad e.g. Quad Name:
A Geomorphology (Subtotal = 14	Absent Weak	Moderate Strong

Absent	Weak	Moderate	Strong
0	1	2	3
0	1	2	3
0			3
0	(1)		3
0	1	2	3
0			3
0		2	3
0		2	3
0	0.5	1	1.5
0	0.5		1.5
No	0 = 0	Yes	= 3
0	1	(2)	3
0			3
1.5	1		0
	0.5		1.5
0		$\overline{}$	1.5
		Yes	
-1			
3	(2)	1	0
	2		0
			3
	1		3
0	0.5		1.5
0			1.5
		\sim	1.5
		1	1.5
See o 35 of manua		1.0 01101	
l within project lim			
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	0 1 2 0 1 2 0 1 2 0 1 2 0 1 2 0 1 2 0 1 2 0 1 2 0 1 2 0 1 2 0 1 2 0 0 1 2 0 0 1 2 0 0 1 2 0 0 0.5 1

seasonal RPW Stream JJJ

Date: 12/10/2013	Project/Site: TTA	Latitude: 35.903190
Evaluator: Brandon Phillips	County: Durham County	Longitude: -78.998857
Total Points: Stream is at least intermittent 21.25 if ≥ 19 or perennial if ≥ 30*	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other SW Durham, NC Quad e.g. Quad Name:

A. Geomorphology (Subtotal = 9.5)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	(1)	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
Particle size of stream substrate	0	1)	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits		1	2	3
8. Headcuts	0		2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	(No	0=0	Yes	= 3
a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal =				
12. Presence of Baseflow	0		2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1)	0.5	0
15. Sediment on plants or debris	0	0.5	(1)	1.5
16. Organic debris lines or piles	0	0.5	(1)	1.5
17. Soil-based evidence of high water table?	No	0 = 0	Yes	= 3
C. Biology (Subtotal = 4.75)				
18. Fibrous roots in streambed	3	2		0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)		1	2	3
21. Aquatic Mollusks		1	2	3
22. Fish		0.5	1	1.5
23. Crayfish		0.5	1	1.5
24. Amphibians		0.5	1	1.5
25. Algae		0.5	1	1.5
26. Wetland plants in streambed		€ACW = 0.75> OB	L = 1.5 Other =	0
*perennial streams may also be identified using other method	ls. See p. 35 of manua			
Notes: Stream JJJ was determined to be intermit	ttent within project	limits.		
Sketch.				

RPW Stream K

NC DWO Stream Identification Form Version 4.11

Date: 06/18/2013	Project/Site: TTA	Latitude: 35.954988
Evaluator: Brandon Phillips	County: Durham County	Longitude: -78.975801
Total Points: Stream is at least intermittent 41.25 if ≥ 19 or perennial if $\geq 30^*$	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other SW Durham, NC Quad e.g. Quad Name:

Continuity of channel bed and bank Sinuosity of channel along thalweg In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence Particle size of stream substrate	0 0	1 1	2 2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence		1	2	3
ripple-pool sequence	0	1		_
Particle size of stream substrate		•	2	3
	0	1	2	3
Active/relict floodplain	0	1	2	3
Depositional bars or benches	0	1	2	3
Recent alluvial deposits	0	1	2	3
Headcuts	0	1	2	3
Grade control	0	0.5	1	1.5
. Natural valley	0	0.5	1	(1.5)
. Second or greater order channel	No	0 = 0	Yes:	= 3
rtificial ditches are not rated; see discussions in manual . Hydrology (Subtotal = 10)				
. Presence of Baseflow	0	1	2	3
. Iron oxidizing bacteria	0	1	2	3
. Leaf litter	1.5		0.5	0
. Sediment on plants or debris	0	0.5	1	1.5
. Organic debris lines or piles	0	0.5	1	1.5
. Soil-based evidence of high water table?	No	0 = 0	Yes:	= 3

C. Biology (Subtotal = 9.25)				
18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks		1	2	3
22. Fish	0	0.5		1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	11	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed		FACW = 0.75>	OBL = 1.5 Other = 0	

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

Notes: Stream K was determined to be perennial within project limits.

RPW Stream KK

NC DWO Stream Identification Form Version 4.11

Date : 09/17/2013	Project/Site:	TTA	Latitude: 36.0	002065
Evaluator: Brandon Phillips	County: Durhan	n County	Longitude:	-78.951402
Total Points:32.25Stream is at least intermittent if \geq 19 or perennial if \geq 30*		ination (circle one) ermittent Perennial	Other NW Du	urham, NC Quad e:
A. Geomorphology (Subtotal = 19)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
Particle size of stream substrate	0	1	(2)	3
5. Active/relict floodplain	0	1	$\bigcirc 2$	3
6. Depositional bars or benches	0	1	$\bigcirc 2$	3
7. Recent alluvial deposits	0		2	3
8. Headcuts	0		2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	$\left(1\right)$	1.5
11. Second or greater order channel	Ne	o = 0	Yes	= 3
^a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 7				
12. Presence of Baseflow	0		2	3
13. Iron oxidizing bacteria	0	1)	2	3
14. Leaf litter	1.5		0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No	o = 0	Yes	= 3
C. Biology (Subtotal = 6.25)				
18. Fibrous roots in streambed	3	2		0
19. Rooted upland plants in streambed	3	2		0
20. Macrobenthos (note diversity and abundance)	0		2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5

0

0

0

 $\bigcirc 0.5$

0.5

0.5

1

FACW = 0.75 OBL = 1.5 Other = 0

1.5

1.5

1.5

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

Notes: Stream KK was determined to be perennial within project limits.

Sketch:

23. Crayfish

25. Algae

24. Amphibians

26. Wetland plants in streambed

seasonal RPW Stream KKK

Date : 12/10/2013	Project/Site: TTA	Latitude: 35.901335
Evaluator: Brandon Phillips	County: Durham County	Longitude: -79.008253
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other Chapel Hill, NC Quad e.g. Quad Name:

Absent	Weak	Moderate	Strong
0	1	2	3
0		2	3
0	1	2	3
0	(1)	2	3
0	1	2	3
0	1	2	3
0	1	2	3
0	1	2	3
0	0.5	1	1.5
0	0.5	(1)	1.5
(No	0=0	Yes :	= 3
-			
0		2	3
0	11	2	3
1.5	(1)	0.5	0
0	0.5	(1)	1.5
0	0.5	(1)	1.5
No	0 = 0	Yes :	= 3
3	2		0
3	2	1	0
0	1	2	3
	1	2	3
	0.5	1	1.5
0	0.5	1	1.5
	0.5	1	1.5
	0.5	1	1.5
	EACW = 0.750	DBL = 1.5 Other = 0	
See p. 35 of manua	l,		
ttent within project	et limits		
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	0 1 2 0 1 2 0 1 2 0 1 2 0 1 2 0 1 2 0 1 2 0 1 2 0 1 2 0 0 5 1 0 0.5 1

RPW Stream L

Date : 06/18/2013	Project/Site: TTA	Latitude: 35.961054
Evaluator: Brandon Phillips	County: Durham County	Longitude: -78.973072
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	Stream Determination (circle one) Ephemeral Intermittent Perennial	SW Durham, NC Quad Other e.g. Quad Name:

A. Geomorphology (Subtotal = 17)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	(1)	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	111	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	N	0=0	Yes	= 3
artificial ditches are not rated; see discussions in manual				
B. Hydrology (Subtotal = 9.5)				
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No	o = 0	Yes	=3)
C. Biology (Subtotal = 7.25)				
18. Fibrous roots in streambed	3	2		0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed		FACW = 0.750	DBL = 1.5 Other =	0
*perennial streams may also be identified using other metho-	ds. See p. 35 of manua	21.		
Notes: Stream L was determined to be perennia	l within project lim	its.		
Sketch.				

RPW Stream LL

Weak 1 1 1 1 1 1 0.5 0.5	Moderate 2 2 2 2 2 2 2 1 Yes =	Strong 3 3 3 3 3 1.5 1.5 3
Weak 1 1 1 1 1 1 0.5 0.5	Moderate 2 2 2 2 2 2 2 1 Yes =	Strong 3 3 3 3 3 3 1.5 1.5 3
1 1 1 1 1 1 1 0.5 0.5	2 2 2 2 2 2 2 2 1 1 Yes =	3 3 3 3 3 3 3 1.5 1.5
1 1 1 1 1 1 0.5 0.5	2 2 2 2 2 2 1 1 Yes =	3 3 3 3 3 3 1.5 1.5
1 1 1 1 1 1 0.5 0.5	2 2 2 2 2 2 1 1 Yes =	3 3 3 3 3 1.5 1.5
1 1 1 1 1 0.5 0.5	2 2 2 2 1 1 Yes =	3 3 3 3 1.5 1.5
1 1 1 1 1 0.5 0.5	2 2 2 2 1 1 Yes =	3 3 3 3 1.5 1.5
1 1 1 0.5 0.5	2 2 2 2 1 1 Yes =	3 3 3 1.5 1.5
1 0.5 0.5	2 2 2 1 1 Yes =	3 3 1.5 1.5 3
1 0.5 0.5	2 2 1 1 Yes =	3 3 1.5 1.5 3
1 0.5 0.5	2 1 1 Yes =	3 1.5 1.5 3
1	1 1 Yes =	1.5 1.5 3
1	1 Yes =	1.5
1	Yes =	3
_	2 2	3
_	2	
_	2	
_	2	
1)		
		3
1)	0.5	0
0.5	(1)	1.5
0.5	1	1.5
	Yes =	3)
2	1	0
2	1	0
1)	2	3
1	2	3
0.5	1	1.5
0.5	(1)	1.5
0.5	(1)	1.5
0.5	1	1.5
CW = 0.75 OB	L = 1.5 Other = 0	
	0.5 0.5 0.5	0.5 1 0.5 1

seasonal RPW Stream LLL

NC DWQ Stream Identification Form Version 4.11

Date: 12/10/2013	Project/Site: TTA	Latitude: 35.903724 Longitude: -79.013458 Other Chapel Hill, NC Quad e.g. Quad Name:	
Evaluator: Brandon Phillips	County: Orange County		
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	Stream Determination (circle one) Ephemeral Intermittent Perennial		

if ≥ 19 or perennial if ≥ 30*	- Lphiemeral (inte	e.g. Quad Ivame.	e.g. Quad Ivallie.		
A. Geomorphology (Subtotal = 8)	Absent	Weak	Moderate	Strong	
1 ^a Continuity of channel bed and bank	0	1	2	3	
Sinuosity of channel along thalweg	0	(1)	2	3	
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3	
Particle size of stream substrate	0	1	2	3	
5. Active/relict floodplain	0		2	3	
6. Depositional bars or benches	0	1	2	3	
7. Recent alluvial deposits		1	2	3	
8. Headcuts	0		2	3	
9. Grade control	0	0.5	1	1.5	
10. Natural valley	0	0.5	1	1.5	
11. Second or greater order channel	(No = 0)		Yes = 3		
a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal =					
12. Presence of Baseflow	0		2	3	
13. Iron oxidizing bacteria		1	2	3	
14. Leaf litter	1.5		0.5	0	
15. Sediment on plants or debris	0	0.5	(1)	1.5	
16. Organic debris lines or piles	0	0.5	(1)	1.5	
17. Soil-based evidence of high water table?	No = 0		Yes = 3		
C. Biology (Subtotal = 6.25)					
18. Fibrous roots in streambed	3	2	1	0	
19. Rooted upland plants in streambed	3	2	11	0	
20. Macrobenthos (note diversity and abundance)		1	2	3	
24 Agustia Malluska		4	2	3	

C. Biology (Subtotal = <u>6.25</u>)				
18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)		1	2	3
21. Aquatic Mollusks		1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish		0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75 OBL = 1.5 Other = 0			

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

Notes: Stream LLL was determined to be intermittent within project limits.

seasonal RPW Stream M

Date: 11/06/2013	Project/Site: TTA County: Durham County Stream Determination (circle one) Ephemeral Intermitten Perennial		Latitude: 35.922657		
Evaluator: Brandon Fulton			Longitude: -79.986684		
Total Points: 24.25 Stream is at least intermittent 24.25 if ≥ 19 or perennial if ≥ 30*			Other SW Durham, NC Quade e.g. Quad Name:		
A. Geomorphology (Subtotal = 11.5)	Absent	Weak	Moderate	Strong	
1 ^a Continuity of channel bed and bank	0	1	(2)	3	
2. Sinuosity of channel along thalweg	0	1	2	3	
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	0	2	3	
4. Particle size of stream substrate	0	(1)	2	3	
5. Active/relict floodplain	0	1)	2	3	
6. Depositional bars or benches	0		2	3	
7. Recent alluvial deposits	0		2	3	
8. Headcuts	0		2	3	
9. Grade control	0	0.5	1	1.5	
10. Natural valley	0	0.5	(1)	1.5	
11. Second or greater order channel	No = 0		Yes = 3		
^B artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal =7)					
12. Presence of Baseflow	0	1	2	3	
13. Iron oxidizing bacteria	0		2	3	
14. Leaf litter	1.5		0.5	0	
15. Sediment on plants or debris	0	0.5	1	1.5	
16. Organic debris lines or piles	0	0.5	1	1.5	
17. Soil-based evidence of high water table?	No = 0		Yes = 3		
C. Biology (Subtotal = <u>5.75</u>)					
18. Fibrous roots in streambed	3	2	1	0	
19. Rooted upland plants in streambed	3	2	1	0	
20. Macrobenthos (note diversity and abundance)	0	1	2	3	
2 und from arrowing and abendurino				_	
21. Aquatic Mollusks		1	2	3	
		0.5	1	1.5	

0

0

0.5

0.5

ACW = 0.75 OBL = 1.5 Other = 0

1.5

1.5

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

Notes: Stream M was determined to be intermittent within project limits.

Sketch:

24. Amphibians

26. Wetland plants in streambed

25. Algae

RPW Stream MM

Date : 09/17/2013	Project/Site: TTA County: Durham County Stream Determination (circle one) Ephemeral Intermittent Perennial		Latitude: 35,935939		
Evaluator: Brandon Phillips			Longitude: -78.990829		
Total Points: Stream is at least intermittent 36.25 if ≥ 19 or perennial if ≥ 30*			Other SW Durham, NC Quad e.g. Quad Name:		
A. Geomorphology (Subtotal = 19)	Absent	Weak	Moderate	Strong	
1 ^a Continuity of channel bed and bank	0	1	2	3	
2. Sinuosity of channel along thalweg	0	(1)	2	3	
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3	
Particle size of stream substrate	0	1	2	(3)	
5. Active/relict floodplain	0	1	2	3	
6. Depositional bars or benches	0	1 1	2	3	
7. Recent alluvial deposits	0		2	3	
8. Headcuts	0		2	3	
9. Grade control	0	0.5		1.5	
10. Natural valley	0	0.5	(1)	1.5	
11. Second or greater order channel	No	0 = 0	Yes	= 3	
^a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 8.5)	1	1			
12. Presence of Baseflow	0	1	2	3	
13. Iron oxidizing bacteria	0		2	3	
14. Leaf litter	1.5		0.5	0	
15. Sediment on plants or debris	0	0.5	(1)	1.5	
16. Organic debris lines or piles	0	0.5	1	1.5	
17. Soil-based evidence of high water table?	No	= 0	Yes	= 3	
C. Biology (Subtotal = <u>8.75</u>)					
18. Fibrous roots in streambed	3	2	1	0	
19. Rooted upland plants in streambed	3	2	1	0	
20. Macrobenthos (note diversity and abundance)	0		2	3	
21. Aquatic Mollusks	0	1	2	3	
22. Fish	0	0.5	11	1.5	
23. Crayfish	0	0.5	$\bigcirc 1$	1.5	
24. Amphibians	0	0.5	$\bigcirc 1$	1.5	
25. Algae	0	0.5	1	1,5	
26. Wetland plants in streambed		EACW = 0.75 OBL	= 1.5 Other = ()	
*perennial streams may also be identified using other metho Notes: Stream MM was determined to be peren Sketch:					

RPW Stream MMM

Date : 12/10/2013	Project/Site: TTA	
Evaluator: Brandon Phillips	County: Orange County	Longitude: -79.010116
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other Chapel Hill, NC Quad e.g. Quad Name:

A. Geomorphology (Subtotal = 11)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches		1	2	3
7. Recent alluvial deposits		1	2	3
B. Headcuts	0		2	3
9. Grade control	0	0.5	1	1.5
I0. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	(No	0=0	Yes =	= 3
artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal =				
12. Presence of Baseflow	0	1	2	3
3, Iron oxidizing bacteria	0		2	3
4. Leaf litter	1.5	(1)	0.5	0
5. Sediment on plants or debris	0	0.5	(1)	1.5
6. Organic debris lines or piles	0	0.5	(1)	1.5
17. Soil-based evidence of high water table?	No	0 = 0	Yes =	3)
C. Biology (Subtotal = 10.25)				
8. Fibrous roots in streambed	3	2	1	0
9. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks		1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1,5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed		EACW = 0.750	OBL = 1.5 Other = 0	
	s. See p. 35 of manua	1		
	Coop of manua			

seasonal RPW Stream N

NC DWO Stream Identification Form Version 4.11

Project/Site: TTA	Latitude: 35.927208
Grandon Fulton County: Orange County Longitude: -79.9	
Stream Determination (circle of Ephemeral Intermittent) Peren	
Absent Weak	Moderate Strong
	County: Orange County Stream Determination (circle of Ephemeral Intermittent) Peren

if ≥ 19 or perennial if ≥ 30*	Ephemeral Inte	ermittent Perennial	e.g. Quad Name:	
A. Geomorphology (Subtotal = 12.5)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	(1)	2	3
5. Active/relict floodplain	0	1)	2	3
6. Depositional bars or benches	0		2	3
7. Recent alluvial deposits	0		2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	No = 0		Yes = 3	
^a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 7.5)				
12. Presence of Baseflow	0		2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	N	o = 0	Yes	= 3

B. Hydrology (Castotal Tio				
12. Presence of Baseflow	0		2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?		No = 0	Yes =	3
C. Biology (Subtotal = 5.75)				
18 Fibrous roots in streamhed	3	2	1	0

3	2	1	0
3	2	1	0
0	1	2	3
0	1	2	3
	0.5	1	1.5
	0.5	1	1.5
0	0.5	1	1.5
0	0.5	1	1.5
	EACW = 0.75; OF	3L = 1.5 Other =	0
	3 3 0 0 0 0 0	0 0.5 0 0.5 0 0.5	0 0.5 1 0 0.5 1

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

Notes: Stream N was determined to be intermittent within project limits.

Sketch:

RPW Stream NN

Date : 09/18/2013	Project/Site: TTA	Latitude: 35.929179	
Evaluator: Brandon Phillips	County: Durham County	Longitude: -78.987929	
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other SW Durham, NC Qua	
A. Geomorphology (Subtotal = 13.5)	Absent Weak	Moderate Strong	

0 0	1 1 1 1 1 1 1 0.5 0.5 0.5	2 2 2 2 2 2 2 2 1 1 Yes =	3 3 3 3 3 3 3 1.5 1.5
0 0 0 0 0 0 0 0	1 1 1 1 1 0.5 0.5 0.5	2 2 2 2 2 2 1 1 Yes =	3 3 3 3 3 3 1.5
0 0 0 0 0 0 0 0	1 1 1 1 0.5 0.5	2 2 2 2 2 1 1 Yes =	3 3 3 3 1.5
0 0 0 0 0 0 0	1 1 1 0.5 0.5	2 2 2 2 1 1 Yes =	3 3 3 1.5
0 0 0 0 0 0	1 1 0.5 0.5 0.5	2 2 2 1 1 Yes =	3 3 1.5 1.5
0 0 0 0 0 0	1 0.5 0.5 0.5	2 2 1 1 Yes =	3 3 1.5 1.5
0 0 0 0 0	0.5 0.5 0 = 0	2 1 1 Yes =	3 1.5 1.5
0 0 0 0	0.5 0.5 0 = 0	1 1 Yes =	1.5 1.5
0 0 0	0.5	Yes =	1.5
0 0	0=0)	Yes =	
0 0			3
0 0			
0	1		
0	1		
-		$\bigcirc 2$	3
4.5		2	3
1.5		0.5	0
0	0.5	(1)	1.5
0	0.5	1	1.5
	0 = 0	Yes =	
3	(2)	1	0
3	2	1	0
0		2	3
0	1		3
0	0.5	1	1.5
0	0.5		1.5
0	0.5		1.5
0	0.5	1	1.5
-4		BL = 1.5 Other = 0	
35 of manua		2	
	3 0 0 0 0 0 0	3 2 3 2 0 1 0 1 0 0.5 0	3 2 1 3 2 1 0 1 2 0 1 2 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1

RPW Stream O

Date : 07/16/2013	County: Durham County Stream Determination (circle one)		Latitude: 35.9	55713
Evaluator: Brandon Phillips			Longitude: -78.978670 SW Durham, NC Quare.	
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$ 31.75				
A. Geomorphology (Subtotal = 17)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	(2)	3

A. Geomorphology (Subtotal = 17)	Absent	Weak	Moderate	Strong
1a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	(1)	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0		2	3
9. Grade control	0	0.5	11	1.5
10. Natural valley	0	0.5	1	(1.5)
11. Second or greater order channel	No	0=0	Yes	= 3
artificial ditches are not rated; see discussions in manual				
B. Hydrology (Subtotal = 8				
12. Presence of Baseflow	0	\bigcirc 1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5		0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	(1)	1.5
17. Soil-based evidence of high water table?	No	o = 0	Yes	= 3
C. Biology (Subtotal = 6.75)				
18. Fibrous roots in streambed	3	2		0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0	(1)	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	11	1.5
26. Wetland plants in streambed		EACW = 0.750	DBL = 1.5 Other = 0)
*perennial streams may also be identified using other method	ods. See p. 35 of manua			

seasonal RPW Stream OO

NC DWQ Stream Identification Form Version 4.11

Date : 09/18/2013	Project/Site: TTA	Latitude: 35.906073	
Evaluator: Brandon Phillips	County: Durham County	Longitude: -78.995219	
Total Points: Stream is at least intermittent if \geq 19 or perennial if \geq 30*	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other SW Durham, NC Quad e.g. Quad Name:	

if ≥ 19 or perennial if $\geq 30^*$	Ephemeral Inte	ermitten Perennial	e.g. Quad Name:	
A. Geomorphology (Subtotal =)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0		2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
Particle size of stream substrate	0	(1)	2	3
5. Active/relict floodplain	0	(1)	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0		2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	(No	No = 0		= 3
^a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 6)		•		
12. Presence of Baseflow	0		2	3
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	(1)	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No	0 = 0	Yes	
C. Biology (Subtotal = 6.75)				
18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)		1	2	3
21. Aquatic Mollusks		1	2	3

21. Aquatic Mollusks 22. Fish 0.5 1 1.5 23. Crayfish 0.5 0 1 1.5 24. Amphibians 0 0.5 1 1.5 25. Algae 0 (0.5) 1.5 26. Wetland plants in streambed FACW = 0.75 OBL = 1.5 Other = 0

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

Notes: Stream OO was determined to be intermittent within project limits.

Sketch:

seasonal RPW Stream OOO

NC DWQ Stream Identification Form Version 4.11

2/11/2013 Project/Site: TTA		
County: Durham County	Longitude: -78.984254	
Stream Determination (circle one) Ephemeral Intermittent Perennial	Other Durham SW, NC Quade e.g. Quad Name:	
	County: Durham County Stream Determination (circle one)	

if ≥ 19 or perennial if ≥ 30*	Epiteriletai (ita	eminterior eremin	a. c.g. Quad Name.	
A. Geomorphology (Subtotal = 13)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	(1)	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	(No = 0)		Yes = 3	
^a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 6.5				
12. Presence of Baseflow	0		2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5		0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	(1)	1.5
17. Soil-based evidence of high water table?	N	o = 0	Yes = 3	
C. Biology (Subtotal = 6.25)				
18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)		1	2	3

3	2	1	0
3	2	1	0
	1	2	3
	1	2	3
0	0.5	1	1.5
	0.5	1	1.5
0	0.5	1	1.5
	0.5	1	1.5
FACW = 0.75 OBL = 1.5 Other = 0			
	3 3 0 0 0 0	0 1 0 1 0 0.5 0 0.5 0 0.5 0 0.5	0 1 2 0 1 2 0 0.5 1 0 0.5 1 0 0.5 1

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

Notes: Stream OOO was determined to be intermittent within project limits.

Sketch.

seasonal RPW Stream P

NC DWO Stream Identification Form Version 4.11

Date : 07/16/2013	Project/Site: TTA	Latitude: 35.952995
Evaluator: Brandon Phillips	County: Durham County	Longitude: -78.982961
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other e.g. Quad Name:
A Geomorphology (Subtotal = 14.5)	Absent Weak	Moderate Strong

if \geq 19 or perennial if \geq 30*	Ephemeral Inte	ermittent Perennial	e.g. Quad Name:	
			,	
A. Geomorphology (Subtotal = 14.5)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1)	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1)	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0		2	3
7. Recent alluvial deposits	0		2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	No = 0		Yes = 3	
a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 6)				
12. Presence of Baseflow	0		2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	N	o = 0	(Yes	= 3)

re. Organic debris intes of piles	0	0.0		1.5
17. Soil-based evidence of high water table?	N	o = 0	Yes =	3
C. Biology (Subtotal = 4.75)	*			
18. Fibrous roots in streambed	3	2		0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)		1	2	3
21. Aquatic Mollusks		1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	EACW = 0.75 OBL = 1.5 Other = 0			

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

Notes: Stream P was determined to be intermittent within project limits.

Sketch.

seasonal RPW Stream PP

Congitude: -79. Other e.g. Quad Name: Moderate 2 2 2 2 2 2 2 1	Strong 3 3 3 3	
Moderate 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Strong	
2 2 2 2 2 2 2 2 2	3 3 3 3 3	
2 2 2 2 2 2 2 2 2	3 3 3 3 3	
2 2 2 2 2 2 2 2	3 3 3 3	
2 2 2 2 2 2 2	3 3 3	
2 2 2 2	3	
2 2 2		
2 2		
2	3	
	3	
1	3	
	1.5	
(1)	1.5	
Yes = 3		
2	3	
2	3	
0.5	0	
1	1.5	
	1.5	
Yes =	3	
1	0	
1	0	
2	3	
2	3	
1	1.5	
1	1.5	
1	1.5	
1	1.5	
= 1.5 Other = 0		
	1	

seasonal RPW Stream Q

NC DWO Stream Identification Form Version 4.11

Date: 07/16/2013	Project/Site: TTA County: Durham County Stream Determination (circle one) Ephemeral Intermittent Perennial		Latitude: 35.9	52756	
Evaluator: Brandon Phillips			Longitude: -78.983074 SW Durham, NC Quad Other e.g. Quad Name:		
Total Points: Stream is at least intermittent $f \ge 19$ or perennial if $\ge 30^*$					
A. Geomorphology (Subtotal = 12.5)	Absent	Weak	Moderate	Strong	
1ª Continuity of channel bed and bank	0	1	2	3	
2. Sinuosity of channel along thalweg	0	1	2	3	
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3	
Particle size of stream substrate	0	1	2	3	
5. Active/relict floodplain	0	1	2	3	
6. Depositional bars or benches	0	(1)	2	3	
7. Recent alluvial deposits	0		2	3	
8. Headcuts	0	1	2	3	
9. Grade control	0	0.5	1	1.5	
10. Natural valley	0	0.5		1.5	
11. Second or greater order channel	No = 0		Yes	= 3	
^a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 6)					
12. Presence of Baseflow	0		2	3	
13. Iron oxidizing bacteria	0	1	2	3	
14. Leaf litter	1.5	1	0.5	0	
15. Sediment on plants or debris	0	0.5	11	1.5	
16. Organic debris lines or piles	0	0.5	1	1.5	
17. Soil-based evidence of high water table?	No = 0		Yes = 3		
C. Biology (Subtotal = 4.75)					
18. Fibrous roots in streambed	3	2	1	0	
19. Rooted upland plants in streambed	3	2	1	0	
20. Macrobenthos (note diversity and abundance)	0	1	2	3	
21. Aquatic Mollusks	0	1 1	2	3	
22. Fish		0.5	1	1.5	

22. Fish 1.5 0.5 23. Crayfish 0 0.5 1 1.5 24. Amphibians 0 0.5 1 1.5 0 0.5 1 1.5 25. Algae FACW = 0.75 OBL = 1.5 Other = 0 26. Wetland plants in streambed

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

Notes: Stream Q was determined to be intermittent within project limits.

Sketch:

RPW Stream QQ

NC DWO Stream Identification Form Version 4.11

Date: 11/05/2013	1 Tojouroite.		Latitude: 35.9	Latitude: 35.902398	
Evaluator: Brandon Phillips			Longitude: -7	9.014898	
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	Stream Determination (circle one) Ephemeral Intermittent Perennial		Other	Hill, NC Quad	
A. Geomorphology (Subtotal = 12.5	Absent	Weak	Moderate	Strong	

≥ 19 or perennial if ≥ 30* Epnemeral Intermittent Perennial e.g. Quad Name:				
A. Geomorphology (Subtotal = 12.5)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	(1)	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	(1)	2	3
8. Headcuts	0		2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	(No = 0)		Yes = 3	
^a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 8)				
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0		2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	(1)	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	N	o = 0	Yes:	= 3

13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	(1)	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No	0 = 0	Yes =	3
C. Biology (Subtotal = 10.75)				
18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5		1.5
23. Crayfish	0	0.5		1.5

 23. Crayfish
 0
 0.5
 1
 1.5

 24. Amphibians
 0
 0.5
 1
 1.5

 25. Algae
 0
 0.5
 1
 1.5

 26. Wetland plants in streambed
 EACW = 0.75 OBL = 1.5 Other = 0

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

Notes: Stream QQ was determined to be perennial within project limits.

Sketch:

seasonal RPW Stream QQQ

NC DWQ Stream Identification Form Version 4.11

Date: 12/11/2013	Project/Site: TTA	Latitude: 35.953951
Evaluator: Brandon Phillips	County: Durham County	Longitude: -78.982939
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other Durham SW, NC Quad e.g. Quad Name:

if ≥ 19 or perennial if ≥ 30*	Epitemeral (mu	erinitteni Pereninai	e.g. Quad Name.		
A. Geomorphology (Subtotal = 14.5)	Absent	Weak	Moderate	Strong	
1 ^a Continuity of channel bed and bank	0	1	(2)	3	
2. Sinuosity of channel along thalweg	0	(1)	2	3	
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3	
Particle size of stream substrate	0	1	2	3	
5. Active/relict floodplain	0	1	2	3	
6. Depositional bars or benches	0	1	2	3	
7. Recent alluvial deposits	0		2	3	
8. Headcuts	0	1	2	3	
9. Grade control	0	0.5		1.5	
10. Natural valley	0	0.5	1	1.5	
11. Second or greater order channel	No = 0 Yes = 3		= 3		
a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 6.5)					
12. Presence of Baseflow	0		2	3	
13. Iron oxidizing bacteria		1	2	3	
14. Leaf litter	1.5		0.5	0	
15. Sediment on plants or debris	0	0.5	1.	1.5	
16. Organic debris lines or piles	0	0.5	(1)	1.5	
17. Soil-based evidence of high water table?	N	o = 0	Yes:	Yes = 3	
C. Biology (Subtotal = 6.25)					
18. Fibrous roots in streambed	3	2	1	0	
19. Rooted upland plants in streambed	3	2	1	0	
20. Macrobenthos (note diversity and abundance)		1	2	3	
21. Aquatic Mollusks		1	2	3	
22. Fish		0.5	1	1.5	

0

0

0.5

0.5

0.5

1.5

1.5

1.5

26. Wetland plants in streambed FACW = 0.75 OBL = 1.5 Other = 0
*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes: Stream QQQ was determined to be intermittent within project limits.

Sketch:

23. Crayfish

25. Algae

24. Amphibians

seasonal RPW Stream R

NC DWO Stream Identification Form Version 4.11

Date: 07/17/2013	Project/Site: TTA	Latitude: 35.946925
Evaluator: Brandon Phillips	County: Durham County	Longitude: -78.998766
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other SW Durham, NC Quad e.g. Quad Name:

if ≥ 19 or perennial if $\geq 30^*$	Ephemeral (Inte	ermitten Perennial	e.g. Quad Name:	
A. Geomorphology (Subtotal = 12.5)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	(1)	2	3
Sinuosity of channel along thalweg	0		2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0		2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	N	No = 0		= 3
artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 7.5)				
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0		2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	(1)	1.5
17. Soil-based evidence of high water table?	N	o = 0	Yes	=3)
C. Biology (Subtotal = 3.75)				
18. Fibrous roots in streambed	3	2		0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)		1	2	3
21. Aquatic Mollusks	0	1	2	3

18. Fibrous roots in streambed	3	2		0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed		FACW = 0.750	OBL = 1.5 Other = 0)

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

Notes: Stream R was determined to be intermittent within project limits.

Sketch.

RPW Stream RR

Date : 11/05/2013		Project/Site: TTA	Latitude: 35.904249	
Evaluator: Brandon Phillips		County: Orange County	Longitude: -79.017962	
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	33.75	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other Chapel Hill, NC Quad e.g. Quad Name:	

A. Geomorphology (Subtotal = 18)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	(1)	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	(1)	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5		1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	No	0 = 0	(Yes:	= 3)
artificial ditches are not rated; see discussions in manual	1-			
B. Hydrology (Subtotal = 8)				
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0		2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	(1)	1.5
17. Soil-based evidence of high water table?	No	0 = 0	Yes:	= 3
C. Biology (Subtotal = 7.75)				
18. Fibrous roots in streambed	3	(2)	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0	(1)	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed		EACW = 0.7500	DBL = 1.5 Other = 0	
*perennial streams may also be identified using other metho	ods. See p. 35 of manua			
	nial within project li			

RPW Stream S

Date: 07/18/2013	County: Durham County Stream Determination (circle one)		Latitude: 35.9	Latitude: 35.959693 Longitude: -78.979567	
Evaluator: Brandon Phillips			Longitude: -		
Total Points: Stream is at least intermittent 40.75 if ≥ 19 or perennial if $\geq 30^{\circ}$			Other SW Durham, NC Quade e.g. Quad Name:		
A. Geomorphology (Subtotal = 19.5)	Absent	Weak	Moderate	Strong	
1ª Continuity of channel bed and bank	0	1	2	(3)	
2. Sinuosity of channel along thalweg	0	1	(2)	3	
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3	
4. Particle size of stream substrate	0	1	2	3	
5. Active/relict floodplain	0	1	2	3	
6. Depositional bars or benches	0	1	2	3	
7. Recent alluvial deposits	0	11	2	3	
8. Headcuts	0		2	3	
9. Grade control	0	0.5	1	1.5	
10. Natural valley	0	0.5		1.5	
11. Second or greater order channel	N	o = 0	Yes	= 3	
a artificial ditches are not rated; see discussions in manual	3				
B. Hydrology (Subtotal = 10)					
12. Presence of Baseflow	0	1	2	3	
13. Iron oxidizing bacteria	0	(1)	2	3	
14. Leaf litter	1.5		0.5	0	
15. Sediment on plants or debris	0	0.5		1.5	
16. Organic debris lines or piles	0	0.5		1.5	
17. Soil-based evidence of high water table?	N	o = 0	Yes	= 3	
C. Biology (Subtotal = 11.25)					
18. Fibrous roots in streambed	3	2	1	0	
19. Rooted upland plants in streambed	3	2	1	0	
20. Macrobenthos (note diversity and abundance)	0	1	\bigcirc 2	3	
21. Aquatic Mollusks		1	2	3	
22. Fish	0	0.5		1.5	
23. Crayfish	0	0.5		1.5	
24. Amphibians	0	0.5	1	1.5	
25. Algae	0	0.5		1.5	
26. Wetland plants in streambed	_ (X	€ACW = 0.75> OF	BL = 1.5 Other =	0	
*perennial streams may also be identified using other meth	ods. See p. 35 of manu	<u>al</u> ,			
Notes: Stream S was determined to be perenni	ial within project lin	nits.			
Sketch:					

seasonal RPW Stream SS

Date : 11/05/2013	Project/Site: TTA	Latitude: 35.903861	
Evaluator: Brandon Phillips	County: Orange County	Longitude: -79.018298	
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other Chapel Hill, NC Quad e.g. Quad Name:	

A. Geomorphology (Subtotal = 8)	Absent	Weak	Moderate	Strong
1ª Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	(1)	2	3
3. In-channel structure: ex. riffle-pool, step-pool,	0		2	3
ripple-pool sequence			•	
4. Particle size of stream substrate	0	$\left\langle \begin{array}{c} 1 \\ 1 \end{array} \right\rangle$	2	3
5. Active/relict floodplain	0		2	3
6. Depositional bars or benches		1	2	3
7. Recent alluvial deposits	0	1	2	3
3. Headcuts	0		2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	(N	o = 0	Yes =	= 3
artificial ditches are not rated; see discussions in manual				
B. Hydrology (Subtotal = 6.5)	1			
12. Presence of Baseflow	0		2	3
13. Iron oxidizing bacteria	0		2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0 Yes = 3			
C. Biology (Subtotal = <u>5.25</u>)				
18. Fibrous roots in streambed	3	2	$\bigcirc 1$	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)		1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish		0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed		€ACW = 0.75 OB	L = 1.5 Other = 0	
*perennial streams may also be identified using other method	ds. See o. 35 of manua			
Notes: Stream SS was determined to be intermi	ttent within project	ilmits.		

RPW Stream T (New Hope Creek)

NC DWO Stream Identification Form Version 4.11

Date : 07/18/2013	Project/Site: TTA	Latitude: 35.958850	
Evaluator: Brandon Phillips	County: Durham County	Longitude: -78.981211	
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other SW Durham, NC Quad e.g. Quad Name:	

A. Geomorphology (Subtotal = 23)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0		2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	N	o = 0	Yes	= 3
^a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 10.5)				
	- 1			

B. Hydrology (Subtotal =10.5)				
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	(1.5)
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?		Vo = 0	Yes	3 = 3

C. Biology (Subtotal = 13.75)				
18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	11	0
20. Macrobenthos (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	11	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5		1.5
25. Algae	0	0.5		1.5
26. Wetland plants in streambed		FACW = 0.75>	OBL = 1.5 Other =	0

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

Notes: Stream T (New Hope Creek) was determined to be perennial within project limits.

Sketch.

RPW Stream TT

NC DWQ Stream Identification Form Version 4.11

Date: 11/05/2013	Project/Site; TTA	Latitude: 35.906395
Evaluator: Brandon Phillips	County: Orange County	Longitude: -79.024656
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	Stream Determination (circle Ephemeral Intermittent Per	
A. Geomorphology (Subtotal = 18.5	Absent Weak	Moderate Strong

if ≥ 19 or perennial if ≥ 30*		annited Perenni	e.g. Quad Name	
A. Geomorphology (Subtotal = 18.5	Absent	Weak	Moderate	Strong
1ª Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0		2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0		2	3
8. Headcuts	0		2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5		1.5
11. Second or greater order channel	No	o = 0	Yes	= 3
^a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal =				
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0		2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	11	1.5
17. Soil-based evidence of high water table?	No	o = 0	Yes	= 3)

14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	N	o = 0	Yes:	= 3
C. Biology (Subtotal = 8.75)				
18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0		2	3
21. Aquatic Mollusks		1	2	3
22. Fish	0	0.5		1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed		EACW = 0.75	OBL = 1.5 Other = 0	

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

Notes: Stream TT was determined to be perennial within project limits.

Sketch:

seasonal RPW Stream UU

NC DWQ Stream Identification Form Version 4.11

Date: 11/05/2013		Project/Site: TTA	Latitude: 35.905825
Evaluator: Brandon Phillips		County: Orange County	Longitude: -79.029577
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	25.25	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other Chapel Hill, NC Quad e.g. Quad Name:

if ≥ 19 or perennial if $\geq 30^*$	Ephemeral (Inte	ermittent Perennial	e.g. Quad Name) :
A. Geomorphology (Subtotal = 8)	Absent	Weak	Moderate	Strong
1 ^{a.} Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0		2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0		2	3
5. Active/relict floodplain	0	(1)	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits		1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	(No	0 = 0	Yes	= 3
^a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal = 7.5)				
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0		2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No	o = 0	Yes	= 3
C. Biology (Subtotal = 9,75)				
18. Fibrous roots in streambed	3	2	1	0

17. Soil-based evidence of high water table?	No = 0		Yes:	= 3)
C. Biology (Subtotal = 9.75)				
18. Fibrous roots in streambed	3	2	11	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0		2	3
21. Aquatic Mollusks		1	2	3
22. Fish	0	0.5		1.5
23. Crayfish	0	0.5		1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed		FACW = 0.75:00	OBL = 1.5 Other = 0	

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

Notes: Stream UU was determined to be intermittent within project limits.

Sketch:

RPW Stream UUU

e: 01/21/2014 Project/Site: TTA		Latitude: 35.954952
Evaluator: Brandon Phillips	ator: Brandon Phillips County: Durham County	
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	Stream Determination (circle one) Ephemeral Intermittent Perennia	Other e.g. Quad Name:

A. Geomorphology (Subtotal = 24)	Absent	Weak	Moderate	Strong
1ª Continuity of channel bed and bank	0	1	2	3
Sinuosity of channel along thalweg	0	1	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No	o = 0	Yes	= 3
artificial ditches are not rated; see discussions in manual				
B. Hydrology (Subtotal = 9.5)				
12. Presence of Baseflow	0	1	(2)	3
13. Iron oxidizing bacteria	0	(1)	2	3
14. Leaf litter	1.5	(1)	0.5	0
15. Sediment on plants or debris	0	0.5	(1)	1.5
16. Organic debris lines or piles	0	0.5	1	(1.5)
17. Soil-based evidence of high water table?	No	0 = 0	Yes	
C. Biology (Subtotal = 12.75)				
		2	1	0
	3		1	
18. Fibrous roots in streambed 19. Rooted upland plants in streambed	$\frac{3}{3}$	2	1	0
18. Fibrous roots in streambed 19. Rooted upland plants in streambed				
Fibrous roots in streambed Rooted upland plants in streambed Macrobenthos (note diversity and abundance)	3	2	1	0
18. Fibrous roots in streambed 19. Rooted upland plants in streambed 20. Macrobenthos (note diversity and abundance) 21. Aquatic Mollusks	3 0	2	1 2	0 3
18. Fibrous roots in streambed 19. Rooted upland plants in streambed 20. Macrobenthos (note diversity and abundance) 21. Aquatic Mollusks 22. Fish	3 0 0	2 1 1	1 2 2	0 3 3
18. Fibrous roots in streambed 19. Rooted upland plants in streambed 20. Macrobenthos (note diversity and abundance) 21. Aquatic Mollusks 22. Fish 23. Crayfish	0 0	2 1 1 0.5	1 2 2	0 3 3 (1.5)
18. Fibrous roots in streambed 19. Rooted upland plants in streambed 20. Macrobenthos (note diversity and abundance) 21. Aquatic Mollusks 22. Fish 23. Crayfish 24. Amphibians	0 0 0 0	2 1 1 0.5 0.5	1 2 2	0 3 3 1.5
18. Fibrous roots in streambed	0 0 0 0 0	2 1 1 0.5 0.5 0.5 0.5	1 2 2 1 1	0 3 3 1.5 1.5 1.5

seasonal RPW Stream V

Date: 07/31/2013	Project/Site:		Latitude: 35.9	16023
Evaluator: Brandon Phillips	County: Durham County		Longitude: -	78.989454
Total Points: Stream is at least intermittent 27.25 if ≥ 19 or perennial if $\geq 30^*$	Stream Determination (circle one) Ephemeral Intermitten Perennial		Other SW Durham, NC Qua	
A. Geomorphology (Subtotal = 12.5	Absent	Weak	Moderate	Strong
1 ^{a.} Continuity of channel bed and bank	0	1)	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	(1)	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	(1)	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0		2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	(N	0=0	Yes = 3	
artificial ditches are not rated; see discussions in manual				
B. Hydrology (Subtotal = 7)				
12. Presence of Baseflow	0	1)	2	3
13. Iron oxidizing bacteria	0		2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	(1)	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?		0 = 0	Yes	A. Carrier and Control of the Contro
C. Biology (Subtotal =				
18. Fibrous roots in streambed	3	2		0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0		2	3
21. Aquatic Mollusks		1	2	3
22. Fish		0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	(1.5)
25. Algae	0	0.5		1.5
26. Wetland plants in streambed		FACW = 0.75 OBI	L = 1.5 Other = 0	
*perennial streams may also be identified using other metho	ods. See p. 35 of manua			
Notes: Stream V was determined to be intermitted				
Ottomi V was determined to be intermit	tone within project i	iiiiio.		
Sketch.				

seasonal RPW Stream W

Project/Site: TTA	Latitude: 35.914764
County: Durham County	Longitude: -78.998681
Stream Determination (circle one) Ephemeral Intermittent Perennial	Other SW Durham, NC Quad e.g. Quad Name:
Epnemeral (intermittent) Perennial	e.g. Quad Name:
	County: Durham County Stream Determination (circle one)

0 0 0 0 0	1 1 1 1	2 2 2 2 2	3 3 3
0 0 0 0	1	2	3
0 0 0		2	3
0	1		
0	1	2	
		_	3
0		2	3
0		2	3
0	1	$\bigcirc 2$	3
0	0.5	1	1.5
0	0.5	(1)	1.5
(No	0=0	Yes	= 3
0	1	2	3
0	1	2	3
1.5	1	0.5	0
0	0.5	(1)	1.5
0	0.5	(1)	1.5
No	o = 0	Yes	= 3
3	2	(1)	0
3	2	1	0
0	1	2	3
0	1	2	3
0	0.5	1	1.5
0	0.5	1	1.5
0	0.5	1	1.5
0	0.5	1	1.5
	€ACW = 0.75> OB	L = 1.5 Other = 0	Ó
ee p. 35 of manua			
	0 No	0 0.5 No = 0 1 0 1 1.5 1 0 0.5 0 0.5 0 0.5 No = 0 3 2 3 2 0 1 0 1 0 0.5 0 0.5 0 0.5 0 0.5 0 0.5 0 0.5	0 0.5 1 No = 0 Yes 1.5 1 0.5 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1 0 0 1 2 0 1 2 0 1 2 0 1 2 0 1 2 0 1 2 0 0 1 2 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1 0 0.5 1

RPW Stream WW - Chapel Branch

Date: 11/05/2013	Project/Site:	TTA	Latitude: 35.9	905374	
Evaluator: Brandon Phillips	County: Orange	County	Longitude: -79.028821		
Total Points: 38.75 Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*	Stream Determination (circle one) Other		Other e.g. Quad Name	Hill, NC Quad :	
A. Geomorphology (Subtotal = 19.5)	Absent	Weak	Moderate Stro		
1 ^a Continuity of channel bed and bank	0	1	2	3	
Sinuosity of channel along thalweg	0	1	2	3	
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3	
Particle size of stream substrate	0	1	2	(3)	
5. Active/relict floodplain	0	1	2	3	
6. Depositional bars or benches	0	1	2	3	
7. Recent alluvial deposits	0		2	3	
8. Headcuts	0		2	3	
9. Grade control	0	0.5	1	1.5	
10. Natural valley	0	0.5		1.5	
11. Second or greater order channel	N	o = 0	Yes	= 3)	
^a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal =8.5)					
12. Presence of Baseflow	0	1	\bigcirc 2	3	
13. Iron oxidizing bacteria	0	1	2	3	
14. Leaf litter	1.5	1	0.5	0	
15. Sediment on plants or debris	0	0.5	(1)	1.5	
16. Organic debris lines or piles	0	0.5	(1)	1.5	
17. Soil-based evidence of high water table?	N	o = 0	Yes	= 3	
C. Biology (Subtotal = 10.75)	*				
18. Fibrous roots in streambed	3	2	1	0	
19. Rooted upland plants in streambed	3	2	1	0	
20. Macrobenthos (note diversity and abundance)	0	1	2	3	
21. Aquatic Mollusks		1	2	3	
22. Fish	0	0.5	(1)	1.5	
23. Crayfish	0	0.5	(1)	1.5	
24. Amphibians	0	0.5	1	1.5	
25. Algae	0	0.5	1	1.5	
26. Wetland plants in streambed		EACW = 0.75 OBL	= 1.5 Other =		
*perennial streams may also be identified using other methon Notes: Stream WW (Chapel Branch) was determined Sketch:		al.			

RPW Stream X

Date: 08/01/2013	Project/Site: TTA	Latitude: 35.913729
Evaluator: Brandon Phillips	County: Durham County	Longitude: -78.998816
Total Points: Stream is at least intermittent 39.6 if ≥ 19 or perennial if $\geq 30^*$	Stream Determination (circle Ephemeral Intermittent Pere	Other SW Durham, NC Quad e.g. Quad Name:

A. Geomorphology (Subtotal = 18)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	(1)	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	(1)	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No	0 = 0	Yes	= 3
artificial ditches are not rated; see discussions in manual				
B. Hydrology (Subtotal = 9)				1
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	(1)	2	3
14. Leaf litter	1.5	(1)	0.5	0
15. Sediment on plants or debris	0	0.5	(1)	1.5
16. Organic debris lines or piles	0	0.5	(1)	1.5
17. Soil-based evidence of high water table?	No	0 = 0	Yes	= 3
C. Biology (Subtotal = 12.5)				
18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0		2	3
22. Fish	0	0.5		1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5		1.5
26. Wetland plants in streambed		FACW = 0.75	OBL = 1.5 Other =	0
·	ada Caan 25 of manua	N.		
*perennial streams may also be identified using other meth-	oos. See p. 33 oi manua	21		

seasonal RPW Stream XX

Date: 11/05/2013	Project/Site:	Project/Site: TTA		99108
Evaluator: Brandon Phillips	Stream Determination (circle one) Ephemeral Intermitten Perennial		Chapel Hill, NC Quare e.g. Quad Name:	
Total Points: Stream is at least intermittent 19.75 if \geq 19 or perennial if \geq 30*				
A. Geomorphology (Subtotal = 9)	Absent	Weak	Moderate	Strong
1ª Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0		2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	(2)	3
5. Active/relict floodplain	0	(1)	2	3
6. Depositional bars or benches	(0)	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	(1)	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	(No	0=0	Yes =	= 3
artificial ditches are not rated; see discussions in manual				
B. Hydrology (Subtotal = 6.5				
12. Presence of Baseflow	0		2	3
13. Iron oxidizing bacteria		1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	(1)	1.5
16. Organic debris lines or piles	0	0.5	$\overline{1}$	1.5
17. Soil-based evidence of high water table?	No	o = 0	Yes = 3	
C. Biology (Subtotal = <u>4.25</u>)				
18. Fibrous roots in streambed	3	2	(1)	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed		EACW = 0.75 OBL	= 1.5 Other = 0	
*perennial streams may also be identified using other method	ods. See p. 35 of manua	il.		
Notes: Stream XX was determined to be interm	ittent within project	limits.		

RPW Stream XXX

Date: 01/22/2014	Project/Site:	Latitude: 35.954375
Evaluator: Brandon Phillips	County: Durham County	Longitude: -78.977513
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 31.75	Stream Determination (circle one) Ephemeral Intermittent Perennial	SW Durham, NC Quad Other e.g. Quad Name:

A. Geomorphology (Subtotal = 17)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0		2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	Ð	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	(1.5)
11. Second or greater order channel	(No	0=0	Yes	
artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal =8)				
12. Presence of Baseflow	0		2	3
13. Iron oxidizing bacteria	0	$\overline{(1)}$	2	3
14. Leaf litter	1.5	$\overline{(1)}$	0.5	0
15. Sediment on plants or debris	0	0.5	(1)	1.5
16. Organic debris lines or piles	0	0.5		1.5
17. Soil-based evidence of high water table?	No	o = 0	Yes	40.00
C. Biology (Subtotal = 6.75)				
18. Fibrous roots in streambed	3	2		0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macrobenthos (note diversity and abundance)	0		2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	(0)	0.5	1	1.5
26. Wetland plants in streambed		EACW = 0.75	DBL = 1.5 Other = ()
· · · · · · · · · · · · · · · · · · ·	1 0 0 0			
*perennial streams may also be identified using other method	ode. See p. 35 of manua			

RPW Stream Y

NC DWO Stream Identification Form Version 4.11

Date: 08/01/2013	Project/Site:	TTA	Latitude: 35.9	13654	
Evaluator: Brandon Phillips	County: Durham County Longitude: -78.		8.999032		
Total Points: Stream is at least intermittent 40 if ≥ 19 or perennial if $\geq 30^*$		ination (circle one) ermittent Perennial			
A. Geomorphology (Subtotal = 18)	Absent	Weak	Moderate	Strong	
1 ^a Continuity of channel bed and bank	0	1	2	3	
2. Sinuosity of channel along thalweg	0	1	2	3	
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3	
Particle size of stream substrate	0	(1)	2	3	
5. Active/relict floodplain	0	1	2	3	
6. Depositional bars or benches	0	(1)	2	3	
7. Recent alluvial deposits	0	1	2	3	
8. Headcuts	0	1	\sim 2	3	
9. Grade control	0	0.5	1	1.5	
10. Natural valley	0	0.5	11	1.5	
11. Second or greater order channel	No = 0		Yes	= 3	
a artificial ditches are not rated; see discussions in manual B. Hydrology (Subtotal =9)					
12. Presence of Baseflow	0	1	$\overline{2}$	3	
13. Iron oxidizing bacteria	0	(1)	2	3	
14. Leaf litter	1.5		0.5	0	
15. Sediment on plants or debris	0	0.5	(1)	1.5	
16. Organic debris lines or piles	0	0.5	(1)	1.5	
17. Soil-based evidence of high water table?	No	o = 0	Yes	(Yes = 3)	
C. Biology (Subtotal = 13)					
18. Fibrous roots in streambed	3	2	1	0	
19. Rooted upland plants in streambed	3	2	1	0	
20. Macrobenthos (note diversity and abundance)	0	1	2	3	
21. Aquatic Mollusks	0		2	3	
22. Fish	0	0.5	1	1.5	
22 0	0	0.5		1.5	
23. Graylish					
23. Crayfish 24. Amphibians	0	0.5		1.5	

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

Notes: Stream Y was determined to be perennial within project limits.

Sketch.

26. Wetland plants in streambed

FACW = 0.75; OBL = 1.5 Other = 0

RPW Stream YY - Meeting of the Waters

Date: 11/05/2013	County: Orange County Longitude: -		Latitude: 35.89	99077
Evaluator: Brandon Phillips			Longitude: -7	
Total Points: Stream is at least intermittent \$\frac{38.25}{if \geq 19 \text{ or perennial if \geq 30*}}		Stream Determination (circle one) Ephemeral Intermittent Perennial Other e.g. Quad Name:		
A. Geomorphology (Subtotal = 19.5)	Absent	Weak	Moderate	Strong
1ª Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	111	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0		2	3
B. Headcuts	0		2	3
9. Grade control	0	0.5	1	1.5
I0. Natural valley	0	0.5	(1)	1.5
1. Second or greater order channel	No = 0 Yes = 3		= 3	
artificial ditches are not rated; see discussions in manual				
B. Hydrology (Subtotal = 8.5)				
2. Presence of Baseflow	0	1	2	3
3. Iron oxidizing bacteria	0		2	3
4. Leaf litter	1.5	1	0.5	0
5. Sediment on plants or debris	0	0.5	(1)	1.5
6. Organic debris lines or piles	0	0.5	(1)	1.5
7. Soil-based evidence of high water table?	No	o = 0	Yes:	= 3
C. Biology (Subtotal = 10.25)				
8. Fibrous roots in streambed	3	2	1	0
9. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0	1	\bigcirc 2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5		1.5
23. Crayfish	0	0.5		1.5
24. Amphibians	0	0.5		1.5
25. Algae	0	0.5	1	1.5
		EACW = 0.75 OBL	= 1.5 Other = 0	
26. Wetland plants in streambed	J. D OF .	i.		
26. Wetland plants in streambed *perennial streams may also be identified using other metho Notes: Stream YY (Meeting of the Waters) was				

RPW Stream Z

Date: 08/13/2013	Project/Site: TTA	Latitude: 35.908000
Evaluator: Brandon Phillips	County: Durham County	Longitude: -78.993723
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$	Stream Determination (circle one) Ephemeral Intermitten Perennial	Other SW Durham, NC Quad e.g. Quad Name:

A. Geomorphology (Subtotal = 15.5)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	(1)	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	(1)	2	3
7. Recent alluvial deposits	0		2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	N	o = 0	Yes:	3
artificial ditches are not rated; see discussions in manual	-			
B. Hydrology (Subtotal = 8)				
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	(1)	2	3
14. Leaf litter	1.5		0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	N	o = 0	Yes =	3
C. Biology (Subtotal = 9.25)				
18. Fibrous roots in streambed	3	2	(1)	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0	(1)	2	3
21. Aquatic Mollusks	0	1)	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5		1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed			DBL = 1.5 Other = 0	
*perennial streams may also be identified using other method	ods. See p. 35 of manus			
Notes: Stream Z was determined to be perennic				

USACE Stream Quality Assessment Worksheets

Map ID	Map ID
А	MMM
AA	N
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RPW Stream A



STREAM QUALITY ASSESSMENT WORKSHEET



1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 6/4/13	4. Time of Evaluation: 10:00 am
5. Name of Stream: <u>Unnamed</u>	6. River Basin: Cape Fear
7. Approximate Drainage Area: 100 acres	8. Stream Order: 2nd
9. Length of Reach Evaluated: 100 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads	and landmarks): east of US 501/15, north of Herald Sun Building
12. Site Coordinates (if known): 35.976615 N	-78.957612 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: hot, humid	
15. Site conditions at time of visit: warm, humid	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES(NO) If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO	19. Does channel appear on USDA Soil Survey? (YES) NO
20. Estimated Watershed Land Use: 25 % Residential	
65 % Forested	% Cleared / Logged% Other (
21. Bankfull Width: 10 ft	22. Bank Height (from bed to top of bank): 4 ft
23. Channel slope down center of stream:Flat (0 to 2%)	<u>x</u> Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _StraightOccasional Bends	x_Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 pworksheet. Scores should reflect an overall assessment of the strewather conditions, enter 0 in the scoring box and provide an exples of a stream under review (e.g., the stream flows from a pasture in	age 2): Begin by determining the most appropriate ecoregion based on naracteristic must be scored using the same ecoregion. Assign points to each provides a brief description of how to review the characteristics identified in the sam reach under evaluation. If a characteristic cannot be evaluated due to site or anation in the comment section. Where there are obvious changes in the characterinto a forest), the stream may be divided into smaller reaches that display more tal score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 62 Comm	nents: Perennial RPW
RPW Stream A was determined to have perennial flow within	n project limits.
gathering the data required by the United States Army	Date

particular mitigation ratio or requirement. Form subject to change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream A

1	14	W Stream		ECOREGION POINT RANGE		
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0 – 5	0-4	0-5	4
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0 – 5	3
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	4
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	3
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	2
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0 – 4	0-4	0-2	3
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	2
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	1
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	3
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0-4	3
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	3
Į,	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	2
ILIT	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
STABILITY	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	2
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0 – 4	0-5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	3
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	5
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	5
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	3
7	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	2
500	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0 – 4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0 – 5	3
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on fi	rst page)			62
						1

^{*} These characteristics are not assessed in coastal streams.

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seasonal RPW Stream AA



STREAM QUALITY ASSESSMENT WORKSHEET



1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 8/13/13	4. Time of Evaluation: 9:30 am
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: 50 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 50 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads a	nd landmarks): east of George King Road.
12. Site Coordinates (if known): 35.908312 N	-78.993569 W
13. Proposed Channel Work (if any): rail embankment	
14. Recent Weather Conditions; hot, humid	
15. Site conditions at time of visit: warm, humid	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation p	point? YES NO If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO 19	9. Does channel appear on USDA Soil Survey? YE\$ NO
20. Estimated Watershed Land Use:15% Residential	% Commercial% Industrial% Agricultural
<u>85</u> % Forested	% Cleared / Logged% Other ()
21. Bankfull Width: 5 ft	22. Bank Height (from bed to top of bank): 1 foot
23. Channel slope down center of stream:Flat (0 to 2%)	X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _StraightOccasional Bends	X Frequent Meander Very Sinuous Braided Channel
location, terrain, vegetation, stream classification, etc. Every charcharacteristic within the range shown for the ecoregion. Page 3 proworksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explan of a stream under review (e.g., the stream flows from a pasture into	te 2): Begin by determining the most appropriate ecoregion based on racteristic must be scored using the same ecoregion. Assign points to each ovides a brief description of how to review the characteristics identified in the m reach under evaluation. If a characteristic cannot be evaluated due to site or ation in the comment section. Where there are obvious changes in the character to a forest), the stream may be divided into smaller reaches that display more I score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 52 Comme	nts: Seasonal RPW
Seasonal RPW Stream AA was determined to have intermittent	t flow within project limits.
gathering the data required by the United States Army stream quality. The total score resulting from the complet	Date 7/3/3 as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of ion of this form is subject to USACE approval and does not imply a change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET seasonal RPW Stream AA

	#	CHADACTEDISTICS		ECOREGION POINT RANGE		
#		CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	2
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	3
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	3
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0 – 5	0-4	0 – 4	3
A.	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0-4	0-4	2
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	2
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	2
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	2
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0 – 5	0-4	0-4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0 – 5	2
X	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	3
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
STABILITY	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	3
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0-5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	2
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	3
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0 – 4	2
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0 – 4	0-5	0-5	1
500	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0-4	1
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0-4	1
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	3
		Total Points Possible	100	100	100	
1	614	TOTAL SCORE (also enter on fi	rst page)			52

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream B



STREAM QUALITY ASSESSMENT WORKSHEET



1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 6/4/13	4. Time of Evaluation: 11:00 am
5. Name of Stream: Unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: 25 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 100 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads	and landmarks): east of US 501/15, north of Herald Sun Building
12. Site Coordinates (if known): 35.976339 N	-78.957751 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: hot, humid	
15. Site conditions at time of visit: warm, humid	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES (NO) If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO	19. Does channel appear on USDA Soil Survey? YE\$ NO
20. Estimated Watershed Land Use: <u>25</u> % Residential	10 % Commercial% Industrial% Agricultural
65 % Forested	% Cleared / Logged% Other ()
21. Bankfull Width: 4 ft	
23. Channel slope down center of stream:Flat (0 to 2%)	Gentle (2 to 4%)X_Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _StraightOccasional Bends	_x_Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every che characteristic within the range shown for the ecoregion. Page 3 p worksheet. Scores should reflect an overall assessment of the stre weather conditions, enter 0 in the scoring box and provide an explain of a stream under review (e.g., the stream flows from a pasture is continuity, and a separate form used to evaluate each reach. The total 100 representing a stream of the highest quality.	age 2): Begin by determining the most appropriate ecoregion based on haracteristic must be scored using the same ecoregion. Assign points to each provides a brief description of how to review the characteristics identified in the sam reach under evaluation. If a characteristic cannot be evaluated due to site or anation in the comment section. Where there are obvious changes in the character into a forest), the stream may be divided into smaller reaches that display more tal score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 57 Comm	ents: Perennial RPW
RPW Stream B was determined to have perennial flow within	project limits.
gathering the data required by the United States Army	Date 6/4//3 y as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of
	etion of this form is subject to USACE approval and does not imply a to change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream B

# CHADACTEDISTICS		ECOREGION POINT RANGE			SCODE	
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream	0-5	0-4	0 - 5	2
		(no flow or saturation = 0; strong flow = max points) Evidence of past human alteration				
	2	(extensive alteration = 0; no alteration = max points)	0-6	0-5	0 – 5	2
	3	Riparian zone	0-6	0-4	0-5	3
PHYSICAL		(no buffer = 0; contiguous, wide buffer = max points)	0-0	V 7	0 3	,
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0 - 5	0-4	0 - 4	2
		Groundwater discharge	0 0			_
	5	(no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0 – 4	0 – 4	3
	6	Presence of adjacent floodplain	0 – 4	0-4	0-2	2
		(no floodplain = 0; extensive floodplain = max points)				
4	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0 - 5	0 – 4	0 - 2	3
		Presence of adjacent wetlands	0 (0.4	0 2	1
	8	(no wetlands = 0; large adjacent wetlands = max points)	0-6	0 – 4	0 – 2	3
	9	Channel sinuosity	0-5	0-4	0-3	3
	F.	(extensive channelization = 0; natural meander = max points)				
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0 - 5	0 – 4	0 – 4	3
		Size & diversity of channel bed substrate	NIA	0 1	0-5	2
	11	(fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-3	3
- 9	12	Evidence of channel incision or widening	0 - 5	0-4	0-5	3
STABILITY		(deeply incised = 0; stable bed & banks = max points) Presence of major bank failures				
	13	(severe erosion = 0; no erosion, stable banks = max points)	0 - 5	0-5	0-5	3
	14	Root depth and density on banks	0-3	0-4	0-5	2
	14	(no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-3	
	15	Impact by agriculture or livestock production	0 – 5	0-4	0-5	3
		(substantial impact =0; no evidence = max points) Presence of riffle-pool/ripple-pool complexes				
	16	(no riffles/ripples or pools = 0; well-developed = max points)	0 - 3	0 - 5	0 – 6	3
BITAT	17	Habitat complexity	0-6	0-6	0-6	3
3	17	(little or no habitat = 0; frequent, varied habitats = max points)	0-0	0-0	0 0	
P	18	Canopy coverage over streambed	0-5	0-5	0 - 5	3
HA		(no shading vegetation = 0; continuous canopy = max points) Substrate embeddedness	Office of the last	San Salar		
	19	(deeply embedded = 0; loose structure = max)	NA*	0 – 4	0-4	2
	20	Presence of stream invertebrates	0-4	0-5	0-5	2
_	20	(no evidence = 0; common, numerous types = max points)		0 0		
2	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0 - 4	0-4	0-4	2
BIOLOGY		Presence of fish	2 4		0 4	
3	22	(no evidence = 0; common, numerous types = max points)	0-4	0 – 4	0-4	0
	23	Evidence of wildlife use	0-6	0-5	0-5	2
		(no evidence = 0; abundant evidence = max points)	in the same		THURSE.	
		Total Points Possible	100	100	100	
1	1	TOTAL SCORE (also setter on S	ret nace)	r eleante		57
		TOTAL SCORE (also enter on fi	ist page)	1 4 3 - 100	1.18	31

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream C



STREAM QUALITY ASSESSMENT WORKSHEET



1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 6/4/13	4. Time of Evaluation: 1:00 pm
5. Name of Stream: <u>Unnamed</u>	6. River Basin: Cape Fear
7. Approximate Drainage Area: 25 acres	
9. Length of Reach Evaluated: 100 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads	and landmarks): east of US 501/15, north of Herald Sun Building
12. Site Coordinates (if known): 35.975685 N	-78,957613 W
13. Proposed Channel Work (if any): rail embankment	
14. Recent Weather Conditions: hot, humid	
15. Site conditions at time of visit: warm, humid	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
	point? YES NO If yes, estimate the water surface area:
	19. Does channel appear on USDA Soil Survey? YE\$ NO
20. Estimated Watershed Land Use: 25 % Residential	
	% Cleared / Logged% Other ()
	22. Bank Height (from bed to top of bank): 6 inches
	Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
	x_Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 pt worksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explain of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on aracteristic must be scored using the same ecoregion. Assign points to each rovides a brief description of how to review the characteristics identified in the am reach under evaluation. If a characteristic cannot be evaluated due to site or nation in the comment section. Where there are obvious changes in the character nto a forest), the stream may be divided into smaller reaches that display more all score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 55 Comme	ents: Perennial RPW
RPW Stream C was determined to have perennial flow within	project limits.
gathering the data required by the United States Army	Date
stream quality. The total score resulting from the comple particular mitigation ratio or requirement. Form subject to	tion of this form is subject to USACE approval and does not imply a change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream C

# CHARACTERISTICS		ECOREGION-POINT RANGE			CCOPE	
124	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0 – 5	0-4	0 – 5	2
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	2
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0 – 5	0-4	0-4	2
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0 – 4	3
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0 – 4	0 – 4	0-2	2
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0 – 2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	3
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0 – 4	0 – 3	3
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0 – 4	3
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0 – 5	3
Y	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0 – 5	0 – 4	0 – 5	3
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
STABILITY	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0-5	2
S.	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0 – 5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	3
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	3
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	3
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0 – 4	2
7	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	2
90	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0 – 4	0
B	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0 – 5	2
	- 3					
		Total Points Possible	100	100	100	

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream CC





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips				
3. Date of Evaluation: 8/13/13 4. Time of Evaluation: 11:30 am					
5. Name of Stream: unnamed	6. River Basin: Cape Fear				
7. Approximate Drainage Area: 250 acres	8. Stream Order: 2nd				
9. Length of Reach Evaluated: 100 ft.	10. County: <u>Durham</u>				
11. Location of reach under evaluation (include nearby roads	and landmarks): west of George King Road, south of US 54.				
12. Site Coordinates (if known): 35.906210 N	-78.995225 W				
13. Proposed Channel Work (if any): rail crossing					
14. Recent Weather Conditions: hot, humid					
15. Site conditions at time of visit: warm, humid					
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat				
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)				
17. Is there a pond or lake located upstream of the evaluation	point? (YES) NO If yes, estimate the water surface area: 10 acres				
18. Does channel appear on USGS quad map? YES NO 1	9. Does channel appear on USDA Soil Survey? (YES) NO				
20. Estimated Watershed Land Use: 15 % Residential	% Commercial% Industrial% Agricultural				
85% Forested	% Cleared / Logged% Other ()				
	22. Bank Height (from bed to top of bank): 4 feet				
23. Channel slope down center of stream: X Flat (0 to 2%)	Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)				
24. Channel Sinuosity: _Straight _X_Occasional Bends	Frequent MeanderVery SinuousBraided Channel				
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 payorksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explain of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on aracteristic must be scored using the same ecoregion. Assign points to each rovides a brief description of how to review the characteristics identified in the am reach under evaluation. If a characteristic cannot be evaluated due to site or nation in the comment section. Where there are obvious changes in the character nto a forest), the stream may be divided into smaller reaches that display more all score assigned to a stream reach must range between 0 and 100, with a score of				
Total Score (from reverse): 69 Commo	ents: Perennial RPW				
RPW Stream CC was determined to have perennial flow within	in project limits.				
gathering the data required by the United States Army stream quality. The total score resulting from the comple	Date V/3//3 as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of this form is subject to USACE approval and does not imply a change – version 05/03. To Comment, please call 919-876-8441 x 26.				

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream CC

Ţ.,	#	# CHADACTEDISTICS		ECOREGION POINT RANGE		
- 5	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream	0-5	0-4	0 – 5	4
		(no flow or saturation = 0; strong flow = max points) Evidence of past human alteration				
	2	(extensive alteration = 0; no alteration = max points)	0 – 6	0 – 5	0 - 5	2
	3	Riparian zone	0-6	0-4	0-5	3
		(no buffer = 0; contiguous, wide buffer = max points) Evidence of nutrient or chemical discharges				
	4	(extensive discharges = 0; no discharges = max points)	0 – 5	0 – 4	0 – 4	3
1	5	Groundwater discharge	0-3	0 – 4	0-4	2
PHYSICAL		(no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 5	0		
S	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0 - 4	0 – 4	0 - 2	3
H		Entrenchment / floodplain access				
	7	(deeply entrenched = 0; frequent flooding = max points)	0 - 5	0-4	0-2	3
	8	Presence of adjacent wetlands	0-6	0-4	0-2	2
		(no wetlands = 0; large adjacent wetlands = max points)				
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0 - 5	0-4	0 – 3	2
	10	Sediment input	0 5	0.4	0 4	2
	10	(extensive deposition= 0; little or no sediment = max points)	0 5	0 – 4	0 4	2
5	11	Size & diversity of channel bed substrate	NA*	0-4	0 – 5	3
		(fine, homogenous = 0; large, diverse sizes = max points) Evidence of channel incision or widening				
_	12	(deeply incised = 0; stable bed & banks = max points)	0 - 5	0-4	0 – 5	3
习	13	Presence of major bank failures	0-5	0-5	0-5	4
	13	(severe erosion = 0; no erosion, stable banks = max points)	0-3	0-3	0-3	-
STABILITY	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 - 3	0-4	0 – 5	3
ST		Impact by agriculture or livestock production				
	15	(substantial impact =0; no evidence = max points)	0 - 5	0-4	0-5	3
= "	16	Presence of riffle-pool/ripple-pool complexes	0-3	0-5	0-6	2
	10	(no riffles/ripples or pools = 0; well-developed = max points)				
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0 - 6	0-6	0-6	4
	10	Canopy coverage over streambed	0 5	0.5	0.5	1
HA	18	(no shading vegetation = 0; continuous canopy = max points)	0 – 5	0-5	0 – 5	4
	19	Substrate embeddedness	NA*	0-4	0-4	3
		(deeply embedded = 0; loose structure = max)				
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0 – 4	0-5	0 – 5	3
S	21	Presence of amphibians	0-4	0-4	0-4	2
Ŏ	21	(no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	3
BIOLOGY	22	Presence of fish	0-4	0-4	0-4	4
B		(no evidence = 0; common, numerous types = max points) Evidence of wildlife use				
E 1	23	(no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	4
		Total Points Possible	100	100	100	
100	1	MOMAY COOPE (1				- (0
		TOTAL SCORE (also enter on fi	rst page)	1 1 1 1 1 1 1 1 1 1 1		69

^{*} These characteristics are not assessed in coastal streams.

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seasonal RPW Stream D





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips			
3. Date of Evaluation: 6/5/13	4. Time of Evaluation: 10:00 am			
5. Name of Stream: Unnamed 6. River Basin: Cape Fear				
7. Approximate Drainage Area: 15 acres	8. Stream Order: 1st			
9. Length of Reach Evaluated: 50 ft.	10. County: Durham			
11. Location of reach under evaluation (include nearby roads a	and landmarks): east of Tower Rd, north of Chapel Hill Blvd. Svc Rd.			
12. Site Coordinates (if known): 35.972010 N	-78.956864 W			
13. Proposed Channel Work (if any): rail crossing				
14. Recent Weather Conditions: hot, humid				
15. Site conditions at time of visit: warm, humid				
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat			
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)			
17. Is there a pond or lake located upstream of the evaluation p	point? YES NO If yes, estimate the water surface area:			
18. Does channel appear on USGS quad map? YES NO 19	9. Does channel appear on USDA Soil Survey? YE\$ NO			
20. Estimated Watershed Land Use:95% Residential	% Commercial% Industrial% Agricultural			
5% Forested	% Cleared / Logged% Other (
21. Bankfull Width: 3 ft	22. Bank Height (from bed to top of bank): 6 inches			
23. Channel slope down center of stream:Flat (0 to 2%)	Gentle (2 to 4%)Moderate (4 to 10%) <u>X</u> Steep (>10%)			
24. Channel Sinuosity: X StraightOccasional Bends	Frequent MeanderVery SinuousBraided Channel			
location, terrain, vegetation, stream classification, etc. Every cha characteristic within the range shown for the ecoregion. Page 3 preworksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explan of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on racteristic must be scored using the same ecoregion. Assign points to each ovides a brief description of how to review the characteristics identified in the m reach under evaluation. If a characteristic cannot be evaluated due to site or ation in the comment section. Where there are obvious changes in the character to a forest), the stream may be divided into smaller reaches that display more I score assigned to a stream reach must range between 0 and 100, with a score of			
Total Score (from reverse): 37 Comme	nts: Seasonal RPW			
Seasonal RPW Stream D was determined to have intermittent f	flow within project limits.			
gathering the data required by the United States Army stream quality. The total score resulting from the complet	Date			

STREAM QUALITY ASSESSMENT WORKSHEET seasonal RPW Stream D

	# CHADACTEDISTICS		ECOREGION POINT RANGE			SCOPE
1,0	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream	0-5	0-4	0-5	1
		(no flow or saturation = 0; strong flow = max points) Evidence of past human alteration				
	2	(extensive alteration = 0; no alteration = max points)	0 - 6	0-5	0 – 5	1
	3	Riparian zone	0-6	0-4	0-5	1
	3	(no buffer = 0; contiguous, wide buffer = max points)	0-0	0-4	0-3	1
W	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	1
5		Groundwater discharge	0 0	0.4	0.4	1
PHYSICAL	5	(no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0-4	0-4	1
ij	6	Presence of adjacent floodplain	0-4	0-4	0-2	1
		(no floodplain = 0; extensive floodplain = max points)				
픠	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0 - 5	0 – 4	0 - 2	3
		Presence of adjacent wetlands				
	8	(no wetlands = 0; large adjacent wetlands = max points)	0 - 6	0-4	0-2	0
	9	Channel sinuosity	0-5	0-4	0-3	1
		(extensive channelization = 0; natural meander = max points)				
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0 – 5	0 – 4	0-4	3
4		Size & diversity of channel bed substrate				
	11	(fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0 - 5	2
STABILITY	12	Evidence of channel incision or widening	0-5	0-4	0-5	3
		(deeply incised = 0; stable bed & banks = max points)				
립	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0 - 5	0 – 5	0 - 5	3
B	14	Root depth and density on banks	0-3	0-4	0-5	2
	14	(no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0-3	
S	15	Impact by agriculture or livestock production	0-5	0-4	0-5	4
		(substantial impact =0; no evidence = max points)				
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 - 3	0-5	0-6	2
		Habitat complexity				
BITAT	17	(little or no habitat = 0; frequent, varied habitats = max points)	0 – 6	0-6	0-6	1
	18	Canopy coverage over streambed	0-5	0-5	0-5	3
H	10	(no shading vegetation = 0; continuous canopy = max points)				
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	2
	46	Presence of stream invertebrates		0.7	0.5	
	20	(no evidence = 0; common, numerous types = max points)	0 – 4	0-5	0-5	0
Ç	21	Presence of amphibians	0-4	0-4	0-4	0
3	-1	(no evidence = 0; common, numerous types = max points)		, ,		ļ ,
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0 – 4	0-4	0
2	22	Evidence of wildlife use	0 (0.5	0 6	1
	23	(no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	2
		Total Points Possible	100	100	100	
		TOTAL SCORE (also automore	ret nace)		1.5	37
1	1 1	TOTAL SCORE (also enter on fi	ist page)			31

^{*} These characteristics are not assessed in coastal streams.

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seasonal RPW Stream DD





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 8/14/13	4. Time of Evaluation: 8:30 am
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: 50 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 100 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads	and landmarks): west of George King Road, north of US 54.
12. Site Coordinates (if known): 35.904737 N	-78.998785 W
13. Proposed Channel Work (if any): rail embankment	
14. Recent Weather Conditions: hot, humid	
15. Site conditions at time of visit: warm, humid	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES NO If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO 1	19. Does channel appear on USDA Soil Survey? YHS NO
20. Estimated Watershed Land Use:% Residential	% Commercial% Industrial% Agricultural
100% Forested	% Cleared / Logged% Other ()
21. Bankfull Width: 6 ft	22. Bank Height (from bed to top of bank): 6 inches
23. Channel slope down center of stream:Flat (0 to 2%)	_X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: X Straight Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 pt worksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explain of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on aracteristic must be scored using the same ecoregion. Assign points to each rovides a brief description of how to review the characteristics identified in the am reach under evaluation. If a characteristic cannot be evaluated due to site or nation in the comment section. Where there are obvious changes in the character nto a forest), the stream may be divided into smaller reaches that display more all score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 49 Comme	ents: Seasonal RPW
RPW Stream DD was determined to have intermittent flow wi	thin project limits.
-	
Evaluator's Signature / Evaluator's Signature	Date 8/14/13
gathering the data required by the United States Army stream quality. The total score resulting from the comple	as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of a ction of this form is subject to USACE approval and does not imply a co change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET seasonal RPW Stream DD

	#	CHARACTERISTICS ECOREGION POINT RANGE		RANGE	SCORE	
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	2
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	2
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0 – 4	2
CAL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0 – 4	0 – 4	1
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0 – 4	0-4	0-2	2
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0-4	0-2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	3
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0 – 5	0-4	0 – 3	1
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0-4	1
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0 – 5	2
2	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0 – 5	0-4	0 – 5	3
STABILITY	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0 – 5	4
TAB	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0-5	2
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0 – 5	3
L	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	3
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	3
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0-5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0 – 4	0-4	2
X	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	1
500	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0-4	1
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0 – 4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0 – 6	0 – 5	0 – 5	3
	N A	Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on fi	rst page)			49

^{*} These characteristics are not assessed in coastal streams.

seasonal RPW Stream E



STREAM QUALITY ASSESSMENT WORKSHEET



1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips			
3. Date of Evaluation: 6/5/13	4. Time of Evaluation: 10:30 am			
5. Name of Stream: Unnamed				
7. Approximate Drainage Area: 25 acres	8. Stream Order: 1st			
9. Length of Reach Evaluated: 50 ft.	10. County: Durham			
11. Location of reach under evaluation (include nearby roads	and landmarks): east of Tower Rd, north of Chapel Hill Blvd. Svc Rd.			
12. Site Coordinates (if known): 35.9715180 N				
13. Proposed Channel Work (if any): rail crossing				
14. Recent Weather Conditions: hot, humid				
15. Site conditions at time of visit: warm, humid				
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat			
	Nutrient Sensitive WatersWater Supply Watershed(I-IV)			
17. Is there a pond or lake located upstream of the evaluation	point? YES NO If yes, estimate the water surface area:			
	19. Does channel appear on USDA Soil Survey? YE\$ NO			
	% Cleared / Logged% Other (
21. Bankfull Width: 4 ft				
	Gentle (2 to 4%)Moderate (4 to 10%) X_Steep (>10%)			
	Frequent MeanderVery SinuousBraided Channel			
characteristic within the range shown for the ecoregion. Page 3 properties of the stream conditions, enter 0 in the scoring box and provide an explaint of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on aracteristic must be scored using the same ecoregion. Assign points to each rovides a brief description of how to review the characteristics identified in the un reach under evaluation. If a characteristic cannot be evaluated due to site or nation in the comment section. Where there are obvious changes in the character into a forest), the stream may be divided into smaller reaches that display more all score assigned to a stream reach must range between 0 and 100, with a score of			
Total Score (from reverse): 44 Comme	ents: Seasonal RPW			
Seasonal RPW Stream E was determined to have intermittent	flow within project limits.			
gathering the data required by the United States Army	Date 6/5//3 as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of tion of this form is subject to USACE approval and does not imply a			

particular mitigation ratio or requirement. Form subject to change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET seasonal RPW Stream E

	ш	CHADA CEEDICEICC	ECOREGION POINT RANGE		SCORE	
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream	0-5	0-4	0-5	2
		(no flow or saturation = 0; strong flow = max points) Evidence of past human alteration				
	2	(extensive alteration = 0; no alteration = max points)	0 - 6	0-5	0 – 5	1
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	2
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	2
A.	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	2
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	2
	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0 – 2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0 – 2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	2
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0 – 4	3
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0 – 5	2
Y	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0 – 4	0 – 5	3
STABILITY	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0 – 5	0 – 5	3
IAB	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0 – 5	2
2	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0 – 5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0 – 6	2
BIIAI	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0 – 6	2
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0 – 5	0 – 5	3
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0 – 4	2
_	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0 – 4	0-5	0-5	0
2	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	1
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0 – 5	2
THE STATE OF	10.0	Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on fi	rst page)			44

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream EE





1. Applicant's Name:_TTA	2. Evaluator's Name:B. Phillips
3. Date of Evaluation: 8/14/13	4. Time of Evaluation: 10:30 am
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: 50 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 100 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads	and landmarks): west of George King Road, south of US 54.
12. Site Coordinates (if known):35.904704 N	
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: hot, humid	
15. Site conditions at time of visit: warm, humid	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES NO If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO	19. Does channel appear on USDA Soil Survey? YHS NO
20. Estimated Watershed Land Use:% Residential	% Commercial% Industrial% Agricultural
100 % Forested	% Cleared / Logged% Other (
21. Bankfull Width: 6 ft	22. Bank Height (from bed to top of bank): 6 inches
23. Channel slope down center of stream:Flat (0 to 2%)	X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity:StraightX_Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 p worksheet. Scores should reflect an overall assessment of the stre weather conditions, enter 0 in the scoring box and provide an expla of a stream under review (e.g., the stream flows from a pasture is continuity, and a separate form used to evaluate each reach. The to 100 representing a stream of the highest quality.	age 2): Begin by determining the most appropriate ecoregion based on naracteristic must be scored using the same ecoregion. Assign points to each provides a brief description of how to review the characteristics identified in the am reach under evaluation. If a characteristic cannot be evaluated due to site or anation in the comment section. Where there are obvious changes in the character nto a forest), the stream may be divided into smaller reaches that display more tal score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 61 Comm	ents: Perennial RPW
RPW Stream EE was determined to have perennial flow with	in project limits.
Evaluator's Signature And Imp	Date 8/14/13
	y as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of
stream quality. The total score resulting from the comple	etion of this form is subject to USACE approval and does not imply a
particular mitigation ratio or requirement. Form subject t	to change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream EE

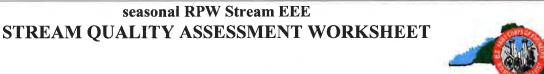
# CHARACTERISTICS		ECOREGION POINT RANGE			SCORE	
53	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	2
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	2
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0 – 4	0-5	2
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0 – 4	2
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	2
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0 – 4	0 – 2	2
HA	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0-4	0-2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0 – 6	0-4	0-2	4
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0 – 5	0-4	0-3	2
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0 – 5	0-4	0-4	1
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0 – 5	3
_	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0 – 5	0-4	0 – 5	3
STABILITY	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0-5	0 – 5	4
IAB	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0 – 4	0 – 5	2
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0-5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	3
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	3
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	2
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 5	0-5	3
500	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	3
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0 – 5	4
	w.\\ -	Total Points Possible	100	100	100	
Š,		TOTAL SCORE (also enter on fi	rst page)		10,010,000	61

^{*} These characteristics are not assessed in coastal streams.

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1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 12/10/13	4. Time of Evaluation: 3:45 pm
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: 50 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 50 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads	and landmarks): east of Meadowmont Lane
12. Site Coordinates (if known): 35.906472 N	-79.008771 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: cold, rainy	
15. Site conditions at time of visit: cold, rainy	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES NO If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO 1	9. Does channel appear on USDA Soil Survey? YES NO
20. Estimated Watershed Land Use:% Residential	85 % Commercial % Industrial % Agricultural
15% Forested	% Cleared / Logged% Other ()
21. Bankfull Width: 2ft	22. Bank Height (from bed to top of bank): 1 foot
23. Channel slope down center of stream:Flat (0 to 2%)	<u>X</u> Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity:StraightX_Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 pt worksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explant of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on aracteristic must be scored using the same ecoregion. Assign points to each rovides a brief description of how to review the characteristics identified in the am reach under evaluation. If a characteristic cannot be evaluated due to site or nation in the comment section. Where there are obvious changes in the character ito a forest), the stream may be divided into smaller reaches that display more all score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 42 Commo	ents: Seasonal RPW
RPW Stream EEE was determined to have intermittent flow w	vithin project limits.
gathering the data required by the United States Army	Date /2/0/3 as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of tion of this form is subject to USACE approval and does not imply a

particular mitigation ratio or requirement. Form subject to change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream EEE

21	#	CHARACTERISTICS ECOREGION POINT RANGE		SCORE		
	#		Coastal	(Piedmont)	Mountain	SCORE
7	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	2
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	2
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0 – 5	0-4	0-4	1
CAL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0 – 4	0-4	1
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	2
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0 – 3	2
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0 - 5	0 4	0 4	3
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0 – 5	3
STABILITY	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0 – 5	0-4	0-5	2
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0 – 5	0-5	2
	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0 – 5	3
8	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0 – 5	0-4	0-5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	2
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	2
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	3
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	3
7	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0 – 4	0-5	0-5	0
505	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	2
18		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on fi	rst page)			42

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream F





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 6/5/13	
5. Name of Stream: <u>Unnamed</u>	
7. Approximate Drainage Area: 100 acres	8. Stream Order: 2nd
9. Length of Reach Evaluated: 100 ft.	
11. Location of reach under evaluation (include nearby roads	and landmarks): east of University Dr. south of MLK Jr. Pkwy.
12. Site Coordinates (if known): 35.960978 N	
13. Proposed Channel Work (if any): rail embankment	
14. Recent Weather Conditions: hot, humid	
15. Site conditions at time of visit: warm, humid	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive Waters Water Supply Watershed (LIV)
17. Is there a pond or lake located upstream of the evaluation	point? (YES) NO If yes, estimate the water surface area: 1 acre
18. Does channel appear on USGS quad map? VES NO 1	19. Does channel appear on USDA Soil Survey? (YES) NO
20. Estimated Watershed Land Use:25% Residential	60 % Commercial% Industrial% Agricultural
	% Cleared / Logged% Other (
	22. Bank Height (from bed to top of bank): 6 feet
23. Channel slope down center of stream:Flat (0 to 2%)	<u>X</u> Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _Straight _X_Occasional Bends	Frequent MeanderVery SinuousBraided Channel
Instructions for completion of worksheet (located on page location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 pr worksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explan of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on aracteristic must be scored using the same ecoregion. Assign points to each rovides a brief description of how to review the characteristics identified in the m reach under evaluation. If a characteristic cannot be evaluated due to site or nation in the comment section. Where there are obvious changes in the character ito a forest), the stream may be divided into smaller reaches that display more all score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 61 Comme	nts: Perennial RPW
RPW Stream F was determined to have perennial flow within I	project limits.
Evaluator's Signature This channel evaluation form is intended to be used only gathering the data required by the United States Army	Date 6/5/3 as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of
stream quanty. The total score resulting from the complet	conps of Engineers in order to make a preliminary assessment of ion of this form is subject to USACE approval and does not imply a change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream F

	#	CHARACTERISTICS ECOREGION POINT RANGI			T RANGE	CCORE
	#		Coastal	Piedmont	Mountain	SCORE
	1	Presence of flow / persistent pools in stream	0-5	0-4	0-5	4
No.		(no flow or saturation = 0; strong flow = max points) Evidence of past human alteration				
	2	(extensive alteration = 0; no alteration = max points)	0 – 6	0-5	0 - 5	1
	3	Riparian zone	0-6	0-4	0-5	2
		(no buffer = 0; contiguous, wide buffer = max points) Evidence of nutrient or chemical discharges				
960	4	(extensive discharges = 0; no discharges = max points)	0 – 5	0 – 4	0 – 4	2
PHYSICAL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0 – 4	0-4	3
C		Presence of adjacent floodplain				
KS	6	(no floodplain = 0; extensive floodplain = max points)	0 - 4	0-4	0 – 2	3
	7	Entrenchment / floodplain access	0-5	0-4	0-2	2
-		(deeply entrenched = 0; frequent flooding = max points)	0-3	0-4	0-2	
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0 – 4	0 – 2	3
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0 – 3	2
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0 – 4	3
		Size & diversity of channel bed substrate	10.			
	11	(fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0 – 5	3
Ľ	12	Evidence of channel incision or widening	0-5	0-4	0-5	2
	12	(deeply incised = 0; stable bed & banks = max points)	0-3	0-4	0-3	
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	2
STABILITY	14	Root depth and density on banks	0-3	0-4	0 – 5	2
ST		(no visible roots = 0; dense roots throughout = max points) Impact by agriculture or livestock production				
H	15	(substantial impact =0; no evidence = max points)	0 - 5	0-4	0 - 5	3
	1.6	Presence of riffle-pool/ripple-pool complexes				_
	16	(no riffles/ripples or pools = 0; well-developed = max points)	0 - 3	0 – 5	0-6	2
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
BI		Canopy coverage over streambed				
HA	18	(no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0 - 5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	3
		Presence of stream invertebrates				
7	20	(no evidence = 0; common, numerous types = max points)	0-4	0 – 5	0 - 5	3
5	21	Presence of amphibians	0 – 4	0-4	0-4	2
9		(no evidence = 0; common, numerous types = max points)	va_	V-7	7	
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	3
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	3
100		Total Points Possible	100	100	100	
		TOTAL GOOD (1				
		TOTAL SCORE (also enter on fir	est page)			61
* Those characteristics are not assessed in acceptal streams						

^{*} These characteristics are not assessed in coastal streams.

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Seasonal RPW Stream G





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 6/5/13	4. Time of Evaluation: 10:30 am
5. Name of Stream: <u>Unnamed</u>	6. River Basin: Cape Fear
7. Approximate Drainage Area: 25 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 100 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads a	and landmarks): east and west of University Drive and south of MLK Jr.
Parkway	
12. Site Coordinates (if known): 35.959836 N	-78.936050 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: hot, humid	
15. Site conditions at time of visit: warm, humid	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation p	point? YES(NO) If yes, estimate the water surface area
18. Does channel appear on USGS quad map? YES NO 1	9. Does channel appear on USDA Soil Survey? YE\$ NO
20. Estimated Watershed Land Use: <u>85</u> % Residential	% Commercial% Industrial% Agricultural
	% Cleared / Logged% Other ()
21. Bankfull Width: 4 ft	22. Bank Height (from bed to top of bank): 2-3 feet
23. Channel slope down center of stream:Flat (0 to 2%)	X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _StraightX_Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 pr worksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explant of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on racteristic must be scored using the same ecoregion. Assign points to each ovides a brief description of how to review the characteristics identified in the m reach under evaluation. If a characteristic cannot be evaluated due to site or nation in the comment section. Where there are obvious changes in the character to a forest), the stream may be divided into smaller reaches that display more all score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 57 Comme	nts: Perennial RPW
Seasonal RPW Stream G was determined to have intermittent	flow within project limits.
gathering the data required by the United States Army stream quality. The total score resulting from the complet	Date
particular mitigation ratio or requirement. Form subject to	change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET Seasonal RPW Stream G

ECOREGION POINT RANGE # **CHARACTERISTICS** SCORE Coastal Piedmont Mountain Presence of flow / persistent pools in stream 1 0 - 50 - 51 (no flow or saturation = 0; strong flow = max points) Evidence of past human alteration 2 0 - 60 - 50 - 5(extensive alteration = 0; no alteration = max points) 1 Riparian zone 3 0 - 60 - 40 - 52 (no buffer = 0; contiguous, wide buffer = max points) Evidence of nutrient or chemical discharges 4 0 - 50 - 40 - 42 (extensive discharges = 0; no discharges = max points) Groundwater discharge 5 PHYSICAL 0 - 30 - 4(no discharge = 0; springs, seeps, wetlands, etc. = max points) 0 - 42 Presence of adjacent floodplain 6 0 - 40 - 40 - 22 (no floodplain = 0; extensive floodplain = max points) Entrenchment / floodplain access 7 0 - 50 - 40 - 22 (deeply entrenched = 0; frequent flooding = max points) Presence of adjacent wetlands 8 0 - 60 - 40 - 2(no wetlands = 0; large adjacent wetlands = max points) 1 Channel sinuosity 9 0 - 50 - 40 - 32 (extensive channelization = 0; natural meander = max points) Sediment input 10 0 - 50 - 40 - 43 (extensive deposition= 0; little or no sediment = max points) Size & diversity of channel bed substrate 11 NA* 0 - 40 - 5(fine, homogenous = 0; large, diverse sizes = max points) 2 Evidence of channel incision or widening 12 0 - 50 - 40 - 52 (deeply incised = 0; stable bed & banks = max points) STABILITY Presence of major bank failures 13 0 - 50 - 50 - 5(severe erosion = 0; no erosion, stable banks = max points) 2 Root depth and density on banks 14 0 - 30 - 40 - 5(no visible roots = 0; dense roots throughout = max points) 1 Impact by agriculture or livestock production 15 0 - 50 - 40 - 53 (substantial impact =0; no evidence = max points) Presence of riffle-pool/ripple-pool complexes 16 0 - 30 - 50 - 62 (no riffles/ripples or pools = 0; well-developed = max points) HABITAT Habitat complexity 17 0 - 60 - 60 - 6(little or no habitat = 0; frequent, varied habitats = max points) 2 Canopy coverage over streambed 18 0 - 50 - 50 - 52 (no shading vegetation = 0; continuous canopy = max points) Substrate embeddedness 19 NA* 0 - 40 - 42 (deeply embedded = 0; loose structure = max) Presence of stream invertebrates 20 0 - 40 - 50 - 5(no evidence = 0; common, numerous types = max points) 0 Presence of amphibians 21 0 - 40 - 40 - 40 (no evidence = 0; common, numerous types = max points) Presence of fish 22 0 - 40 - 40 - 4(no evidence = 0; common, numerous types = max points) 0 Evidence of wildlife use 23 0 - 60 - 50 - 52 (no evidence = 0; abundant evidence = max points) **Total Points Possible** 100 100 100 TOTAL SCORE (also enter on first page) 38

^{*} These characteristics are not assessed in coastal streams.

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Seasonal RPW Stream GG





2. Evaluator's Name: B. Phillips
4. Time of Evaluation: 10:30 am
6. River Basin: Cape Fear
8. Stream Order: 1
10. County:Durham
and landmarks): east of intersection of NC 15/501 and Cornwallis Road
-78.956850 W
Section 10Tidal WatersEssential Fisheries Habitat
_ Nutrient Sensitive Waters Water Supply Watershed(I-IV)
point? YES (NO) If yes, estimate the water surface area:
9. Does channel appear on USDA Soil Survey? YES NO
% Commercial% Industrial% Agricultural
% Cleared / Logged% Other ()
22. Bank Height (from bed to top of bank): 2-3 feet
X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
Frequent MeanderVery SinuousBraided Channel
ge 2): Begin by determining the most appropriate ecoregion based on tracteristic must be scored using the same ecoregion. Assign points to each ovides a brief description of how to review the characteristics identified in the m reach under evaluation. If a characteristic cannot be evaluated due to site or lation in the comment section. Where there are obvious changes in the character to a forest), the stream may be divided into smaller reaches that display more all score assigned to a stream reach must range between 0 and 100, with a score of
nts: Intermittent RPW
t flow within project limits.
p-1,
Date 7/5/3 as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of ion of this form is subject to USACE approval and does not imply a change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET Seasonal RPW Stream GG

# CHARACTERISTICS		ECOREGION POINT RANGE			SCORE	
== 1	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream	0 – 5	0-4	0-5	1
	2	(no flow or saturation = 0; strong flow = max points) Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0 – 5	2
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0 – 5	1
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0 – 4	0 – 4	2
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0 – 4	2
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0 – 4	0-4	0-2	0
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0-4	0-2	2
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0 – 3	2
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0 – 5	0-4	0-4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	2
Į,	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0 – 5	0-4	0 – 5	2
STABILITY	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0-5	0-5	3
TAB	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0 – 5	3
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0 – 5	0-4	0 – 5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	2
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0 – 6	0-6	0-6	3
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	1
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0 – 4	2
X	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0 – 5	0-5	1
50°	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	1
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0 – 4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	3
	To We	Total Points Possible	100	100	100	
	in in	TOTAL SCORE (also enter on fin	rst page)			40

^{*} These characteristics are not assessed in coastal streams.

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seasonal RPW Stream GGG STREAM QUALITY ASSESSMENT WORKSHEET



1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 12/10/13	4. Time of Evaluation: 9:30 am
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: 50 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 100 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads	and landmarks): west of George King Road.
12. Site Coordinates (if known): 35.925876 N	-78.989128 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: cold, rainy	
15. Site conditions at time of visit: cold, rainy	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES NO If yes, estimate the water surface area: 2 acres
18. Does channel appear on USGS quad map? (YES) NO	19. Does channel appear on USDA Soil Survey? (YES) NO
20. Estimated Watershed Land Use:15_% Residential	% Commercial% Industrial% Agricultural
85 % Forested	% Cleared / Logged% Other (
21. Bankfull Width: 4ft	22. Bank Height (from bed to top of bank): 1 foot
23. Channel slope down center of stream: _X_Flat (0 to 2%)	
24. Channel Sinuosity: _Straight _X_Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every che characteristic within the range shown for the ecoregion. Page 3 p worksheet. Scores should reflect an overall assessment of the stre weather conditions, enter 0 in the scoring box and provide an expla of a stream under review (e.g., the stream flows from a pasture i	age 2): Begin by determining the most appropriate ecoregion based on haracteristic must be scored using the same ecoregion. Assign points to each provides a brief description of how to review the characteristics identified in the sam reach under evaluation. If a characteristic cannot be evaluated due to site or anation in the comment section. Where there are obvious changes in the character into a forest), the stream may be divided into smaller reaches that display more tal score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 51 Comm	ents: Seasonal RPW
RPW Stream GGG was determined to have intermittent flow	within project limits.
gathering the data required by the United States Army	Date 12/10/13 y as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of etion of this form is subject to USACE approval and does not imply a

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream GGG

KI W Stream G		ECOREGION POINT RANGE			CCOPE	
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0 – 5	0-4	0 – 5	2
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0 – 5	0-5	3
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0 – 6	0-4	0 – 5	4
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0 – 4	0-4	3
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0-4	0-4	1
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0 – 4	0-4	0-2	3
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0-4	0 – 2	2
8	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0 – 2	2
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0 – 3	2
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0 – 4	3
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0 – 4	0 – 5	2
Y	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0 – 5	0 – 4	0 – 5	2
	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0 – 5	0 – 5	2	
STABILITY	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)		0 – 3	0-4	0 – 5	3
Ś	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0-5	3
-	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0 – 5	0-6	1
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	3
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0-5	0 – 5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	2
7	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	0
500	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0 – 4	0
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	4
		Total Points Possible	100	100	100	
			THE RESERVE TO SERVE THE PERSON NAMED IN COLUMN TWO IN COL			

^{*} These characteristics are not assessed in coastal streams.

seasonal RPW Stream H





1. Applicant's Name: TTA	2. Evaluator's Name:B. Phillips
3. Date of Evaluation: 6/5/13	4. Time of Evaluation: 1:30 pm
5. Name of Stream: <u>Unnamed</u>	6. River Basin: Cape Fear
7. Approximate Drainage Area: 50 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 100 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads	and landmarks): west of University Dr, south of MLK Jr. Pkwy.
12. Site Coordinates (if known): 35.959455 N	
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: hot, humid	
15. Site conditions at time of visit: warm, humid	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES NO If yes, estimate the water surface area: 1 acre
18. Does channel appear on USGS quad map? YES NO 1	
20. Estimated Watershed Land Use:75% Residential	% Commercial% Industrial% Agricultural
25 % Forested	% Cleared / Logged% Other (
21. Bankfull Width: 5 ft	22. Bank Height (from bed to top of bank): 1 foot
23. Channel slope down center of stream:Flat (0 to 2%)	X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _Straight _X_Occasional Bends	Frequent MeanderVery SinuousBraided Channel
characteristic within the range shown for the ecoregion. Page 3 pr worksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explan of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on racteristic must be scored using the same ecoregion. Assign points to each ovides a brief description of how to review the characteristics identified in the m reach under evaluation. If a characteristic cannot be evaluated due to site or lation in the comment section. Where there are obvious changes in the character to a forest), the stream may be divided into smaller reaches that display more I score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 46 Comme	nts: Seasonal RPW
Seasonal RPW Stream H was determined to have intermittent to	flow within project limits.
gathering the data required by the United States Army	Date 6/5//3 as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of ion of this form is subject to USACE approval and does not imply a
particular mitigation ratio or requirement. Form subject to	change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET seasonal RPW Stream H

	щ	CHADACTEDISTICS		ECOREGION POINT RANGE		
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream	0-5	0-4	0-5	2
	2	(no flow or saturation = 0; strong flow = max points) Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	2
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	2
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0-4	0-4	1
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	3
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0 – 2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0 – 5	0-4	0 – 3	2
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0 – 5	0-4	0 – 4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	2
2	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0 – 5	0-4	0-5	2
STABILITY	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	2
TAE	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0-5	2
	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0-5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	2
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	3
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	2
_	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	2
000	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	2
	74 1	Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on fi	rst page)			46

^{*} These characteristics are not assessed in coastal streams.

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Perennial RPW Stream HH



STREAM QUALITY ASSESSMENT WORKSHEET



1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 8/15/13	4. Time of Evaluation: 11:45 am
5. Name of Stream: <u>UT to Sandy Creek</u>	6. River Basin: Cape Fear
7. Approximate Drainage Area: ~1500 acres	8. Stream Order: >3
9. Length of Reach Evaluated: 50 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads as	nd landmarks): east of intersection of NC 15/501 and Cornwallis Road
12. Site Coordinates (if known): 35.983516 N	-78.956785 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: hot, humid	
15. Site conditions at time of visit: warm, humid	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive Waters Water Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation p	oint? YES NO If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? (YES) NO 19	. Does channel appear on USDA Soil Survey? (YES) NO
20. Estimated Watershed Land Use: <u>85</u> % Residential	% Commercial% Industrial% Agricultural
	% Cleared / Logged% Other (
	22. Bank Height (from bed to top of bank): 4-5 feet
23. Channel slope down center of stream:Flat (0 to 2%)	X Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _StraightX_Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every char characteristic within the range shown for the ecoregion. Page 3 pro worksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explana of a stream under review (e.g., the stream flows from a pasture into	e 2): Begin by determining the most appropriate ecoregion based on acteristic must be scored using the same ecoregion. Assign points to each vides a brief description of how to review the characteristics identified in the a reach under evaluation. If a characteristic cannot be evaluated due to site or ation in the comment section. Where there are obvious changes in the character of a forest), the stream may be divided into smaller reaches that display more score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 62 Commen	ts: Perennial RPW
Perennial RPW Stream HH was determined to have perennial fl	ow within project limits.
gathering the data required by the United States Army (Date 7/5/13 as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of on of this form is subject to USACE approval and does not imply a

particular mitigation ratio or requirement. Form subject to change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET Seasonal RPW Stream HH

5	ш	CHADACTEDISTICS		ECOREGION POINT RANGE		
	# CHARACTERISTICS Presence of flow / persistent pools in stream		Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0 – 5	4
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0 – 6	0 – 5	0-5	3
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0 – 6	0-4	0 – 5	3
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0 – 5	0-4	0-4	2
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0-4	0-4	2
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0 – 4	0-4	0-2	2
3	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	2
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0 – 2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0 – 5	0-4	0 – 3	2
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0-4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	3
,	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0 – 5	0-4	0-5	3
SIABILITY	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
AB	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0-5	3
2	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0-5	3
Į	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	3
BIIAI	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0 – 4	3
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0 – 5	0-5	2
BIOLOGY	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0-4	2
SIOL	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	3
_	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	4
		Total Points Possible	100	100	100	
	AL .	TOTAL SCORE (also enter on fi	rst page)			62

^{*} These characteristics are not assessed in coastal streams.

RPW Stream I





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 6/5/13	4. Time of Evaluation: 2:30 pm
5. Name of Stream: <u>Unnamed</u>	6. River Basin: Cape Fear
7. Approximate Drainage Area: 100 acres	
9. Length of Reach Evaluated: 100 ft.	
11. Location of reach under evaluation (include nearby road	s and landmarks): east of Garrett Rd, west of University Dr.
12. Site Coordinates (if known): 35.960085 N	
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: hot, humid	
15. Site conditions at time of visit: warm, humid	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation	n point? YES NO If yes, estimate the water surface area: 1 acre
18. Does channel appear on USGS quad map? YES NO	19. Does channel appear on USDA Soil Survey? YES NO
20. Estimated Watershed Land Use: 25 % Residential	% Commercial% Industrial% Agricultural
	% Cleared / Logged% Other (
01 D 10 H **********************************	22. Bank Height (from bed to top of bank): 2 feet
	X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _StraightOccasional Bends	X_Frequent MeanderVery SinuousBraided Channel
characteristic within the range shown for the ecoregion. Page 3 p worksheet. Scores should reflect an overall assessment of the stre weather conditions, enter 0 in the scoring box and provide an expla of a stream under review (e.g., the stream flows from a pasture in	age 2): Begin by determining the most appropriate ecoregion based on haracteristic must be scored using the same ecoregion. Assign points to each provides a brief description of how to review the characteristics identified in the sam reach under evaluation. If a characteristic cannot be evaluated due to site or anation in the comment section. Where there are obvious changes in the character into a forest), the stream may be divided into smaller reaches that display more tal score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 56 Comm	ents: Perennial RPW
RPW Stream I was determined to have perennial flow within	project limits.
stream quality. The total score resulting from the comple	Date 6/5/2 y as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of etion of this form is subject to USACE approval and does not imply a o change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream I

	# CHARACTERISTICS			ECOREGION POINT RANGE		
	17		Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream	0-5	0-4	0-5	3
		(no flow or saturation = 0; strong flow = max points) Evidence of past human alteration				
	2	(extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	3
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	3
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	2
'AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	3
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	3
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0 – 4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	3
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0-4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	2
Y	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	3
LIT	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	2
STABILITY	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	2
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0 – 4	0-5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	2
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	2
,	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0 – 5	2
50	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0 – 4	1
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0 – 5	2
		Total Points Possible	100	100	100	
	A 110	TOTAL SCORE (also enter on fir	rst page)			56

^{*} These characteristics are not assessed in coastal streams.

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Seasonal RPW Stream II





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 9/16/13	4. Time of Evaluation: 9:15 am
5. Name of Stream: <u>UT to Sandy Creek</u>	6. River Basin: Cape Fear
7. Approximate Drainage Area: ~30 acres	8. Stream Order: 1
9. Length of Reach Evaluated: 50 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads a	and landmarks): south of intersection of Cameron Blvd and Erwin Road
12. Site Coordinates (if known): 35.983516 N	-78.953951 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: warm, humid	
15. Site conditions at time of visit: warm, humid	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive Waters _Water Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation p	point? YES (NO) If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES (NO) 1	9. Does channel appear on USDA Soil Survey? (YES) NO
20. Estimated Watershed Land Use: <u>85</u> % Residential	% Commercial% Industrial% Agricultural
15 % Forested	% Cleared / Logged% Other ()
21. Bankfull Width: 4 ft	22. Bank Height (from bed to top of bank): 1-2 feet
23. Channel slope down center of stream:Flat (0 to 2%)	X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _StraightX_Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 pr worksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explar of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on tracteristic must be scored using the same ecoregion. Assign points to each ovides a brief description of how to review the characteristics identified in the m reach under evaluation. If a characteristic cannot be evaluated due to site or nation in the comment section. Where there are obvious changes in the character to a forest), the stream may be divided into smaller reaches that display more all score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 50 Comme	nts: Seasonal RPW
Seasonal RPW Stream II was determined to have seasonal flow	w within project limits.
gathering the data required by the United States Army stream quality. The total score resulting from the complete	Date 9//6//3 as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of tion of this form is subject to USACE approval and does not imply a change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET Seasonal RPW Stream II

	#	CHARACTERISTICS	ECOREGION POINT RANGE		SCORE	
	π		Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream	0-5	0-4	0-5	2
		(no flow or saturation = 0; strong flow = max points) Evidence of past human alteration				
	2	(extensive alteration = 0; no alteration = max points)	0-6	0-5	0 – 5	3
	3	Riparian zone	0-6	0-4	0 – 5	1 ,
		(no buffer = 0; contiguous, wide buffer = max points)	0 - 0	0-4	0 – 3	3
E	4	Evidence of nutrient or chemical discharges	0 – 5	0-4	0-4	2
		(extensive discharges = 0; no discharges = max points) Groundwater discharge				
PHYSICAL	5	(no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 - 3	0-4	0 - 4	2
10	6	Presence of adjacent floodplain	0 4	0.4	0 0	
XS	U	(no floodplain = 0; extensive floodplain = max points)	0 – 4	0 – 4	0-2	1
H	7	Entrenchment / floodplain access	0-5	0-4	0-2	2
		(deeply entrenched = 0; frequent flooding = max points)			0 2	
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0 - 2	0
4	0	Channel sinuosity				
	9	(extensive channelization = 0; natural meander = max points)	0-5	0-4	0 - 3	2
	10	Sediment input	0-5	0-4	0-4	2
	10	(extensive deposition—0; little or no sediment = max points)	0-3	0-4	0-4	
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0 – 4	0 - 5	2
		Evidence of channel incision or widening				
7	12	(deeply incised = 0; stable bed & banks = max points)	0 - 5	0-4	0 - 5	2
STABILITY		Presence of major bank failures	0-5	0-5	0.5	2
		(severe erosion = 0; no erosion, stable banks = max points)	0-3	0-3	0 – 5	3
AB	14	Root depth and density on banks	0 - 3	0-4	0-5	3
		(no visible roots = 0; dense roots throughout = max points) Impact by agriculture or livestock production				
	15	(substantial impact =0; no evidence = max points)	0 - 5	0-4	0 - 5	3
	1.0	Presence of riffle-pool/ripple-pool complexes				
	16	(no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	3
BITAT	17	Habitat complexity	0-6	0-6	0-6	3
		(little or no habitat = 0; frequent, varied habitats = max points)	0 0	0 0	0-0	,
HAH	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0 - 5	0-5	0 - 5	4
	10	Substrate embeddedness	distribution of the last of th			
	19	(deeply embedded = 0; loose structure = max)	NA*	0-4	0 - 4	2
	20	Presence of stream invertebrates	0-4	0-5	0-5	1
7	20	(no evidence = 0; common, numerous types = max points)	0-4	0-5	0 – 3	1
BIOLOGY	21	Presence of amphibians	0-4	0-4	0-4	1
Ĭ		(no evidence = 0; common, numerous types = max points) Presence of fish				
018	22	(no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0-4	0
m	23	Evidence of wildlife use	0 (0.5	0 5	
	4.5	(no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	4
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on fir	ret ne co			50
	1 181	arracteristics are not assessed in constal streams	st page)			50

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream J - Sandy Creek





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips			
3. Date of Evaluation: 6/5/13 4. Time of Evaluation: 3:00 pm				
5. Name of Stream: <u>Unnamed</u>	6. River Basin: Cape Fear			
7. Approximate Drainage Area: 250 acres	8. Stream Order: 3rd			
9. Length of Reach Evaluated: 100 ft.	10. County: Durham			
11. Location of reach under evaluation (include nearby roads	s and landmarks): east of Garrett Rd, west of University Dr.			
12. Site Coordinates (if known): 35.956158 N	-78.975226 W			
13. Proposed Channel Work (if any): rail crossing				
14. Recent Weather Conditions: hot, humid				
15. Site conditions at time of visit: warm, humid				
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat			
	X Nutrient Sensitive WatersWater Supply Watershed(I-IV)			
	point? YES NO If yes, estimate the water surface area: 1 acre			
18. Does channel appear on USGS quad map? YES NO	19. Does channel appear on USDA Soil Survey? YES NO			
	% Cleared / Logged% Other ()			
	22. Bank Height (from bed to top of bank): 4 feet			
	X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)			
	X Frequent Meander Very Sinuous Braided Channel			
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 p worksheet. Scores should reflect an overall assessment of the stre weather conditions, enter 0 in the scoring box and provide an explant of a stream under review (e.g., the stream flows from a pasture is continuity, and a separate form used to evaluate each reach. The total 100 representing a stream of the highest quality.	age 2): Begin by determining the most appropriate ecoregion based on haracteristic must be scored using the same ecoregion. Assign points to each provides a brief description of how to review the characteristics identified in the am reach under evaluation. If a characteristic cannot be evaluated due to site or anation in the comment section. Where there are obvious changes in the character into a forest), the stream may be divided into smaller reaches that display more tal score assigned to a stream reach must range between 0 and 100, with a score of			
Total Score (from reverse): 74 Comm	ents: Perennial RPW			
RPW Stream J (Sandy Creek) was determined to have perenn	ial flow within project limits.			
Evaluator's Signature By	Date 6/5/13			
gathering the data required by the United States Army stream quality. The total score resulting from the comple	y as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of etion of this form is subject to USACE approval and does not imply a company place of 10.0 876 8441 x 26			

STREAM QUALITY ASSESSMENT WORKSHEET

RPW Stream J – Sandy Creek

	п			ECOREGION POINT RANGE		
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	4
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	4
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	4
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	2
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0 – 4	0 – 4	3
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	4
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0-4	0-2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0 – 3	3
	10	Sediment input (extensive deposition—0; little or no sediment = max points)	0-5	0-4	0-4	3
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	3
<u> </u>	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	3
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0 – 5	0 – 5	3
STABILITY	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0-5	2
2	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0-5	3
Ų.	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	3
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	5
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	5
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	3
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	4
5	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	3
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0-4	3
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0 – 5	4
		Total Points Possible	100	100	100	
-	3 34	TOTAL SCORE (also enter on fin	rst page)			74

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream JJ





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 9/17/13	4. Time of Evaluation: 8:45 am
5. Name of Stream: <u>UT to Sandy Creek</u>	6. River Basin: Cape Fear
7. Approximate Drainage Area: ~100 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 50 ft.	10. County:_ Durham
11. Location of reach under evaluation (include nearby roads	and landmarks): west of Erwin Road and north of Cameron Blvd.
12. Site Coordinates (if known): 35.999698 N	
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: mild, dry	
15. Site conditions at time of visit: warm, dry	
	Section 10Tidal WatersEssential Fisheries Habitat
	_ Nutrient Sensitive Waters _ Water Supply Watershed(I-IV)
	point? YES NO If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? (YES) NO	9. Does channel appear on USDA Soil Survey? (YES) NO
20. Estimated Watershed Land Use:% Residential	20 % Commercial% Industrial% Agricultural
80 % Forested	% Cleared / Logged% Other (
21. Bankfull Width: 10 ft	
23. Channel slope down center of stream:Flat (0 to 2%)	X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
	Frequent MeanderVery SinuousBraided Channel
characteristic within the range shown for the ecoregion. Page 3 pt worksheet. Scores should reflect an overall assessment of the streat weather conditions, enter 0 in the scoring box and provide an explain of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on aracteristic must be scored using the same ecoregion. Assign points to each rovides a brief description of how to review the characteristics identified in the m reach under evaluation. If a characteristic cannot be evaluated due to site or nation in the comment section. Where there are obvious changes in the characteristic a forest), the stream may be divided into smaller reaches that display more all score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 56 Comme	ents: Perennial RPW
Perennial RPW Stream JJ was determined to have perennial fl-	ow within project limits.
gathering the data required by the United States Army	Date 7/7/3 as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of
stream quanty. The total score resulting from the complete	cion of this form is subject to USACE approval and does not imply a change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream JJ

	ш	CHARACTERISTICS ECOREGION POINT RANGE				
	#	# CHARACTERISTICS		Coastal (Piedmont) Mountain		
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0 – 5	0-4	0 – 5	2
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	2
	3	Riparian zone	0-6	0-4	0-5	3
	4	(no buffer = 0; contiguous, wide buffer = max points) Evidence of nutrient or chemical discharges	0-5	0-4	0-4	3
AL	5	(extensive discharges = 0; no discharges = max points) Groundwater discharge (no discharge = 0; no reprises seems and leaves a leave to the leaves and leaves a leaves and leaves a leaves and leaves a	0-3	0-4	0-4	1
PHYSICAL	6	(no discharge = 0; springs, seeps, wetlands, etc. = max points) Presence of adjacent floodplain (no floodplain = 0; overseine floodplain	0-4	0-4	0-2	3
PHY	7	(no floodplain = 0; extensive floodplain = max points) Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	2
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	2
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0-4	1
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	3
Y	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	2
LIT	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
STABILITY	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	3
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0-5	3
T	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	3
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0 – 6	4
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	3
X	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0 – 4	0-5	0 – 5	2
BIOLOGY	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2
BIOI	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0 – 4	2
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0 - 5	3
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on first	st page)			56

^{*} These characteristics are not assessed in coastal streams.

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seasonal RPW Stream JJJ



STREAM QUALITY ASSESSMENT WORKSHEET

1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 12/10/13	4. Time of Evaluation: 3:30 pm
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: 50 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 50 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads a	and landmarks): south of NC 54
12. Site Coordinates (if known): 35.903190 N	
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: cold, rainy	
15. Site conditions at time of visit: cold, rainy	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
	point? YES (NO) If yes, estimate the water surface area:
	9. Does channel appear on USDA Soil Survey? YES NO
	15 % Commercial% Industrial% Agricultural
	% Cleared / Logged% Other (
	22. Bank Height (from bed to top of bank): 1 foot
	Gentle (2 to 4%)
	Frequent MeanderVery SinuousBraided Channel
characteristic within the range shown for the ecoregion. Page 3 proworksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explan of a stream under review (e.g., the stream flows from a pasture into	ge 2): Begin by determining the most appropriate ecoregion based on racteristic must be scored using the same ecoregion. Assign points to each ovides a brief description of how to review the characteristics identified in the n reach under evaluation. If a characteristic cannot be evaluated due to site or ation in the comment section. Where there are obvious changes in the character to a forest), the stream may be divided into smaller reaches that display more a score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 46 Commen	nts: Seasonal RPW
RPW Stream JJJ was determined to have intermittent flow with	in project limits.
gathering the data required by the United States Army	Date 12/10/13 as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of ion of this form is subject to USACE approval and does not imply a

particular mitigation ratio or requirement. Form subject to change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream JJJ

	W Stream 5		ECOREGION POINT RANGE			
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0 – 5	2
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	2
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	3
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0 – 4	3
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0-4	0-4	1
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0 – 4	0-4	0-2	3
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	2
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	2
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0-4	3
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	2
Y	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	2
STABILITY	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	2
LAB	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	3
Š	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0-5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	1
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	3
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0-5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	2
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	0
90,	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0-4	0
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0 – 4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0 – 6	0 – 5	0-5	3
		Total Points Possible	100	100	100	12 00
3191		TOTAL SCORE (also enter on fin	rst page)		ETERT - S	46

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream K





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 6/5/13	4. Time of Evaluation: 4:00 pm
5. Name of Stream: <u>Unnamed</u>	6. River Basin: Cape Fear
7. Approximate Drainage Area: 100 acres	8. Stream Order: 2nd
9. Length of Reach Evaluated: 100 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads a	and landmarks): east of Garrett Rd, west of University Dr.
12. Site Coordinates (if known):35.954988 N	-78.975801 W
13. Proposed Channel Work (if any): rail embankment	
14. Recent Weather Conditions: hot, humid	
15. Site conditions at time of visit: warm, humid	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation p	point? YES (NO) If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO 19	9. Does channel appear on USDA Soil Survey? (YES) NO
20. Estimated Watershed Land Use: 25 % Residential	% Commercial% Industrial% Agricultural
	% Cleared / Logged% Other ()
21. Bankfull Width: 6 ft	22. Bank Height (from bed to top of bank): 2 feet
23. Channel slope down center of stream:Flat (0 to 2%)	X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _StraightOccasional Bends	X Frequent Meander Very Sinuous Braided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 proworksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explant of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on racteristic must be scored using the same ecoregion. Assign points to each ovides a brief description of how to review the characteristics identified in the m reach under evaluation. If a characteristic cannot be evaluated due to site or lation in the comment section. Where there are obvious changes in the character to a forest), the stream may be divided into smaller reaches that display more I score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 60 Comme	nts: Perennial RPW
RPW Stream K was determined to have perennial flow within	project limits.
gathering the data required by the United States Army stream quality. The total score resulting from the complet	Date

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream K

5.6	#	CHADACTEDISTICS		ECOREGION POINT RANGE				
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE		
EX.	1	Presence of flow / persistent pools in stream	0-5	0-4	0-5	3		
Y		(no flow or saturation = 0; strong flow = max points) Evidence of past human alteration						
	2	(extensive alteration = 0; no alteration = max points)	0-6	0 – 5	0-5	3		
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	3		
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	2		
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0 – 4	0-4	3		
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0 – 4	0-2	3		
PHY	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	3		
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0 – 2	0		
	9	Channel sinuscity						
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0 – 5	0 – 4	0 – 4	3		
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	3		
Y	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0 – 4	0-5	3		
STABILITY	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0 – 5	0-5	3		
LAB	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0-5	2		
Š	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0 – 5	0 – 4	0-5	3		
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	2		
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4		
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0-5	0 – 5	4		
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0 – 4	0-4	2		
7	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0 – 5	0 – 5	2		
06)	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2		
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2		
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0 – 5	0-5	2		
		Total Points Possible	100	100	100			
		TOTAL SCORE (also enter on fi	rst page)			60		

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream KK





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 9/17/13	4. Time of Evaluation: 10:00 am
5. Name of Stream: UT to Sandy Creek	6. River Basin: Cape Fear
7. Approximate Drainage Area: ~100 acres	The state of the s
9. Length of Reach Evaluated: 50 ft.	
11. Location of reach under evaluation (include nearby roads	and landmarks): west of Erwin Road and north of Cameron Blvd.
12. Site Coordinates (if known): 36.002065 N	
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: mild, dry	
15. Site conditions at time of visit: warm, dry	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
	Nutrient Sensitive Waters(I-IV)
	point? YES NO If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? (YES) NO 1	
	20 % Commercial% Industrial% Agricultural
	% Cleared / Logged% Other (
21. Bankfull Width: 12 ft	22. Bank Height (from bed to top of bank): 4 feet
23. Channel slope down center of stream: _Flat (0 to 2%)	X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _StraightX_Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 pt worksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explain of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on aracteristic must be scored using the same ecoregion. Assign points to each rovides a brief description of how to review the characteristics identified in the am reach under evaluation. If a characteristic cannot be evaluated due to site or nation in the comment section. Where there are obvious changes in the character into a forest), the stream may be divided into smaller reaches that display more all score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 60 Comme	ents: Perennial RPW
Perennial RPW Stream KK was determined to have perennial	flow within project limits.
gathering the data required by the United States Army stream quality. The total score resulting from the complete	Date 9///3 as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of tion of this form is subject to USACE approval and does not imply a change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream KK

	KI W Stream N		ECORE	CCOPE		
	#	CHARACTERISTICS	Coastal	Piedmont	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0 – 5	3
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	2
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	3
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0 – 4	3
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0-4	0 – 4	1
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	3
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	2
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0 – 6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0 – 3	2
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0 – 5	0-4	0-4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	3
X	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points) $0-5$ $0-4$		0-4	0-5	2
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0-5	0 – 5	3
STABILITY	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	3
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0 – 5	0-4	0 – 5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	4
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	3
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0 – 5	3
90	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0 – 4	2
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	3
		Total Points Possible	100	100	100	
	15	TOTAL SCORE (also enter on fi	rst page)			60

^{*} These characteristics are not assessed in coastal streams.

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STREAM QUALITY ASSESSMENT WORKSHEET



1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 12/10/13	4. Time of Evaluation: 4:00 pm
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: 50 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 50 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads a	and landmarks): south of NC 54
12. Site Coordinates (if known): 35.901335 N	-79.008253 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: cold, rainy	
15. Site conditions at time of visit: cold, rainy	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation p	point? YES (NO) If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO 19	9. Does channel appear on USDA Soil Survey? YES NO
20. Estimated Watershed Land Use: 60 % Residential	
25 % Forested	% Cleared / Logged% Other ()
21. Bankfull Width: 2ft	22. Bank Height (from bed to top of bank): 1 foot
23. Channel slope down center of stream: <u>X</u> Flat (0 to 2%)	Gentle (2 to 4%)
24. Channel Sinuosity:StraightX_Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every cha characteristic within the range shown for the ecoregion. Page 3 proworksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explan of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on racteristic must be scored using the same ecoregion. Assign points to each ovides a brief description of how to review the characteristics identified in the m reach under evaluation. If a characteristic cannot be evaluated due to site or lation in the comment section. Where there are obvious changes in the character to a forest), the stream may be divided into smaller reaches that display more all score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 41 Comme	nts: Seasonal RPW
RPW Stream KKK was determined to have intermittent flow w	vithin project limits.
	Date 12/10/13 as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of

stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream KKK

(Les	#	# CHARACTERISTICS		ECOREGION POINT RANGE			
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE	
	1	Presence of flow / persistent pools in stream	0-5	0-4	0 – 5	2	
		(no flow or saturation = 0; strong flow = max points) Evidence of past human alteration			3 9 30		
	2	(extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1	
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	2	
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0 – 4	2	
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	1	
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0 – 4	0 – 4	0-2	3	
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	2	
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0	
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-4	0-3	2		
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0-4	3	
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0 – 4	0-5	2	
Y	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	2	
LIT	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0 – 5	0-5	2	
STABILITY	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0-5	3	
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0 – 5	3	
i i	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	1	
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	2	
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0-5	0-5	4	
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	2	
7	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0 – 5	0 – 5	0	
90	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0 – 4	0	
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0	
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	2	
		Total Points Possible	100	100	100		
	30.	TOTAL SCORE (also enter on fi	rst page)			41	
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^{*} These characteristics are not assessed in coastal streams.

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RPW Stream L





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 6/5/13	4. Time of Evaluation: 4:30 pm
5. Name of Stream: Unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: 50 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 50 ft.	10. County: <u>Durham</u>
11. Location of reach under evaluation (include nearby roads	and landmarks): east of Garrett Rd, west of University Dr.
12. Site Coordinates (if known): 35.961054 N	-78.973072 W
13. Proposed Channel Work (if any): rail embankment	
14. Recent Weather Conditions: hot, humid	
15. Site conditions at time of visit: warm, humid	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES (NO) If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO 1	
20. Estimated Watershed Land Use:% Residential	85_% Commercial% Industrial% Agricultural
15% Forested	% Cleared / Logged% Other ()
21. Bankfull Width: 6 ft	22. Bank Height (from bed to top of bank): 2 feet
23. Channel slope down center of stream:Flat (0 to 2%)	X Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity:StraightOccasional Bends	X Frequent Meander Very Sinuous Braided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 pr worksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explan of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on tracteristic must be scored using the same ecoregion. Assign points to each ovides a brief description of how to review the characteristics identified in the m reach under evaluation. If a characteristic cannot be evaluated due to site or lation in the comment section. Where there are obvious changes in the character to a forest), the stream may be divided into smaller reaches that display more all score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 53 Comme	nts: Perennial RPW
RPW Stream L was determined to have perennial flow within	project limits.
gathering the data required by the United States Army	Date 6/5//3 as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of
stream quality. The total score resulting from the complet particular mitigation ratio or requirement. Form subject to	cion of this form is subject to USACE approval and does not imply a change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream L

E	#	CHADACTEDISTICS		GION POINT	RANGE	~~~
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0 – 5	0-4	0-5	2
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	2
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	3
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	3
M	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	3
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	3
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	1
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	2
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	3
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0-4	3
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0 – 5	2
STABILITY	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0 – 5	1
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0 – 5	1
LAB	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0 – 5	3
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0 – 5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	2
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0 – 5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	2
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0 – 5	2
BIOLOGY	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2
RIOL	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	2
		Total Points Possible	100	100	100	
	17.3	TOTAL SCORE (also enter on fir	st page)			53

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream LL





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 9/17/13	4. Time of Evaluation: 1:30 pm
5. Name of Stream; unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: ~100 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 50 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads	and landmarks): west of I-40 and east of Crystal Oaks Ct.
12. Site Coordinates (if known):35.929179 N	-78.987929 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: mild, dry	
15. Site conditions at time of visit: warm, dry	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive Waters(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES NO If yes, estimate the water surface area: 15 acres
18. Does channel appear on USGS quad map? (YES) NO 1	9. Does channel appear on USDA Soil Survey? (YES) NO
20. Estimated Watershed Land Use: 40 % Residential	% Commercial% Industrial% Agricultural
60% Forested	% Cleared / Logged% Other ()
21. Bankfull Width: 8 ft	22. Bank Height (from bed to top of bank): 2 feet
23. Channel slope down center of stream:Flat (0 to 2%)	_X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: X Straight Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 p worksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explain of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on aracteristic must be scored using the same ecoregion. Assign points to each rovides a brief description of how to review the characteristics identified in the am reach under evaluation. If a characteristic cannot be evaluated due to site or nation in the comment section. Where there are obvious changes in the character nto a forest), the stream may be divided into smaller reaches that display more al score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 56 Commo	ents: Perennial RPW
Perennial RPW Stream LL was determined to have perennial	flow within project limits.
gathering the data required by the United States Army stream quality. The total score resulting from the comple	Date 9/7/3 as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of this form is subject to USACE approval and does not imply a change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream LL

	ш	CHADACTEDISTICS	ECOREGION POINT RANG		RANGE	acon-
3	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORI
1	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	3
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	3
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0 – 4	0 – 4	2
Á	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0-4	0 – 4	1
LHISICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0 – 4	0-4	0-2	3
=	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0 – 4	0-2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0 – 6	0 – 4	0 – 2	0
B	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0 – 3	1
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0 – 4	3
0.00	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	3
	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0 – 5	3
TITITUDE	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0 – 5	3
	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0 – 5	3
2	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0-5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	2
	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0 – 5	4
1	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0 – 4	3
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	2
	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0-4	2
	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	1
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0 – 6	0-5	0-5	3
		Total Points Possible	100	100	100	
11		TOTAL SCORE (also enter on fi	rst page)	July 2 To 1 To 1		56

^{*} These characteristics are not assessed in coastal streams.

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seasonal RPW Stream LLL STREAM QUALITY ASSESSMENT WORKSHEET



11.01	
1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 12/10/13	4. Time of Evaluation: 4:15 pm
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: 50 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 50 ft.	10. County: Orange
11. Location of reach under evaluation (include nearby roads	and landmarks): south of NC 54
12. Site Coordinates (if known): 35.903724 N	-79.013458 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: cold, rainy	
15. Site conditions at time of visit: cold, rainy	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES NO If yes, estimate the water surface area: 3 acres
18. Does channel appear on USGS quad map? YES NO 1	9. Does channel appear on USDA Soil Survey? YES NO
20. Estimated Watershed Land Use:% Residential	85 % Commercial% Industrial% Agricultural
15_% Forested	% Cleared / Logged% Other ()
21. Bankfull Width: 2ft	22. Bank Height (from bed to top of bank): 1 foot
23. Channel slope down center of stream:Flat (0 to 2%)	<u>X</u> Gentle (2 to 4%) <u>Moderate</u> (4 to 10%) <u>Steep (>10%)</u>
24. Channel Sinuosity: X Straight Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 pt worksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explain of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on aracteristic must be scored using the same ecoregion. Assign points to each rovides a brief description of how to review the characteristics identified in the am reach under evaluation. If a characteristic cannot be evaluated due to site or nation in the comment section. Where there are obvious changes in the character nto a forest), the stream may be divided into smaller reaches that display more all score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 42 Commo	ents: Seasonal RPW
RPW Stream LLL was determined to have intermittent flow w	rithin project limits.
Evaluator's Signature And In	Date_ 12/10/13
This channel evaluation form is intended to be used only gathering the data required by the United States Army stream quality. The total score resulting from the comple	as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of tion of this form is subject to USACE approval and does not imply a change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream LLL

	ш	CHADACTEDICTICS	ECOREGION POINT R		RANGE	SCORE
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0 – 5	0-4	0 – 5	2
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0 – 6	0-5	0-5	1
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	1
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	1
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	2
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0 – 4	0-4	0-2	1
PHY	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0-4	0-2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0 – 6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	1
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0 – 5	0-4	0-4	3
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	3
K	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	3
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
STABILITY	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0-5	3
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0 – 5	0-4	0-5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	3
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	2
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0 – 5	0-5	3
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0 – 4	3
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0 – 4	0-5	0-5	0
50	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0-4	0
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0-4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	1
	X	Total Points Possible	100	100	100	
7		TOTAL SCORE (also enter on fi	rst page)	1 1 1 1 1 1 2		42

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream M





1. Applicant's Name: TTA	2. Evaluator's Name: B. Fulton
3. Date of Evaluation: 11/06/13	4. Time of Evaluation: 12:30 pm
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: <u>~20 acres</u>	8. Stream Order: 1st
9. Length of Reach Evaluated: 50 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads	and landmarks): west of I-40 and east of Fairington Rd.
12. Site Coordinates (if known): 35.922657 N	-78.986684 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: mild, dry	
15. Site conditions at time of visit: cool, dry	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive Waters(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES (NO) If yes, estimate the water surface area:
	19. Does channel appear on USDA Soil Survey? YES NO
20. Estimated Watershed Land Use:70_ % Residential	% Commercial% Industrial% Agricultural
30% Forested	% Cleared / Logged% Other ()
21. Bankfull Width: 4 ft	22. Bank Height (from bed to top of bank): 2 feet
23. Channel slope down center of stream:Flat (0 to 2%)	X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _StraightX_Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 provides a stream conditions, enter 0 in the scoring box and provide an explain of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on aracteristic must be scored using the same ecoregion. Assign points to each rovides a brief description of how to review the characteristics identified in the am reach under evaluation. If a characteristic cannot be evaluated due to site or nation in the comment section. Where there are obvious changes in the character not a forest), the stream may be divided into smaller reaches that display more all score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 42 Comme	ents: Intermittent RPW
Seasonal RPW Stream M was determined to have intermittent	flow within project limits.
gathering the data required by the United States Army stream quality. The total score resulting from the comple	Date
particular mitigation ratio or requirement. Form subject to	o change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream NN

	щ	CHARACTERISTICS		GION POINT	RANGE	GCODI
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0 – 5	1
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0 – 6	0 – 5	0-5	1
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0 – 4	0 – 5	3
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0 – 5	0-4	0 – 4	1
À.	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0-4	0 – 4	1
rnisical	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	1
	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0 – 4	0-2	1
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0 – 3	2
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0-4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0 – 5	1
	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0 – 5	0-4	0-5	2
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0-5	0 – 5	3
	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0 – 4	0 – 5	2
2	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0 – 4	0 – 5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0 – 5	0-6	2
	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	2
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0 – 5	1
	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0 – 4	1
	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0 – 4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0 – 5	4
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on fi	rst page)			42

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream MM



STREAM QUALITY ASSESSMENT WORKSHEET



1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips	
3. Date of Evaluation: 9/17/13	4. Time of Evaluation: 3:30 pm	
5. Name of Stream: unnamed	6. River Basin: Cape Fear	
7. Approximate Drainage Area: ~100 acres	8. Stream Order: 1st	
9. Length of Reach Evaluated: 50 ft.	10. County: Durham	
11. Location of reach under evaluation (include nearby roads	and landmarks): west of I-40 and east of Bakers Mill Rd.	
12. Site Coordinates (if known): 35.929179 N	-78.987929 W	
13. Proposed Channel Work (if any): rail crossing		
14. Recent Weather Conditions: mild, dry		
15. Site conditions at time of visit: warm, dry		
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat	
Trout WatersOutstanding Resource Waters	_ Nutrient Sensitive Waters _ Water Supply Watershed(I-IV)	
17. Is there a pond or lake located upstream of the evaluation	point? YES (NO) If yes, estimate the water surface area:	
18. Does channel appear on USGS quad map? (YES) NO 1	9. Does channel appear on USDA Soil Survey? (YES) NO	
20. Estimated Watershed Land Use: 60 % Residential	% Commercial% Industrial% Agricultural	
40 % Forested	% Cleared / Logged% Other (
21. Bankfull Width: 12 ft	22. Bank Height (from bed to top of bank): 3 feet	
23. Channel slope down center of stream:Flat (0 to 2%)	<u>X</u> Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)	
24. Channel Sinuosity: _StraightX_Occasional Bends	Frequent MeanderVery SinuousBraided Channel	
location, terrain, vegetation, stream classification, etc. Every ch characteristic within the range shown for the ecoregion. Page 3 p worksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an expla of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on aracteristic must be scored using the same ecoregion. Assign points to each rovides a brief description of how to review the characteristics identified in the mr reach under evaluation. If a characteristic cannot be evaluated due to site or nation in the comment section. Where there are obvious changes in the character nto a forest), the stream may be divided into smaller reaches that display more al score assigned to a stream reach must range between 0 and 100, with a score of	
Total Score (from reverse): 59 Commo	ents: Perennial RPW	
Perennial RPW Stream MM was determined to have perennia	l flow within project limits.	
gathering the data required by the United States Army	Date 9//2/13 The professional of this form is subject to USACE approval and does not imply a second of this form is subject to USACE approval and does not imply a second of this form is subject to USACE approval and does not imply a second of this form is subject to USACE approval and does not imply a second of this form is subject to USACE approval and does not imply a second of this form is subject to USACE approval and does not imply a second of this form is subject to USACE approval and does not imply a second of this form is subject to USACE approval and does not imply a second of this form is subject to USACE approval and does not imply a second of this form is subject to USACE approval and does not imply a second of this form is subject to USACE approval and does not imply a second of this form is subject to USACE approval and does not imply a second of this form is subject to USACE.	

particular mitigation ratio or requirement. Form subject to change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream MM

	#	CHADACTEDISTICS	ECORE	GION POINT	RANGE	SCORE
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream	0-5	0-4	0-5	3
		(no flow or saturation = 0; strong flow = max points) Evidence of past human alteration				
	2	(extensive alteration = 0; no alteration = max points)	0-6	0 – 5	0-5	1
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0 – 5	3
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	2
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	1
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0 – 4	0-4	0-2	3
PHY	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0-4	0-2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	2
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0 – 5	0-4	0-4	2
U.	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	3
J.	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	3
ILI	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
STABILITY	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0 – 4	0-5	3
Š	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0-5	3
_	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	3
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0 – 5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	3
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0 – 5	0 – 5	3
50'	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0-4	3
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	1
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	3
		Total Points Possible	100	100	100	
	1.5	TOTAL SCORE (also enter on fi	rst page)			59

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream MMM STREAM QUALITY ASSESSMENT WORKSHEET



11011	
1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 12/10/13	4. Time of Evaluation: 4:30 pm
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: 50 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 50 ft.	10. County: Orange
11. Location of reach under evaluation (include nearby roads a	and landmarks): south of NC 54
12. Site Coordinates (if known): 35.900496 N	-79.010116 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: cold, rainy	
15. Site conditions at time of visit: cold, rainy	·
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation p	point? YES NO If yes, estimate the water surface area: 1 acre
18. Does channel appear on USGS quad map? YES NO 19	9. Does channel appear on USDA Soil Survey? YES NO
20. Estimated Watershed Land Use:% Residential	85_% Commercial% Industrial% Agricultural
15% Forested	% Cleared / Logged% Other ()
21. Bankfull Width: 4ft	22. Bank Height (from bed to top of bank): 1-3 feet
23. Channel slope down center of stream:Flat (0 to 2%)	<u>X</u> Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity:StraightX_Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 proworksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explan of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on racteristic must be scored using the same ecoregion. Assign points to each ovides a brief description of how to review the characteristics identified in the m reach under evaluation. If a characteristic cannot be evaluated due to site or lation in the comment section. Where there are obvious changes in the character to a forest), the stream may be divided into smaller reaches that display more all score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 53 Comme	nts: Perennial RPW
RPW Stream MMM was determined to have perennial flow wi	thin project limits.
	as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of
	tion of this form is subject to USACE approval and does not imply a

particular mitigation ratio or requirement. Form subject to change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream MMM

	# CHARACTERISTICS ECOREGION POINT RANGE				SCOPE	
91	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
- 1	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	3
3.6	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	1
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0 – 5	0-4	0-4	1
A	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	2
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0 – 4	0-4	0-2	1
Ħ.	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	2
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0 – 3	3
31	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0-4	3
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0 – 5	4
STABILITY	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0 – 5	2
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0 – 5	3
2	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0 – 5	0-4	0 – 5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	3
BIIAI	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0 – 5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	3
5.1	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0 – 4	0-5	0-5	3
	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0-4	1
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0 – 5	3
	The second	Total Points Possible	100	100	100	
1		TOTAL SCORE (also enter on fi	rst page)		V 52 181	53

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream N





1. Applicant's Name: TTA	2. Evaluator's Name: B. Fulton
3. Date of Evaluation: 11/06/13	4. Time of Evaluation: 9:15 am
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: ~20 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 50 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads	and landmarks): west of I-40 and east of Fairington Rd.
12. Site Coordinates (if known): 35.927208 N	-79.987333 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: mild, dry	
15. Site conditions at time of visit: cool, dry	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive Waters(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES (NO) If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO	19. Does channel appear on USDA Soil Survey? YES NO
20. Estimated Watershed Land Use: 30 % Residential	% Commercial% Industrial% Agricultural
	% Cleared / Logged% Other ()
21. Bankfull Width: 4 ft	22. Bank Height (from bed to top of bank): 2 feet
23. Channel slope down center of stream:Flat (0 to 2%)	X Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _StraightX_Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 pworksheet. Scores should reflect an overall assessment of the stre weather conditions, enter 0 in the scoring box and provide an expla of a stream under review (e.g., the stream flows from a pasture is	age 2): Begin by determining the most appropriate ecoregion based on haracteristic must be scored using the same ecoregion. Assign points to each provides a brief description of how to review the characteristics identified in the arm reach under evaluation. If a characteristic cannot be evaluated due to site or anation in the comment section. Where there are obvious changes in the character into a forest), the stream may be divided into smaller reaches that display more tall score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 47 Comm	ents: Intermittent RPW
Seasonal RPW Stream N was determined to have intermittent	t flow within project limits.
gathering the data required by the United States Army stream quality. The total score resulting from the comple	y as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of etion of this form is subject to USACE approval and does not imply a to change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream NN

7	4	# CHAPACTERISTICS ECOREGION POINT RANGE			SCORE	
-	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream	0-5	0-4	0 – 5	2
	2	(no flow or saturation = 0; strong flow = max points) Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0 – 4	0-5	2
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0 – 4	1
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	2
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	2
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0 – 4	0-2	2
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0 – 4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0 – 3	2
ă I	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0 – 4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	2
STABILITY	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	2
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	2
TAB	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0 – 4	0 – 5	3
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0 – 5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	2
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0 – 6	0-6	0-6	4
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0 – 5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0 – 4	0 – 4	2
_	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	1
50	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0-4	2
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0 – 4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0 – 6	0 – 5	0-5	4
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on fi	rst page)			47

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream NN





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 9/18/13	4. Time of Evaluation: 8:30 pm
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: ~50 acres	
9. Length of Reach Evaluated: 50 ft.	
11. Location of reach under evaluation (include nearby roads	and landmarks): west of I-40 and south of Ephesus Church Rd.
12. Site Coordinates (if known): 35.929179 N	-78.987929 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: mild, dry	
15. Site conditions at time of visit: cool, dry	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES (NO) If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO	19. Does channel appear on USDA Soil Survey? YES NO
20. Estimated Watershed Land Use:30% Residential	% Commercial% Industrial% Agricultural
70% Forested	% Cleared / Logged% Other ()
21. Bankfull Width: 7 ft	22. Bank Height (from bed to top of bank): 2 feet
23. Channel slope down center of stream:Flat (0 to 2%)	X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _StraightX_Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every che characteristic within the range shown for the ecoregion. Page 3 p worksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explain of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on aracteristic must be scored using the same ecoregion. Assign points to each rovides a brief description of how to review the characteristics identified in the am reach under evaluation. If a characteristic cannot be evaluated due to site or nation in the comment section. Where there are obvious changes in the character nto a forest), the stream may be divided into smaller reaches that display more al score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 55 Comme	ents: Perennial RPW
Perennial RPW Stream NN was determined to have perennial	flow within project limits.
gathering the data required by the United States Army stream quality. The total score resulting from the comple	Date 9/18/13 as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of etion of this form is subject to USACE approval and does not imply a
particular mitigation ratio or requirement. Form subject to	o change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream NN

	# CHARACTERISTICS ECOREGION POINT RANGE			SCODE		
16 (#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)			0-5	0-4	0 – 5	3
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	3
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	1
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0-4	0-4	1
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	3
E	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	2
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0-4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0 – 5	3
X	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	3
STABILITY	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0-5	3
0	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0-5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	2
BIIAI	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0-5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	3
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	2
	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2
BIOLUGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0 – 4	0 – 4	1
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	3
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on fi	rst page)			55

^{*} These characteristics are not assessed in coastal streams.

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B. Phillips 30 am t Rd, south of US 15/501. VatersEssential Fisheries HabitaWater Supply Watershed(I-IV) mate the water surface area: DA Soil Survey? YES NO
VatersEssential Fisheries Habita Water Supply Watershed(I-IV) mate the water surface area: DA Soil Survey? YES NO
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Water Supply Watershed(I-IV) nate the water surface area: DA Soil Survey? YES NO
Water Supply Watershed(I-IV) nate the water surface area: DA Soil Survey? YES NO
Water Supply Watershed(I-IV) nate the water surface area: DA Soil Survey? YES NO
Water Supply Watershed(I-IV) nate the water surface area: DA Soil Survey? YES NO
nate the water surface area: DA Soil Survey? YES NO
DA Soil Survey? (YES) NO
122,110
_% Industrial% Agricultural
% Other (
to top of bank): 2 feet
Inderate (4 to 10%)Steep (>10%)
Very SinuousBraided Channel
the most appropriate ecoregion based on the same ecoregion. Assign points to each to review the characteristics identified in the aracteristic cannot be evaluated due to site or ere there are obvious changes in the character vided into smaller reaches that display more must range between 0 and 100, with a score of
e 7/16/13 ers and environmental professionals in to make a preliminary assessment of USACE approval and does not imply a parament, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream O

	#	CHARACTERISTICS	ECOREGION POINT RANGE			
	#	CHARACTERISTICS	Coastal	Piedmont	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	3
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	4
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	3
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0 – 5	0-4	0-4	3
CAL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	3
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0 – 4	0-4	0-2	3
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0-4	0-2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	1
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	3
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0-4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	2
2	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	2
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
STABILITY	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0-5	3
2	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0 – 5	0-4	0-5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	2
BITAI	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	5
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0-5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	3
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 5	0-5	3
20	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0 – 4	0-4	3
BIOLUGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0-4	2
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	4
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on first	st page)			67

^{*} These characteristics are not assessed in coastal streams.

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seasonal RPW Stream OO





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 9/18/13	4. Time of Evaluation: 3:30 pm
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: ~250 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 50 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads	and landmarks): south of US 54 and in between RPWs BB and CC.
12. Site Coordinates (if known): 35,906073 N	-78.995219 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: mild, dry	
15. Site conditions at time of visit: warm, dry	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES (NO) If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO	19. Does channel appear on USDA Soil Survey? YHS NO
20. Estimated Watershed Land Use:15% Residential	% Commercial% Industrial% Agricultural
85 % Forested	% Cleared / Logged% Other ()
21. Bankfull Width: 4 ft	22. Bank Height (from bed to top of bank): 2 feet
23. Channel slope down center of stream: X Flat (0 to 2%)	Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _StraightX_Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 pworksheet. Scores should reflect an overall assessment of the stre weather conditions, enter 0 in the scoring box and provide an explain of a stream under review (e.g., the stream flows from a pasture in	age 2): Begin by determining the most appropriate ecoregion based on aracteristic must be scored using the same ecoregion. Assign points to each provides a brief description of how to review the characteristics identified in the arm reach under evaluation. If a characteristic cannot be evaluated due to site or mation in the comment section. Where there are obvious changes in the character into a forest), the stream may be divided into smaller reaches that display more tal score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 41 Comm	ents: Seasonal RPW
Seasonal RPW Stream OO was determined to have intermitted	ent flow within project limits.
Evaluator's Signature My	Date_ 9/18/13
	y as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of
stream quality. The total score resulting from the comple	etion of this form is subject to USACE approval and does not imply a
	to change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET seasonal RPW Stream OO

1740	Щ	ECOREGION POINT RANGE		T RANGE	CCOPE	
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream	0-5	0-4	0-5	1
		(no flow or saturation = 0; strong flow = max points) Evidence of past human alteration		4		
	2	(extensive alteration = 0; no alteration = max points)	0-6	0-5	0 – 5	4
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	2
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0 – 5	0-4	0-4	4
AL.	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	1
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	2
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0-4	0-2	2
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
3	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	2
	10	Sediment input (extensive deposition—0; little or no sediment — max points)	0-5	0-4	0-4	1
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0 – 5	1
	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	2
STABILITY	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0 – 5	0-5	2
LAB	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0 – 4	0 – 5	2
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0 – 5	0 – 4	0 – 5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	1
BITAI	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	2
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0 – 5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	3
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0 – 4	0-5	0 – 5	0
50	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0-4	0
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0-4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0 – 6	0-5	0-5	2
		Total Points Possible	100	100	100	
	N. S.	TOTAL SCORE (also enter on fi	rst page)			41

^{*} These characteristics are not assessed in coastal streams.

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seasonal RPW Stream OOO STREAM QUALITY ASSESSMENT WORKSHEET

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1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 12/11/13	4. Time of Evaluation: 10:00 am
5. Name of Stream: <u>unnamed</u>	6. River Basin: Cape Fear
7. Approximate Drainage Area: 50 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 50 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads	s and landmarks): east of Durham Drive
12. Site Coordinates (if known): 35.955545 N	
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: cold, rainy	The state of the s
15. Site conditions at time of visit: cold, rainy	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES NO If yes, estimate the water surface area:
	19. Does channel appear on USDA Soil Survey? YES NO
	% Commercial% Industrial% Agricultural
	% Cleared / Logged% Other ()
21. Bankfull Width: 3 ft	
	X Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
	Frequent MeanderVery SinuousBraided Channel
characteristic within the range shown for the ecoregion. Page 3 p worksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an expla of a stream under review (e.g., the stream flows from a pasture in	Age 2): Begin by determining the most appropriate ecoregion based on naracteristic must be scored using the same ecoregion. Assign points to each provides a brief description of how to review the characteristics identified in the am reach under evaluation. If a characteristic cannot be evaluated due to site or mation in the comment section. Where there are obvious changes in the character into a forest), the stream may be divided into smaller reaches that display more tal score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 49 Commo	ents: Seasonal RPW
RPW Stream OOO was determined to have intermittent flow	within project limits.
Evaluator's Signature	Date / 2/1//3 as a guide to assist landowners and environmental professionals in
gathering the data required by the United States Army stream quality. The total score resulting from the comple	Corps of Engineers in order to make a preliminary assessment of etion of this form is subject to USACE approval and does not imply a o change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream OOO

	#	CHADACTEDISTICS		GION POINT	RANGE	9999
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	2
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	4
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	2
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	3
TAL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0-4	0-4	1
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0 – 4	0-4	0-2	3
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0-4	0-2	2
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0 – 5	0-4	0-3	2
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0-4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	3
LY.	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0 – 5	0-4	0 – 5	2
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
STABILITY	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0-5	2
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0 – 5	0-4	0 – 5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	2
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0 – 6	0-6	0-6	3
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0-5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0 – 4	2
,	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	0
500	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0 – 4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0 – 5	0 – 5	4
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on fir	st page)			49

^{*} These characteristics are not assessed in coastal streams.

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seasonal RPW Stream P



STREAM QUALITY ASSESSMENT WORKSHEET



1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 7/16/13	4. Time of Evaluation: 11:30 am
5. Name of Stream: <u>Unnamed</u>	6. River Basin: Cape Fear
7. Approximate Drainage Area: 50 acres	8. Stream Order: 2nd
9. Length of Reach Evaluated: 100 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads	and landmarks): east of Durham Drive, south of US 15/501.
12. Site Coordinates (if known): 35.952995 N	-78.982961 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: hot, humid	
15. Site conditions at time of visit: warm, humid	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES (NO) If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO	19. Does channel appear on USDA Soil Survey? (YES) NO
20. Estimated Watershed Land Use:45_% Residential	
40 % Forested	% Cleared / Logged% Other (
21. Bankfull Width: 3 ft	22. Bank Height (from bed to top of bank): 1 foot
23. Channel slope down center of stream:Flat (0 to 2%)	X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _StraightOccasional Bends	X Frequent Meander Very Sinuous Braided Channel
location, terrain, vegetation, stream classification, etc. Every che characteristic within the range shown for the ecoregion. Page 3 p worksheet. Scores should reflect an overall assessment of the strewather conditions, enter 0 in the scoring box and provide an expla of a stream under review (e.g., the stream flows from a pasture in	aracteristic must be scored using the same ecoregion. Assign points to each provides a brief description of how to review the characteristics identified in the arm reach under evaluation. If a characteristic cannot be evaluated due to site or mation in the comment section. Where there are obvious changes in the character into a forest), the stream may be divided into smaller reaches that display more real score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 47 Comme	ents: Seasonal RPW
seasonal RPW Stream P was determined to have intermittent	flow within project limits.
gathering the data required by the United States Army	Date 7/6/13 y as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of etion of this form is subject to USACE approval and does not imply a

particular mitigation ratio or requirement. Form subject to change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET seasonal RPW Stream P

	#	CHARACTERISTICS		GION POINT	RANGE	SCODE
	#		Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream	0-5	0-4	0-5	2
		(no flow or saturation = 0; strong flow = max points) Evidence of past human alteration				
	2	(extensive alteration = 0; no alteration = max points)	0-6	0 – 5	0-5	3
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	3
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	3
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0-4	0-4	1
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	3
PHY	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	2
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	1
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	3
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0-4	1
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	2
Y	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	2
LIT	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0 – 5	2
STABILITY	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0-5	2
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0-5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0 - 5	0-6	2
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0 - 6	3
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0 – 5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	2
7	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	0
06)	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	3
4		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on fin	rst page)			47
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^{*} These characteristics are not assessed in coastal streams.

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RPW Stream PP





1. Applicant's Name: TTA	2. Evaluator's Name: B. Fulton
3. Date of Evaluation: 11/06/13	4. Time of Evaluation: 10:30 am
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: ~25 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 50 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads a	nd landmarks): westof I-40 and west of Fairington Road.
12. Site Coordinates (if known): 35.922953 N	-78.986421 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: mild, dry	
15. Site conditions at time of visit: cool, dry	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive Waters _Water Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation p	point? YES NO If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO 19	
	% Commercial% Industrial% Agricultural
	% Cleared / Logged% Other (
21. Bankfull Width: 4 ft	
	X Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _StraightX_Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every char characteristic within the range shown for the ecoregion. Page 3 proworksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explans of a stream under review (e.g., the stream flows from a pasture into	te 2): Begin by determining the most appropriate ecoregion based on racteristic must be scored using the same ecoregion. Assign points to each ovides a brief description of how to review the characteristics identified in the m reach under evaluation. If a characteristic cannot be evaluated due to site or ation in the comment section. Where there are obvious changes in the character to a forest), the stream may be divided into smaller reaches that display more a score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 49 Commer	nts: Seasonal RPW
Seasonal RPW Stream PP was determined to have intermittent	flow within project limits.
gathering the data required by the United States Army stream quality. The total score resulting from the complet	as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of ion of this form is subject to USACE approval and does not imply a change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream NN

	#	CHADACTEDISTICS		GION POINT	RANGE	ggen-
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	2
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	2
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	3
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0 – 4	2
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	1
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	1
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	1
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	2
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0-4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	2
7	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	2
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
STABILITY	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	3
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0-5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	2
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	2
~	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0 - 5	0 – 5	I
063	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0 – 4	1
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0 – 4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	4
		Total Points Possible	100	100	100	
***		TOTAL SCORE (also enter on fin	rst page)			49

^{*} These characteristics are not assessed in coastal streams.

seasonal RPW Stream Q





1. Applicant's Name: TTA	2. Evaluator's Name:B. Phillips
3. Date of Evaluation: 7/16/13	4. Time of Evaluation: 1:30 pm
5. Name of Stream: <u>Unnamed</u>	6. River Basin: Cape Fear
7. Approximate Drainage Area: 50 acres	
9. Length of Reach Evaluated: 50 ft.	
11. Location of reach under evaluation (include nearby roads	and landmarks): east of Durham Drive, south of US 15/501.
12. Site Coordinates (if known): 35.952756 N	
13. Proposed Channel Work (if any): rail embankment	
14. Recent Weather Conditions: hot, humid	
15. Site conditions at time of visit: warm, humid	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES NO If yes, estimate the water surface area:
	19. Does channel appear on USDA Soil Survey? YES NO
	15 % Commercial% Industrial% Agricultural
	% Cleared / Logged% Other ()
	22. Bank Height (from bed to top of bank): 1 foot
	Gentle (2 to 4%)X_Moderate (4 to 10%)Steep (>10%)
	X Frequent MeanderVery SinuousBraided Channel
characteristic within the range shown for the ecoregion. Page 3 pt worksheet. Scores should reflect an overall assessment of the streat weather conditions, enter 0 in the scoring box and provide an explain of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on aracteristic must be scored using the same ecoregion. Assign points to each rovides a brief description of how to review the characteristics identified in the un reach under evaluation. If a characteristic cannot be evaluated due to site or nation in the comment section. Where there are obvious changes in the character into a forest), the stream may be divided into smaller reaches that display more all score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 45 Comme	ents: Seasonal RPW
seasonal RPW Stream Q was determined to have intermittent	flow within project limits.
gathering the data required by the United States Army stream quality. The total score resulting from the complete	Date 7/16/13 as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of tion of this form is subject to USACE approval and does not imply a
particular mitigation ratio or requirement. Form subject to	change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET seasonal RPW Stream Q

	#	CHADA CTEDISTICS		GION POINT	PANCE	100000
4	1"	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream	0-5			
	-	(no flow or saturation = 0; strong flow = max points)	0-3	0-4	0-5	2
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1
	1	Riparian zone			0-3	
	3	(no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0 - 5	3
	4	Evidence of nutrient or chemical discharges				
		(extensive discharges = 0; no discharges = max points)	0-5	0 – 4	0 - 4	1
	5	Groundwater discharge	0-3	0.4		
C	-	(no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	1
PHYSICAL	6	Presence of adjacent floodplain	0-4	0-4	0-2	2
		(no floodplain = 0; extensive floodplain = max points) Entrenchment / floodplain access		0-4	0 – 2	3
	7	(deeply entrenched = 0; frequent flooding = max points)	0 - 5	0-4	0-2	2
	8	Presence of adjacent wetlands				
	0	(no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0 – 2	3
1	9	Channel sinuosity			-	
1000	-	(extensive channelization = 0; natural meander = max points)	0 – 5	0-4	0 - 3	3
	10	Sediment input	0-5	0-4	0.4	
		(extensive deposition= 0; little or no sediment = max points)	0-3	0 – 4	0 – 4	1
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	2
	12	Evidence of channel incision or widening	-			
1	12	(deeply incised = 0; stable bed & banks = max points)	0 - 5	0-4	0 - 5	2
STABILITY	13	Presence of major bank failures				
E		(severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0-5	0 - 5	2
A	14	Root depth and density on banks	0-3	0-4	0 5	
ST		(no visible roots = 0; dense roots throughout = max points)	0-5	0 = 4	0-5	2
	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0-5	3
	1.6	Presence of riffle-pool/ripple-pool complexes			0 0	
	16	(no riffles/ripples or pools = 0; well-developed = max points)	0 - 3	0 – 5	0-6	2
BITAT	17	Habitat complexity				
	- 1	(little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	3
	18	Canopy coverage over streambed	0-5	0 5		
H		(no shading vegetation = 0; continuous canopy = max points)	0 – 3	0 – 5	0 – 5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	2
	20	Presence of stream invertebrates			0 - 4	4
	20	(no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	0
5	21	Presence of amphibians				
31	21	(no evidence = 0; common, numerous types = max points)	0 - 4	0 – 4	0 - 4	0
BIOLOGY	22	Presence of fish	0 1	0 1		
B		(no evidence = 0; common, numerous types = max points)	0-4	0 – 4	0 - 4	0
	23	Evidence of wildlife use	0-6	0 - 5	0-5	3
		(no evidence = 0; abundant evidence = max points)			0-3	3
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on first	t nage)			
* T1	ese ch		t page)			45
11	CSC CII	aracteristics are not assessed in coastal streams.				

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RPW Stream QQ





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 11/5/13	4. Time of Evaluation: 10:00 am
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: ~150 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 50 ft.	10. County: Orange
11. Location of reach under evaluation (include nearby roads	and landmarks): south of US 54 and east of Finley Golf Course.
12. Site Coordinates (if known): 35.902398 N	-79.014898 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: mild, dry	
15. Site conditions at time of visit: cool, dry	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? (YES) NO If yes, estimate the water surface area: 1 acre
18. Does channel appear on USGS quad map? YES NO	19. Does channel appear on USDA Soil Survey? YES NO
20. Estimated Watershed Land Use:% Residential	
50% Forested	% Cleared / Logged% Other ()
21. Bankfull Width: 5 ft	22. Bank Height (from bed to top of bank): 2 feet
23. Channel slope down center of stream: X Flat (0 to 2%)	Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _Straight _X_Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every che characteristic within the range shown for the ecoregion. Page 3 p worksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an expla of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on aracteristic must be scored using the same ecoregion. Assign points to each rovides a brief description of how to review the characteristics identified in the am reach under evaluation. If a characteristic cannot be evaluated due to site or nation in the comment section. Where there are obvious changes in the character into a forest), the stream may be divided into smaller reaches that display more real score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 46 Comm	ents: Perennial RPW
RPW Stream QQ was determined to have perennial flow with	in project limits.
gathering the data required by the United States Army stream quality. The total score resulting from the comple	Date

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream QQ

13	щ	CHARACTERISTICS		GION POINT	T RANGE	GCODE
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
14	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	2
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0 – 5	1
TO S	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	2
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	2
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	2
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	2
HA	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	2
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0 – 3	1
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0 – 4	0 – 4	3
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0 – 4	0-5	2
	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0 – 5	2
STABILITY	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0-5	0-5	3
TAB	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0-5	3
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0 – 4	0 – 5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0 – 5	0-6	2
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0 – 6	0-6	0-6	2
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0-5	0 – 5	2
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	3
_	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	2
500	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	1
(7)	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0 – 6	0-5	0 – 5	2
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on fi	rst page)			46

^{*} These characteristics are not assessed in coastal streams.

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seasonal RPW Stream QQQ STREAM QUALITY ASSESSMENT WORKSHEET

<u>uoui</u>	
1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 12/11/13	
5. Name of Stream: unnamed	
7. Approximate Drainage Area: 50 acres	
9. Length of Reach Evaluated: 50 ft.	
11. Location of reach under evaluation (include nearby road	
12. Site Coordinates (if known): 35.953951 N	
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: cold, rainy	
15. Site conditions at time of visit: cold, rainy	
	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation	n point? YES NO If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO	19. Does channel appear on USDA Soil Survey? YES NO
20. Estimated Watershed Land Use:50 % Residential	% Commercial% Industrial% Agricultural
	% Cleared / Logged% Other (
21. Bankfull Width: 3 ft	22. Bank Height (from bed to top of bank): 1 foot
23. Channel slope down center of stream:Flat (0 to 2%)	X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity:StraightX_Occasional Bends	Frequent MeanderVery SinuousBraided Channel
Instructions for completion of worksheet (located on pallocation, terrain, vegetation, stream classification, etc. Every electrocated within the range shown for the ecoregion. Page 3 payorksheet. Scores should reflect an overall assessment of the stream example of a stream under review (e.g., the stream flows from a pasture of a stream under review (e.g., the stream flows from a pasture in the stream of t	age 2): Begin by determining the most appropriate ecoregion based on haracteristic must be scored using the same ecoregion. Assign points to each provides a brief description of how to review the characteristics identified in the sam reach under evaluation. If a characteristic cannot be evaluated due to site or anation in the comment section. Where there are obvious changes in the characteristic a forest), the stream may be divided into smaller reaches that display more tal score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 47 Comm	ents: Seasonal RPW
RPW Stream OOO was determined to have intermittent flow	within project limits.
Evaluator's Signature Sign	Date_/2/11//3

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

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream OOO

	#	CHARACTERISTICS		GION POINT	RANGE	
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0 – 5	2
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0 – 5	4
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	2
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	1
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0-4	0-4	1
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0 – 4	0-4	0-2	3
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	2
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0 – 5	0-4	0 – 3	2
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0-4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0 – 4	0 – 5	3
J.	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0 – 5	2
STABILITY	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0 – 5	3
LAB	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	2
0	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0-5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0 – 6	2
SIIAI	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	3
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0-5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	2
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	0
BIOLOGY	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0-4	0
MIN	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0 – 4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	4
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on first	st page)	315		47

^{*} These characteristics are not assessed in coastal streams.

seasonal RPW Stream R





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 7/17/13	4. Time of Evaluation: 3:30 pm
5. Name of Stream: <u>Unnamed</u>	6. River Basin: Cape Fear
7. Approximate Drainage Area: 50 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 50 ft.	10. County:Durham
11. Location of reach under evaluation (include nearby roads	and landmarks): north of Old Chapel Hill Rd, east of N. White Oak Dr.
12. Site Coordinates (if known): 35,946925 N	
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: hot, humid	
15. Site conditions at time of visit: warm, humid	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES (NO) If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO 1	
	% Commercial% Industrial% Agricultural
	% Cleared / Logged% Other (
	22. Bank Height (from bed to top of bank): 2 feet
	<u>X</u> Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
	Frequent MeanderVery SinuousBraided Channel
characteristic within the range shown for the ecoregion. Page 3 pr worksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explan of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on racteristic must be scored using the same ecoregion. Assign points to each ovides a brief description of how to review the characteristics identified in the m reach under evaluation. If a characteristic cannot be evaluated due to site or lation in the comment section. Where there are obvious changes in the character to a forest), the stream may be divided into smaller reaches that display more I score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 39 Commen	nts: Seasonal RPW
seasonal RPW Stream R was determined to have intermittent fl	ow within project limits.
Evaluator's Signature	Date 7/17/13
gathering the data required by the United States Army (stream quality. The total score resulting from the complet	as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of ion of this form is subject to USACE approval and does not imply a change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET seasonal RPW Stream R

	#	CHARACTERISTICS E		ECOREGION POINT RANGE		
	#	CHARACTERISTICS			Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0 – 5	2
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	2
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0 – 5	0-4	0-4	1
PHYSICAL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0-4	0-4	1
VSI	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0 – 2	2
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	2
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	2
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0 – 3	1
015	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0 – 5	0 – 4	0-4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	2
Y	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	2
STABILITY	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0 – 5	2
TAB	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0 – 5	3
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0 – 5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0 – 6	2
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0 – 6	2
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	2
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	2
7	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0 – 5	0-5	0
50,	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0-4	0
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0 – 4	0-4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0 – 5	3
	A A	Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on fir	st page)			39

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream RR





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 11/5/13	4. Time of Evaluation: 8:30 am
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: ~150 acres	8. Stream Order: 2nd
9. Length of Reach Evaluated: 50 ft.	10. County: Orange
11. Location of reach under evaluation (include nearby roads	and landmarks): south of US 54 and north of Finley Golf Course.
12. Site Coordinates (if known): 35.904249 N	-79.017962 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: mild, dry	
15. Site conditions at time of visit: cool, dry	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES (NO) If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO	19. Does channel appear on USDA Soil Survey? YES NO
20. Estimated Watershed Land Use:% Residential	40 % Commercial % Industrial % Agricultural
60 % Forested	% Cleared / Logged% Other ()
21. Bankfull Width: 5 ft	22. Bank Height (from bed to top of bank): 1 foot
23. Channel slope down center of stream: <u>X</u> Flat (0 to 2%)	Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _Straight _X_Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every che characteristic within the range shown for the ecoregion. Page 3 pworksheet. Scores should reflect an overall assessment of the stre weather conditions, enter 0 in the scoring box and provide an explain of a stream under review (e.g., the stream flows from a pasture in	age 2): Begin by determining the most appropriate ecoregion based on an aracteristic must be scored using the same ecoregion. Assign points to each provides a brief description of how to review the characteristics identified in the arm reach under evaluation. If a characteristic cannot be evaluated due to site or mation in the comment section. Where there are obvious changes in the character nto a forest), the stream may be divided into smaller reaches that display more tal score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 54 Comm	ents: Perennial RPW
RPW Stream RR was determined to have perennial flow with	in project limits.
gathering the data required by the United States Army stream quality. The total score resulting from the comple	Date // 5 // 3 y as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of etion of this form is subject to USACE approval and does not imply a
particular mitigation ratio or requirement. Form subject t	to change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream RR

3.5	ш	# CHARACTERISTICS		ECOREGION POINT RANGE		
			Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0 - 5	2
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0 - 5	3
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	3
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0 – 5	0-4	0-4	2
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0 – 4	0 – 4	1
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0 – 4	0-4	0 – 2	3
HA	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0 – 5	0-4	0 – 3	2
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0 – 4	0 – 4	3
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	2
Į.	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0 – 5	0-4	0 – 5	2
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
STABILITY	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0-5	3
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0 – 5	0 – 4	0 – 5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	3
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	2
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0 – 5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	3
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0 – 5	0 – 5	2
500	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0 – 4	2
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0 – 4	1
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0 – 5	0-5	2
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on fi	rst page)		2.1	54

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream S





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 7/18/13	4. Time of Evaluation: 3:30 pm
5. Name of Stream: Unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: 250 acres	8. Stream Order: 2nd
9. Length of Reach Evaluated: 100 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads ar	nd landmarks): south of US 15/501, west of Garrett Rd.
12. Site Coordinates (if known): 35.959693 N	-78.979567 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: hot, humid	
15. Site conditions at time of visit: warm, humid	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation po	pint? YES (NO) If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO 19	. Does channel appear on USDA Soil Survey? YES NO
20. Estimated Watershed Land Use:45_% Residential	35_% Commercial% Industrial% Agricultural
20 % Forested	% Cleared / Logged% Other ()
21. Bankfull Width: 15 ft	22. Bank Height (from bed to top of bank): 5 feet
23. Channel slope down center of stream:Flat (0 to 2%)	X Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _Straight _X_Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 pro worksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explana of a stream under review (e.g., the stream flows from a pasture into	e 2): Begin by determining the most appropriate ecoregion based on acteristic must be scored using the same ecoregion. Assign points to each vides a brief description of how to review the characteristics identified in the a reach under evaluation. If a characteristic cannot be evaluated due to site or tion in the comment section. Where there are obvious changes in the character of a forest), the stream may be divided into smaller reaches that display more score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 55 Commen	ts: Perennial RPW
RPW Stream S was determined to have perennial flow within pr	roject limits.
gathering the data required by the United States Army C stream quality. The total score resulting from the completi	Date 7/1/3 as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of on of this form is subject to USACE approval and does not imply a change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream S

# 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 16	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points) Evidence of past human alteration (extensive alteration = 0; no alteration = max points) Riparian zone (no buffer = 0; contiguous, wide buffer = max points) Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points) Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points) Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points) Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points) Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points) Channel sinuosity (extensive channelization = 0; natural meander = max points) Sediment input (extensive deposition= 0; little or no sediment = max points) Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	Coastal 0-5 0-6 0-6 0-5 0-3 0-4 0-5 0-6 0-5 0-5	0-4 0-4 0-4 0-4 0-4 0-4 0-4 0-4 0-4	Mountain 0-5 0-5 0-5 0-4 0-4 0-2 0-2	4 1 2 1 2 2 2 2 2 2
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	(no flow or saturation = 0; strong flow = max points) Evidence of past human alteration (extensive alteration = 0; no alteration = max points) Riparian zone (no buffer = 0; contiguous, wide buffer = max points) Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points) Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points) Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points) Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points) Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points) Channel sinuosity (extensive channelization = 0; natural meander = max points) Sediment input (extensive deposition= 0; little or no sediment = max points) Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	0-6 0-6 0-5 0-3 0-4 0-5 0-6 0-5	0-5 0-4 0-4 0-4 0-4 0-4	0-5 $0-5$ $0-4$ $0-4$ $0-2$ $0-2$	1 2 1 2 2 2 2
3 4 5 6 7 8 9 10 11 12 13 14 15 16	(extensive alteration = 0; no alteration = max points) Riparian zone (no buffer = 0; contiguous, wide buffer = max points) Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points) Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points) Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points) Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points) Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points) Channel sinuosity (extensive channelization = 0; natural meander = max points) Sediment input (extensive deposition= 0; little or no sediment = max points) Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	0-6 0-5 0-3 0-4 0-5 0-6 0-5	0-4 0-4 0-4 0-4 0-4	0-5 $0-4$ $0-4$ $0-2$ $0-2$	2 1 2 2 2
4 5 6 7 8 9 10 11 12 13 14 15 16	(no buffer = 0; contiguous, wide buffer = max points) Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points) Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points) Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points) Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points) Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points) Channel sinuosity (extensive channelization = 0; natural meander = max points) Sediment input (extensive deposition= 0; little or no sediment = max points) Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	0-5 $0-3$ $0-4$ $0-5$ $0-6$ $0-5$	0-4 0-4 0-4 0-4	0-4 $0-4$ $0-2$ $0-2$	2 2 2
5 6 7 8 9 10 11 12 13 14 15 16	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points) Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points) Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points) Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points) Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points) Channel sinuosity (extensive channelization = 0; natural meander = max points) Sediment input (extensive deposition= 0; little or no sediment = max points) Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	0-3 $0-4$ $0-5$ $0-6$ $0-5$	0-4 0-4 0-4 0-4	0-4 $0-2$ $0-2$	2 2 2
8 9 10 11 12 13 14 15 16	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points) Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points) Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points) Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points) Channel sinuosity (extensive channelization = 0; natural meander = max points) Sediment input (extensive deposition= 0; little or no sediment = max points) Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	0-4 $0-5$ $0-6$ $0-5$	0 - 4 0 - 4 0 - 4	0-2	2 2
8 9 10 11 12 13 14 15 16	(no floodplain = 0; extensive floodplain = max points) Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points) Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points) Channel sinuosity (extensive channelization = 0; natural meander = max points) Sediment input (extensive deposition= 0; little or no sediment = max points) Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	0-5 $0-6$ $0-5$	0-4	0-2	2
8 9 10 11 12 13 14 15 16	(deeply entrenched = 0; frequent flooding = max points) Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points) Channel sinuosity (extensive channelization = 0; natural meander = max points) Sediment input (extensive deposition= 0; little or no sediment = max points) Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	0-6	0 – 4		
9 10 11 12 13 14 15 16	(no wetlands = 0; large adjacent wetlands = max points) Channel sinuosity (extensive channelization = 0; natural meander = max points) Sediment input (extensive deposition= 0; little or no sediment = max points) Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	0-5		0-2	2
10 11 12 13 14 15 16	(extensive channelization = 0; natural meander = max points) Sediment input (extensive deposition= 0; little or no sediment = max points) Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)		0-4		
11 12 13 14 15 16	(extensive deposition= 0; little or no sediment = max points) Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	0-5		0-3	2
12 13 14 15 16	(fine, homogenous = 0; large, diverse sizes = max points)		0 – 4	0-4	2
13 14 15 16		NA*	0-4	0 – 5	3
15	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0 – 5	0-4	0-5	2
15	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0-5	0 – 5	3
15	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0 – 5	3
	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0 – 5	0-4	0-5	3
	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	2
17 17 18	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	3
18 18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0-5	0-5	3
19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	3
20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0 – 5	3
21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0-4	1
21 22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	3
23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0 – 5	0 – 5	3
10/4	Total Points Possible	100	100	100	
		rst page)			55

^{*} These characteristics are not assessed in coastal streams.

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seasonal RPW Stream SS





1 Applicant's Names TTA	2 Facilitates? Manage D. D. William
1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 11/5/13	4. Time of Evaluation: 8:00 am
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: ~150 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 50 ft.	10. County: Orange
11. Location of reach under evaluation (include nearby roads	and landmarks): south of US 54 and north of Finley Golf Course.
12. Site Coordinates (if known): 35.903861 N	-79.018298 W
13. Proposed Channel Work (if any): rail embankment	
14. Recent Weather Conditions: mild, dry	
15. Site conditions at time of visit: cool, dry	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive Waters(I-IV)
	point? YES (NO) If yes, estimate the water surface area:
	19. Does channel appear on USDA Soil Survey? YES NO
20. Estimated Watershed Land Use:% Residential	40 % Commercial % Industrial % Agricultural
	% Cleared / Logged% Other ()
21. Bankfull Width: 2 ft	22. Bank Height (from bed to top of bank): 1 foot
23. Channel slope down center of stream: X Flat (0 to 2%)	Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: X Straight Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every che characteristic within the range shown for the ecoregion. Page 3 p worksheet. Scores should reflect an overall assessment of the stre weather conditions, enter 0 in the scoring box and provide an expla of a stream under review (e.g., the stream flows from a pasture i	age 2): Begin by determining the most appropriate ecoregion based on aracteristic must be scored using the same ecoregion. Assign points to each provides a brief description of how to review the characteristics identified in the am reach under evaluation. If a characteristic cannot be evaluated due to site or mation in the comment section. Where there are obvious changes in the character into a forest), the stream may be divided into smaller reaches that display more tal score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 40 Comm	ents: Seasonal RPW
Seasonal RPW Stream SS was determined to have intermitten	at flow within project limits.
Evaluator's Signature A	Date_ ///5/13
This channel evaluation form is intended to be used only gathering the data required by the United States Army stream quality. The total score resulting from the comple	y as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of etion of this form is subject to USACE approval and does not imply a so change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET seasonal RPW Stream SS

	μ	CHADA CERDICENCO	ECORE	SCOPE		
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0 – 5	0-4	0 – 5	2
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0 – 6	0-5	0-5	1
	3	Ringrian zona		0-4	0-5	1
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	1
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	1
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	2
HA	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	2
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	1
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0 – 3	1
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0-4	3
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	2
STABILITY	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0 – 5	0-4	0-5	2
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
LAB	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0-5	3
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0 – 5	0-4	0-5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0 – 5	0-6	2
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	2
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0-5	0 – 5	2
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	2
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0 – 5	1
50,	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0-4	1
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0 – 5	2
	312	Total Points Possible	100	100	100	
1000	W 10 3	TOTAL SCORE (also enter on fi				40

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream T - New Hope Creek





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 7/18/13	4. Time of Evaluation: 10:30 am
5. Name of Stream: New Hope Creek	6. River Basin: Cape Fear
7. Approximate Drainage Area: 250 acres	8. Stream Order: 3rd
9. Length of Reach Evaluated: 100 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads at	nd landmarks): south of US 15/501, west of Garrett Rd.
12. Site Coordinates (if known): 35.958850 N	-7 <u>8.981211</u> W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: hot, humid	
15. Site conditions at time of visit: warm, humid	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource WatersX	Nutrient Sensitive WatersWater Supply Watershed _X(I-IV)
17. Is there a pond or lake located upstream of the evaluation po	oint? YES (NO) If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? (YES) NO 19	
20. Estimated Watershed Land Use: 25 % Residential	
	% Cleared / Logged% Other (
21. Bankfull Width: 30 ft	22. Bank Height (from bed to top of bank): 6 feet
23. Channel slope down center of stream:Flat (0 to 2%)	X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _Straight _X_Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 proworksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explana of a stream under review (e.g., the stream flows from a pasture into	e 2): Begin by determining the most appropriate ecoregion based on acteristic must be scored using the same ecoregion. Assign points to each vides a brief description of how to review the characteristics identified in the reach under evaluation. If a characteristic cannot be evaluated due to site or tion in the comment section. Where there are obvious changes in the character of a forest), the stream may be divided into smaller reaches that display more score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 72 Commen	ts: Perennial RPW
RPW Stream T (New Hope Creek) was determined to have pere	ennial flow within project limits.
gathering the data required by the United States Army C stream quality. The total score resulting from the completic	Date

STREAM QUALITY ASSESSMENT WORKSHEET

RPW Stream T - New Hope Creek

4 CHADACTEDICTICS		ECOREGION POINT RANGE			CCOPE	
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0 – 5	4
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	3
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0 – 5	3
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0 – 5	0 – 4	0 – 4	2
	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0-4	0 – 4	2
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0 – 4	0 – 2	4
E	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0 – 2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0 – 2	3
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0 – 3	3
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0 – 5	0 – 4	0-4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0 – 5	3
7	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0 – 5	0 – 4	0 – 5	2
SIABILLIY	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
IAB	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0-5	3
2	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0 – 4	0 – 5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	3
BIIAI	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	5
DAD	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0 – 5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0 – 4	0 – 4	3
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0 – 4	0-5	0-5	4
3	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 4	0-4	3
DIOLOGI	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0 – 4	0 – 4	3
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0 – 6	0 – 5	0 – 5	4
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on fi	rst page)			72

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream TT



STREAM QUALITY ASSESSMENT WORKSHEET



1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 11/5/13	4. Time of Evaluation: 9:00 am
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: ~250 acres	8. Stream Order: 2nd
9. Length of Reach Evaluated: 50 ft.	10. County: Orange
11. Location of reach under evaluation (include nearby roads	and landmarks): south of US 54 and west of Finley Golf Course.
12. Site Coordinates (if known): 35.906395 N	-79.024656 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: mild, dry	
15. Site conditions at time of visit: cool, dry	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive Waters _Water Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES (NO) If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO 1	9. Does channel appear on USDA Soil Survey? YES NO
20. Estimated Watershed Land Use:% Residential	
50% Forested	% Cleared / Logged% Other (
21. Bankfull Width: 18 ft	22. Bank Height (from bed to top of bank): 8 feet
23. Channel slope down center of stream:Flat (0 to 2%)	_X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _StraightOccasional Bends	X Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 pt worksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explain of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on aracteristic must be scored using the same ecoregion. Assign points to each rovides a brief description of how to review the characteristics identified in the um reach under evaluation. If a characteristic cannot be evaluated due to site or nation in the comment section. Where there are obvious changes in the character ito a forest), the stream may be divided into smaller reaches that display more all score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 56 Commo	ents: Perennial RPW
RPW Stream TT was determined to have perennial flow within	n project limits.
gathering the data required by the United States Army	Date // 5 // 3 as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of tion of this form is subject to USACE approval and does not imply a

particular mitigation ratio or requirement. Form subject to change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream TT

Ш	ш	CHARACTERISTICS		GION POINT	RANGE	CCODE
¥i	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	3
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0 – 5	3
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0 – 4	0 – 5	3
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0 – 4	0-4	2
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	1
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0 – 4	0 – 4	0-2	2
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0 – 4	0-2	1
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0 – 5	0-4	0-3	3
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0-4	3
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	3
X	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	1
5	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	1
STABILITY	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	3
S.	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0-5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	4
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	3
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0-5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0 – 4	3
7	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0 – 5	3
500	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0 – 4	0-4	2
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	3
		Total Points Possible	100	100	100	
ġ.		TOTAL SCORE (also enter on fi	rst page)			56

^{*} These characteristics are not assessed in coastal streams.

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seasonal RPW Stream UU





2. Evaluator's Name: B. Phillips		
4. Time of Evaluation: 10:00 am		
6. River Basin: Cape Fear		
8. Stream Order: 1st		
10. County: Orange		
and landmarks): north of US 54 and north of Barbee Chapel Rd.		
-79.029577 W		
Section 10Tidal WatersEssential Fisheries Habitat		
Nutrient Sensitive Waters(I-IV)		
point? YES (NO) If yes, estimate the water surface area:		
9. Does channel appear on USDA Soil Survey? YES NO		
50_% Commercial% Industrial% Agricultural		
% Cleared / Logged% Other ()		
22. Bank Height (from bed to top of bank): 4 feet		
Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)		
Frequent MeanderVery SinuousBraided Channel		
ge 2): Begin by determining the most appropriate ecoregion based on tracteristic must be scored using the same ecoregion. Assign points to each ovides a brief description of how to review the characteristics identified in the m reach under evaluation. If a characteristic cannot be evaluated due to site or nation in the comment section. Where there are obvious changes in the character to a forest), the stream may be divided into smaller reaches that display more all score assigned to a stream reach must range between 0 and 100, with a score of		
nts: Seasonal RPW		
t flow within project limits.		
Date		

STREAM QUALITY ASSESSMENT WORKSHEET seasonal RPW Stream UU

1 50	ш	CHADACTEDISTICS		GION POINT	T RANGE	SCORE
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	2
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0 – 4	0-5	1
370	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0 – 5	0-4	0 – 4	1
CAL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0 – 4	1
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	2
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0-4	0-2	1
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0 - 4	0 – 2	2
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0 – 4	0-3	1
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0-4	3
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	2
7	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0 – 5	0-4	0 – 5	1
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0 – 5	1
STABILITY	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0 – 5	3
Ś	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0 – 5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	0
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	1
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	2
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	3
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0 – 4	0-5	0 – 5	1
50	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	1
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
H	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	1
		Total Points Possible	100	100	100	
	227	TOTAL SCORE (also enter on fi	rst page)		No. 1 Acc	34

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream UUU





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 1/21/14	4. Time of Evaluation: 2:00 pm
5. Name of Stream: <u>Unnamed</u>	6. River Basin: Cape Fear
7. Approximate Drainage Area: 250 acres	8. Stream Order: 2nd
9. Length of Reach Evaluated: 100 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads a	and landmarks): west of Garrett Rd,
12. Site Coordinates (if known): 35.954952 N	-78.973348 W
13. Proposed Channel Work (if any): rail embankment	
14. Recent Weather Conditions: cold, rainy	
15. Site conditions at time of visit: cold, clear	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation p	point? YES NO If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO 19	9. Does channel appear on USDA Soil Survey? (YES) NO
20. Estimated Watershed Land Use:40% Residential	20 % Commercial % Industrial % Agricultural
40 % Forested	% Cleared / Logged% Other ()
21. Bankfull Width: 20 ft	22. Bank Height (from bed to top of bank): 3 feet
23. Channel slope down center of stream:Flat (0 to 2%)	X Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _StraightOccasional Bends	X_Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 proworksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explant of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on tracteristic must be scored using the same ecoregion. Assign points to each ovides a brief description of how to review the characteristics identified in the m reach under evaluation. If a characteristic cannot be evaluated due to site or lation in the comment section. Where there are obvious changes in the character to a forest), the stream may be divided into smaller reaches that display more all score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 74 Comme	nts: Perennial RPW
RPW Stream UUU was determined to have perennial flow wit	hin project limits.
	as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of
stream quality. The total score resulting from the complet	tion of this form is subject to USACE approval and does not imply a change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream UUU

	44	CHADACTEDICTICS	ECOREGION POINT RANGE			CCORE
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	4
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	3
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0 – 5	4
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	2
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	3
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0 – 4	0-4	0-2	4
	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0-4	0-2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0 – 6	0-4	0-2	3
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0 – 5	0 – 4	0-3	3
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0 – 5	0-4	0 – 4	3
1	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	3
X	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0 – 5	0-4	0 – 5	3
STABILLIY	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0-5	0 – 5	2
IAB	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0 – 4	0-5	2
2	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0 – 5	0-4	0 – 5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	3
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	5
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0-5	0-5	4
15	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	3
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0 – 5	0 – 5	4
50	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	3
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	3
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	4
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on fi	rst page)			74

^{*} These characteristics are not assessed in coastal streams.

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seasonal RPW Stream V





1. Applicant's Name: <u>TTA</u>	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 7/31/13	4. Time of Evaluation: 9:30 am
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: 50 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 100 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads	s and landmarks): south of Wendell Road.
12. Site Coordinates (if known): 35.916023 N	-78.989454 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: hot, humid	
15. Site conditions at time of visit: warm, humid	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive Waters Water Supply Watershed (I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES NO If yes, estimate the water surface area: 2 acres
	19. Does channel appear on USDA Soil Survey? (YES) NO
20. Estimated Watershed Land Use: 25 % Residential	% Commercial% Industrial% Agricultural
<u>85</u> % Forested	% Cleared / Logged% Other ()
21. Bankfull Width: 3 ft	22. Bank Height (from bed to top of bank): 6 inches
23. Channel slope down center of stream:Flat (0 to 2%)	_X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _StraightOccasional Bends	X Frequent Meander Very Sinuous X Braided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 p worksheet. Scores should reflect an overall assessment of the stre weather conditions, enter 0 in the scoring box and provide an expla of a stream under review (e.g., the stream flows from a pasture is	age 2): Begin by determining the most appropriate ecoregion based on naracteristic must be scored using the same ecoregion. Assign points to each provides a brief description of how to review the characteristics identified in the sam reach under evaluation. If a characteristic cannot be evaluated due to site or anation in the comment section. Where there are obvious changes in the character into a forest), the stream may be divided into smaller reaches that display more tall score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 51 Comm	ents: Perennial RPW
RPW Stream V was determined to have intermittent flow with	hin project limits.
Evaluator's Signature 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Date 7/3///3 y as a guide to assist landowners and environmental professionals in
stream quality. The total score resulting from the comple	or Corps of Engineers in order to make a preliminary assessment of etion of this form is subject to USACE approval and does not imply a to change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET seasonal RPW Stream V

	#	CHARACTERISTICS	ECORE	GION POINT	T RANGE	CCODE
	17		Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	2
		Evidence of past human alteration		Part		
	2	(extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	2
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	3
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0 – 5	0-4	0-4	2
(AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0 – 4	0-4	1
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0 – 4	0-2	3
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0 – 4	0-2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0 – 3	3
	10	Sediment input (extensive deposition 0; little or no sediment = max points)	0-5	0-4	0 – 4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0 – 5	1
7	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0 – 4	0 – 5	3
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0 – 5	0-5	2
STABILITY	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0 – 5	2
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0 – 5	0-4	0-5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	2
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0 – 6	0 – 6	3
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0 – 5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	2
X	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	1
500	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	3
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0 – 4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0 – 5	0 – 5	4
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on fir	rst page)			51

^{*} These characteristics are not assessed in coastal streams.

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seasonal RPW Stream W





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 7/31/13	4. Time of Evaluation: 2:30 pm
5. Name of Stream: unnamed	
7. Approximate Drainage Area: 150 acres	
9. Length of Reach Evaluated: 100 ft.	10. County: Durham
	s and landmarks): west of George King Road.
12. Site Coordinates (if known): 35.914764 N	
	-10.770001 W
14. Recent Weather Conditions: hot, humid	
15. Site conditions at time of visit: warm, humid	
	Section 10Tidal WatersEssential Fisheries Habitat
	Nutrient Sensitive WatersWater Supply Watershed(I-IV) a point? YES NO If yes, estimate the water surface area:
	\ /
	19. Does channel appear on USDA Soil Survey? (YES) NO
	% Commercial% Industrial% Agricultural
<u>85</u> % Forested	% Cleared / Logged% Other (
21. Bankfull Width: 6 ft	22. Bank Height (from bed to top of bank): 1 foot
23. Channel slope down center of stream: <u>X</u> Flat (0 to 2%)	Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _Straight _X_Occasional Bends	sFrequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every claracteristic within the range shown for the ecoregion. Page 3 worksheet. Scores should reflect an overall assessment of the streweather conditions, enter 0 in the scoring box and provide an exploration of a stream under review (e.g., the stream flows from a pasture	age 2): Begin by determining the most appropriate ecoregion based on haracteristic must be scored using the same ecoregion. Assign points to each provides a brief description of how to review the characteristics identified in the sam reach under evaluation. If a characteristic cannot be evaluated due to site or anation in the comment section. Where there are obvious changes in the character into a forest), the stream may be divided into smaller reaches that display more stal score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 51 Comm	ents: Seasonal RPW
RPW Stream W was determined to have intermittent flow wi	thin project limits.
Evaluator's Signature Signature This channel evaluation form is intended to be used only	Date 7/3//3 y as a guide to assist landowners and environmental professionals in
gathering the data required by the United States Army stream quality. The total score resulting from the comple	Corps of Engineers in order to make a preliminary assessment of etion of this form is subject to USACE approval and does not imply a to change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream W

9 5 8	ш	CHARACTERISTICS	ECOREGION POINT RANG		RANGE	SCOPE
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0 – 5	0-4	0 – 5	1
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0 – 6	0-5	0-5	4
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	4
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	3
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0-4	0-4	1
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	3
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0 – 4	0-2	2
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0 – 4	0 – 2	2
5. 1	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0 – 3	2
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0-5	0-4	0 – 4	3
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0 – 4	0-5	2
Y	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	2
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0 – 5	0-5	2
STABILITY	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0-5	3
S.	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0 – 5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0 – 5	0-6	1
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	3
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0 – 5	0 – 5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0 – 4	0-4	2
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0 – 4	0-5	0-5	0
50	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0-4	0
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0 – 5	4
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on fin	rst page)			51

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream WW - Chapel Branch



STREAM QUALITY ASSESSMENT WORKSHEET



1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 11/5/13	4. Time of Evaluation: 11:00 am
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: ~250 acres	8. Stream Order: 2nd
9. Length of Reach Evaluated: 50 ft.	10. County: Orange
11. Location of reach under evaluation (include nearby roads	and landmarks): east of US 54 and north of Old Mason Farm Rd.
12. Site Coordinates (if known): 35.905374 N	-79.028821 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: mild, dry	
15. Site conditions at time of visit: cool, dry	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive Waters _Water Supply Watershed _X _(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES (NO) If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO	19. Does channel appear on USDA Soil Survey? YES NO
20. Estimated Watershed Land Use:% Residential	
_ <u>50_</u> % Forested	% Cleared / Logged% Other ()
21. Bankfull Width: 12 ft	22. Bank Height (from bed to top of bank): 3 feet
23. Channel slope down center of stream:Flat (0 to 2%)	X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _StraightOccasional Bends	X Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 pworksheet. Scores should reflect an overall assessment of the strewather conditions, enter 0 in the scoring box and provide an explain of a stream under review (e.g., the stream flows from a pasture of the stream flows f	age 2): Begin by determining the most appropriate ecoregion based on naracteristic must be scored using the same ecoregion. Assign points to each provides a brief description of how to review the characteristics identified in the sam reach under evaluation. If a characteristic cannot be evaluated due to site or anation in the comment section. Where there are obvious changes in the character into a forest), the stream may be divided into smaller reaches that display more tal score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 59 Comm	nents: Perennial RPW
RPW Stream WW (Chapel Branch) was determined to have	perennial flow within project limits.
gathering the data required by the United States Army	Date

particular mitigation ratio or requirement. Form subject to change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET

RPW Stream WW - Chapel Branch

d	11	CYLADA CEEDICEICE		ECOREGION POINT RANGE		
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0 – 5	3
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	3
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0 – 5	3
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	2
į	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0-4	0-4	1
TELESICE I	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	3
	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0 – 3	3
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0 – 5	0-4	0-4	3
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0 – 5	3
	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0 – 5	2
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0-5	3
2	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0 – 5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	4
	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	3
	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0 – 5	0-5	2
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0 – 4	3
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0 – 4	0-5	0 – 5	3
	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0 – 4	2
	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	1
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0 – 5	0 – 5	3
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on fi	rst page)	THE STATE OF THE		59

^{*} These characteristics are not assessed in coastal streams.

RPW Stream X





	The state of the s
1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 8/1/13	4. Time of Evaluation: 10:30 am
5. Name of Stream: <u>unnamed</u>	6. River Basin: Cape Fear
7. Approximate Drainage Area: 250 acres	8. Stream Order: 2nd
9. Length of Reach Evaluated: 100 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads	and landmarks): west of George King Road.
12. Site Coordinates (if known): 35.913729 N	
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: hot, humid	
15. Site conditions at time of visit: warm, humid	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES NO If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? (YES) NO 1	9. Does channel appear on USDA Soil Survey? VES NO
20. Estimated Watershed Land Use: 15 % Residential	% Commercial% Industrial% Agricultural
	% Cleared / Logged% Other (
	22. Bank Height (from bed to top of bank): 2 feet
	Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: Straight X Occasional Bends	Frequent MeanderVery SinuousBraided Channel
Instructions for completion of worksheet (located on page location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 proportion of the stream weather conditions, enter 0 in the scoring box and provide an explant of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on tracteristic must be scored using the same ecoregion. Assign points to each ovides a brief description of how to review the characteristics identified in the m reach under evaluation. If a characteristic cannot be evaluated due to site or nation in the comment section. Where there are obvious changes in the character to a forest), the stream may be divided into smaller reaches that display more all score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 69 Comme	nts: Perennial RPW
RPW Stream X was determined to have perennial flow within	project limits.
gainering the data required by the United States Army	Date Date as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of
tream quality. I he total score resulting from the complet	ion of this form is subject to USACE approval and does not imply a change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream X

	#	CUADACTEDICTICS	ECORE	GION POINT	RANGE	GGGG
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	3
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0 – 5	4
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	4
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0 – 4	3
Į.	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0-4	0-4	2
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	3
H	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	3
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	3
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0 – 5	0-4	0-4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	2
X	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	3
SIABILLIY	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	3
IAB	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	3
2	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0-5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	1
BIIAI	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0 – 5	0 – 5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0 – 4	3
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 5	0-5	3
) כן בן	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	3
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	3
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	4
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on fir				69

^{*} These characteristics are not assessed in coastal streams.

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seasonal RPW Stream XX





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 11/5/13	4. Time of Evaluation: 11:00 am
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: ~50 acres	8. Stream Order: 1st
9. Length of Reach Evaluated: 50 ft.	10. County: Orange
11. Location of reach under evaluation (include nearby roads a	and landmarks): north of US 54 and east of Manning Dr.
12. Site Coordinates (if known): 35.899108 N	-79.036483 W
13. Proposed Channel Work (if any): rail embankment	
14. Recent Weather Conditions: mild, dry	
15. Site conditions at time of visit: cool, dry	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive Waters _Water Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation p	point? YES (NO) If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO 19	9. Does channel appear on USDA Soil Survey? YES NO
20. Estimated Watershed Land Use:% Residential	
50% Forested	% Cleared / Logged% Other ()
21. Bankfull Width: 8 ft	22. Bank Height (from bed to top of bank): 3 feet
23. Channel slope down center of stream:Flat (0 to 2%)	Gentle (2 to 4%) X_Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: X StraightOccasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 proworksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explant of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on racteristic must be scored using the same ecoregion. Assign points to each ovides a brief description of how to review the characteristics identified in the m reach under evaluation. If a characteristic cannot be evaluated due to site or ation in the comment section. Where there are obvious changes in the character to a forest), the stream may be divided into smaller reaches that display more I score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 36 Comme	nts: Seasonal RPW
Seasonal RPW Stream XX was determined to have intermitten	t flow within project limits.
gathering the data required by the United States Army stream quality. The total score resulting from the complet	Date ///5 //3 as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of ion of this form is subject to USACE approval and does not imply a change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET seasonal RPW Stream XX

	щ	CHARACTERISTICS		GION POINT	Γ RANGE	SCORE
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCURE
	1	Presence of flow / persistent pools in stream	0-5	0-4	0-5	1
1		(no flow or saturation = 0; strong flow = max points) Evidence of past human alteration	NE S			
	2	(extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	1
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	2
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	1
Į.	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	1
	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	2
PHYSICAL	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	1
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	1
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0 – 5	0-4	0-4	3
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	3
X	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0 – 4	0-5	1
STABILITY	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	1
AB	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	3
2	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0-5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	2
BIIAI	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0 – 6	0-6	0-6	2
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	3
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	3
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	0
50	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	1
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	1
W		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on fi	rst page)			36

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream XXX





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 1/22/14	4. Time of Evaluation: 9:00 am
5. Name of Stream: <u>Unnamed</u>	6. River Basin: Cape Fear
7. Approximate Drainage Area: 250 acres	8. Stream Order: 2nd
9. Length of Reach Evaluated: 100 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads	and landmarks): west of Garrett Rd.
12. Site Coordinates (if known): 35.954375 N	-78.977513 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: cold, rainy	
15. Site conditions at time of visit: cold, clear	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation	point? YES NO If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO 1	
20. Estimated Watershed Land Use:% Residential	15 % Commercial% Industrial% Agricultural
	% Cleared / Logged% Other ()
	22. Bank Height (from bed to top of bank): 2 feet
	X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _StraightOccasional Bends	X Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every characteristic within the range shown for the ecoregion. Page 3 pt worksheet. Scores should reflect an overall assessment of the streat weather conditions, enter 0 in the scoring box and provide an explant of a stream under review (e.g., the stream flows from a pasture in	ge 2): Begin by determining the most appropriate ecoregion based on aracteristic must be scored using the same ecoregion. Assign points to each rovides a brief description of how to review the characteristics identified in the am reach under evaluation. If a characteristic cannot be evaluated due to site or nation in the comment section. Where there are obvious changes in the character not a forest), the stream may be divided into smaller reaches that display more all score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 66 Comme	ents: Perennial RPW
RPW Stream XXX was determined to have perennial flow with	thin project limits.
-	
gathering the data required by the United States Army stream quality. The total score resulting from the comple	Date // 2 2 // // as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of tion of this form is subject to USACE approval and does not imply a
particular mitigation ratio or requirement. Form subject to	o change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream XXX

I di	#	# CHARACTERISTICS		ECOREGION POINT RANGE			
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE	
	1	Presence of flow / persistent pools in stream	0-5	0-4	0 – 5	3	
		(no flow or saturation = 0; strong flow = max points) Evidence of past human alteration					
	2	(extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	4	
	3	Riparian zone	0-6	0-4	0-5	3	
		(no buffer = 0; contiguous, wide buffer = max points)					
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0 - 5	0-4	0 – 4	3	
3	5	Groundwater discharge	0-3	0-4	0 – 4	3	
CA		(no discharge = 0; springs, seeps, wetlands, etc. = max points)					
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0 – 4	0-4	0 - 2	3	
Z		Entrenchment / floodplain access					
P	7	(deeply entrenched = 0; frequent flooding = max points)	0 - 5	0 – 4	0 - 2	3	
	8	Presence of adjacent wetlands	0-6	0.4	0 2	2	
	0	(no wetlands = 0; large adjacent wetlands = max points)		0 – 4	0 – 2	2	
3	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	3	
	10	Sediment input	0 – 5	0-4	0-4	2	
		(extensive deposition= 0; little or no sediment = max points) Size & diversity of channel bed substrate	NA*				
	11	(fine, homogenous = 0; large, diverse sizes = max points)		0-4	0 - 5	2	
111	12	Evidence of channel incision or widening	0-5	0-4	0-5	2	
	12	(deeply incised = 0; stable bed & banks = max points)	0-3	0-4	0-3	2	
STABILITY	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0-5	0-5	3	
	14	Root depth and density on banks	0 – 3	0-4	0-5	3	
L		(no visible roots = 0; dense roots throughout = max points) Impact by agriculture or livestock production					
	15	(substantial impact =0; no evidence = max points)	0 – 5	0-4	0 - 5	3	
	16	Presence of riffle-pool/ripple-pool complexes	0 – 3	0-5	0 (1	
	10	(no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-3	0-6	2	
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	5	
B		Canopy coverage over streambed					
HA	18	(no shading vegetation = 0; continuous canopy = max points)	0 - 5	0-5	0 - 5	4	
	19	Substrate embeddedness	NA*	0-4	0-4	3	
3	17	(deeply embedded = 0; loose structure = max)	NA.	0 – 4	0-4	3	
	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0 - 4	0-5	0-5	3	
Z.		Presence of amphibians					
BIOLOGY	21	(no evidence = 0; common, numerous types = max points)	0 - 4	0 – 4	0 - 4	3	
0	22	Presence of fish	0-4	0-4	0-4	0	
BI		(no evidence = 0; common, numerous types = max points)	0 - 4	0-4	0 - 7	-	
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	4	
18.18		Total Points Possible	100	100	100		
	NO B	TOTAL SCORE (also enter on fi	rst naga)		F 10.8 part 12.9	66	
- 6	K.	TOTAL SCORE (also effer off fi	ist page)	43.1	San San San San	00	

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream Y – Little Creek





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 8/1/13	4. Time of Evaluation: 1:30 pm
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: 250 acres	8. Stream Order: 2nd
9. Length of Reach Evaluated: 100 ft.	10. County: Durham
11. Location of reach under evaluation (include nearby roads a	nd landmarks): west of George King Road.
12. Site Coordinates (if known): 35.913654 N	-78.999032 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: hot, humid	
15. Site conditions at time of visit: warm, humid	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
Trout WatersOutstanding Resource Waters	Nutrient Sensitive WatersWater Supply Watershed(I-IV)
17. Is there a pond or lake located upstream of the evaluation p	point? YES NO If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? (YES) NO 19	9. Does channel appear on USDA Soil Survey? (YES) NO
	% Commercial% Industrial% Agricultural
	% Cleared / Logged% Other (
21. Bankfull Width: 25 ft	
23. Channel slope down center of stream: X Flat (0 to 2%)	Gentle (2 to 4%)
24. Channel Sinuosity: _Straight _X_Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every charcharacteristic within the range shown for the ecoregion. Page 3 proworksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explan of a stream under review (e.g., the stream flows from a pasture into	ge 2): Begin by determining the most appropriate ecoregion based on racteristic must be scored using the same ecoregion. Assign points to each ovides a brief description of how to review the characteristics identified in the n reach under evaluation. If a characteristic cannot be evaluated due to site or ation in the comment section. Where there are obvious changes in the character to a forest), the stream may be divided into smaller reaches that display more I score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 69 Comme	nts: Perennial RPW
RPW Stream Y (Little Creek) was determined to have perennia	al flow within project limits.
gathering the data required by the United States Army	as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of
	ion of this form is subject to USACE approval and does not imply a change – version 05/03. To Comment, please call 919-876-8441 x 26.

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream Y – Little Creek

J 150	#	CHADACTEDISTICS	ECOREGION POINT RANGE			SCORE
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream	0-5	0-4	0-5	3
		(no flow or saturation = 0; strong flow = max points) Evidence of past human alteration				
	2	(extensive alteration = 0; no alteration = max points)		0-5	0 - 5	4
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0 – 4	0-5	4
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	3
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0 – 3	0-4	0-4	2
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	3
PHY	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	3
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0 – 5	0-4	0 – 3	3
	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0 – 5	0-4	0-4	2
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0 – 5	2
Į,	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	3
STABILITY	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0 – 5	0 – 5	3
	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0 – 5	3
Š	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0-5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	1
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0 – 5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0 – 4	0 – 4	3
Ā	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0 – 5	0 – 5	3
500	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0 – 4	0-4	0-4	3
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	3
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0 – 5	4
		Total Points Possible	100	100	100	2-1
		TOTAL SCORE (also enter on fi	rst page)			69

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream YY – Meeting of the Waters





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips
3. Date of Evaluation: 11/5/13	4. Time of Evaluation: 11:15 am
5. Name of Stream: unnamed	6. River Basin: Cape Fear
7. Approximate Drainage Area: <u>~250 acres</u>	8. Stream Order: 2nd
9. Length of Reach Evaluated: 50 ft.	10. County: Orange
11. Location of reach under evaluation (include nearby roads a	nd landmarks): north of US 54 and east of Manning Dr.
12. Site Coordinates (if known): 35,899077 N	-79.035864 W
13. Proposed Channel Work (if any): rail crossing	
14. Recent Weather Conditions: mild, dry	
15. Site conditions at time of visit: cool, dry	
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat
	Nutrient Sensitive Waters _Water Supply Watershed _X(I-IV)
17. Is there a pond or lake located upstream of the evaluation p	oint? YES (NO) If yes, estimate the water surface area:
18. Does channel appear on USGS quad map? YES NO 19	D. Does channel appear on USDA Soil Survey YES NO
20. Estimated Watershed Land Use: 30 % Residential	% Commercial% Industrial% Agricultural
	% Cleared / Logged% Other ()
21. Bankfull Width: 20 ft	22. Bank Height (from bed to top of bank): 3 ft
	X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)
24. Channel Sinuosity: _Straight _X Occasional Bends	Frequent MeanderVery SinuousBraided Channel
location, terrain, vegetation, stream classification, etc. Every char characteristic within the range shown for the ecoregion. Page 3 proworksheet. Scores should reflect an overall assessment of the stream weather conditions, enter 0 in the scoring box and provide an explana of a stream under review (e.g., the stream flows from a pasture into	e 2): Begin by determining the most appropriate ecoregion based on acteristic must be scored using the same ecoregion. Assign points to each evides a brief description of how to review the characteristics identified in the n reach under evaluation. If a characteristic cannot be evaluated due to site or ation in the comment section. Where there are obvious changes in the character to a forest), the stream may be divided into smaller reaches that display more score assigned to a stream reach must range between 0 and 100, with a score of
Total Score (from reverse): 68 Commen	its: Perennial RPW
RPW Stream YY (Meeting of the Waters) was determined to ha	ave perennial flow within project limits.
gathering the data required by the United States Army (stream quality. The total score resulting from the completi	Date

STREAM QUALITY ASSESSMENT WORKSHEET

RPW Stream YY – Meeting of the Waters

	ш	# CHARACTERISTICS		GION POINT	RANGE	CCODE
			Coastal	(Piedmont)	Mountain	SCORE
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	3
	2 Evidence of past human alteration (extensive alteration = 0; no alteration = max points)		0-6	0-5	0-5	3
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	3
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0 – 5	0-4	0-4	3
PHYSICAL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	2
SIC	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0 - 4	0-4	0-2	3
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0 – 5	0-4	0-2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0 – 3	2
18	10	Sediment input (extensive deposition= 0; little or no sediment = max points)	0 – 5	0-4	0-4	2
2117	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	4
Y	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	3
STABILITY	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0 – 5	4
TAB	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0-4	0 – 5	3
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0-5	3
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	4
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0 – 5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	3
7	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	3
50	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	3
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0 – 5	4
		Total Points Possible	100	100	100	
		TOTAL SCORE (also enter on fi	rst page)			68

^{*} These characteristics are not assessed in coastal streams.

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RPW Stream Z





1. Applicant's Name: TTA	2. Evaluator's Name: B. Phillips			
3. Date of Evaluation: 8/13/13	4. Time of Evaluation: 8:30 am			
5. Name of Stream: <u>unnamed</u>	6. River Basin: Cape Fear			
7. Approximate Drainage Area: 150 acres				
9. Length of Reach Evaluated: 100 ft.	10. County:_ Durham			
11. Location of reach under evaluation (include nearby roads				
12. Site Coordinates (if known): 35.908000 N	-78.993723 W			
13. Proposed Channel Work (if any): rail embankment				
14. Recent Weather Conditions: hot, humid				
15. Site conditions at time of visit: warm, humid				
16. Identify any special waterway classifications known:	Section 10Tidal WatersEssential Fisheries Habitat			
	Nutrient Sensitive WatersWater Supply Watershed(I-IV)			
17. Is there a pond or lake located upstream of the evaluation	point? YES NO If yes, estimate the water surface area:			
18. Does channel appear on USGS quad map? YES NO	19. Does channel appear on USDA Soil Survey? YES NO			
	% Commercial% Industrial% Agricultural			
	% Cleared / Logged% Other ()			
21. Bankfull Width: 6 ft	22. Bank Height (from bed to top of bank): 1 foot			
	X_Gentle (2 to 4%)Moderate (4 to 10%)Steep (>10%)			
24. Channel Sinuosity: _StraightOccasional Bends	X Frequent Meander Very Sinuous Braided Channel			
Instructions for completion of worksheet (located on particular to the continuity, and a separate form used to evaluate each reach. The tot 100 representing a stream of the highest quality.	age 2): Begin by determining the most appropriate ecoregion based on naracteristic must be scored using the same ecoregion. Assign points to each provides a brief description of how to review the characteristics identified in the sam reach under evaluation. If a characteristic cannot be evaluated due to site or anation in the comment section. Where there are obvious changes in the character into a forest), the stream may be divided into smaller reaches that display more tall score assigned to a stream reach must range between 0 and 100, with a score of			
Total Score (from reverse): 57 Commo	ents: Perennial RPW			
RPW Stream Z was determined to have perennial flow within	project limits.			
Evaluator's Signature By	Date 8/13/13			
athering the data required by the United States Army	as a guide to assist landowners and environmental professionals in Corps of Engineers in order to make a preliminary assessment of tion of this form is subject to USACE approval and does not imply a change a version 05/03. To Comment places well 010 076 0444			

STREAM QUALITY ASSESSMENT WORKSHEET RPW Stream Z

53	#	CHARACTERISTICS	ECOREGION POINT RANGE			GE COPY	
	#	CHARACTERISTICS	Coastal	(Piedmont)	Mountain	SCORE	
	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	3	
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	3	
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	3	
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	3	
AL	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	2	
PHYSICAL	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0 – 4	0-2	2	
PH	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	2	
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0	
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0 – 3	3	
	10	Sediment input (extensive deposition 0; little or no sediment = max points)	0 – 5	0-4	0-4	2	
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	2	
STABILITY	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0 – 4	0-5	3	
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0 – 5	0-5	0-5	3	
TAB	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0 – 3	0 – 4	0-5	3	
S	15	Impact by agriculture or livestock production (substantial impact =0; no evidence = max points)	0-5	0-4	0 – 5	3	
	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0 – 3	0-5	0-6	3	
BITAT	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	3	
HAB	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	4	
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	2	
X	20	Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)	0 – 4	0 – 5	0-5	2	
500	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2	
BIOLOGY	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	1	
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0 – 6	0 – 5	0 – 5	3	
	TEN	Total Points Possible	100	100	100		
TOTAL SCORE (also enter on first page)						57	

^{*} These characteristics are not assessed in coastal streams.

NC Wetland Assessment Method Forms

Map ID	NCWAM Classification	NCWAM Wetland Rating
А	Headwater Forest	High
AA	Bottomland Hardwood Forest	High
В	Basin Wetland	Medium
ВВ	Bottomland Hardwood Forest	High
BBB	Basin Wetland	High
С	Headwater Forest	High
СС	Bottomland Hardwood Forest	High
ССС	Basin Wetland	High
D	Bottomland Hardwood Forest	Low
DD	Bottomland Hardwood Forest	High
DDD	Basin Wetland	High
E	Bottomland Hardwood Forest	High
EE	Bottomland Hardwood Forest	High
F	Bottomland Hardwood Forest	Medium
FF	Bottomland Hardwood Forest	High
G	Bottomland Hardwood Forest	High
GG	Bottomland Hardwood Forest	High
Н	Non-Tidal Freshwater Marsh	Medium
ННН	Non-Tidal Freshwater Marsh	Low
I	Bottomland Hardwood Forest	High
III	Bottomland Hardwood Forest	High
J	Bottomland Hardwood Forest	High
К	Bottomland Hardwood Forest	High
N	Bottomland Hardwood Forest	High
NNN	Non-Tidal Freshwater Marsh	High
0	Bottomland Hardwood Forest	High
000	Basin Wetland	Low
Р	Bottomland Hardwood Forest	High
Q	Bottomland Hardwood Forest	High
R	Headwater Forest	Low
S	Headwater Forest	High
Т	Headwater Forest	Low
TTT	Bottomland Hardwood Forest	High
U	Basin Wetland	Medium
UUU	Bottomland Hardwood Forest	High
V	Bottomland Hardwood Forest	Low
VV	Non-Tidal Freshwater Marsh	Low
VVV	Bottomland Hardwood Forest	High
W	Bottomland Hardwood Forest	High
ww	Bottomland Hardwood Forest	Low
www	Bottomland Hardwood Forest	High
XX	Bottomland Hardwood Forest	High
Υ	Basin Wetland	Medium
YY	Non-Tidal Freshwater Marsh	Medium
YYY	Bottomland Hardwood Forest	High
Z	Bottomland Hardwood Forest	High
ZZ	Bottomland Hardwood Forest	Medium
ZZZ	Bottomland Hardwood Forest	High

Wetland Site Name ITA Wetland A Wetland Type Headw aiser Forest Assessor Name/Organization EP-STV Nearest Name/Organization EP-STV Nearest Name/Organization EP-STV Nearest Name/Water Body Sandy Creek USGS 2-Dipt Catalogue Unit g03030002 Site No. Precipitation within 48 hrs? Lattude/Longitude (deci-degrees) \$5.976203, 78.957812 Evidence of stressors affecting the assessment area (may not be within the assessment area Please cicles and/or make note on that paped evidence of stressors is appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.		Rating Calculato	r version 4.1	
River Basin	Wetland Site Name	TTA Wetland A	Date 6	/4/13
River Basin Cape Fear	Wetland Type	Headw ater Forest ▼	Assessor Name/Organization B	P -STV
Evidence of stressors affecting the assessment area (may not be within the assessment area) Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following. + Hydrological modification (examples: distincts, afms, beaver dame, disea, berms, ponds, etc.) + Surface and estimates into the welland (examples: displayers, containing obvious pollutants, presence of nearby surface). - Surface and testings area (SUSTS), hog lagoma, and surface, disease, storm damage, salt intrusion, etc.) - Signs of vegetation stress (examples: wegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.) - Is the assessment area intensively managed? - Yes No Regulatory Considerations (select all that apply to the assessment area) - Anadromous fish - Federally protected species or State endangered or threatened species - NoDWG sparan buffer rule in effect - Abuts a Primary Mursery Area (PNA) - N. C. Devision of Coestal Management Area of Environmental Concern (AEC) (including buffer) - Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HOW, ORW, or Trout - Designated NCNHP reference community - Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HOW, ORW, or Trout - Designated NCNHP reference community - Blackwater - B	Level III Ecoregion	Pledmont	Nearest Named Water Body S	andy Creek
Evidence of stressors affecting the assessment area (may not be within the assessment area) Please circles undor make note to last apage if evidence of stressors is appreent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following. 1. Hydrological modifications (examples: dicthes, dams, beaver dams, dikes, berms, ponds, etc.) 2. Sufface and sub-surface discharages into the vettand (examples: discharages containing obvoives pollutants, presence of nearby sepitic tanks, underground storage tanks (USTs), hog lagoons, etc.) 2. Signs of vegetation stress (examples: vegetation mortalis), insect damage, disease, storm damage, salt intrusion, etc.) 3. Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.) 3. Signs of vegetation stress (examples: vegetation mortalis), insect damage, disease, storm damage, salt intrusion, etc.) 4. Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.) 5. Signs of vegetation stress (examples: vegetation mortalis), insect damage, disease, storm damage, salt intrusion, etc.) 4. Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.) 5. Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.) 7. Regulatory Considerations (select all that apply to the assessment area. 7. Anadomous fish. 7. Following protection specials or State ordangered or threatened species 7. Publicity owned properly 7. Publicity owned properly 7. Publicity owned properly 7. Abuts a stream with a NCDWO classification of SA or supplemental classifications of HOW, ORW, or Trout 7. Designated NCNHP reference community 8. Abuts a stream with a NCDWO classification of SA or supplemental classifications of HOW, ORW, or Trout 8. Blackward of SA or	River Basin	Cape Fear ▼	USGS 8-Digit Catalogue Unit 0	3030002
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in rocent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following. + Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.) • Surface and sub-outface discharges into the wetland (oxamples: discharges containing obvious pollutants, presence of nearby septe tracts, underground storage tarks (USF), hole jagoons, etc.) • Signs of vegetation stress (examples: wegetation montally, insect damage, disease, storm damage, salt infrusion, etc.) • Habitalphan community alternative (oxamples: moving, clear-cuting, oxotics, etc.) Is the assessment area intensively managed? Total Publichy protected species or State endangered or threatened species Regulatory Considerations (select all that apply to the assessment area) Anadromous fish Fodoralpy protected species or State endangered or threatened species NCDWO riparian buffer rule in effect Abuts a Primary Mursery Area (PNA) Publichy owned property N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) N.C. Division of Coastal Management Area of Environment	∏Yes ⊡ N	o Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) 3	5.976203, -78.957812
Regulatory Considerations (select all that apply to the assessment area) Anadromous fish Federally protected species or State endangered or threatened species NCDWO riparian buffer rule in effect Abuts a Primary Nursey Area (PNA) Publicly owned property NC. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) NC. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) NC. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) NC. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) NC. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) NC. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) NC. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) Nature of natural stream is associated with the wetland, if any? (check all that apply) Blackwater Tidal (if tidal, check one of the following boxes) TLunar [Wind]Both Is the assessment area on a coastal island? [Yes [No Does the assessment area on a coastal island? [Yes [No Does the assessment area's surface water storage capacity or duration substantially altered by beaver? [Yes [No Does the assessment area's surface water storage capacity or duration substantially altered by beaver? [Yes [No Does the assessment area experience overbank flooding during normal rainfall conditions? [Yes [No Does the assessment area experience overbank flooding during normal rainfall conditions? [Yes [No Does the assessment area experience overbank flooding during normal rainfall conditions? [Yes [No Does the assessment area experience overbank flooding during normal rainfall conditions? [Yes [No Does the assessment area experience overbank flooding during normal rainfall conditions? [Yes [No Does the assessment area experience overbank flooding during normal rainfall conditions? [Yes [No Does [No Does the assessment area and vegetation structure (No Does the	Please circle and/or m appropriate, in recent to the following. • Hydrological m • Surface and su septic tanks, ui • Signs of vegeta	ake note on last page if evidence of stressors is apparate (for instance, approximately within 10 years). No odifications (examples: ditches, dams, beaver dams, ib-surface discharges into the wetland (examples: disnderground storage tanks (USTs), hog lagoons, etc.) ation stress (examples: vegetation mortality, insect dommunity alteration (examples: mowing, clear-cutting)	arent. Consider departure from reference towarthy stressors include, but are not lides, berms, ponds, etc.) charges containing obvious pollutants, paramage, disease, storm damage, salt intractions.	mited resence of nearby
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Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect. GS VS A Not severely altered Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) 2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric Check a box in each column. Consider surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch sub-surface water. Consider tidal flooding regime, if applicable. Surf Sub A Water storage capacity and duration are not altered. B B Water storage capacity or duration are not altered. Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). 3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only) Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT). AA WT 3a. A Majority of wetland with depressions able to pond wa	Does the assessmen	t area experience overbank flooding during norma	al rainfall conditions?	Yes No
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Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT). AA WT 3a. A Majority of wetland with depressions able to pond water > 1 foot deep B Majority of wetland with depressions able to pond water 6 inches to 1 foot deep C C Majority of wetland with depressions able to pond water 3 to 6 inches deep D D Depressions able to pond water < 3 inches deep 3b. A Evidence that maximum depth of inundation is greater than 2 feet	Check a box in eduration (Sub). (North Carolina hys 1 foot deep is consultant of Sub-Surface water Surf Sub-Surf Sub-Sub-Surf Sub-Sub-Sub-Sub-Sub-Sub-Sub-Sub-Sub-Sub-	cach column. Consider surface storage capacity and Consider both increase and decrease in hydrology. Redric soils (see USACE Wilmington District website) for considered to affect surface water only, while a ditch per consider tidal flooding regime, if applicable. Vater storage capacity and duration are not altered. Vater storage capacity or duration are altered, but not vater storage capacity or duration are substantially alter storage capacity or duration are substantially alter storage capacity or duration are substantially alter.	duration (Surf) and sub-surface storage efer to the current NRCS lateral effect of the zone of influence of ditches in hydronomer of the total effect both substantially (typically, not sufficient to detent to typically, alteration sufficient to reserved (typically, alteration sufficient to reserved).	f ditching guidance for ic soils. A ditch urface and ditch urface and ditch hange vegetation).
Endoned that maximum depth of indication is between 1 and 2 loct	Check a box in e type (WT). AA WT 3a. A A B B C C C D 3b. A C A E D C C D C D C D C C C C C C C C C C C	Majority of wetland with depressions able to pond Depressions able to pond water < 3 inches deep	water > 1 foot deep water 6 inches to 1 foot deep water 3 to 6 inches deep an 2 feet	

		x from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape xe soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for
	regional indi 4a. 🂽 A	cators. Sandy soil
	4а. В В	Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
	∏B ∏C ∏D ∏E	Loamy or clayey soils not exhibiting redoximorphic features Loamy or clayey gleyed soil
	ĒΕ	Histosol or histic epipedon
	4b.	Soil ribbon < 1 inch
		Soil ribbon ≥ 1 inch
	4c. ⊡ A □B	No peat or muck presence A peat or muck presence
5.	Discharge in	nto Wetland – opportunity metric
		x in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.
	Surf Sub	sub-surface discribinges include presence of nearby septic talik, diffuerground storage talik (001), etc.
	⊙A ⊙A	
	∏в ∏в	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
	□c □c	
6.	Land Use -	opportunity metric
	draining to a	at apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources ssessment area within entire upstream watershed (WS), within 5 miles <u>and</u> within the watershed draining to the area (5M), and within 2 miles <u>and</u> within the watershed draining to the assessment area (2M). Effective riparian buffers
	are consider WS 5M	ed to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. 2M
	▼A ▼A	✓ A ≥ 10% impervious surfaces
	□B □B	
		☐ F ≥ 20% coverage of maintained grass/herb☐ G ≥ 20% coverage of clear-cut land
	□н □н	H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.		ting as Vegetated Buffer – assessment area/wetland complex condition metric
	7a. Is asse	ssment area within 50 feet of a tributary or other open water? No If Yes, continue to 7b. If No, skip to Metric 8.
	Wetlan	d buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland.
		a note if a portion of the buffer has been removed or disturbed. uch of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
	□ A	≥ 50 feet
	⊡ B ∷ C	From 30 to < 50 feet From 15 to < 30 feet
	∏ D	From 5 to < 15 feet
		< 5 feet or buffer bypassed by ditches ry width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
		-feet wide
		is of assessment area vegetation extend into the bank of the tributary/open water?
		ary or other open water sheltered or exposed?
		tered – adjacent open water with width < 2500 feet <u>and</u> no regular boat traffic. osed – adjacent open water with width ≥ 2500 feet <u>or</u> regular boat traffic.
8.	Wetland Wie	dth at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)
		x in each column. Select the average width for the wetland type at the assessment area (WT)
	WT WC	and complex at the assessment areas (WC). See User Manual for WT and WC boundaries.
	CA CA	≥ 100 feet
	B B C CC	From 80 to < 100 feet From 50 to < 80 feet
	⊙ D ⊙ D	From 40 to < 50 feet
		From 30 to $<$ 40 feet
	G G G	From 15 to $<$ 30 feet From 5 to $<$ 15 feet
	MH MH	

4. Soil Texture/Structure – assessment area condition metric

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. Evidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. Sediment deposition is excessive, but not overwhelming the wetland. Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) A A ≥ 500 acres B B B From 100 to < 500 acres C C C From 50 to < 100 acres C C C From 50 to < 100 acres C C C From 50 to < 10 acres C C C From 10 to < 25 acres C C C From 10 to < 5 acres C C C C From 5 to < 10 acres C C C C From 0.5 to < 1 acre C C C C From 0.1 to < 0.5 acre C C C C From 0.1 to < 0.5 acre C C C C From 0.1 to < 0.5 acre C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C C C C C C C C C C C C C C C
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) A Pocosin is the full extent (≥ 90%) of its natural landscape size. B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥ 500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres D D From 10 to < 50 acres E C C From 50 to < 100 acres F S Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) ☑A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. ☑B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. ☑C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

17a.	etative Structure – a Is vegetation presen Yes No	ssessment area/wetland type condition metric t? If Yes, continue to 17b. If No, skip to Metric 18.
	Evaluate percent co A ≥ 25% cove	verage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. age of vegetation
17c.	Check a box in each	rage of vegetation h column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure e assessment area (AA) and the wetland type (WT) separately.
	AA WId-Story Canopy AB C B C	Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent
	Mid-Story	Dense mid-story/sapling layer Moderate density mid-story/sapling layer Mid-story/sapling layer sparse or absent
	Quring A A B C C	Dense shrub layer Moderate density shrub layer Shrub layer sparse or absent
	Q C C C C C C C C C C C C C C C C C C C	Dense herb layer Moderate density herb layer Herb layer sparse or absent
18. Sna q □ A ⊡ B	gs – wetland type co Large snags (mor Not A	ondition metric the than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
19. Dian		tion – wetland type condition metric y trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are
⊙ B C		y trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. y trees are < 6 inches DBH or no trees.
_	ide both natural debri	vetland type condition metric s and man-placed natural debris. than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
Mars Sele	sh only) ct the figure that best	Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas, while solid white areas indicate open water.
Exar	mples of activities the hing, fill, sedimentation overbank and overbank flow is overland flow is se	at may severely alter hydrologic connectivity include intensive on, channelization, diversion, man-made berms, beaver dams, and stream incision. Derland flow are not severely altered in the assessment area.
Notes Wetland	A is a palustrine fores	sted wetland abutting both sides of Stream B. Wetland A is drained by Stream B to Stream A.

Wetland Type _	Headwater Forest	Assessor Name/Organization	BP -STV
		-	D1 011
lotes on Field Assessr	ment Form (Y/N)		YES
Presence of regulatory			YES
Vetland is intensively r	, ,		NO
· · · · · · · · · · · · · · · · · · ·	= ' '	or open water (V/N)	YES
	cated within 50 feet of a natural tributary or other	er open water (17N)	NO
	bstantially altered by beaver (Y/N)	Il conditions (V/N)	
•	riences overbank flooding during normal rainfa	ill conditions (1/N)	YES
Assessment area is on	a coastal island (Y/N)		NO
Sub-function Rating S	Gummary		
unction	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-Surface Storage and Retention	Condition	HIGH
Vater Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	HIGH
	<u>-</u>	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	MEDIUM
	20.0000 20.0009	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	HIGH
	Triyotodi Ottarigo	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Pollution Change	Condition	NA NA
	1 ollulon onlange	Condition/Opportunity	NA NA
		Opportunity Presence? (Y/N)	NA NA
	Physical Structure	Condition	MEDIUM
labitat	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	HIGH
	vegetation composition	Condition	IIIOII
unction Rating Sum			D.C.
unction	Metrics/Notes		Rating
lydrology Vater Quality	Condition Condition		HIGH HIGH
valei Quality	Condition Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	YES
Habitat	Conditon	('''')	MEDIUM

NC WAM WETLAND ASSESSMENT FORM

Accompanies User Manual Version 4.1

Rating Calculator Version 4.1

Wetland Site Name TTA Wetland AA Date 7/31/13			
Wet	land Ty	pe Bottomland Hardwood Forest	Assessor Name/Organization BP/STV
Level III E	Coregi	on Piedmont	Nearest Named Water Body Little Creek
Ri	ver Bas	Cape Fear	USGS 8-Digit Catalogue Unit 03030002
⊡ Ye	s 🗀	No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) 35.913693, -78.999364
Please circle appropriate, to the follow Hydre Surfa septi	e and/or in recer ing. ological ace and c tanks, s of veg	make note on last page if evidence of stressors is applying the past (for instance, approximately within 10 years). In modifications (examples: ditches, dams, beaver dam sub-surface discharges into the wetland (examples: di underground storage tanks (USTs), hog lagoons, etc. etation stress (examples: vegetation mortality, insect community alteration (examples: mowing, clear-cutting).	parent. Consider departure from reference, if Noteworthy stressors include, but are not limited s, dikes, berms, ponds, etc.) ischarges containing obvious pollutants, presence of nearby) damage, disease, storm damage, salt intrusion, etc.)
Is the asses	sment	area intensively managed? Tyes No	
☐ Anac ☐ Fede ☐ NCD ☐ Abut ☐ Publi ☐ N.C. ☐ Abut ☐ Design	dromous rally pro WQ ripa s a Prim icly own Division s a strea gnated I	erations (select all that apply to the assessment and fish officed species or State endangered or threatened speciarian buffer rule in effect mary Nursery Area (PNA) ed property of Coastal Management Area of Environmental Concarn with a NCDWQ classification of SA or supplemental CONHP reference community (d)-listed stream or a tributary to a 303(d)-listed stream	ecies ern (AEC) (including buffer) al classifications of HQW, ORW, or Trout
Black Brow Tidal	kwater nwater (if tidal,	al stream is associated with the wetland, if any? (continue of the following boxes) Lunar area on a coastal island? Yes No	wheck all that apply)
		area's surface water storage capacity or duration	substantially altered by beaver?
1		ent area experience overbank flooding during norr	
Check (VS) in then rat GS	a box in the assete the as VS A	essment area. Compare to reference wetland if applicates applicate and assert on evidence of an effect. Not severely altered Severely altered over a majority of the assessment as sedimentation, fire-plow lanes, skidder tracks, bedding	rea condition metric face (GS) in the assessment area and vegetation structure face (see User Manual). If a reference is not applicable, frea (ground surface alteration examples: vehicle tracks, excessive fig. fill, soil compaction, obvious pollutants) (vegetation structure fides, salt intrusion [where appropriate], exotic species, grazing,
Check duration North C ≤1 foot sub-sur Surf A B	a box in n (Sub). carolina deep is	Consider both increase and decrease in hydrology. hydric soils (see USACE Wilmington District website) considered to affect surface water only, while a ditch ster. Consider tidal flooding regime, if applicable. Water storage capacity and duration are not altered. Water storage capacity or duration are altered, but no Water storage capacity or duration are substantially a	sment area condition metric and duration (Surf) and sub-surface storage capacity and Refer to the current NRCS lateral effect of ditching guidance for for the zone of influence of ditches in hydric soils. A ditch > 1 foot deep is expected to affect both surface and ditch of substantially (typically, not sufficient to change vegetation). altered (typically, alteration sufficient to result in vegetation on, filling, excessive sedimentation, underground utility lines).
Check type (W Av 3a.	a box ir /T). A W A B	Table 1 A Majority of wetland with depressions able to por Majority of wetland with depressions able to por	nd water 6 inches to 1 foot deep
3b. []	A E	C Majority of wetland with depressions able to por Depressions able to pond water < 3 inches deep vidence that maximum depth of inundation is greater to be that maximum depth of inundation is between K.21-4	p han 2 feet _1_and 2 feet

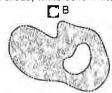
4.	Soil Texture/Structure – assessment area condition metric Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators. 4a. A Sandy soil B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) C Loamy or clayey soils not exhibiting redoximorphic features D Loamy or clayey gleyed soil Histosol or histic epipedon 4b. A Soil ribbon < 1 inch
	 ☑ B Soil ribbon ≥1 inch 4c. ☑ A No peat or muck presence ☑ B A peat or muck presence
5.	Discharge into Wetland – opportunity metric Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub A A Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Land Use – opportunity metric Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. WS 5M 2M A A ≥ 10% impervious surfaces B A B B B B B B B B B B B B B B B B B
7.	Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water? Yes No If Yes, continue to 7b. If No, skip to Metric 8. Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed. 7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. A ≥50 feet B From 30 to < 50 feet C From 15 to < 30 feet D From 5 to < 15 feet E < 5 feet or buffer bypassed by ditches 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width. S ≤15-feet wide Yes No 7e. Is tributary or other open water sheltered or exposed? Sheltered – adjacent open water with width < 2500 feet or regular boat traffic. Exposed – adjacent open water with width ≥2500 feet or regular boat traffic.
8.	Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries. WT WC A A ≥100 feet B B From 80 to < 100 feet C C From 50 to < 80 feet D D From 40 to < 50 feet E F From 30 to < 40 feet F F From 15 to < 30 feet G G From 5 to < 15 feet H H H < 5 feet

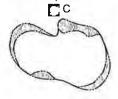
9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. Answer for assessment area dominant landform. By Evidence of short-duration inundation (< 7 consecutive days) By Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. Bediment deposition is excessive, but not overwhelming the wetland. C Sediment deposition is excessive and is overwhelming the wetland.
	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) CA CA CA SO0 acres B B B From 100 to < 500 acres C C C From 50 to < 100 acres C C C From 50 to < 50 acres C C C From 50 to < 50 acres C C C From 50 to < 50 acres C C C From 50 to < 10 acres C C C C From 5 to < 10 acres C C C C From 5 to < 10 acres C C C C From 5 to < 1 acre C C C C From 0.01 to < 0.5 acre C C C C From 0.01 to < 0.1 acre C C C C C From 0.01 to < 0.1 acre C C C C C C C From 0.01 to < 0.1 acre C C C C C C C C C C C C C C C C C C C
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥90%) of its natural landscape size. □ B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres C D D From 10 to < 50 acres E E E < 10 acres F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	 Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. C C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

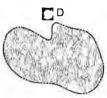
	E C
17	 Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present? Yes No If Yes, continue to 17b. If No, skip to Metric 18.
	17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ☐ A ≥25% coverage of vegetation ☐ B < 25% coverage of vegetation
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT
	Canopy closed, or nearly closed, with natural gaps associated with natural processes B B Canopy present, but opened more than natural gaps C C Canopy sparse or absent
	☐ A ☐ A Dense mid-story/sapling layer ☐ B ☐ B Moderate density mid-story/sapling layer ☐ C ☐ C Mid-story/sapling layer sparse or absent
	☐ A ☐ A Dense shrub layer ☐ B ☐ B Moderate density shrub layer ☐ C ☐ C Shrub layer sparse or absent
	EA EA Dense herb layer B B Moderate density herb layer C C Herb layer sparse or absent
18	Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). B Not A
19	 Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
	Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.
20	 Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). B Not A
21	. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that heat describes the ground of interpression between vegetation and open water in the ground of interpression between vegetation and open water in the ground of interpression between vegetation and open water in the ground of interpression between vegetation and open water in the ground of interpression between vegetation and open water in the ground open water in the ground open water on the property of the ground open water in the ground open water on the ground open water of interpression between water of the ground open water on the ground open water of the ground open water on the ground open water on the ground open water on the ground open water of the ground open water of the ground open water on the ground open water on the ground open water of the ground open water of the ground open water of the ground open water open water of the ground open water open wa

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.









22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive

ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

- Overbank and overland flow are not severely altered in the assessment area.
- B Overbank flow is severely altered in the assessment area.
- C Overland flow is severely altered in the assessment area.
- D Both overbank and overland flow are severely altered in the assessment area.

Notes

Wetland AA is a palustrine forested/emergent wetland located adjacent to Little Creek (Stream Y). Wetland AA is located in the floodplain forest of the Corps Waterfowl lands.

Wetland Site Name_	TTA Wetland AA	Date	7/31/13
Wetland Type_	Bottomland Hardwood Forest	Assessor Name/Organization	BP/STV
Notes on Field Assessr	nent Form (Y/N)		YES
Presence of regulatory			YES
Vetland is intensively r	, ,		NO
·	ated within 50 feet of a natural tributary or other	er open water (Y/N)	YES
	ostantially altered by beaver (Y/N)	Si opon mater (mit)	NO
	riences overbank flooding during normal rainfa	Il conditions (Y/N)	NO
Assessment area is on		ar conditions (1774)	NO
ASSESSITIETIL ALEA IS OIT	a coastai isianu (1714)		
Sub-function Rating S	Summary		
unction	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-Surface Storage and Retention	Condition	LOW
Vater Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Particulate Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Soluble Change	Condition	HIGH
	•	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Physical Change	Condition	HIGH
	, u, joisean e mainige	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Pollution Change	Condition	NA
	1 chatton change	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Physical Structure	Condition	HIGH
labitat	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	HIGH
	vogotation compensation		
Function Rating Sumr	mary Metrics/Notes		Rating
-unction Hydrology	Condition		HIGH
Vater Quality	Condition		HIGH
Tator addutty	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	YES
-labitat	Conditon	,	HIGH

	Rating Calculato	version 4.1	
Wetland Site Nan	ne_TTA Wetland B	Date 6/4/13	
Wetland Typ	pe Basin Wetland	Assessor Name/Organization BP-STV	
Level III Ecoregio	on Piedmont 🔻	Nearest Named Water Body Sandy Creek	
River Bas	Sin Cape Fear	USGS 8-Digit Catalogue Unit 03030002	
☐Yes ☐	No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) 35.976683, -78.95808	38
Please circle and/or appropriate, in recer to the following. • Hydrological • Surface and septic tanks, • Signs of vege	ors affecting the assessment area (may not be within make note on last page if evidence of stressors is appart past (for instance, approximately within 10 years). Not modifications (examples: ditches, dams, beaver dams, sub-surface discharges into the wetland (examples: dis underground storage tanks (USTs), hog lagoons, etc.) etation stress (examples: vegetation mortality, insect discommunity alteration (examples: mowing, clear-cutting)	rent. Consider departure from reference, if teworthy stressors include, but are not limited dikes, berms, ponds, etc.) charges containing obvious pollutants, presence of nearby amage, disease, storm damage, salt intrusion, etc.)	
Is the assessment	area intensively managed? Tyes No		
Anadromous Federally pro NCDWQ ripa Abuts a Prim Publicly owne N.C. Division Abuts a strea Designated N Abuts a 303(What type of natura Blackwater Brownwater Tidal (if tidal, Is the assessment	stected species or State endangered or threatened speciarian buffer rule in effect hary Nursery Area (PNA) ed property of Coastal Management Area of Environmental Conce am with a NCDWQ classification of SA or supplemental NCNHP reference community d)-listed stream or a tributary to a 303(d)-listed stream all stream is associated with the wetland, if any? (check one of the following boxes) Check one of the following boxes) Lunar Area on a coastal island?	ies rn (AEC) (including buffer) classifications of HQW, ORW, or Trout eck all that apply) Wind Both	
Is the assessment	area's surface water storage capacity or duration su	bstantially altered by beaver?	■No
Does the assessme	ent area experience overbank flooding during norma	Il rainfall conditions?	
Check a box in (VS) in the asset then rate the as GS VS A A A B B	essment area. Compare to reference wetland if applical assessment area based on evidence of an effect. Not severely altered Severely altered over a majority of the assessment are sedimentation, fire-plow lanes, skidder tracks, bedding	ce (GS) in the assessment area and vegetation structure	re
Check a box in duration (Sub). North Carolina I ≤ 1 foot deep is sub-surface wat Surf Sub A A A B B B B C C C C	hydric soils (see USACE Wilmington District website) for considered to affect surface water only, while a ditch ter. Consider tidal flooding regime, if applicable. Water storage capacity and duration are not altered. Water storage capacity or duration are altered, but not Water storage capacity or duration are substantially altered.		or
Check a box in type (WT). AA W 3a. A C B C C D 3b. A E B B	T A Majority of wetland with depressions able to pond B Majority of wetland with depressions able to pond C Majority of wetland with depressions able to pond	water > 1 foot deep water 6 inches to 1 foot deep water 3 to 6 inches deep n 2 feet and 2 feet	ud

		from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for
	<mark>⊡</mark> B L <u>□</u> C L	tors. Sandy soil Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) Loamy or clayey soils not exhibiting redoximorphic features Loamy or clayey gleyed soil
	E F	distosol or histic epipedon
		Soil ribbon < 1 inch
		Soil ribbon ≥ 1 inch No peat or muck presence
		A peat or muck presence
5.	Check a box i	o Wetland – opportunity metric in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). ub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Check all that draining to ass assessment ar are considered	pportunity metric tapply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources sessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the rea (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers d to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.
	WS 5M ☑A ☑A	2M ✓ A ≥ 10% impervious surfaces
	□в □в	B < 10% impervious surfaces
		 C Confined animal operations (or other local, concentrated source of pollutants) D ≥ 20% coverage of pasture
	□E □E	E ≥ 20% coverage of agricultural land (regularly plowed land)
	□F □F □G □G	F ≥ 20% coverage of maintained grass/herb G ≥ 20% coverage of clear-cut land
	□н □н	
7.		ng as Vegetated Buffer – assessment area/wetland complex condition metric
	7a. Is assess	sment area within 50 feet of a tributary or other open water? No If Yes, continue to 7b. If No, skip to Metric 8.
	Wetland	buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland.
		note if a portion of the buffer has been removed or disturbed. The of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
		: 50 feet From 30 to < 50 feet
		From 15 to < 30 feet
	☐D F	From 5 to < 15 feet : 5 feet <u>or</u> buffer bypassed by ditches
		width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
	[o] ≤ 15-fe 7d. Do roots	eet wide [] > 15-feet wide [] Other open water (no tributary present) of assessment area vegetation extend into the bank of the tributary/open water?
	Yes	[] No
	Shelte	ry or other open water sheltered or exposed? red – adjacent open water with width < 2500 feet <u>and</u> no regular boat traffic. ed – adjacent open water with width ≥ 2500 feet <u>or</u> regular boat traffic.
8.	Check a box i and the wetlan	h at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) in each column. Select the average width for the wetland type at the assessment area (WT) and complex at the assessment areas (WC). See User Manual for WT and WC boundaries.
	WT WC	≥ 100 feet
	□В □В	From 80 to < 100 feet
		From 50 to < 80 feet From 40 to < 50 feet
	E E	From 30 to < 40 feet
	∏F ∏F ☑G ☑G	From 15 to < 30 feet From 5 to < 15 feet
	H H	< 5 feet

4. Soil Texture/Structure – assessment area condition metric

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. Evidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. Sediment deposition is excessive, but not overwhelming the wetland. Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) CA CA ≥ 500 acres B B B From 100 to < 500 acres CC CC From 50 to < 100 acres CC CC From 50 to < 100 acres CF FF FF From 10 to < 25 acres CF CF FF From 5 to < 10 acres CG CG CG From 1 to < 5 acres CH CH CH From 0.5 to < 1 acre CJ CJ CJ From 0.1 to < 0.5 acre CJ CJ CJ From 0.1 to < 0.1 acre CJ CJ CJ From 0.01 to < 0.1 acre CJ CJ CJ From 0.01 to < 0.1 acre CJ CJ CJ CJ Acre or assessment area is clear-cut
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □A Pocosin is the full extent (≥ 90%) of its natural landscape size.
	B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A A Source B B From 100 to < 500 acres C C From 50 to < 100 acres D D From 10 to < 50 acres E E < 10 acres F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) ☑ A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. ☑ B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. ☑ C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

17.	Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present?
	Yes No If Yes, continue to 17b. If No, skip to Metric 18.
	17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. □ A ≥ 25% coverage of vegetation □ B < 25% coverage of vegetation
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.
	AA WT AA WT AA WT AA WT AA Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent AA Canopy present, but opened more than natural gaps Canopy sparse or absent AA Canopy present, but opened more than natural gaps Canopy sparse or absent AA Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy sparse or absent AA Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy sparse or absent AA Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy sparse or absent AB CA Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy sparse or absent AB CA Canopy sparse or absent
	— — — — — — — — — — — — — — — — — — —
	☐ C Shrub layer sparse or absent
	CA CA Dense herb layer B Moderate density herb layer C C Herb layer sparse or absent
18.	Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A
19.	Diameter Class Distribution – wetland type condition metric Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
	Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.
20.	Large Woody Debris – wetland type condition metric
	Include both natural debris and man-placed natural debris. Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A
21.	A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)
21.	Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.
21.	Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.
	Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. A B C D Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Overbank and overland flow are not severely altered in the assessment area. Overbank flow is severely altered in the assessment area.
22.	Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. A B C C D Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Overbank and overland flow are not severely altered in the assessment area. Overbank flow is severely altered in the assessment area. Both overbank and overland flow are severely altered in the assessment area. Both overbank and overland flow are severely altered in the assessment area.
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22.	Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. A B C C D Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Overbank and overland flow are not severely altered in the assessment area. Overbank flow is severely altered in the assessment area. Both overbank and overland flow are severely altered in the assessment area. Both overbank and overland flow are severely altered in the assessment area.
22.	Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. A B C C D Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Overbank and overland flow are not severely altered in the assessment area. Overbank flow is severely altered in the assessment area. Both overbank and overland flow are severely altered in the assessment area. Both overbank and overland flow are severely altered in the assessment area.

Wetland Site Name	TTA Wetland B	Date	6/4/13
Wetland Type	Basin Wetland	Assessor Name/Organization	BP-STV
Natas an Field Assess	(M/N)		VEC
Notes on Field Assess			YES
= -	/ considerations (Y/N)		YES
Wetland is intensively	- · · · ·	0.480	NO NO
	cated within 50 feet of a natural tributary or other	er open water (Y/N)	NO NO
	ubstantially altered by beaver (Y/N)		NO
· · · · · · · · · · · · · · · · · · ·	eriences overbank flooding during normal rainfa	all conditions (Y/N)	YES
Assessment area is or	n a coastal island (Y/N)		NO
Sub-function Rating	Summary		
unction	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	NA
	Sub-Surface Storage and Retention	Condition	NA
Vater Quality	Pathogen Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Particulate Change	Condition	NA
	-	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	NA
	Service Service Grand	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Physical Change	Condition	NA
	. Hydiodi dilango	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA NA
	Pollution Change	Condition	MEDIUM
	1 ollulon change	Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Physical Structure	Condition	HIGH
labitat	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	HIGH
	vogetation composition	Condition	111011
Function Rating Sum	nmary Metrics/Notes		Dotin~
-unction Hydrology	Condition		Rating HIGH
Nater Quality	Condition		MEDIUM
value Quality	Condition/Opportunity		MEDIUM
	Opportunity Presence?	(Y/N)	NO
Habitat	Conditon	、 · · /	MEDIUM

NC WAM WETLAND ASSESSMENT FORM **Accompanies User Manual Version 4.1**

	Rating Calculate	or Version 4.1
Wetland Site Name	TTA Wetland BB	Date 7/31/13
Wetland Type	Bottomland Hardw ood Forest	Assessor Name/Organization BP/STV
Level III Ecoregion	Piedmont ▼	Nearest Named Water Body Little Creek
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit 03030002
Yes No	o Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) 35.914080, -78.998049
	s affecting the assessment area (may not be with	
appropriate, in recent p to the following. Hydrological mo Surface and sul septic tanks, un Signs of vegeta	nderground storage tanks (USTs), hog lagoons, etc.	oteworthy stressors include, but are not limited s, dikes, berms, ponds, etc.) scharges containing obvious pollutants, presence of nearby damage, disease, storm damage, salt intrusion, etc.)
Is the assessment are	ea intensively managed?	
Anadromous fis Federally protect NCDWQ riparia Abuts a Primary Publicly owned N.C. Division of Abuts a stream Designated NC Abuts a 303(d)- What type of natural s Blackwater Brownwater	cted species or State endangered or threatened species buffer rule in effect by Nursery Area (PNA) property f Coastal Management Area of Environmental Concessith a NCDWQ classification of SA or supplemental NHP reference community disted stream or a tributary to a 303(d)-listed stream stream is associated with the wetland, if any? (classed one of the following boxes)	ern (AEC) (including buffer) Il classifications of HQW, ORW, or Trout
, ,		
	ea on a coastal island?	
Is the assessment are	ea's surface water storage capacity or duration s	
Does the assessment	t area experience overbank flooding during norn	nal rainfall conditions?
Check a box in early (VS) in the assess then rate the asse GS VS A A B A No B B Se	sment area. Compare to reference wetland if applications area based on evidence of an effect. of severely altered everely altered over a majority of the assessment are edimentation, fire-plow lanes, skidder tracks, bedding teration examples: mechanical disturbance, herbicities diversity [if appropriate], hydrologic alteration)	ace (GS) in the assessment area and vegetation structure able (see User Manual). If a reference is not applicable, ea (ground surface alteration examples: vehicle tracks, excessive g, fill, soil compaction, obvious pollutants) (vegetation structure des, salt intrusion [where appropriate], exotic species, grazing,
Check a box in eaduration (Sub). Control Carolina hydes 1 foot deep is consub-surface water. Surf Sub CA	consider both increase and decrease in hydrology. Idric soils (see USACE Wilmington District website) if considered to affect surface water only, while a ditch consider tidal flooding regime, if applicable. Idea attended to affect surface water only, while a ditch consider tidal flooding regime, if applicable. Idea attended to affect surface and duration are not altered. It is attended to a surface appacity or duration are altered, but no later storage capacity or duration are substantially a	d duration (Surf) and sub-surface storage capacity and Refer to the current NRCS lateral effect of ditching guidance for or the zone of influence of ditches in hydric soils. A ditch 1 foot deep is expected to affect both surface and ditch 1 substantially (typically, not sufficient to change vegetation). Itered (typically, alteration sufficient to result in vegetation in, filling, excessive sedimentation, underground utility lines).
		ndition metric (answer for non-marsh wetlands only) propriate storage for the assessment area (AA) and the wetland
3a. A A A B B B B C C C D C D	Majority of wetland with depressions able to pon Majority of wetland with depressions able to pon Majority of wetland with depressions able to pon Depressions able to pond water < 3 inches deep	d water 6 inches to 1 foot deep d water 3 to 6 inches deep
	ence that maximum depth of inundation is greater the ence that maximum depth of inundation is between.	

4.	 4. Soil Texture/Structure – assessment area condition metric Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment are feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soil regional indicators. 4a. A Sandy soil D Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) D Loamy or clayey soils not exhibiting redoximorphic features D Loamy or clayey gleyed soil D Histosol or histic epipedon 	
	4b. [A Soil ribbon < 1 inch	
	4c. A No peat or muck presence B A peat or muck presence	
5.	 Discharge into Wetland – opportunity metric Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants (Surface Pollutants) and sub-surface pollutants (Surface Pollutants) and sub-surface pollutants (S	arges (Sub).
	 A	
	C C Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assess potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, sedimentation, odor)	
6.	6. Land Use – opportunity metric Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Cod draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge MWS 5M 2M A	g to the riparian buffers Mountains ecoregion.
7.	 7a. Is assessment area within 50 feet of a tributary or other open water? Yes No If Yes, continue to 7b. If No, skip to Metric 8. Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average Record a note if a portion of the buffer has been removed or disturbed. 7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively be a been as a been removed or disturbed. 7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively be a been removed or disturbed. 7c. From 30 to < 50 feet C From 15 to < 30 feet C From 5 to < 15 feet E < 5 feet or buffer bypassed by ditches 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width. Self-feet wide No Toroots of assessment area vegetation extend into the bank of the tributary/open water? Yes No No 7e. Is tributary or other open water sheltered or exposed? Sheltered – adjacent open water with width < 2500 feet or regular boat traffic. Exposed – adjacent open water with width ≥2500 feet or regular boat traffic. 	ypass the buffer.
8.	8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetland Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries. WT WC A A ≥100 feet B B From 80 to <100 feet C C From 50 to <80 feet D D From 40 to <50 feet E E From 30 to <40 feet F F From 15 to <30 feet G G G From 5 to <15 feet	s only)

	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. A Evidence of short-duration inundation (< 7 consecutive days) B Evidence of saturation, without evidence of inundation C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. B Sediment deposition is excessive, but not overwhelming the wetland. C C Sediment deposition is excessive and is overwhelming the wetland.
	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) CA CA CA SO0 acres CB CB CB CF From 100 to < 500 acres CC CC CC From 50 to < 100 acres CD CD CD From 25 to < 50 acres CE CE CE From 10 to < 25 acres CF FF From 5 to < 10 acres CG CG CG From 1 to < 5 acres CH CH CH CH From 0.5 to < 1 acre CI CI CI From 0.01 to < 0.5 acre CI CI CI From 0.01 to < 0.1 acre CI CI CI From 0.01 to < 0.1 acre CI CI CI From 0.01 to < 0.1 acre CI CI CI From 0.01 to < 0.1 acre
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥90%) of its natural landscape size. □ B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres D D From 10 to < 50 acres E E E < 10 acres F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	 Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) ☑ A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. ☑ B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. ☑ C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

17.	Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present?
	Yes No If Yes, continue to 17b. If No, skip to Metric 18.
	17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands, ☐ A ≥25% coverage of vegetation ☐ B <25% coverage of vegetation
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT
	Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent
	C C Shrub layer sparse or absent
	E A E A Dense herb layer B B B Moderate density herb layer C C C Herb layer sparse or absent
18.	Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A
19.	Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
	Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.
20.	Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A
21.	Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. CA CD CD CD CD CD CD CD CD CD
22.	Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. The Courtest flow is severely altered in the assessment area.

Mater

Wetland BB is a palustrine forested/emergent wetland located adjacent to Stream W. Wetland BB is located in the floodplain forest of the Corps Waterfowl lands.

Overland flow is severely altered in the assessment area. Both overbank <u>and</u> overland flow are severely altered in the assessment area.

Wetland Site Name_	TTA Wetland BB	Date	7/31/13
Wetland Type _	Bottomland Hardwood Forest	Assessor Name/Organization	BP/STV
Notes on Field Assessn	nent Form (Y/N)		YES
Presence of regulatory			YES
Wetland is intensively n			NO
-	ated within 50 feet of a natural tributary or other	er open water (Y/N)	NO
	estantially altered by beaver (Y/N)	or open water (/////	NO
	iences overbank flooding during normal rainfa	all conditions (Y/N)	NO
Assessment area is on		m conditions (1771)	NO
Assessifient area is on	a coastal island (1714)		
Sub-function Rating S	ummary		
unction	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-Surface Storage and Retention	Condition	LOW
Vater Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Particulate Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Soluble Change	Condition	HIGH
	ű	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Physical Change	Condition	LOW
	,	Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	YES
	Pollution Change	Condition	NA
	r change	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Physical Structure	Condition	HIGH
	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	HIGH
unction Rating Sumn	nary Metrics/Notes		Rating
lydrology	Condition		HIGH
Vater Quality	Condition		HIGH
	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	YES
-labitat	Conditon		HIGH

	Rating Calculat	for Version 4.1	
Wetland Site Name	TTA Wetland BBB	Date	12/09/13
Wetland Type	Basin Wetland	Assessor Name/Organization	BP/STV
Level III Ecoregion	Piedmont 🔻	Nearest Named Water Body	Little Creek
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030002
Yes N	lo Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.914571, -79.002095
Please circle and/or mappropriate, in recent to the following. • Hydrological mesory surface and suspension tanks, ues Signs of vegetation Habitat/plant co	rs affecting the assessment area (may not be with make note on last page if evidence of stressors is appast (for instance, approximately within 10 years). In additional content of the welland (examples: ditches, dams, beaver dam sub-surface discharges into the welland (examples: ditches), hog lagoons, etc. ation stress (examples: vegetation mortality, insect ommunity alteration (examples: mowing, clear-cutting intensively managed?	parent. Consider departure from referent Noteworthy stressors include, but are no s, dikes, berms, ponds, etc.) ischarges containing obvious pollutants) damage, disease, storm damage, salt in	ot limited , presence of nearby
	rations (select all that apply to the assessment ar	raal .	
Anadromous fi Federally prote Position of the control of the contr	sh ected species or State endangered or threatened spe an buffer rule in effect ry Nursery Area (PNA)	ecies ern (AEC) (including buffer) al classifications of HQW, ORW, or Tro	ut
What type of natural	stream is associated with the wetland, if any? (c	heck all that apply)	
Blackwater	Stream is associated with the wettand, it any t	neck an that apply,	
Brownwater	had a state fallowing bound	FINAL FIRST	
` '		Wind Both	
	rea on a coastal island?		
Is the assessment ar	rea's surface water storage capacity or duration s	substantially altered by beaver?	Yes No
Does the assessmen	t area experience overbank flooding during norr	nal rainfall conditions?	Yes No
Check a box in each (VS) in the assess then rate the assess GS VS A A A B S B S a	Condition/Vegetation Condition – assessment a each column. Consider alteration to the ground sursment area. Compare to reference wetland if applicates applicates area based on evidence of an effect. Iot severely altered ever a majority of the assessment are edimentation, fire-plow lanes, skidder tracks, beddin literation examples: mechanical disturbance, herbicities diversity [if appropriate], hydrologic alteration)	face (GS) in the assessment area and value (see User Manual). If a reference rea (ground surface alteration examples g, fill, soil compaction, obvious pollutan	is not applicable, s: vehicle tracks, excessive tts) (vegetation structure
Check a box in eduration (Sub). (North Carolina hy≤1 foot deep is consub-surface water Surf Sub A A A A A A A A A A A A A A A A A A A	p-Surface Storage Capacity and Duration – assess each column. Consider surface storage capacity and Consider both increase and decrease in hydrology. Adric soils (see USACE Wilmington District website) considered to affect surface water only, while a ditch r. Consider tidal flooding regime, if applicable. Water storage capacity and duration are not altered. Water storage capacity or duration are altered, but no Water storage capacity or duration are substantially a hange) (examples: draining, flooding, soil compactic	nd duration (Surf) and sub-surface stora Refer to the current NRCS lateral effect for the zone of influence of ditches in hy > 1 foot deep is expected to affect both of substantially (typically, not sufficient to altered (typically, alteration sufficient to	t of ditching guidance for ydric soils. A ditch n surface and ditch o change vegetation). result in vegetation
Check a box in e	surface Relief – assessment area/wetland type co each column for each group below. Select the ap		
3a. CA CA EB EB CC CC CD CD 3b. CA Evid	Majority of wetland with depressions able to por Majority of wetland with depressions able to por Majority of wetland with depressions able to por	nd water 6 inches to 1 foot deep nd water 3 to 6 inches deep o han 2 feet 1 and 2 feet	

	Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators. 4a.
	 Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) Loamy or clayey soils not exhibiting redoximorphic features Loamy or clayey gleyed soil Histosol or histic epipedon
	4b. ☐ A Soil ribbon < 1 inch B Soil ribbon ≥1 inch
	4c. A No peat or muck presence B A peat or muck presence
5.	Discharge into Wetland – opportunity metric Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub A Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Land Use – opportunity metric Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. WS 5M 2M A A A A ≥ 10% impervious surfaces B B B B B B A < 10% impervious surfaces C C Confined animal operations (or other local, concentrated source of pollutants) D D D D D ≥ 20% coverage of pasture E B B B B B ≥ 20% coverage of agricultural land (regularly plowed land) F B B B B B ≥ 20% coverage of maintained grass/herb G G G G ≥ 20% coverage of clear-cut land H H H H H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.	 Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water?
8.	Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries. WT WC A A ≥100 feet B B From 80 to < 100 feet C C From 50 to < 80 feet D D From 40 to < 50 feet E E From 30 to < 40 feet F F From 15 to < 30 feet G G G From 5 to < 15 feet H H H <5 feet

4. Soil Texture/Structure – assessment area condition metric

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. Answer for assessment area dominant landform. Evidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. B Sediment deposition is excessive, but not overwhelming the wetland. C Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) CA CA ≥500 acres CB CB CB CB From 100 to < 500 acres CC CC From 50 to < 100 acres CD CD CD From 25 to < 50 acres CB CB CB From 10 to < 25 acres CB CB CB From 5 to < 10 acres CG CG CG From 5 to < 10 acres CG CG CG From 1 to < 5 acres CH CH CH CH From 0.5 to < 1 acre CI CI CI From 0.1 to < 0.5 acre CI CI CI CI From 0.01 to < 0.1 acre CI CI CI CI From 0.01 to < 0.1 acre CI CI CI CI CI Acre CI CI CI CI From 0.01 to < 0.1 acre
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥90%) of its natural landscape size. □ B Pocosin is < 90% of the full extent of its natural landscape size.
13.	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥500 acres B F From 100 to < 500 acres C From 50 to < 100 acres D D From 10 to < 50 acres E E < 10 acres F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
	 Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

17. eyequative Structure – assessment area/wetland type condition metric 17a. Is vegetation present? 17b. Evaluate percent coverage of vegetation 17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. 17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. 17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. 17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. 18c. AA A WT 19c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. 18d. AA A WT 19d. Check a canopy present but opened more than natural gaps associated with natural processes. 19d. Check a Dense price structure in airspace and the natural gaps. 19d. Check a Dense shrub layer parase or absent. 19d. Check a Dense shrub layer parase or absent. 19d. Check a Dense shrub layer parase or absent. 19d. Check a Dense shrub layer parase or absent. 19d. Check a Dense shrub layer parase or absent. 19d. Check a Dense shrub layer parase or absent. 19d. Check a Dense shrub layer parase or absent. 19d. Check a Dense shrub layer parase or absent. 19d. Check a Dense shrub layer parase or absent. 19d. Check a Dense shrub layer parase or absent. 19d. Check a Dense shrub layer parase or absent. 19d. Check a Dense shrub layer parase or absent. 19d. Check a Dense shrub layer parase or absent. 19d. Check a Dense shrub layer parase or absent. 19d. Check a Dense shrub layer parase or absent.			
170. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands. A 225% coverage of vegetation 17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. A WT A WT A Canopy closed, or nearly closed, with natural gaps associated with natural processes C B B C B Canopy present, but opened more than natural gaps associated with natural processes C C Canopy sparse or absent Moderate density mid-stony/sapling layer Moderate density mid-stony/sapling layer Moderate density shrub layer B B B Moderate density shrub layer Moderate density shrub layer Shrub layer sparse or absent C C C Shrub layer sparse or absent A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). B Not A 18. Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Majority of canopy trees have stems > 6 inches DBH or no trees. A Large logs (more than one) are visible (> 12-inches DBH, few are > 12-inch DBH. C Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. C Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. C A Large logs (more than one) are visible (> 12 inches In diameter, or large relative to species present and landscape stability). Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid while areas indicate open water. C A Large logs (more than one) are visible (> 12 inches In diameter, or large relative to species present and landscape stability). Not A Large logs (more than one) are visible (> 12 inches In diameter, or large relative to sp	17.		
A 25% coverage of vegetation 17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT AA WT B C B C B C Canopy present, but opened more than natural gaps associated with natural processes Canopy present, but opened more than natural gaps associated with natural processes Canopy present, but opened more than natural gaps C C C C Canopy sparse or absent A C A Dense mid-story/sapling layer parse or absent C C C Shrub layer sparse or absent A C Dense shrub layer Moderate density shrub layer B B B Moderate density herb layer Herb layer sparse or absent A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A 19. Diameter Class Distribution – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A 19. Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees. 20. Large Woody Debris – wetland type condition metric include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). B Not A 21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Palterned areas indicate open water. D D D D D D D D D D D D D D D D D D D		Yes No If Yes, continue to 17b. If No, skip to Metric 18.	
In airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT AA WT A Canopy present, but opened more than natural gaps associated with natural processes B Canopy present, but opened more than natural gaps C C C C Canopy sparse or absent B Moderate density mid-story/sapling layer B M Moderate density mid-story/sapling layer C C C Mid-story/sapling layer sparse or absent B M Moderate density mid-story/sapling layer B M Moderate density shrub layer B M Majority or canopy trees have stems > 6 inches DBH, or large relative to species present and landscape stability). B M Majority or canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present. B M Majority or canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. B M Majority or canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority or canopy trees are < 6 inches DBH or no trees. C M Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A 21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. C A D C Overbank and overland flow are not severely alter hydrologic connectivity include intensive d		A ≥25% coverage of vegetationB < 25% coverage of vegetation	
A Canopy present, but opened more than natural gaps associated with natural processes C Canopy sparse or absent C C C Canopy sparse or absent C C C C C C C C C C C C C C C C C C C		in airspace above the assessment area (AA) and the wetland type (WT) separately.	
Sample		A Canopy closed, or nearly closed, with natural gaps associated with natural processes B B CB Canopy present, but opened more than natural gaps C C C Canopy sparse or absent	
A Dense herb layer Moderate density herb layer Moderate density herb layer C C C C Herb layer sparse or absent 18. Snags - wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). B Not A 19. Diameter Class Distribution - wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present. B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. C Majority of canopy trees are < 6 inches DBH or no trees. 20. Large Woody Debris - wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). B Not A 21. Vegetation/Open Water Dispersion - wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. C A Describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. C A Describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. C A Deventant and overland flow are not severely alterned in the assessment area.		C A Dense mid-story/sapling layer B B B Moderate density mid-story/sapling layer C C Mid-story/sapling layer sparse or absent	
18. Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A 19. Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present. B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. C Majority of canopy trees are < 6 inches DBH or no trees. 20. Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A 21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. C A Describance Season of Seas		D - D	
Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A 19. Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present. B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees. 20. Large Woody Debris – wetland type condition metric include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A 21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. C A C B C C C C C C C C C C C C C C C C		C C C Herb layer absent	
A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present. B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. C Majority of canopy trees are < 6 inches DBH or no trees. 20. Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). B Not A 21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. C C D D 22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. C A Overbank and overland flow are not severely altered in the assessment area.	18.	Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).	
Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees. 20. Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A 21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. C A B C B C C C C C C C C C C C C C C C	19.	A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are	
Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A 21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. C A C B C C C C C C C C C C C C C C C C			
Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. CA B CC D Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. A Overbank and overland flow are not severely altered in the assessment area.	20.	Include both natural debris and man-placed natural debris. • A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).	
Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. [A Overbank and overland flow are not severely altered in the assessment area.	21.	Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.	
Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. [A Overbank and overland flow are not severely altered in the assessment area.			
	22.	Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. A Overbank and overland flow are not severely altered in the assessment area.	

- B Overbank flow is severely altered in the assessment area.
- C Overland flow is severely altered in the assessment area.
- D Both overbank and overland flow are severely altered in the assessment area.

Notes

Wetland BBB is a palustrine forested/emergent wetland located adjacent to Little Creek (Stream Y). Wetland BBB is a backwater basin located in the floodplain forest of the Corps Waterfowl lands.

Wetland Site Name	TTA Wetland BBB	Date	12/09/13
Wetland Type	Basin Wetland	Assessor Name/Organization	BP/STV
			VE0
Notes on Field Assessm	• •		YES
Presence of regulatory c			YES
Wetland is intensively ma			NO NO
	ited within 50 feet of a natural tributary or other	er open water (Y/N)	YES
	stantially altered by beaver (Y/N)		NO
	ences overbank flooding during normal rainfa	Il conditions (Y/N)	NONO
Assessment area is on a	a coastal island (Y/N)		NO
Sub-function Rating Su	ummary		
unction	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	NA
	Sub-Surface Storage and Retention	Condition	NA
Vater Quality	Pathogen Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Particulate Change	Condition	NA
		Condition/Opportunity	NA
	Soluble Change	Opportunity Presence? (Y/N)	NA
		Condition	NA
	-	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Physical Change	Condition	NA
	Pollution Change	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
		Condition	HIGH
	, change	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Physical Structure	Condition	HIGH
	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	HIGH
Function Rating Summ	narv		
unction	Metrics/Notes		Rating
Hydrology	Condition		HIGH
Vater Quality	Condition		HIGH
	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	NO
Habitat	Conditon		HIGH

1		realing Calculator	VC131011 4.1	
	Wetland Site Name TTA We	etland C	Date	6/4/13
	Wetland Type Head	w ater Forest	Assessor Name/Organization	BP-STV
ı	Level III Ecoregion Piedm	nont	Nearest Named Water Body	Sandy Creek
ı	River Basin Cape	Fear	USGS 8-Digit Catalogue Uni	03030002
ı	Yes No Prec	ipitation within 48 hrs?	Latitude/Longitude (deci-degrees) 35.975664, -78.957633
	Please circle and/or make note appropriate, in recent past (for to the following. • Hydrological modificatio • Surface and sub-surface septic tanks, undergrou • Signs of vegetation stre	ng the assessment area (may not be within on last page if evidence of stressors is apparting instance, approximately within 10 years). Not ons (examples: ditches, dams, beaver dams, the discharges into the wetland (examples: discend storage tanks (USTs), hog lagoons, etc.) as (examples: vegetation mortality, insect day alteration (examples: mowing, clear-cutting,	rent. Consider departure from refere teworthy stressors include, but are no dikes, berms, ponds, etc.) charges containing obvious pollutants mage, disease, storm damage, salt	ot limited s, presence of nearby
	Is the assessment area intens	sively managed? Yes No		
	Anadromous fish Federally protected spe NCDWQ riparian buffer Abuts a Primary Nurser Publicly owned property N.C. Division of Coastal Abuts a stream with a N Designated NCNHP refe	y Area (PNA) I Management Area of Environmental Concer ICDWQ classification of SA or supplemental o	es n (AEC) (including buffer)	out
	What type of natural stream is Blackwater Brownwater Tidal (if tidal, check one Is the assessment area on a	s associated with the wetland, if any? (che	Wind Both	[∵Yes [∙ No
		sperience overbank flooding during normal		Yes No
	Check a box in each colu (VS) in the assessment are then rate the assessment are GS VS A A Not severe B B Severely a sedimenta alteration of	n/Vegetation Condition – assessment area umn. Consider alteration to the ground surface. ea. Compare to reference wetland if applicabe area based on evidence of an effect. ely altered altered over a majority of the assessment area tion, fire-plow lanes, skidder tracks, bedding, examples: mechanical disturbance, herbicide sity [if appropriate], hydrologic alteration)	te (GS) in the assessment area and le (see User Manual). If a reference a (ground surface alteration example fill, soil compaction, obvious pollutar	is not applicable, s: vehicle tracks, excessive nts) (vegetation structure
	Check a box in each coluduration (Sub). Consider North Carolina hydric soils ≤ 1 foot deep is considered sub-surface water. Considered Surful Suful Sub Water stored But But Water stored Curve Water Supplementation (Sub). Consider Sub Water Stored Curve Water Sub W	e Storage Capacity and Duration – assessmum. Consider surface storage capacity and both increase and decrease in hydrology. Re (see USACE Wilmington District website) for d to affect surface water only, while a ditch > er tidal flooding regime, if applicable. Tage capacity and duration are not altered. The age capacity or duration are altered, but not stage capacity or duration are substantially altered age capacity or duration are substantially altered ages capacity or duration, soil compaction,	duration (Surf) and sub-surface stora efer to the current NRCS lateral effect the zone of influence of ditches in h 1 foot deep is expected to affect both substantially (typically, not sufficient to	et of ditching guidance for sydric soils. A ditch h surface and ditch so change vegetation).
	Check a box in each column type (WT). AA WT 3a. A A A A A A A A A A A A A A A A A A A	elief – assessment area/wetland type condumn for each group below. Select the appropriate of wetland with depressions able to ponduity of wetland with depressions able to ponduity of wetland with depressions able to ponduessions able to ponduity of wetland with depressions able to ponduity of wetland with depressions able to ponduity of water < 3 inches deep to maximum depth of inundation is greater than to maximum depth of inundation is less than 1	water > 1 foot deep water 6 inches to 1 foot deep water 3 to 6 inches deep n 2 feet and 2 feet	

4.	Soil Texture/Structure – assessment area condition metric Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators. 4a. A Sandy soil B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) C Loamy or clayey soils not exhibiting redoximorphic features D Loamy or clayey gleyed soil Histosol or histic epipedon
	 4b.
5.	Discharge into Wetland – opportunity metric Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub A Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive
6.	Land Use – opportunity metric Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. WS 5M 2M ✓ A ✓ A ✓ A → 10% impervious surfaces □ B □ B □ B < 10% impervious surfaces □ C □ C □ C Confined animal operations (or other local, concentrated source of pollutants) □ D □ D □ D ≥ 20% coverage of pasture □ E □ E □ E ≥ 20% coverage of agricultural land (regularly plowed land) □ F □ F □ F ≥ 20% coverage of maintained grass/herb □ G □ G □ G ≥ 20% coverage of clear-cut land □ H □ H □ H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.	 Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water? Yes No If Yes, continue to 7b. If No, skip to Metric 8. Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed. 7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. A ≥ 50 feet B From 30 to < 50 feet C From 15 to < 30 feet D From 5 to < 15 feet E < 5 feet or buffer bypassed by ditches 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width. ✓ 15-feet wide
8.	Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries. WT WC A A ≥ 100 feet B B From 80 to < 100 feet C C From 50 to < 80 feet D From 40 to < 50 feet F From 30 to < 40 feet F From 15 to < 30 feet G G From 5 to < 15 feet H C H < 5 feet

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. Evidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. Sediment deposition is excessive, but not overwhelming the wetland. Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) A A ≥ 500 acres B B From 10 to < 500 acres C C C From 50 to < 100 acres C C C From 50 to < 100 acres C C C From 50 to < 10 acres C C C From 5 to < 10 acres C C C C From 5 to < 10 acres C C C C From 5 to < 10 acres C C C C From 0.5 to < 1 acre C C C C From 0.1 to < 0.5 acre C C C C C C C C C C C C C C C C C C C
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) A Pocosin is the full extent (≥ 90%) of its natural landscape size. B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥ 500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres D D From 10 to < 50 acres E < 10 acres F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) ☑ A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. ☑ B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. ☑ C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric
17a. Is vegetation present? ☑ Yes ☑ No If Yes, continue to 17b. If No, skip to Metric 18.
17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ☐A ≥ 25% coverage of vegetation ☐B < 25% coverage of vegetation
17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT
Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent
G G G Shrub layer C C Shrub layer sparse or absent
CA CA Dense herb layer B Moderate density herb layer C C Herb layer sparse or absent
18. Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). B Not A
 19. Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are
present. B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.
 20. Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). B Not A
21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)
Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.
22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive
ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. A Overbank and overland flow are not severely altered in the assessment area.
B Overbank flow is severely altered in the assessment area. C Overland flow is severely altered in the assessment area.
Both overbank <u>and</u> overland flow are severely altered in the assessment area. Notes
Wetland C is a palustrine forested/emergent wetland abutting both sides of Stream C. Wetland C drains to Stream B and Wetland A through a pipe culvert set under an earthen berm that has created a dam which has created Wetland C.

Wetland Site Name	TTA Wetland C	Date	6/4/13
Wetland Type	Headwater Forest	Assessor Name/Organization	BP-STV
Natas an Field Assessed	2014 Farmer (V/N)		VEC
Notes on Field Assessm			YES YES
Presence of regulatory of			NO
Wetland is intensively m	= ' '	or open water (V/N)	YES
	ated within 50 feet of a natural tributary or othe stantially altered by beaver (Y/N)	er open water (1714)	NO
	lences overbank flooding during normal rainfa	all conditions (Y/N)	YES
Assessment area is on a		in conditions (1/14)	NO
Assessment area is on a	d Coastai Island (1714)		110
Sub-function Rating S	ummary		
Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-Surface Storage and Retention	Condition	MEDIUM
Water Quality	Pathogen Change	Condition	LOW
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	HIGH
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Habitat	Physical Structure	Condition	MEDIUM
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	HIGH
Function Rating Sumn	nary.		
Function Rating Summ	Metrics/Notes		Rating
Hydrology	Condition		HIGH
Water Quality	Condition		HIGH
	Condition/Opportunity		HIGH
	Opportunity Presence? (Y/N)		YES
Habitat	Conditon		MEDIUM

	Rating Calculate	tor Version 4.1
Wetland Site Name	TTA Wetland CC	Date 11/05/13
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization BP/STV
Level III Ecoregion	Piedmont	Nearest Named Water Body Little Creek
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit 03030002
Yes No	o Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) 35.906439, -78.994569
Please circle and/or mappropriate, in recent pto the following. Hydrological mesorate surface and surface tanks, uresigns of vegeta	nderground storage tanks (USTs), hog lagoons, etc	parent. Consider departure from reference, if Noteworthy stressors include, but are not limited as, dikes, berms, ponds, etc.) lischarges containing obvious pollutants, presence of nearby .) damage, disease, storm damage, salt intrusion, etc.)
Is the assessment are	ea intensively managed? Tyes No	
Anadromous fis Federally prote V NCDWQ riparia Abuts a Priman V Publicly owned N.C. Division of Abuts a stream Designated NC Abuts a 303(d) What type of natural Blackwater Brownwater Tidal (if tidal, cf Is the assessment are Is the assessment are Check a box in e (VS) in the assess then rate the asses GS VS A A A N B B S	cted species or State endangered or threatened spean buffer rule in effect y Nursery Area (PNA) property f Coastal Management Area of Environmental Concernity with a NCDWQ classification of SA or supplement NHP reference community listed stream or a tributary to a 303(d)-listed stream stream is associated with the wetland, if any? (concernity is surface water storage capacity or duration in the surface water storage capacity or duration in the surface water storage capacity or duration in the column. Consider alteration to the ground surface column. Consider alteration to the ground surface water area. Compare to reference wetland if applications are a severely altered everely	cern (AEC) (including buffer) al classifications of HQW, ORW, or Trout check all that apply) Wind Both substantially altered by beaver? Yes No
2. Surface and Sub Check a box in e duration (Sub). (North Carolina hy ≤1 foot deep is co sub-surface water Surf Sub AAAA BBBW CCCCCW	ess diversity [if appropriate], hydrologic alteration) Described Storage Capacity and Duration – assessach column. Consider surface storage capacity and Consider both increase and decrease in hydrology. dric soils (see USACE Wilmington District website) considered to affect surface water only, while a ditcher. Consider tidal flooding regime, if applicable. Vater storage capacity and duration are not altered. Vater storage capacity or duration are altered, but not vater storage capacity or duration are substantially and content of the cont	sides, salt intrusion [where appropriate], exotic species, grazing, ssment area condition metric and duration (Surf) and sub-surface storage capacity and Refer to the current NRCS lateral effect of ditching guidance for for the zone of influence of ditches in hydric soils. A ditch > 1 foot deep is expected to affect both surface and ditch out substantially (typically, not sufficient to change vegetation). altered (typically, alteration sufficient to result in vegetation on, filling, excessive sedimentation, underground utility lines).
Check a box in e type (WT). AA WT 3a. A A B B C C C C 3b. A Evid	Majority of wetland with depressions able to por	nd water 6 inches to 1 foot deep nd water 3 to 6 inches deep p than 2 feet

4.	Check a box feature. Make regional indices 4a. A B C C C D	Structure – assessment area condition metric from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape e soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for ators. Sandy soil Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) Loamy or clayey soils not exhibiting redoximorphic features Loamy or clayey gleyed soil Histosol or histic epipedon
	4b. 🖸 A	Soil ribbon < 1 inch Soil ribbon ≥1 inch
		No peat or muck presence A peat or muck presence
5.	Check a box Examples of s Surf Sub	to Wetland – opportunity metric in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.
	EB EB	Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
	Ec Ec	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Check all the draining to as assessment a are considered. WS 5M A A A B B B C C C D D E E E F F F G G G	at apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources a sessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers and to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. 2M A ≥10% impervious surfaces B <10% impervious surfaces C Confined animal operations (or other local, concentrated source of pollutants) D ≥20% coverage of pasture E ≥20% coverage of agricultural land (regularly plowed land) F ≥20% coverage of maintained grass/herb G ≥20% coverage of clear-cut land H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
	7a. Is assess Yes Wetland Record 7b. How mu A B C C D T E 7c. Tributan Yes 7e. Is tributa Shelt Expos	ary or other open water sheltered or exposed? ered – adjacent open water with width < 2500 feet <u>and</u> no regular boat traffic. sed – adjacent open water with width ≥2500 feet <u>or</u> regular boat traffic.
8.	Check a box	Ith at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) in each column. Select the average width for the wetland type at the assessment area (WT) nd complex at the assessment areas (WC). See User Manual for WT and WC boundaries. ≥100 feet From 80 to < 100 feet From 50 to < 80 feet From 40 to < 50 feet From 30 to < 40 feet From 15 to < 30 feet From 5 to < 15 feet < 5 feet

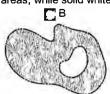
9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform.
	TA Evidence of short-duration inundation (< 7 consecutive days)
	Evidence of saturation, without evidence of inundation
	Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric
	Consider recent deposition only (no plant growth since deposition). GA Sediment deposition is not excessive, but at approximately natural levels.
	Sediment deposition is not excessive, but at approximately natural levels. Sediment deposition is excessive, but not overwhelming the wetland.
	C Sediment deposition is excessive and is overwhelming the wetland.
11	Wetland Size – wetland type/wetland complex condition metric
• • •	Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the
	size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User
	Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.
	WT WC FW (if applicable) □ A □ A ≥500 acres
	B B From 100 to < 500 acres
	C C C From 50 to < 100 acres
	C C C From 50 to < 100 acres C D C D From 25 to < 50 acres C E C E From 10 to < 25 acres
	E E E From 10 to < 25 acres F E F From 5 to < 10 acres
	G G G From 1 to < 5 acres
	H H From 0.5 to < 1 acre
	☐ H ☐ H From 0.5 to < 1 acre ☐ I ☐ I From 0.1 to < 0.5 acre ☐ J ☐ J From 0.01 to < 0.1 acre
	C C C From 50 to < 100 acres D D D From 25 to < 50 acres E E E From 10 to < 25 acres F F F F From 5 to < 10 acres G G G From 1 to < 5 acres H D H From 0.5 to < 1 acre I D D D From 25 to < 10 acres C C C C From 10 to < 25 acres C C C C C C C C C C C C C C C C C C C
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) ☐ A Pocosin is the full extent (≥90%) of its natural landscape size.
	B Pocosin is < 90% of the full extent of its natural landscape size.
13.	Connectivity to Other Natural Areas – landscape condition metric
	13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This
	evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous
	metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.
	Well Loosely
	A A ≥500 acres
	B B From 100 to < 500 acres
	C C From 50 to < 100 acres D From 10 to < 50 acres
	E E < 10 acres
	F F Wetland type has a poor or no connection to other natural habitats
	13b. Evaluate for marshes only.
	Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes)
	May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts.
	Consider the eight main points of the compass.
	A No artificial edge within 150 feet in all directions
	B No artificial edge within 150 feet in four (4) to seven (7) directions
	An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)
	Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
	Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species
	characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or
	clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
	Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in
	at least one stratum.
16	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)
10.	A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
	B Vegetation diversity is low or has > 10% to 50% cover of exotics.
	C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present? Yes No. If Yes, continue to 17b. If No, skip to Metric 18. 17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands. ≥25% coverage of vegetation < 25% coverage of vegetation 17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. WT Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent Dense mid-story/sapling layer Moderate density mid-story/sapling layer Mid-story/sapling layer sparse or absent Dense shrub layer Moderate density shrub layer Shrub layer sparse or absent Dense herb layer Moderate density herb layer Herb layer sparse or absent 18. Snags - wetland type condition metric A B Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). 19. Diameter Class Distribution - wetland type condition metric Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. **≓**c Majority of canopy trees are < 6 inches DBH or no trees. 20. Large Woody Debris - wetland type condition metric Include both natural debris and man-placed natural debris C A ⊙ B Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A

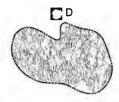
21. Vegetation/Open Water Dispersion - wetland type/open water condition metric (evaluate for Non-Tidal Freshwater

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.









22. Hydrologic Connectivity - assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive

ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

A B C D Overbank and overland flow are not severely altered in the assessment area.

Overbank flow is severely altered in the assessment area.

Overland flow is severely altered in the assessment area.

Both overbank and overland flow are severely altered in the assessment area.

Wetland CC is a palustrine forested wetland located adjacent to the NC 54 Highway. Wetland CC is located in the floodplain forest adjacent to Stream CC.

Wetland Site Name	TTA Wetland CC	A N /O ! !!	DD/CT\/			
Wetland Type _	Bottomland Hardwood Forest	Assessor Name/Organization	BP/STV			
Notes on Field Assessn	nent Form (Y/N)		YES			
Presence of regulatory considerations (Y/N)						
Wetland is intensively managed (Y/N)						
=	ated within 50 feet of a natural tributary or other	er open water (Y/N)	YES			
	ostantially altered by beaver (Y/N)	, , , , , , , , , , , , , , , , , , , ,	NO			
	iences overbank flooding during normal rainfa	Il conditions (Y/N)	NO			
Assessment area is on		(,	NO			
TOOGGGINGITE GIGGING OF	a social island (1774)					
Sub-function Rating S	Summary					
unction	Sub-function	Metrics	Rating			
Hydrology	Surface Storage and Retention	Condition	HIGH			
	Sub-Surface Storage and Retention	Condition	MEDIUM			
Water Quality	Pathogen Change	Condition	HIGH			
		Condition/Opportunity	HIGH			
		Opportunity Presence? (Y/N)	NO			
	Particulate Change	Condition	HIGH			
		Condition/Opportunity	HIGH			
		Opportunity Presence? (Y/N)	NO			
	Soluble Change	Condition	MEDIUM			
	ū	Condition/Opportunity	MEDIUM			
		Opportunity Presence? (Y/N)	NO			
	Physical Change	Condition	MEDIUM			
	, ,	Condition/Opportunity	MEDIUM			
		Opportunity Presence? (Y/N)	YES			
	Pollution Change	Condition	- NA			
	, c	Condition/Opportunity	NA			
		Opportunity Presence? (Y/N)	NA			
	Physical Structure	Condition	MEDIUM			
	Landscape Patch Structure	Condition	LOW			
	Vegetation Composition	Condition	HIGH			
	·					
Function Rating Sumr Function	mary Metrics/Notes		Rating			
Hydrology	Condition		HIGH			
Water Quality	Condition		HIGH			
	Condition/Opportunity		HIGH			
	Opportunity Presence?	(Y/N)	YES			
Habitat	Conditon		MEDIUM			

			Rating Calcula	tor Version 4.1	
Wetland Site	Name	TTA Wetland CCC			Pate 12/09/13
Wetlan	d Type	Basin Wetland	_	Assessor Name/Organiza	BP/STV
Level III Eco	region	Piedmont	*	Nearest Named Water B	ody Little Creek
Rive	Basin	Cape Fear	•	USGS 8-Digit Catalogue I	Jnit 03030002
T Yes	∏ No	Precipitation within 48 hrs	s?	Latitude/Longitude (deci-degre	ees) 35.913820, -79.001718
Please circle an appropriate, in to the following Hydrolo Surface septic to Signs of Habitat/	nd/or ma recent p gical mo and sub anks, un f vegeta plant co	ast (for instance, approximate offications (examples: ditcheso-surface discharges into the viderground storage tanks (UST tion stress (examples: vegetal mmunity alteration (examples:	ce of stressors is ap ly within 10 years). I s, dams, beaver dam vetland (examples: d s), hog lagoons, etc tion mortality, insect mowing, clear-cutti	parent. Consider departure from ref Noteworthy stressors include, but ar is, dikes, berms, ponds, etc.) ischarges containing obvious polluta .) damage, disease, storm damage, s	e not limited ants, presence of nearby
is the assessn	nent are	ea intensively managed?	Yes No		
Anadror Federal NCDWG Abuts a Publicly N.C. Div Abuts a Designa Abuts a	mous fis ly protect of riparial Primary owned vision of stream ated NCI 303(d)-	ted species or State endanger n buffer rule in effect n Nursery Area (PNA) property Coastal Management Area of with a NCDWQ classification of NHP reference community listed stream or a tributary to a	red or threatened sp Environmental Cond of SA or supplement a 303(d)-listed strean	ecies cern (AEC) (including buffer) al classifications of HQW, ORW, or	Trout
Blackwa Brownw	ater ater	stream is associated with the		heck all that apply)	
	tiual, or	ieck one of the following boxes	s) 🔼 Lunar	Wind Both	
Is the assessn		eck one of the following boxes a on a coastal island?		☐ Wind ☐ Both	
	nent are	ea on a coastal island?	Yes No		C. Yes € No
Is the assessn	nent are	ea on a coastal island? ea's surface water storage ca	Yes No	substantially altered by beaver?	_ Yes _ No _ Yes _ No
Does the asses 1. Ground S Check a b (VS) in the	nent are ssment urface (ox in ea assess he asse A No B Se se alt	ea on a coastal island? ea's surface water storage can area experience overbank for Condition/Vegetation Condition Condition Consider alterationent area. Compare to refere ssment area based on evidence of severely altered everely altered everely altered over a majority edimentation, fire-plow lanes, s	Tyes No apacity or duration looding during nor ion – assessment a ion to the ground sui ence wetland if applic be of an effect. of the assessment a kidder tracks, beddin I disturbance, herbid	substantially altered by beaver?	Tyes No and vegetation structure nce is not applicable, ples: vehicle tracks, excessive utants) (vegetation structure
Is the assessn Does the asses 1. Ground S Check a b (VS) in the then rate t GS VS ☐ A ☐ ☐ B ☐ 2. Surface a Check a b duration (North Card ≤1 foot de sub-surface	nent are ssment urface (ox in existence) assesses he asses A No B Se alt lex nd Sub ox in existence Sub). C Oblina hyd existence be water ub A W B W C W	ca on a coastal island? ca's surface water storage ca carea experience overbank file Condition/Vegetation Condition Consider alteration cach column. Consider alteration consider alteration consider altered coverely altered coverely altered over a majority dimentation, fire-plow lanes, sile consider surface consider both increase and decidic soils (see USACE Wilming considered to affect surface water action consider tidal flooding regime atter storage capacity and duration atter storage capacity or duration cater storage capacity or duration	apacity or duration looding during nor ion – assessment a ion to the ground suitance wetland if applicate of an effect. of the assessment a kidder tracks, bedding il disturbance, herbicatrologic alteration) and Duration – assesses to storage capacity a crease in hydrology, thon District website) er only, while a ditche, if applicable. ation are not altered, on are altered, but no on are substantially	substantially altered by beaver? mal rainfall conditions? area condition metric face (GS) in the assessment area a cable (see User Manual). If a refere	Ind vegetation structure nce is not applicable, ples: vehicle tracks, excessive utants) (vegetation structure te], exotic species, grazing, storage capacity and ffect of ditching guidance for in hydric soils. A ditch both surface and ditch
Is the assessment of the control of	nent are ssment urface (ox in extended assessed assessed assessed assessed assessed at the control of the cont	ea on a coastal island? ea's surface water storage cata area experience overbank for Condition/Vegetation Condition/Vegetation Condition Consider alteration area. Compare to refere sement area based on evidence of severely altered everely altered everely altered everely altered everely altered exercive in examples: mechanical es diversity [if appropriate], hydrocompare to example consider surface examples: mechanical es diversity [if appropriate], hydrocompare to example consider both increase and deciric soils (see USACE Wilming ensidered to affect surface water storage capacity and durater storage capacity or duratifater storag	apacity or duration looding during norm ion – assessment a ion to the ground suitance wetland if applicate of an effect. of the assessment at kidder tracks, bedding disturbance, herbical disturbance, if applicable. ation are not altered, but non are altered, but non are substantially oding, soil compaction are altered, but non are substantially oding, soil compaction are altered. Select the appressions able to popressions able to po	substantially altered by beaver? mal rainfall conditions? area condition metric face (GS) in the assessment area a cable (see User Manual). If a refere area (ground surface alteration examing, fill, soil compaction, obvious politides, salt intrusion [where appropriates, sament area condition metric and duration (Surf) and sub-surface is area for the current NRCS lateral is for the zone of influence of ditches > 1 foot deep is expected to affect out substantially (typically, not sufficient in the substantially (typically, alteration sufficient in the	nd vegetation structure nce is not applicable, ples: vehicle tracks, excessive utants) (vegetation structure te], exotic species, grazing, storage capacity and ffect of ditching guidance for in hydric soils. A ditch both surface and ditch ent to change vegetation). It to result in vegetation underground utility lines).

Soil Texture/Structure – assessment area condition metric Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators. 4a. A Sandy soil B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
C Loamy or clayey soils not exhibiting redoximorphic features C D Loamy or clayey gleyed soil Histosol or histic epipedon
4b. ☐ A Soil ribbon < 1 inch ☐ B Soil ribbon ≥1 inch
4c. A No peat or muck presence A peat or muck presence
Discharge into Wetland – opportunity metric Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub
Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
Land Use – opportunity metric Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. WS 5M 2M A A A A ≥10% impervious surfaces
F B F B < 10% impervious surfaces C C C C C Confined animal operations (or other local, concentrated source of pollutants) D D D D D ≥20% coverage of pasture E F F F E ≥20% coverage of agricultural land (regularly plowed land) F F F F F ≥20% coverage of maintained grass/herb G G G G G ≥20% coverage of clear-cut land H H H H H H H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water? ☐ Yes ☐ No If Yes, continue to 7b. If No, skip to Metric 8. Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed. 7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. ☐ A ≥50 feet ☐ C From 30 to < 50 feet ☐ D From 5 to < 30 feet ☐ D From 5 to < 15 feet ☐ E < 5 feet or buffer bypassed by ditches 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width. ☐ ≤15-feet wide ☐ > 15-feet wide ☐ Other open water (no tributary present) 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water? ☐ Yes ☐ No 7e. Is tributary or other open water sheltered or exposed? ☐ Sheltered — adjacent open water with width < 2500 feet and no regular boat traffic. ☐ Exposed — adjacent open water with width ≥2500 feet or regular boat traffic.
Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries. WT WC A A ≥100 feet B B From 80 to < 100 feet C C From 50 to < 80 feet D D From 40 to < 50 feet E F From 30 to < 40 feet F F From 15 to < 30 feet C G G From 5 to < 15 feet C H H H < 5 feet

	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. Answer for assessment area dominant landform. Evidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. B Sediment deposition is excessive, but not overwhelming the wetland. C C Sediment deposition is excessive and is overwhelming the wetland.
	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) CA CA CA ≥500 acres CB CB CB CB From 100 to < 500 acres CC CC From 50 to < 100 acres CD CD CD From 25 to < 50 acres CE CE CE From 50 to < 100 acres CF CF From 5 to < 10 acres CG CG CG From 1 to < 5 acres CH CH CH CH From 0.5 to < 1 acre CI CI CI From 0.01 to < 0.5 acre CJ CJ CJ From 0.01 to < 0.1 acre CK CK CK CO.01 acre or assessment area is clear-cut
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥90%) of its natural landscape size. □ B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres C D D From 10 to < 50 acres E E E < 10 acres F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	 Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) ☑ A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. ☑ B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. ☑ C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

17.	Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present?					
	Yes No If Yes, continue to 17b. If No, skip to Metric 18.					
	17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ☐ A ≥25% coverage of vegetation ☐ B < 25% coverage of vegetation					
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT					
	Canopy closed, or nearly closed, with natural gaps associated with natural processes B B Canopy present, but opened more than natural gaps C C Canopy sparse or absent					
	Dense mid-story/sapling layer A Dense mid-story/sapling layer B B Moderate density mid-story/sapling layer C C Mid-story/sapling layer sparse or absent					
	☐ A ☐ A Dense shrub layer ☐ B ☐ B Moderate density shrub layer ☐ C ☐ C Shrub layer sparse or absent					
	☐ A ☐ A Dense herb layer ☐ B ☐ B Moderate density herb layer ☐ C ☐ C Herb layer sparse or absent					
18.	Snags – wetland type condition metric					
	Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A					
19.	Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.					
	Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.					
20.	Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A					
21.	Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned					
	areas indicate vegetated areas, while solid white areas indicate open water.					
	EA EB EC EP					
	(25) (2) ()					
22.	Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive					
	ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. TA Overbank and overland flow are not severely altered in the assessment area.					

- Overbank flow is severely altered in the assessment area.
- Overland flow is severely altered in the assessment area.
- Both overbank and overland flow are severely altered in the assessment area.

Notes

Wetland CCC is a palustrine emergent wetland located adjacent to Little Creek (Stream Y). Wetland CCC is a backwater basin located in the floodplain forest of the Corps Waterfowl lands.

1 0 1

Wetland Site Name	TTA Wetland CCC	Date	12/09/13		
Wetland Type_	Basin Wetland	Assessor Name/Organization	BP/STV		
Votes on Field Assessr	ment Form (Y/N)		YES		
Notes on Field Assessment Form (Y/N) Presence of regulatory considerations (Y/N)					
Presence of regulatory considerations (Y/N) Wetland is intensively managed (Y/N)					
•	ated within 50 feet of a natural tributary or other	er open water (Y/N)	NO YES		
	ostantially altered by beaver (Y/N)	or open water (1711)	NO		
	riences overbank flooding during normal rainfa	all conditions (V/N)	NO		
Assessment area is on		in conditions (1711)	NO		
Assessment area is on	a coastal island (1714)				
Sub-function Rating S	Summary				
Function	Sub-function	Metrics	Rating		
Hydrology	Surface Storage and Retention	Condition	NA		
	Sub-Surface Storage and Retention	Condition	NA		
Water Quality	Pathogen Change	Condition	NA		
		Condition/Opportunity	NA		
		Opportunity Presence? (Y/N)	NA		
	Particulate Change	Condition	NA		
		Condition/Opportunity	NA		
		Opportunity Presence? (Y/N)	NA		
	Soluble Change	Condition	NA		
	· ·	Condition/Opportunity	- NA		
		Opportunity Presence? (Y/N)	NA		
	Physical Change	Condition	NA		
	3.	Condition/Opportunity	NA		
		Opportunity Presence? (Y/N)	NA		
	Pollution Change	Condition	HIGH		
	. Gradieri Granige	Condition/Opportunity	HIGH		
		Opportunity Presence? (Y/N)	NO		
––––––––––––––––––––––––––––––––––––––	Physical Structure	Condition	HIGH		
	Landscape Patch Structure	Condition	HIGH		
	Vegetation Composition	Condition	HIGH		
	. ogotate eepeee.				
Function Rating Sumr	mary Metrics/Notes		Rating		
Function Hydrology	Condition		HIGH		
Water Quality	Condition		HIGH		
rrator duality	Condition/Opportunity		HIGH		
	Opportunity Presence?	(Y/N)	NO		
Habitat	Conditon		HIGH		

	Rating Calculato	Version 4.1	
Wetland Site Nam	ne TTA Wetland D	Date 6/	/5/13
Wetland Typ	Bottomland Hardw ood Forest	Assessor Name/Organization B	P-STV
Level III Ecoregio	n Piedmont 🔻	Nearest Named Water Body S	andy Creek
River Basi	in Cape Fear 🔻	USGS 8-Digit Catalogue Unit 0	3030002
☐Yes 🖸	No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) 3	5.960118, -78.962445
Please circle and/or appropriate, in recent to the following. • Hydrological results of the surface and septic tanks, • Signs of vegee • Habitat/plant	ors affecting the assessment area (may not be within make note on last page if evidence of stressors is appart past (for instance, approximately within 10 years). No modifications (examples: ditches, dams, beaver dams, sub-surface discharges into the wetland (examples: disunderground storage tanks (USTs), hog lagoons, etc.) etation stress (examples: vegetation mortality, insect decommunity alteration (examples: mowing, clear-cutting area intensively managed? Tyes No erations (select all that apply to the assessment area	arent. Consider departure from reference of the worthy stressors include, but are not list dikes, berms, ponds, etc.) charges containing obvious pollutants, parmage, disease, storm damage, salt introp, exotics, etc.)	mited
NCDWQ ripal Abuts a Prima Publicly owne N.C. Division Abuts a strea Designated N	tected species or State endangered or threatened spec rian buffer rule in effect ary Nursery Area (PNA)	rn (AEC) (including buffer)	
Blackwater Brownwater Tidal (if tidal, Is the assessment a	check one of the following boxes) Lunar Tarea on a coastal island? Yes No Area's surface water storage capacity or duration su	Wind Both	∏Yes ⊡ No
Does the assessme	ent area experience overbank flooding during norma	ıl rainfall conditions?	Yes No
Check a box in (VS) in the asse then rate the ass GS VS	e Condition/Vegetation Condition – assessment are each column. Consider alteration to the ground surfa ssment area. Compare to reference wetland if applical sessment area based on evidence of an effect. Not severely altered Severely altered over a majority of the assessment area sedimentation, fire-plow lanes, skidder tracks, bedding alteration examples: mechanical disturbance, herbicideless diversity [if appropriate], hydrologic alteration)	ce (GS) in the assessment area and vegole (see User Manual). If a reference is a (ground surface alteration examples: y fill, soil compaction, obvious pollutants)	not applicable, vehicle tracks, excessive) (vegetation structure
Check a box in duration (Sub). North Carolina h ≤ 1 foot deep is sub-surface wat Surf Sub A A A B B B C C C	each column. Consider surface storage capacity and Consider both increase and decrease in hydrology. R hydric soils (see USACE Wilmington District website) for considered to affect surface water only, while a ditch > er. Consider tidal flooding regime, if applicable. Water storage capacity and duration are not altered. Water storage capacity or duration are altered, but not Water storage capacity or duration are substantially altochange) (examples: draining, flooding, soil compaction	duration (Surf) and sub-surface storage efer to the current NRCS lateral effect of r the zone of influence of ditches in hydred foot deep is expected to affect both substantially (typically, not sufficient to deep (typically, alteration sufficient to reserved (typically, alteration sufficient to reserved)	f ditching guidance for ric soils. A ditch urface and ditch when the solution of the solution
Check a box in type (WT). AA WT 3a. \[\begin{array}{ccccc} AA & \begin{array}{ccccc} C & \begin{array}{cccccccc} C & \begin{array}{cccccccccc} C & \begin{array}{cccccccccccccccccccccccccccccccccccc	A Majority of wetland with depressions able to pond B Majority of wetland with depressions able to pond C Majority of wetland with depressions able to pond	water > 1 foot deep water 6 inches to 1 foot deep water 3 to 6 inches deep un 2 feet and 2 feet	

		x from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape ke soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for
	regional indi	cators.
	4a.	Sandy soil Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
	⊡ В ⊡ С	Loamy or clayey soils not exhibiting redoximorphic features
	□D	Loamy or clayey gleyed soil
	∏E.	Histosol or histic epipedon
	4b. [☐A [☐B	Soil ribbon < 1 inch Soil ribbon ≥ 1 inch
	4c. 💽 A	
	46. MA	No peat or muck presence A peat or muck presence
5.	Discharge i	nto Wetland – opportunity metric
	_	x in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub).
	Examples of Surf Sub	sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.
	A DA	Little or no evidence of pollutants or discharges entering the assessment area
	ов ов	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the
	C C	treatment capacity of the assessment area Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and
	FTC FTC	potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive
		sedimentation, odor)
6.		opportunity metric
		at apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the
	•	area (5M), and within 2 miles <u>and</u> within the watershed draining to the assessment area (2M). Effective riparian buffers
		red to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.
	WS 5M ✓ A ✓ A	2M ✓ A ≥ 10% impervious surfaces
	В □В	
	□F □F	
	□G □G	
	□н □н	H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.	Wetland Ac	ting as Vegetated Buffer – assessment area/wetland complex condition metric
		ssment area within 50 feet of a tributary or other open water?
	Yes Wetler	No If Yes, continue to 7b. If No, skip to Metric 8. d buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland.
		d bullet fleed only be present on one side of the water body. Make bullet judgment based on the average width of the wettand.
		uch of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
		≥ 50 feet From 30 to < 50 feet
	E C	From 15 to < 30 feet
	□ D	From 5 to < 15 feet
		< 5 feet <u>or</u> buffer bypassed by ditches ry width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
		-feet wide > 15-feet wide Other open water (no tributary present)
		ts of assessment area vegetation extend into the bank of the tributary/open water?
		tered – adjacent open water with width < 2500 feet <u>and</u> no regular boat traffic.
	Expo	osed – adjacent open water with width ≥ 2500 feet <u>or</u> regular boat traffic.
8.		dth at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)
		x in each column. Select the average width for the wetland type at the assessment area (WT) and complex at the assessment areas (WC). See User Manual for WT and WC boundaries.
	WT WC	
	A A	
	B BB	From 50 to < 80 feet
	⊙ D ⊙ D	From 40 to < 50 feet
		From 30 to < 40 feet From 15 to < 30 feet
	G G	
	MH MH	

4. Soil Texture/Structure – assessment area condition metric

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. A Evidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. Sediment deposition is excessive, but not overwhelming the wetland. Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) A A ≥ 500 acres B B B From 10 to < 500 acres C C C From 50 to < 100 acres C C C From 50 to < 100 acres C C C From 50 to < 10 acres C C C From 5 to < 10 acres C C C C From 5 to < 10 acres C C C C From 0.5 to < 1 acre C C C C From 0.1 to < 0.5 acre C C C C C From 0.1 to < 0.1 acre C C C C C C C C C C C C C C C C C C C
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥ 90%) of its natural landscape size.
	B Pocosin is < 90% of the full extent of its natural landscape size.
13.	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥ 500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres C C From 50 to < 100 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C C C C C C C C C C C C C C C C C
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) ☑A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. ☑B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. ☑C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present?
Yes No If Yes, continue to 17b. If No, skip to Metric 18.
17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. □ A ≥ 25% coverage of vegetation □ B < 25% coverage of vegetation
17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT
Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent
C C Shrub layer sparse or absent
EA Dense herb layer B Moderate density herb layer C C Herb layer sparse or absent
 18. Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). B Not A
 19. Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present. B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
Majority of canopy trees are < 6 inches DBH or no trees.
 20. Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). B Not A
21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater
Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. A B C D
22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. A Overbank and overland flow are not severely altered in the assessment area. Overbank flow is severely altered in the assessment area.
Overland flow is severely altered in the assessment area. Both overbank and overland flow are severely altered in the assessment area.
Notes Wetland D is a palustrine forested/emergent wetland located over a santiary sewer line adjacent to University Drive and Stream F. Wetland D drains into Stream G which drains to Stream F.

Wetland Site Name	TTA Wetland D	Date	6/5/13	
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP-STV	
Notes on Field Assessm	cont Form (V/N)		YES	
Notes on Field Assessment Form (Y/N) Presence of regulatory considerations (Y/N)				
Netland is intensively m			YES YES	
-	ated within 50 feet of a natural tributary or othe	er open water (Y/N)	YES	
	stantially altered by beaver (Y/N)	or open water (1714)	NO	
	ences overbank flooding during normal rainfa	all conditions (Y/N)	YES	
Assessment area is on a			NO	
	a coucial locality			
Sub-function Rating S	ummary			
Function	Sub-function	Metrics	Rating	
Hydrology	Surface Storage and Retention	Condition	LOW	
	Sub-Surface Storage and Retention	Condition	MEDIUM	
Nater Quality	Pathogen Change	Condition	MEDIUM	
		Condition/Opportunity	MEDIUM	
		Opportunity Presence? (Y/N)	NO	
	Particulate Change	Condition	LOW	
		Condition/Opportunity	LOW	
		Opportunity Presence? (Y/N)	NO	
	Soluble Change	Condition	MEDIUM	
		Condition/Opportunity	MEDIUM	
		Opportunity Presence? (Y/N)	NO	
	Physical Change	Condition	LOW	
		Condition/Opportunity	LOW	
		Opportunity Presence? (Y/N)	NO	
	Pollution Change	Condition	NA	
		Condition/Opportunity	NA	
		Opportunity Presence? (Y/N)	NA	
Habitat	Physical Structure	Condition	LOW	
	Landscape Patch Structure	Condition	LOW	
	Vegetation Composition	Condition	HIGH	
Function Rating Sumn	nary			
Function Rating Summ	Metrics/Notes		Rating	
Hydrology	Condition		LOW	
Nater Quality	Condition		LOW	
	Condition/Opportunity	LOW		
	Opportunity Presence?	(Y/N)		
Habitat	Conditon		LOW	

			Rating Calculate	r Version 4.1	
W	etland Site Name	TTA Wetland DD		Da	ate 11/05/13
	Wetland Type	Bottomland Hardwood Forest		Assessor Name/Organization	on BP/STV
L	evel III Ecoregion	Piedmont	•	Nearest Named Water Bo	dy Little Creek
	River Basin	Cape Fear	_	USGS 8-Digit Catalogue U	nit 03030002
	Yes No	Precipitation within 48 hrs	?	Latitude/Longitude (deci-degree	es) 35.907254, -78.995358
Ple:	ase circle and/or ma ropriate, in recent p ne following. Hydrological mo Surface and sut septic tanks, un Signs of vegeta	ast (for instance, approximately diffications (examples: ditches, p-surface discharges into the we derground storage tanks (USTs	e of stressors is approximation 10 years). No dams, beaver dams etland (examples: dis.), hog lagoons, etc.) on mortality, insect d	arent. Consider departure from refe oteworthy stressors include, but are dikes, berms, ponds, etc.) ocharges containing obvious pollutar amage, disease, storm damage, sa	not limited
ls t	he assessment are	ea intensively managed?	TYes No		
	Anadromous fis Federally protect NCDWQ riparia Abuts a Primary Publicly owned N.C. Division of Abuts a stream Designated NCI Abuts a 303(d)- at type of natural s Blackwater Brownwater Tidal (if tidal, ch the assessment are the assessment are set the assessment Ground Surface C Check a box in ea (VS) in the assess then rate the asses GS VS A A A C Se alt	cted species or State endangered in buffer rule in effect in Nursery Area (PNA) property Coastal Management Area of Ewith a NCDWQ classification of NHP reference community listed stream or a tributary to a stream is associated with the value of the following boxes area experience overbank flocation/Vegetation Condition area. Compare to reference system area based on evidence of severely altered everely altered everely altered over a majority of dimentation, fire-plow lanes, ski	Environmental Conce SA or supplemental 303(d)-listed stream wetland, if any? (cf Lunar Yes No pacity or duration so pacity or durati	cies ern (AEC) (including buffer) I classifications of HQW, ORW, or The ck all that apply) Wind Both ubstantially altered by beaver?	Yes No Yes No No No vegetation structure ce is not applicable, lles: vehicle tracks, excessive tants) (vegetation structure
2.	Surface and Sub-Check a box in eaduration (Sub). C North Carolina hyd≤1 foot deep is co sub-surface water. Surf Sub A A W B B W C C C W	Surface Storage Capacity and ach column. Consider surface onsider both increase and decretific soils (see USACE Wilmingtonsidered to affect surface water Consider tidal flooding regime, atter storage capacity and duratificater storage capacity or duration ange) (examples: draining, flooding)	d Duration – assess storage capacity and ease in hydrology. For District website) for only, while a ditch if applicable. Iden are not altered, on are altered, but not are substantially alding, soil compaction	d duration (Surf) and sub-surface sto Refer to the current NRCS lateral effor or the zone of influence of ditches in > 1 foot deep is expected to affect b at substantially (typically, not sufficient tered (typically, alteration sufficient of the filling, excessive sedimentation, un	ect of ditching guidance for a hydric soils. A ditch oth surface and ditch of the control of the
3.		ach column for each group be Majority of wetland with depr	ressions able to pond ressions able to pond ressions able to pond ressions able to pond	d water 6 inches to 1 foot deep	

4.	Soil Texture/Structure – assessment area condition metric Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators. 4a. A Sandy soil B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) C Loamy or clayey soils not exhibiting redoximorphic features C Loamy or clayey gleyed soil C Histosol or histic epipedon
	4b.
	B A peat or muck presence
5.	Discharge into Wetland – opportunity metric Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub
	Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Land Use – opportunity metric Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles <u>and</u> within the watershed draining to the assessment area (5M), and within 2 miles <u>and</u> within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. WS 5M 2M A A A A ≥10% impervious surfaces B F B F B F B < 10% impervious surfaces
	C C C Confined animal operations (or other local, concentrated source of pollutants) D D D ≥20% coverage of pasture E E E ≥20% coverage of agricultural land (regularly plowed land) F F F ≥20% coverage of maintained grass/herb G G G ≥20% coverage of clear-cut land F F H
7.	 7a. Is assessment area within 50 feet of a tributary or other open water? Yes No If Yes, continue to 7b. If No, skip to Metric 8. Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed. 7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. A ≥50 feet B From 30 to < 50 feet C From 15 to < 30 feet D From 5 to < 15 feet E < 5 feet or buffer bypassed by ditches 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width. S=15-feet wide C > 15-feet wide C Other open water (no tributary present) 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water? Yes No 7e. Is tributary or other open water sheltered or exposed? Sheltered – adjacent open water with width ≥2500 feet and no regular boat traffic. Exposed – adjacent open water with width ≥2500 feet or regular boat traffic.
8.	Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries. WT WC A A ≥ 100 feet B B From 80 to < 100 feet C C From 50 to < 80 feet D D From 40 to < 50 feet E F From 30 to < 40 feet F F From 15 to < 30 feet G G From 5 to < 15 feet H H C H < 5 feet

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. Answer for assessment area dominant landform. Be in Evidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. B Sediment deposition is excessive, but not overwhelming the wetland. C Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.
	WT WC FW (if applicable) A A ≥500 acres B B B From 100 to < 500 acres C C C From 50 to < 100 acres C D D D From 25 to < 50 acres E E E From 10 to < 25 acres F F F From 5 to < 10 acres G G G From 1 to < 5 acres H H H From 0.5 to < 1 acre I I From 0.1 to < 0.5 acre J C J C J From 0.01 to < 0.1 acre K K K < 0.01 acre or assessment area is clear-cut
	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥90%) of its natural landscape size. □ B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres C D D From 10 to < 50 acres C E E E < 10 acres C F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
	 Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) ✓ A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. ✓ B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. ✓ C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

	El Companyone de la Compa		
17.	7. Vegetative Structure – assessment area/wetland type condition metric		
	17a. Is vegetation present? The second of t		
	17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ☐ A ≥25% coverage of vegetation ☐ B < 25% coverage of vegetation		
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT		
	C A Canopy closed, or nearly closed, with natural gaps associated with natural processes B B Canopy present, but opened more than natural gaps C C Canopy sparse or absent		
	C C Mid-story/sapling layer sparse or absent		
	C A Dense shrub layer B C B Moderate density shrub layer C C C Shrub layer sparse or absent		
	☐ A ☐ A Dense herb layer ☐ B ☐ B Moderate density herb layer ☐ C ☐ C Herb layer sparse or absent		
18.	Snags – wetland type condition metric Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A		
19.	Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.		
	Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.		
20.	Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). B Not A		
21.	Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. A B C D		
	OF CO CO		

22. Hydrologic Connectivity - assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive

ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

- Overbank and overland flow are not severely altered in the assessment area.
- Overbank flow is severely altered in the assessment area.
- Overland flow is severely altered in the assessment area.
- B C D Both overbank and overland flow are severely altered in the assessment area.

Notes

Wetland DD is a palustrine forested wetland located within the Corps Waterfowl lands. Wetland DD is an isolated basin within the floodplain forest.

Wetland Site Name	TTA Wetland DD		
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP/STV
Notes on Field Assess	ment Form (Y/N)		YES
Presence of regulatory	• •		YES
Wetland is intensively			NO
· ·	cated within 50 feet of a natural tributary or other	er open water (Y/N)	NO
	bstantially altered by beaver (Y/N)		NO
	riences overbank flooding during normal rainfa	III conditions (Y/N)	NO
	a coastal island (Y/N)	,	NO
ioogoomoni aroa io on	a coucia iolana (iii)		
Sub-function Rating S	Summary		
unction	Sub-function Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-Surface Storage and Retention	Condition	MEDIUM
Vater Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Particulate Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Soluble Change	Condition	HIGH
	Ç	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Physical Change	Condition	LOW
	, ,	Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	YES
	Pollution Change	Condition	NA
	. Grandin Granige	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Physical Structure	Condition	MEDIUM
	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	HIGH
unction Rating Sum	mary Metrics/Notes		Rating
unction lydrology	Condition		HIGH
Vater Quality	Condition		HIGH
rator admity	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	YES
-labitat	Conditon	. ,	HIGH

NC WAM WETLAND ASSESSMENT FORM **Accompanies User Manual Version 4.1**

	Rating Calculato	r Version 4.1	
Wetland Site Name	TTA Wetland DDD	Date	12/09/13
Wetland Type	Basin Wetland ▼	Assessor Name/Organization	BP/STV
Level III Ecoregion	Piedmont	Nearest Named Water Body	Little Creek
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030002
(3)	o Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.912596, -79.000845
Please circle and/or ma appropriate, in recent p to the following. • Hydrological mo • Surface and sul septic tanks, un • Signs of vegeta	s affecting the assessment area (may not be within ake note on last page if evidence of stressors is appropriate (for instance, approximately within 10 years). No codifications (examples: ditches, dams, beaver dams besurface discharges into the wetland (examples: dischargeound storage tanks (USTs), hog lagoons, etc.) ation stress (examples: vegetation mortality, insect dommunity alteration (examples: mowing, clear-cutting	arent. Consider departure from referer of teworthy stressors include, but are no , dikes, berms, ponds, etc.) charges containing obvious pollutants, amage, disease, storm damage, salt in	t limited , presence of nearby
	ea intensively managed?	g, oxolioo, oto.,	
	ations (select all that apply to the assessment are	le.	
Anadromous fis Federally protect NCDWQ riparia Abuts a Primary Publicly owned N.C. Division of Abuts a stream Designated NC	sh cted species or State endangered or threatened spec an buffer rule in effect y Nursery Area (PNA)	cies ern (AEC) (including buffer)	ut
· · · · · · · · · · · · · · · · · · ·	stream is associated with the wetland, if any? (ch	eck all that apply)	
Blackwater			
Brownwater Tidal (if tidal ch	neck one of the following boxes)	Wind Both	
1	ea on a coastal island?	144110 F 1 DOIL	
	ea's surface water storage capacity or duration s	shetantially altered by heaver?	Yes No
	t area experience overbank flooding during norm		Yes No
Check a box in early (VS) in the assess then rate the asses GS VS A A A No B B Se	Condition/Vegetation Condition – assessment are ach column. Consider alteration to the ground surfacement area. Compare to reference wetland if applicates assessment area based on evidence of an effect. ot severely altered everely altered everely altered over a majority of the assessment are edimentation, fire-plow lanes, skidder tracks, bedding teration examples: mechanical disturbance, herbicides so diversity [if appropriate], hydrologic alteration)	ace (GS) in the assessment area and whole (see User Manual). If a reference as (ground surface alteration examples as fill, soil compaction, obvious pollutanes, salt intrusion [where appropriate],	is not applicable, s: vehicle tracks, excessive tts) (vegetation structure
Check a box in eaduration (Sub). Control Carolina hydes 1 foot deep is consub-surface water Surf Sub A	-Surface Storage Capacity and Duration – assess ach column. Consider surface storage capacity and Consider both increase and decrease in hydrology. Redric soils (see USACE Wilmington District website) for considered to affect surface water only, while a ditched consider tidal flooding regime, if applicable. Vater storage capacity and duration are not altered. Vater storage capacity or duration are altered, but not vater storage capacity or duration are substantially alter ange) (examples: draining, flooding, soil compaction)	d duration (Surf) and sub-surface storatefer to the current NRCS lateral effect or the zone of influence of ditches in hy 1 foot deep is expected to affect both substantially (typically, not sufficient to leter (typically, alteration sufficient typically, alteration sufficient to leter (typically, alteration sufficient typically).	t of ditching guidance for ydric soils. A ditch n surface and ditch o change vegetation). result in vegetation
3. Water Storage/St Check a box in e type (WT). AA WT	urface Relief – assessment area/wetland type con ach column for each group below. Select the app	ndition metric (answer for non-mars) ropriate storage for the assessment an	h wetlands only) rea (AA) and the wetland
3a. A MA	Majority of wetland with depressions able to pond Majority of wetland with depressions able to pond	water 6 inches to 1 foot deep	
3b. 🗖 A Evide	ence that maximum depth of inundation is greater the ence that maximum depth of inundation is between 1 K.21-52	and 2 feet	

4.	Soil Texture/Structure – assessment area condition metric Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators. 4a.
	4b. ☐ A Soil ribbon < 1 inch ☐ B Soil ribbon ≥1 inch 4c. ☐ A No peat or muck presence
5.	Discharge into Wetland – opportunity metric Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub A A Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Land Use – opportunity metric Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. WS 5M 2M A A A ≥ 10% impervious surfaces B B B B B A < 10% impervious surfaces C C C C Confined animal operations (or other local, concentrated source of pollutants) D D D D D ≥ 20% coverage of pasture E B E B B ≥ 20% coverage of agricultural land (regularly plowed land) F F F F A ≥ 20% coverage of maintained grass/herb G G G G S ≥ 20% coverage of clear-cut land H H H H H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.	 Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water? Yes No If Yes, continue to 7b. If No, skip to Metric 8. Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed. 7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. A ≥50 feet B From 30 to < 50 feet C From 15 to < 30 feet D From 5 to < 15 feet E < 5 feet or buffer bypassed by ditches 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width. ✓ 15-feet wide ✓ > 15-feet wide ✓ Other open water (no tributary present) 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water? ✓ Yes No 7e. Is tributary or other open water sheltered or exposed? ✓ Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic. ✓ Exposed – adjacent open water with width ≥2500 feet or regular boat traffic.
8.	Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries. WT WC A A ≥100 feet B B From 80 to < 100 feet C F C From 50 to < 80 feet D D From 40 to < 50 feet E F From 30 to < 40 feet F F From 15 to < 30 feet G G From 5 to < 15 feet H C H < 5 feet

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. Answer for assessment area condition metric Answer for assessment area dominant landform. Evidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). CA Sediment deposition is not excessive, but at approximately natural levels. CB Sediment deposition is excessive, but not overwhelming the wetland. CC Sediment deposition is excessive and is overwhelming the wetland.
	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) A CA SO0 acres B B B From 100 to < 500 acres C C C From 50 to < 100 acres C C C From 25 to < 50 acres E E F F F F F F F F F F F F F F F F F
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥90%) of its natural landscape size. □ B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres C D From 10 to < 50 acres C E E E < 10 acres C F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
	 Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) ☑ A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. ☑ B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. ☑ C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

	Ei Control of the Con		
17.	7. Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present?		
	Yes No If Yes, continue to 17b. If No, skip to Metric 18.		
	17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ☐ A ≥25% coverage of vegetation ☐ B < 25% coverage of vegetation		
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT		
	A Canopy closed, or nearly closed, with natural gaps associated with natural processes B Canopy present, but opened more than natural gaps C C Canopy sparse or absent		
	E A E A Dense mid-story/sapling layer B B B Moderate density mid-story/sapling layer C C Mid-story/sapling layer sparse or absent		
	☐ ☐ A ☐ Dense shrub layer ☐ B ☐ B Moderate density shrub layer ☐ C ☐ C Shrub layer sparse or absent		
	☐ A ☐ A Dense herb layer ☐ B ☐ B Moderate density herb layer ☐ C ☐ C Herb layer sparse or absent		
18.	Snags – wetland type condition metric Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A		
19.	Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.		
	Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.		
20.	Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A		
21.	Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.		
22.	Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. The A Overbank and overland flow are not severely altered in the assessment area.		

- B Overbank flow is severely altered in the assessment area.
- C Overland flow is severely altered in the assessment area.
- D Both overbank and overland flow are severely altered in the assessment area.

Notes

Wetland DDD is a palustrine forested wetland located adjacent to Little Creek (Stream Y). Wetland DDD is a backwater basin located in the floodplain forest of the Corps Waterfowl lands.

Wetland Site Name _	TTA Wetland DDD	Date	12/09/13
Wetland Type _	Basin Wetland	Assessor Name/Organization	BP/STV
latas as Esald Assessed	(V/A))		VEC
Notes on Field Assessm	•		YES
Presence of regulatory	· · · · · ·		YES
Vetland is intensively m		0.000	NO
	ated within 50 feet of a natural tributary or other	er open water (Y/N)	YES
	stantially altered by beaver (Y/N)		NO
•	iences overbank flooding during normal rainfa	II conditions (Y/N)	NO
Assessment area is on a	a coastal island (Y/N)		NO
Sub-function Rating S	ummary		
unction	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	NA
	Sub-Surface Storage and Retention	Condition	NA
Vater Quality	Pathogen Change	Condition	NA NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Particulate Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	- NA
	· ·	Condition/Opportunity	- NA
		Opportunity Presence? (Y/N)	NA
	Physical Change	Condition	NA
	, in the same of t	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA NA
	Pollution Change	Condition	HIGH
	. ondien endinge	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Physical Structure	Condition	HIGH
Tabitat	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	HIGH
Function Rating Sumn Function	Metrics/Notes		Rating
Hydrology	Condition		HIGH
Vater Quality	Condition		HIGH
*	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	NO
-labitat	Conditon		HIGH

	Rating Calculato	version 4.1	
Wetland Site Name	e_TTA Wetland E	Date	6/06/13
Wetland Type	Bottomland Hardw ood Forest ▼	Assessor Name/Organization	BP -STV
Level III Ecoregion	n Piedmont 🔻	Nearest Named Water Body	Sandy Creek
River Basi	n Cape Fear	USGS 8-Digit Catalogue Unit	03030002
∏Yes ⊡	No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.960697, -78.972118
Please circle and/or nappropriate, in recent to the following. • Hydrological network of the Surface and septic tanks, uesigns of vegeted Habitat/plant of	rs affecting the assessment area (may not be within make note on last page if evidence of stressors is appart past (for instance, approximately within 10 years). No modifications (examples: ditches, dams, beaver dams, sub-surface discharges into the wetland (examples: distunderground storage tanks (USTs), hog lagoons, etc.) tation stress (examples: vegetation mortality, insect day community alteration (examples: mowing, clear-cutting	arent. Consider departure from referenteworthy stressors include, but are not dikes, berms, ponds, etc.) charges containing obvious pollutants, amage, disease, storm damage, salt in	t limited presence of nearby
	rea intensively managed? Tyes No		
Anadromous f Federally prote NCDWQ ripar Abuts a Prima Publicly owner N.C. Division Abuts a strear Designated No	ected species or State endangered or threatened spec rian buffer rule in effect ary Nursery Area (PNA)	ies rn (AEC) (including buffer)	ıt
7.	stream is associated with the wetland, if any? (che	eck all that apply)	
Blackwater Brownwater			
E-3	check one of the following boxes)	Wind Both	
Is the assessment a	rea on a coastal island?		
Is the assessment a	rea's surface water storage capacity or duration su	bstantially altered by beaver?	Yes No
	nt area experience overbank flooding during norma		Yes No
Check a box in (VS) in the asses then rate the ass GS VS	e Condition/Vegetation Condition – assessment are each column. Consider alteration to the ground surfaces sement area. Compare to reference wetland if applical sessment area based on evidence of an effect. Not severely altered Severely altered over a majority of the assessment area sedimentation, fire-plow lanes, skidder tracks, bedding alteration examples: mechanical disturbance, herbicide ess diversity [if appropriate], hydrologic alteration)	a condition metric ce (GS) in the assessment area and vole (see User Manual). If a reference in a (ground surface alteration examples: fill, soil compaction, obvious pollutant	egetation structure s not applicable, vehicle tracks, excessive (s) (vegetation structure
Check a box in duration (Sub). North Carolina h ≤ 1 foot deep is d sub-surface wate Surf Sub A A A B B B A C C C C	b-Surface Storage Capacity and Duration – assessing each column. Consider surface storage capacity and Consider both increase and decrease in hydrology. Rydric soils (see USACE Wilmington District website) for considered to affect surface water only, while a ditch per. Consider tidal flooding regime, if applicable. Water storage capacity and duration are not altered. Water storage capacity or duration are altered, but not water storage capacity or duration are substantially altochange) (examples: draining, flooding, soil compaction)	duration (Surf) and sub-surface storage fer to the current NRCS lateral effect rethe zone of influence of ditches in hy 1 foot deep is expected to affect both substantially (typically, not sufficient to red (typically, alteration sufficient to red).	of ditching guidance for dric soils. A ditch surface and ditch change vegetation).
	A Majority of wetland with depressions able to pond B Majority of wetland with depressions able to pond C Majority of wetland with depressions able to pond	opriate storage for the assessment are water > 1 foot deep water 6 inches to 1 foot deep	
3b. A Evi	dence that maximum depth of inundation is greater that dence that maximum depth of inundation is between 1 dence that maximum depth of inundation is less than 1	and 2 feet	

		x from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape xe soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for
	regional indi	
	4a. ∏ A ⊡ B	Sandy soil Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
	⊡B □C □D □E	Loamy or clayey soils not exhibiting redoximorphic features
	ËË	Loamy or clayey gleyed soil Histosol or histic epipedon
	4b. 🔼 A	Soil ribbon < 1 inch
	⊡ B	Soil ribbon ≥ 1 inch
	4c. ⊡ A □B	No peat or muck presence A peat or muck presence
5.	Discharge in	nto Wetland – opportunity metric
		x in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub).
	Surf Sub	sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.
	⊙ A ⊙ A	
	∏в ∏в	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
	□c □c	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and
		potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6	l and llas	
6.		opportunity metric at apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources
	draining to a	ssessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the
		area (5M), and within 2 miles <u>and</u> within the watershed draining to the assessment area (2M). Effective riparian buffers ed to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.
	WS 5M	2M
	C C	
	D D	
		G ≥ 20% coverage of clear-cut land
	□н □н	☐ H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.	Wetland Act	ting as Vegetated Buffer – assessment area/wetland complex condition metric
		ssment area within 50 feet of a tributary or other open water?
	Yes Wetlan	No If Yes, continue to 7b. If No, skip to Metric 8. d buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland.
	Record	a note if a portion of the buffer has been removed or disturbed.
	7b. How m	uch of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. ≥ 50 feet
	⊡ B	From 30 to < 50 feet
	E C	From 15 to < 30 feet From 5 to < 15 feet
		< 5 feet <u>or</u> buffer bypassed by ditches
		ry width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
		-feet wide
		☑ No
		ary or other open water sheltered or exposed? tered – adjacent open water with width < 2500 feet <u>and</u> no regular boat traffic.
		osed – adjacent open water with width ≥ 2500 feet <u>or</u> regular boat traffic.
8.		dth at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)
		x in each column. Select the average width for the wetland type at the assessment area (WT) and complex at the assessment areas (WC). See User Manual for WT and WC boundaries.
	WT WC	and complex at the assessment areas (WO). Gee oser Mandarior WT and WO boundaries.
	OA OA	≥ 100 feet
	B BB	From 80 to < 100 feet From 50 to < 80 feet
	DD D	From 40 to < 50 feet
		From 30 to < 40 feet From 15 to < 30 feet
	GGG	
	Дн Дн	

4. Soil Texture/Structure – assessment area condition metric

	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. A Evidence of short-duration inundation (< 7 consecutive days) B Evidence of saturation, without evidence of inundation C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. Sediment deposition is excessive, but not overwhelming the wetland. C Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) A A A ≥ 500 acres B B From 100 to < 500 acres C C C From 50 to < 100 acres C C C From 50 to < 100 acres B E E E E From 10 to < 25 acres C F F F F From 5 to < 10 acres C G G G From 1 to < 5 acres C G G G From 0.5 to < 1 acre C G G G From 0.1 to < 0.5 acre C G G G From 0.1 to < 0.5 acres C G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G G From 0.1 to < 0.5 acres C G G G G G From 0.1 to < 0.5 acres C G G G G G From 0.1 to < 0.5 acres C G G G G G From 0.1 to < 0.5 acres C G G G G G From 0.1 to < 0.5 acres C G G G G G From 0.1 to < 0.5 acres C G G G G G From 0.1 to < 0.5 acres C G G G G G From 0.1 to < 0.5 acres C G G G G G From 0.1 to < 0.5 acres C G G G G G From 0.1 to < 0.5 acres
	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) A Pocosin is the full extent (≥ 90%) of its natural landscape size. B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥ 500 acres B B From 100 to < 500 acres C C C From 50 to < 100 acres C D D From 10 to < 50 acres C E C From 50 to < 100 acres C E C F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. C Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions B No artificial edge within 150 feet in four (4) to seven (7) directions C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric
17a. Is vegetation present? ☐ Yes ☐ No If Yes, continue to 17b. If No, skip to Metric 18.
17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. □A ≥ 25% coverage of vegetation □B < 25% coverage of vegetation
17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT
Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent Canopy present, but opened more than natural gaps Canopy sparse or absent
C C Shrub layer sparse or absent
CA Dense herb layer B Moderate density herb layer C C Herb layer sparse or absent
18. Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). B Not A
19. Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.
 20. Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). B Not A
21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)
Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. C D
22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. A Overbank and overland flow are not severely altered in the assessment area.
Overbank <u>and</u> overland flow are not severely altered in the assessment area. Overbank flow is severely altered in the assessment area. Overland flow is severely altered in the assessment area. Both overbank <u>and</u> overland flow are severely altered in the assessment area.
Notes Wetland E is a palustrine forested wetland located in the Sandy Creek floodplain. Wetland E receives drainage from Stream L and drains to Stream J (Sandy Creek).

Wetland Site Name	TTA Wetland E	Date	6/06/13
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP -STV
Natara - Field Assessed	F (V/A))		\/F0
Notes on Field Assessn			YES
Presence of regulatory			YES
Wetland is intensively n		a. 10 . V	NO NO
	ated within 50 feet of a natural tributary or other	er open water (Y/N)	YES
	ostantially altered by beaver (Y/N)		NO
•	riences overbank flooding during normal rainfa	all conditions (Y/N)	YES
Assessment area is on	a coastal island (Y/N)		NO
Sub-function Rating S	Summary		
Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-Surface Storage and Retention	Condition	LOW
Nater Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Soluble Change	Condition	HIGH
	3	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	MEDIUM
	, c.com cgc	Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	YES
	Pollution Change	Condition	NA
	r change	Condition/Opportunity	NA NA
		Opportunity Presence? (Y/N)	NA NA
	Physical Structure	Condition	HIGH
	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	HIGH
Function Define Comm			
F unction Rating Sum r Function	Metrics/Notes		Rating
Hydrology	Condition		HIGH
Nater Quality	Condition		
•	Condition/Opportunity		
	Opportunity Presence? (Y/N)		YES
Habitat Conditon		HIGH	

	Rating Calculate	or Version 4.1	
Wetland Site Name	TTA Wetland EE	Date 8/14/13	
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization BP/STV	
Level III Ecoregion	Piedmont	Nearest Named Water Body Little Creek	
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit 03030002	
Yes No	o Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) 35.905451, -78.997632	
Please circle and/or ma appropriate, in recent p to the following. Hydrological ma Surface and sul septic tanks, un Signs of vegeta	s affecting the assessment area (may not be with ake note on last page if evidence of stressors is approant (for instance, approximately within 10 years). No addifications (examples: ditches, dams, beaver dams b-surface discharges into the wetland (examples: dis- aderground storage tanks (USTs), hog lagoons, etc.) ation stress (examples: vegetation mortality, insect dommunity alteration (examples: mowing, clear-cutting	arent. Consider departure from reference, if oteworthy stressors include, but are not limited is, dikes, berms, ponds, etc.) scharges containing obvious pollutants, presence of nearby lamage, disease, storm damage, salt intrusion, etc.)	
Is the assessment are	ea intensively managed? TYes No		
Anadromous fis Federally protect NCDWQ riparia Abuts a Primany Publicly owned N.C. Division of Abuts a stream Designated NC	cted species or State endangered or threatened spec an buffer rule in effect y Nursery Area (PNA)	cies ern (AEC) (including buffer)	
	stream is associated with the wetland, if any? (ch	neck all that apply)	
Blackwater Brownwater Tidal (if tidal, ch			
Tidal (if tidal, ch	neck one of the following boxes) C Lunar	Wind Both	
Is the assessment are	ea on a coastal island?		
Is the assessment are	ea's surface water storage capacity or duration s	ubstantially altered by beaver?	
Does the assessment	area experience overbank flooding during norm	al rainfall conditions? Yes No	
Check a box in early (VS) in the assess then rate the asses GS VS A A A A A A A A A A A A A A A A A A A	sment area. Compare to reference wetland if applicates is sment area based on evidence of an effect. Out severely altered everely altered over a majority of the assessment are additionally fire-plow lanes, skidder tracks, bedding	ea condition metric ace (GS) in the assessment area and vegetation structure able (see User Manual). If a reference is not applicable, ea (ground surface alteration examples: vehicle tracks, excessive g, fill, soil compaction, obvious pollutants) (vegetation structure des, salt intrusion [where appropriate], exotic species, grazing,	
Check a box in eaduration (Sub). C North Carolina hyd ≤1 foot deep is co sub-surface water. Surf Sub A A A W B B B W C C C W	consider both increase and decrease in hydrology. Redric soils (see USACE Wilmington District website) for soils (see USACE Wilmington District website) for sidered to affect surface water only, while a ditch of the consider tidal flooding regime, if applicable. Cater storage capacity and duration are not altered, but not later storage capacity or duration are substantially alter storage capacity or duration are substantially altered to soil the consider storage capacity or duration are substantially altered.	ment area condition metric d duration (Surf) and sub-surface storage capacity and Refer to the current NRCS lateral effect of ditching guidance for or the zone of influence of ditches in hydric soils. A ditch > 1 foot deep is expected to affect both surface and ditch substantially (typically, not sufficient to change vegetation). tered (typically, alteration sufficient to result in vegetation n, filling, excessive sedimentation, underground utility lines).	
Check a box in eatype (WT). AA WT 3a. A A	ach column for each group below. Select the app Majority of wetland with depressions able to pond	·	
	Majority of wetland with depressions able to pond Majority of wetland with depressions able to pond Depressions able to pond water < 3 inches deep	d water 3 to 6 inches deep	
- A	ence that maximum depth of inundation is greater the ence that maximum depth of inundation is between 1		

4.	Soil Texture/Structure – assessment area condition metric Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators. 4a. A Sandy soil B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) C Loamy or clayey soils not exhibiting redoximorphic features C D Loamy or clayey gleyed soil C E Histosol or histic epipedon
	4b. CA Soil ribbon < 1 inch CB Soil ribbon ≥1 inch
	4c. A No peat or muck presence A peat or muck presence
5.	Discharge into Wetland – opportunity metric Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub
	Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and
	potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Land Use – opportunity metric Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles <u>and</u> within the watershed draining to the assessment area (5M), and within 2 miles <u>and</u> within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. WS 5M 2M ✓ A ☐ A ☐ A ≥10% impervious surfaces
	□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □
7.	 Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water?
8.	Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries. WT WC A A ≥ 100 feet B B From 80 to < 100 feet C C From 50 to < 80 feet D D From 40 to < 50 feet E From 30 to < 40 feet F F From 15 to < 30 feet C G G From 5 to < 15 feet C H C H C H < 5 feet

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. Answer for assessment area dominant landform. By A Evidence of short-duration inundation (< 7 consecutive days) By Evidence of saturation, without evidence of inundation By C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. B Sediment deposition is excessive, but not overwhelming the wetland. C Sediment deposition is excessive and is overwhelming the wetland.
	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) CA CA SO0 acres CB CC CC From 50 to < 500 acres CC CC From 50 to < 100 acres CE CE CE From 10 to < 25 acres CE CE CE From 10 to < 25 acres CF CF CF From 5 to < 10 acres CG CG From 1 to < 5 acres CH CH CH CH From 0.5 to < 1 acre CI CI CI From 0.01 to < 0.5 acre CI CI CI From 0.01 to < 0.1 acre CG CG CG From 0.01 to < 0.1 acre CG CG CG CG From 0.01 to < 0.1 acre CG CG CG CG From 0.01 to < 0.1 acre CG CG CG CG From 0.01 to < 0.1 acre CG CG CG CG From 0.01 to < 0.1 acre CG CG CG CG From 0.01 to < 0.1 acre CG CG CG CG From 0.01 to < 0.1 acre CG CG CG CG From 0.01 to < 0.1 acre CG CG CG From 0.01 to < 0.1 acre CG CG CG CG From 0.01 to < 0.1 acre CG CG CG CG From 0.01 to < 0.1 acre CG CG CG CG From 0.01 to < 0.1 acre CG CG CG CG From 0.01 to < 0.1 acre CG CG CG CG From 0.01 to < 0.1 acre
	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥90%) of its natural landscape size. □ B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres C D D From 10 to < 50 acres C E E E < 10 acres C F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	 Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) ⚠ A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. ⚠ B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. ⚠ C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

17.	Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present?
	Yes No If Yes, continue to 17b. If No, skip to Metric 18.
	17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ☐ A ≥25% coverage of vegetation ☐ B < 25% coverage of vegetation
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.
	AA WT
	Canopy closed, or nearly closed, with natural gaps associated with natural processes CBCCCCCAnopy present, but opened more than natural gaps Canopy sparse or absent
	C C Mid-story/sapling layer sparse or absent
	C A Dense shrub layer B B Moderate density shrub layer C C C Shrub layer sparse or absent
	A Dense herb layer B B B Moderate density herb layer C C C Herb layer sparse or absent
18.	Snags – wetland type condition metric
	Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A
19.	Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
	Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.
20.	Large Woody Debris – wetland type condition metric
	Include both natural debris and man-placed natural debris. Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A
21.	Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater
	Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned
	areas indicate vegetated areas, while solid white areas indicate open water. C A C D
	(STR 22) (CT) (STR)
22.	Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive
	ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

- A Overbank and overland flow are not severely altered in the assessment area.
- B Overbank flow is severely altered in the assessment area.
 - C Overland flow is severely altered in the assessment area.
- D Both overbank and overland flow are severely altered in the assessment area.

Notes

Wetland EE is a palustrine forested wetland located adjacent to the NC 54 Highway and the Corps Waterfowl lands. Wetland EE abuts both sides of and provides the headwaters to Stream DD.

KO I K

Wetland Site Name	TTA Wetland EE	Date	8/14/13
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP/STV
Notes on Field Assessm	ont Form (V/NI)		YES
Notes on Field Assessm			
Presence of regulatory of			YES
Wetland is intensively m		4.400	NO NO
	ated within 50 feet of a natural tributary or other	er open water (Y/N)	YES
	stantially altered by beaver (Y/N)		NO NO
•	ences overbank flooding during normal rainfa	III conditions (Y/N)	NO
Assessment area is on a	a coastal island (Y/N)		NO
Sub-function Rating Su	ummary		
unction	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-Surface Storage and Retention	Condition	MEDIUM
Nater Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Particulate Change	Condition	HIGH
	-	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Soluble Change	Condition	HIGH
	3	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Physical Change	Condition	HIGH
	, o.o.a. o.o.a.go	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Pollution Change	Condition	NA
	, shallen enange	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Physical Structure	Condition	HIGH
	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	HIGH
Function Rating Summ			
unction Rating Summ	Metrics/Notes		Rating
Hydrology	Condition		HIGH
Vater Quality	Condition		HIGH
	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	YES
Habitat Conditon		HIGH	

	ting outcolletor version 4.1
Wetland Site Name TTA Wetland F	Date 6/18/13
Wetland Type Bottomland Hardw ood Forest	Assessor Name/Organization BP -STV
Level III Ecoregion Piedmont	Nearest Named Water Body Sandy Creek
River Basin Cape Fear	■ USGS 8-Digit Catalogue Unit 03030002
Yes No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) 35.959115, -78.971601
septic tanks, underground storage tanks (USTs), hog	ressors is apparent. Consider departure from reference, if 10 years). Noteworthy stressors include, but are not limited , beaver dams, dikes, berms, ponds, etc.) (examples: discharges containing obvious pollutants, presence of nearby lagoons, etc.) rtality, insect damage, disease, storm damage, salt intrusion, etc.)
Is the assessment area intensively managed?	s No
Regulatory Considerations (select all that apply to the assession of the Anadromous fish and Federally protected species or State endangered or the NCDWQ riparian buffer rule in effect Abuts a Primary Nursery Area (PNA) Publicly owned property N.C. Division of Coastal Management Area of Environ Abuts a stream with a NCDWQ classification of SA or Designated NCNHP reference community Abuts a 303(d)-listed stream or a tributary to a 303(d)-	nreatened species nmental Concern (AEC) (including buffer) supplemental classifications of HQW, ORW, or Trout
What type of natural stream is associated with the wetlan	d, if any? (check all that apply)
Blackwater Brownwater	
Brownwater Tidal (if tidal, check one of the following boxes)	Lunar Wind Both
Is the assessment area on a coastal island?	
Is the assessment area's surface water storage capacity	
Does the assessment area experience overbank flooding	
Does the assessment area experience overbank flooding 1. Ground Surface Condition/Vegetation Condition – as Check a box in each column. Consider alteration to the (VS) in the assessment area. Compare to reference wet then rate the assessment area based on evidence of an GS VS A A Not severely altered B Severely altered over a majority of the assedimentation, fire-plow lanes, skidder tr	during normal rainfall conditions? Seessment area condition metric e ground surface (GS) in the assessment area and vegetation structure tland if applicable (see User Manual). If a reference is not applicable, effect. Seessment area (ground surface alteration examples: vehicle tracks, excessive tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, herbicides, salt intrusion [where appropriate], exotic species, grazing,
1. Ground Surface Condition/Vegetation Condition – as Check a box in each column. Consider alteration to th (VS) in the assessment area. Compare to reference wet then rate the assessment area based on evidence of an GS VS A Not severely altered B Severely altered over a majority of the assedimentation, fire-plow lanes, skidder tralteration examples: mechanical disturb less diversity [if appropriate], hydrologic. 2. Surface and Sub-Surface Storage Capacity and Durat Check a box in each column. Consider surface storage duration (Sub). Consider both increase and decrease in North Carolina hydric soils (see USACE Wilmington Dist ≤ 1 foot deep is considered to affect surface water only, sub-surface water. Consider tidal flooding regime, if appl Surf Sub A A Water storage capacity and duration are a Water storage capacity or duration are a Water storage capacity or duration are a	during normal rainfall conditions? Sessment area condition metric e ground surface (GS) in the assessment area and vegetation structure tland if applicable (see User Manual). If a reference is not applicable, effect. Sesessment area (ground surface alteration examples: vehicle tracks, excessive tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, excessive tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure) tracks
1. Ground Surface Condition/Vegetation Condition – as Check a box in each column. Consider alteration to the (VS) in the assessment area. Compare to reference wet then rate the assessment area based on evidence of an GS VS A A Not severely altered B Severely altered over a majority of the assedimentation, fire-plow lanes, skidder the alteration examples: mechanical disturb less diversity [if appropriate], hydrologic sedimentation (Sub). Consider both increase and decrease in North Carolina hydric soils (see USACE Wilmington Dist ≤ 1 foot deep is considered to affect surface water only, sub-surface water. Consider tidal flooding regime, if appl Surf Sub A A Water storage capacity or duration are a Change) (examples: draining, flooding, so change) (examples: draining, flooding, so change) (examples: draining, flooding, so change) (water storage capacity or duration are a change) (examples: draining, flooding, so change) (examples: draining, flooding, so change) (water storage capacity or duration are so change) (examples: draining, flooding, so change) (water storage capacity or duration are so change) (examples: draining, flooding, so change) (water storage capacity or duration are so change) (water storage c	during normal rainfall conditions? Eyes No sessment area condition metric e ground surface (GS) in the assessment area and vegetation structure thand if applicable (see User Manual). If a reference is not applicable, effect. sessessment area (ground surface alteration examples: vehicle tracks, excessive tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure tracks, bedding, fill, soil compaction, fill and sub-surface storage capacity and the proposition metric the capacity and duration (Surf) and sub-surface storage capacity and the hydrology. Refer to the current NRCS lateral effect of ditching guidance for tract website) for the zone of influence of ditches in hydric soils. A ditch while a ditch > 1 foot deep is expected to affect both surface and ditch licable. Into altered. Intered, but not substantially (typically, not sufficient to change vegetation). Substantially altered (typically, alteration sufficient to result in vegetation oil compaction, filling, excessive sedimentation, underground utility lines). Into altered condition metric (answer for non-marsh wetlands only) Select the appropriate storage for the assessment area (AA) and the wetland as able to pond water > 1 foot deep as able to pond water 3 to 6 inches deep anches deep a

		x from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape ke soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for
	regional indi	icators.
	4a. 🌅 A	Sandy soil Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
	⊡ B □C	Loamy or clayey soils not exhibiting redoximorphic features
	□D	Loamy or clayey gleyed soil
	<u>∏</u> E	Histosol or histic epipedon
	4b. [☐A ☐B	Soil ribbon < 1 inch Soil ribbon ≥ 1 inch
	4c. 💽 A	No peat or muck presence
	В В	A peat or muck presence
5.		nto Wetland – opportunity metric
	•	x in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub).
	Examples of Surf Sub	f sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.
	oui Sub	
	∏в ∏в	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the
		treatment capacity of the assessment area Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and
		potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive
		sedimentation, odor)
6.	Land Use -	opportunity metric
		nat apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the
	•	area (5M), and within 2 miles <u>and</u> within the watershed draining to the assessment area (2M). Effective riparian buffers
	are conside	red to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.
	WS 5M	2M ✓ A ≥ 10% impervious surfaces
	В □В	
	OF OF	
	□н □н	H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.	Wetland Ac	ting as Vegetated Buffer – assessment area/wetland complex condition metric
		essment area within 50 feet of a tributary or other open water?
	Yes	
		Ind buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. If a note if a portion of the buffer has been removed or disturbed.
		such of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
	ΠA	≥ 50 feet
	∏B ∏C	From 30 to < 50 feet From 15 to < 30 feet
	D	From 5 to < 15 feet
		< 5 feet <u>or</u> buffer bypassed by ditches ary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
		i-feet wide
		ts of assessment area vegetation extend into the bank of the tributary/open water?
		No tary or other open water sheltered or exposed?
	💽 She	ltered – adjacent open water with width < 2500 feet <u>and</u> no regular boat traffic.
	Exp	osed – adjacent open water with width ≥ 2500 feet <u>or</u> regular boat traffic.
8.		dth at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)
		x in each column. Select the average width for the wetland type at the assessment area (WT) and complex at the assessment areas (WC). See User Manual for WT and WC boundaries.
	WT WC	
	DA DA	
	B BB	From 80 to < 100 feet From 50 to < 80 feet
		From 30 to < 40 feet
	G G G	From 15 to < 30 feet From 5 to < 15 feet

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. Evidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). Sediment deposition is not excessive, but at approximately natural levels. Sediment deposition is excessive, but not overwhelming the wetland. Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) A A ≥ 500 acres B B From 100 to < 500 acres C C C From 50 to < 100 acres C C C From 50 to < 100 acres C C C C From 50 to < 10 acres C C C C From 5 to < 10 acres C C C C From 5 to < 10 acres C C C C From 5 to < 10 acres C C C C From 5 to < 10 acres C C C C From 0.5 to < 1 acre C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C C C C C C C C C C C C C C C
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) A Pocosin is the full extent (≥ 90%) of its natural landscape size. B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥ 500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres C C From 50 to < 100 acres C C From 10 to < 50 acres C C From 10 to <
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) ☑A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. ☑B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. ☑C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetiand type condition metric
17a. Is vegetation present? Yes No If Yes, continue to 17b. If No, skip to Metric 18.
17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. □ A ≥ 25% coverage of vegetation □ B < 25% coverage of vegetation
17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT
Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent
Dense shrub layer B B Moderate density shrub layer C C Shrub layer sparse or absent
CA CA Dense herb layer B B Moderate density herb layer CC C Herb layer sparse or absent
 18. Snags – wetland type condition metric Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A
 19. Diameter Class Distribution – wetland type condition metric Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present. Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.
 20. Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). B Not A
21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater
Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned
areas indicate vegetated areas, while solid white areas indicate open water. A B C C D
22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive
ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.
B Overbank flow is severely altered in the assessment area.
Overland flow is severely altered in the assessment area. Both overbank <u>and</u> overland flow are severely altered in the assessment area.
Notes Wetland F is a palustrine emergent wetland located in the Sandy Creek floodplain. Wetland F is a small, linear wetland that drains to Stream J (Sandy Creek).

Wetland Site Name	TTA Wetland F	Date	6/18/13
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP -STV
datas an Field Assessmen			VEO
Notes on Field Assessm			YES
Presence of regulatory considerations (Y/N)			YES
Wetland is intensively m		0.400	NO
	ated within 50 feet of a natural tributary or other	er open water (Y/N)	YES
	stantially altered by beaver (Y/N)		NO
· · · · · · · · · · · · · · · · · · ·	iences overbank flooding during normal rainfa	III conditions (Y/N)	YES
Assessment area is on a	a coastal island (Y/N)		NO
Sub-function Rating S	ummary		
unction	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	MEDIUM
	Sub-Surface Storage and Retention	Condition	MEDIUM
Vater Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	YES
	Soluble Change	Condition	HIGH
	, and the second	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	MEDIUM
	, c	Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	YES
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	HIGH
Function Rating Sumn	narv		
unction Rating Summ	Metrics/Notes		Rating
Hydrology	Condition		MEDIUM
Vater Quality	Condition		HIGH
	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	YES
Habitat	Conditon		MEDIUM

			Rating Calculat	or Version 4.1	
Wetland Site	Name]	TTA Wetland FF		Date	8/14/13
Wetland	Туре	Bottomland Hardwood Fores	t 💌	Assessor Name/Organization	BP/STV
Level III Ecor	egion	Piedmont	▼	Nearest Named Water Body	Little Creek
River	Basin	Cape Fear	~	USGS 8-Digit Catalogue Unit	03030002
Yes	☐ No	Precipitation within 48 hrs	?	Latitude/Longitude (deci-degrees)	35.905049, -78.997013
Please circle and appropriate, in reto the following. Hydrolog Surface a septic tar Signs of	d/or ma ecent pa ical mo and sub nks, und vegetat	ast (for instance, approximately difications (examples: ditches, surface discharges into the widerground storage tanks (USTs	ce of stressors is app y within 10 years). N , dams, beaver dama etland (examples: di s), hog lagoons, etc. ion mortality, insect o	parent. Consider departure from refere Noteworthy stressors include, but are not s, dikes, berms, ponds, etc.) ischarges containing obvious pollutants) damage, disease, storm damage, salt i	ot limited s, presence of nearby
Is the assessm	ent are	a intensively managed?	Yes No		
Anadrom Federally NCDWQ Abuts a F Publicly of N.C. Divi Abuts a s Designat Abuts a s Blackwat Brownwa Tidal (if ti Is the assessme Is the assessme Ground Su Check a bo (VS) in the s	rous fislic protect riparian protect rip	ted species or State endangered buffer rule in effect Nursery Area (PNA) Droperty Coastal Management Area of I with a NCDWQ classification of NHP reference community isted stream or a tributary to a tream is associated with the eck one of the following boxes) a on a coastal island? a's surface water storage cal area experience overbank flowed in the column. Consider alteration ment area. Compare to reference stream area based on evidence the severely altered over a majority of dimentation, fire-plow lanes, skeep a stream of the column of the	Environmental Conc of SA or supplemental 303(d)-listed stream wetland, if any? (c) Lunar Yes No pacity or duration so coding during norm on – assessment and to the ground surince wetland if applice of an effect. of the assessment and didder tracks, beddind disturbance, herbici	ecies eern (AEC) (including buffer) al classifications of HQW, ORW, or Tro heck all that apply) Wind Both substantially altered by beaver? mal rainfall conditions?	Yes No Yes No vegetation structure is not applicable, s: vehicle tracks, excessive nts) (vegetation structure
Check a boduration (S North Carolist Sub-surface Surf Sut CA CA CB CC CC 3. Water Stor Check a bod	ox in each	ich column. Consider surface onsider both increase and decriric soils (see USACE Wilmingt insidered to affect surface water Consider tidal flooding regime after storage capacity and durate after storage capacity or durationater storage.	e storage capacity ar rease in hydrology. ton District website) or only, while a ditch a, if applicable. tion are not altered. on are altered, but no on are substantially a oding, soil compactio	sment area condition metric and duration (Surf) and sub-surface stora Refer to the current NRCS lateral effect for the zone of influence of ditches in h > 1 foot deep is expected to affect bot obt substantially (typically, not sufficient to altered (typically, alteration sufficient to on, filling, excessive sedimentation, und ondition metric (answer for non-mars propriate storage for the assessment a	et of ditching guidance for ydric soils. A ditch h surface and ditch to change vegetation). result in vegetation lerground utility lines).
type (WT). AA 3a. AB CB CC CD 3b. AB	WT A B C C D Evide	Majority of wetland with dep	ressions able to pon ressions able to pon ressions able to pon rater < 3 inches deep undation is greater th	nd water > 1 foot deep nd water 6 inches to 1 foot deep nd water 3 to 6 inches deep p han 2 feet	

	Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.
	4a. A Sandy soil B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) C Loamy or clayey soils not exhibiting redoximorphic features D Loamy or clayey gleyed soil Histosol or histic epipedon
	4b. C A Soil ribbon < 1 inch C B Soil ribbon ≥1 inch
	4c. A No peat or muck presence A peat or muck presence
5.	Discharge into Wetland – opportunity metric Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub A A A A Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area C C C Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and
	potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Land Use – opportunity metric Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. WS 5M 2M
	F A
	Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water? Yes No If Yes, continue to 7b. If No, skip to Metric 8. Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed. 7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. A ≥50 feet B From 30 to < 50 feet C From 15 to < 30 feet D From 5 to < 15 feet E < 5 feet or buffer bypassed by ditches 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width. S15-feet wide S>15-feet wide Other open water (no tributary present) 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water? Yes No 7e. Is tributary or other open water sheltered or exposed? Sheltered – adjacent open water with width < 2500 feet or regular boat traffic. Exposed – adjacent open water with width ≥2500 feet or regular boat traffic.
8.	Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries. WT WC A A ≥100 feet B B From 80 to < 100 feet C C From 50 to < 80 feet D D From 40 to < 50 feet E F From 30 to < 40 feet F F From 15 to < 30 feet C G G From 5 to < 15 feet H C H < 5 feet

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. Answer for assessment area dominant landform. Evidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). CA Sediment deposition is not excessive, but at approximately natural levels. CB Sediment deposition is excessive, but not overwhelming the wetland. CC Sediment deposition is excessive and is overwhelming the wetland.
	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) CA CA CA SO0 acres B B B From 100 to < 500 acres CC CC From 50 to < 100 acres CD CD CD From 25 to < 50 acres CE CE CE From 10 to < 25 acres CF FF From 5 to < 10 acres CG CG From 1 to < 5 acres CH CH CH CH CF From 0.5 to < 1 acre CI CI CI From 0.1 to < 0.5 acre CI CI CI From 0.01 to < 0.1 acre CI CI CI From 0.01 to < 0.1 acre CK CK CK CK < 0.01 acre or assessment area is clear-cut
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥90%) of its natural landscape size. □ B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres D D From 10 to < 50 acres E E E < 10 acres F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
	 Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) ☑ A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. ☑ B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. ☑ C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure - assessment area/wetland type condition metric 17a. Is vegetation present? If Yes, continue to 17b. If No, skip to Metric 18. Yes No. 17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands. ≥25% coverage of vegetation B B < 25% coverage of vegetation 17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT Canopy closed, or nearly closed, with natural gaps associated with natural processes B Canopy present, but opened more than natural gaps Canopy sparse or absent Dense mid-story/sapling layer Moderate density mid-story/sapling layer Mid-story/sapling layer sparse or absent Dense shrub layer Moderate density shrub layer Shrub layer sparse or absent Dense herb layer Moderate density herb layer Herb layer sparse or absent 18. Snags - wetland type condition metric Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). ∏ A ⊕ B 19. Diameter Class Distribution - wetland type condition metric Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present. Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. B

20. Large Woody Debris - wetland type condition metric

Include both natural debris and man-placed natural debris.

C A ⊙ B Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).

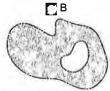
Not A

C

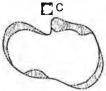
21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

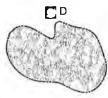
Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.





Majority of canopy trees are < 6 inches DBH or no trees.





22. Hydrologic Connectivity - assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive

ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

⊙ A **⊝** B Overbank and overland flow are not severely altered in the assessment area.

Overbank flow is severely altered in the assessment area.

Overland flow is severely altered in the assessment area. C

CD Both overbank and overland flow are severely altered in the assessment area.

Notes

Wetland FF is a palustrine forested wetland located adjacent to the NC 54 Highway. Wetland FF abuts both sides of Stream EE.

Wetland Site Name _	TTA Wetland FF	Date	8/14/13
Wetland Type _	Bottomland Hardwood Forest	Assessor Name/Organization	BP/STV
Notes on Field Assessn	pont Form (V/N)		YES
	, ,		YES
Presence of regulatory	•		NO
Wetland is intensively m			YES
	ated within 50 feet of a natural tributary or other	er open water (17N)	1
	estantially altered by beaver (Y/N)	III a a distanza (AZAN)	NO
	iences overbank flooding during normal rainfa	ii conditions (Y/N)	NO
Assessment area is on	a coastal Island (Y/N)		NO
Sub-function Rating S	ummary		
unction	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-Surface Storage and Retention	Condition	MEDIUM
Vater Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Particulate Change	Condition	HIGH
	-	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Soluble Change	Condition	HIGH
	3 -	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Physical Change	Condition	HIGH
	, nyelesi enange	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Pollution Change	Condition	NA
	1 onation onlings	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA NA
	Physical Structure	Condition	HIGH
labitat	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	HIGH
		Condition	
Function Rating Sumn Function	nary Metrics/Notes		Rating
Hydrology	Condition		HIGH
Vater Quality	Condition		HIGH
. C.O. Quality	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	YES
Habitat	Conditon	,	HIGH

		Rating Carculator	*C131011 4.1	
ł	Wetland Site Name	TTA Wetland G	Date	6/18/13
	Wetland Type	Bottomland Hardw ood Forest	Assessor Name/Organization	BP -STV
	Level III Ecoregion	Piedmont	Nearest Named Water Body	Sandy Creek
	River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030002
ļ	∏Yes [•]N	o Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.956380, -78.975044
	Please circle and/or m appropriate, in recent p to the following. • Hydrological m • Surface and su septic tanks, ur • Signs of vegeta	s affecting the assessment area (may not be within ake note on last page if evidence of stressors is appa past (for instance, approximately within 10 years). No odifications (examples: ditches, dams, beaver dams, b-surface discharges into the wetland (examples: dischargeound storage tanks (USTs), hog lagoons, etc.) ation stress (examples: vegetation mortality, insect data ommunity alteration (examples: mowing, clear-cutting)	rent. Consider departure from refere teworthy stressors include, but are not dikes, berms, ponds, etc.) charges containing obvious pollutants amage, disease, storm damage, salt i	ot limited
ļ	Is the assessment are	ea intensively managed? Tyes Tyes		
	Anadromous fis Federally prote NCDWQ riparia Abuts a Primar Publicly owned N.C. Division o Abuts a stream Designated NC	cted species or State endangered or threatened speci an buffer rule in effect y Nursery Area (PNA)	rn (AEC) (including buffer)	ut
	Blackwater Brownwater Tidal (if tidal, cl	stream is associated with the wetland, if any? (che heck one of the following boxes) Lunar ea on a coastal island? Yes No ea's surface water storage capacity or duration su	Wind Both	∏Yes ⊡ No
ł	Does the assessmen	t area experience overbank flooding during norma	l rainfall conditions?	Yes No
	Check a box in e (VS) in the assess then rate the asse GS VS A A A B B B S Se al	Condition/Vegetation Condition – assessment area ach column. Consider alteration to the ground surfact sment area. Compare to reference wetland if applicates sment area based on evidence of an effect. ot severely altered everely altered everely altered over a majority of the assessment area edimentation, fire-plow lanes, skidder tracks, bedding, teration examples: mechanical disturbance, herbicides so diversity [if appropriate], hydrologic alteration)	ce (GS) in the assessment area and vole (see User Manual). If a reference a (ground surface alteration examples fill, soil compaction, obvious pollutar	is not applicable, s: vehicle tracks, excessive nts) (vegetation structure
	Check a box in eduration (Sub). Control Carolina hydes 1 foot deep is consub-surface water Surf Sub A PA WARE B B B WARE C C C W	-Surface Storage Capacity and Duration – assessmach column. Consider surface storage capacity and Consider both increase and decrease in hydrology. Redric soils (see USACE Wilmington District website) for considered to affect surface water only, while a ditch > 1. Consider tidal flooding regime, if applicable. Vater storage capacity and duration are not altered. Vater storage capacity or duration are altered, but not solvater storage capacity or duration are substantially alternange) (examples: draining, flooding, soil compaction,	duration (Surf) and sub-surface stora efer to the current NRCS lateral effect r the zone of influence of ditches in h 1 foot deep is expected to affect both substantially (typically, not sufficient to ered (typically, alteration sufficient to	t of ditching guidance for ydric soils. A ditch n surface and ditch o change vegetation).
	Check a box in e type (WT). AA WT 3a. A A B B C C C C D D 3b. A Evid B Evid	Majority of wetland with depressions able to pond Majority of wetland with depressions able to pond	water > 1 foot deep water 6 inches to 1 foot deep water 3 to 6 inches deep n 2 feet and 2 feet	

4.	Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators. 4a. A Sandy soil B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) C Loamy or clayey soils not exhibiting redoximorphic features C Loamy or clayey gleyed soil Histosol or histic epipedon
	 4b.
5.	
6.	Land Use – opportunity metric Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. WS 5M 2M A A A A A A A S 10% impervious surfaces B B B B A < 10% impervious surfaces C C C C Confined animal operations (or other local, concentrated source of pollutants) D D D D D A 20% coverage of pasture E B B B A 20% coverage of agricultural land (regularly plowed land) F F F F A 20% coverage of maintained grass/herb G G G G G ≥ 20% coverage of clear-cut land H H H H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.	 Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water? Yes No If Yes, continue to 7b. If No, skip to Metric 8. Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed. 7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. A ≥ 50 feet B From 30 to < 50 feet C From 15 to < 30 feet D From 5 to < 15 feet E < 5 feet or buffer bypassed by ditches 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width. S 15-feet wide S > 15-feet wide O Other open water (no tributary present) 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water? Yes No 7e. Is tributary or other open water sheltered or exposed? Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic. Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.
8.	Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries. WT WC A A ≥ 100 feet B B From 80 to < 100 feet C C From 50 to < 80 feet D D From 40 to < 50 feet E F From 30 to < 40 feet F F From 15 to < 30 feet G G From 5 to < 15 feet H H H < 5 feet

	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. A Evidence of short-duration inundation (< 7 consecutive days) B Evidence of saturation, without evidence of inundation C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. B Sediment deposition is excessive, but not overwhelming the wetland. C Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) A A S 500 acres B B From 100 to < 500 acres C C C From 50 to < 100 acres C C C From 50 to < 100 acres B E E F From 10 to < 25 acres C F F F F From 5 to < 10 acres C G G G From 1 to < 5 acres C G G G From 1 to < 5 acres C G G G From 0.5 to < 1 acre C G G G From 0.1 to < 0.5 acre C G G G From 0.1 to < 0.5 acres C G G G From 0.1 to < 0.5 acres C G G G From 0.1 to < 0.5 acres C G G G From 0.1 to < 0.5 acres C G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.2 to < 0.1 acre or assessment area is clear-cut
	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) A Pocosin is the full extent (≥ 90%) of its natural landscape size. B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥ 500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres C C From 50 to < 100 acres C C From 50 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C F From 10 to < 50 acres C C F From 10 to < 50 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 10 to < 50 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C C F From 50 to < 100 acres C F F From 50 to < 100 acres C F F F F F F F F F F F F F F F F F F F
	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions B No artificial edge within 150 feet in four (4) to seven (7) directions C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present? Yes No If Yes, continue to 17b. If No, skip to Metric 18.
17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ☐A ≥ 25% coverage of vegetation
TB < 25% coverage of vegetation 17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT A WT AC Canopy closed, or nearly closed, with natural gaps associated with natural processes
B Canopy present, but opened more than natural gaps Canopy sparse or absent
Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent Canopy sparse or absent Canopy sparse or absent Dense mid-story/sapling layer Moderate density mid-story/sapling layer Mid-story/sapling layer sparse or absent
CA CA Dense shrub layer B Moderate density shrub layer C C Shrub layer sparse or absent
CA Dense herb layer B Moderate density herb layer C C Herb layer sparse or absent
18. Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). B Not A
19. Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.
 20. Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). B Not A
21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned
areas indicate vegetated areas, while solid white areas indicate open water.
22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. A Overbank and overland flow are not severely altered in the assessment area. Overbank flow is severely altered in the assessment area.
Overland flow is severely altered in the assessment area. Both overbank <u>and</u> overland flow are severely altered in the assessment area.
Notes Wetland G is a palustrine forested wetland located in the Sandy Creek floodplain. Wetland G abuts Stream J (Sandy Creek).

Wetland Site Name	TTA Wetland G	Date	6/18/13	
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP -STV	
Natas as Field Assess			V/50	
Notes on Field Assess	` ,		YES	
Presence of regulatory			YES NO	
Wetland is intensively managed (Y/N)				
	cated within 50 feet of a natural tributary or other	er open water (Y/N)	YES	
	bstantially altered by beaver (Y/N)		NO	
· · · · · · · · · · · · · · · · · · ·	eriences overbank flooding during normal rainfa	all conditions (Y/N)	YES	
Assessment area is on	a coastal island (Y/N)		NO	
Sub-function Rating	Summary			
Function	Sub-function	Metrics	Rating	
Hydrology	Surface Storage and Retention	Condition	HIGH	
	Sub-Surface Storage and Retention	Condition	LOW	
Nater Quality	Pathogen Change	Condition	HIGH	
		Condition/Opportunity	HIGH	
		Opportunity Presence? (Y/N)	YES	
	Particulate Change	Condition	HIGH	
		Condition/Opportunity	HIGH	
		Opportunity Presence? (Y/N)	YES	
	Soluble Change	Condition	HIGH	
	Ç	Condition/Opportunity	HIGH	
		Opportunity Presence? (Y/N)	YES	
	Physical Change	Condition	MEDIUM	
		Condition/Opportunity	MEDIUM	
		Opportunity Presence? (Y/N)	YES	
	Pollution Change	Condition	NA	
	1 Shaller Sharige	Condition/Opportunity	NA NA	
		Opportunity Presence? (Y/N)	NA NA	
	Physical Structure	Condition	HIGH	
labitat	Landscape Patch Structure	Condition	LOW	
	Vegetation Composition	Condition	HIGH	
Function Rating Sum Function	Metrics/Notes		Rating	
Hydrology	Condition		HIGH	
Nater Quality	Condition		HIGH	
	Condition/Opportunity		HIGH	
	Opportunity Presence?	(Y/N)	YES	
Habitat	Conditon		HIGH	

Mada d O'4 - N-	Rating Calculate	7 7 61 61 61 11 11 1	
wetiand Site Name	TTA Wetland GG	Date	11/05/13
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP/STV
Level III Ecoregion	Piedmont	Nearest Named Water Body	Chapel Creek
River Basin	Cape Fear ▼	USGS 8-Digit Catalogue Unit	03030002
Yes N	o Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.905366, -79.028462
Evidence of stressor Please circle and/or m appropriate, in recent to the following. • Hydrological m • Surface and su septic tanks, ui • Signs of vegeta • Habitat/plant co Is the assessment ar Regulatory Consider Anadromous fis Federally prote V NCDWQ riparia Abuts a Primar Publicly owned N.C. Division o Abuts a stream Designated NC Abuts a 303(d) What type of natural Blackwater	s affecting the assessment area (may not be with ake note on last page if evidence of stressors is apposat (for instance, approximately within 10 years). No odifications (examples: ditches, dams, beaver dams be-surface discharges into the wetland (examples: disnorderground storage tanks (USTs), hog lagoons, etc.) ation stress (examples: vegetation mortality, insect dommunity alteration (examples: mowing, clear-cutting a intensively managed? Tyes No oations (select all that apply to the assessment are should be applyed	in the assessment area) arent. Consider departure from referer betworthy stressors include, but are no dikes, berms, ponds, etc.) charges containing obvious pollutants, amage, disease, storm damage, salt in g, exotics, etc.) cia) cies arn (AEC) (including buffer) classifications of HQW, ORW, or Trou	nce, if of limited , presence of nearby ntrusion, etc.)
Brownwater			
<u> </u>	neck one of the following boxes)	Wind Both	
Is the assessment ar	ea on a coastal island?		
Is the assessment ar	ea's surface water storage capacity or duration s	ubstantially altered by beaver?	TYes No
Does the assessmen			
	t area experience overbank flooding during norm	al rainfall conditions?	Yes No
Check a box in e (VS) in the assess then rate the asses GS VS A A A N B B B S al	tarea experience overbank flooding during norm Condition/Vegetation Condition – assessment are ach column. Consider alteration to the ground surfacement area. Compare to reference wetland if applicates a sesment area based on evidence of an effect. Lot severely altered everely altered everely altered over a majority of the assessment are adimentation, fire-plow lanes, skidder tracks, bedding teration examples: mechanical disturbance, herbicious diversity [if appropriate], hydrologic alteration)	ea condition metric ace (GS) in the assessment area and value (see User Manual). If a reference ace (ground surface alteration examples a fill, soil compaction, obvious pollutan	vegetation structure is not applicable, :: vehicle tracks, excessive ts) (vegetation structure
Check a box in e (VS) in the assess then rate the asses GS VS A A A N B B B S al le 2. Surface and Sub Check a box in e duration (Sub). (North Carolina hy ≤1 foot deep is of sub-surface water Surf Sub A A A W B B B W C C C C W	Condition/Vegetation Condition – assessment are ach column. Consider alteration to the ground surfactment area. Compare to reference wetland if applicates applicates are abased on evidence of an effect. Out severely altered everely altered over a majority of the assessment are adimentation, fire-plow lanes, skidder tracks, bedding teration examples: mechanical disturbance, herbicic	ea condition metric ace (GS) in the assessment area and value (see User Manual). If a reference ace (ground surface alteration examples begin fill, soil compaction, obvious pollutan ace, salt intrusion [where appropriate], ace	regetation structure is not applicable, revehicle tracks, excessive ts) (vegetation structure exotic species, grazing, ge capacity and tof ditching guidance for redric soils. A ditch in surface and ditch o change vegetation).
Check a box in e (VS) in the assess then rate the asses GS VS A A A N B B S al Be 2. Surface and Sub Check a box in e duration (Sub). O North Carolina hy ≤1 foot deep is of sub-surface water Surf Sub A A A W B B B W C C C W Cd 3. Water Storage/S	Condition/Vegetation Condition – assessment are ach column. Consider alteration to the ground surfact sment area. Compare to reference wetland if applicates and the action area based on evidence of an effect. Lot severely altered ever a majority of the assessment area between the action of the action of the action of the action examples: mechanical disturbance, herbicides disturbance, herbicides disturbance, herbicides disturbance, herbicides disturbance, herbicides disturbance, herbicides and consider surface Storage Capacity and Duration – assessment area ach column. Consider surface storage capacity and Consider both increase and decrease in hydrology. For action of the actio	ace (GS) in the assessment area and whole (see User Manual). If a reference area (ground surface alteration examples at (ground surface alteration pollutanies, salt intrusion [where appropriate], and the salt intrusion (surf) and sub-surface storate at the current NRCS lateral effect for the zone of influence of ditches in hybrid to the substantially (typically, not sufficient to the substantially (typically, alteration sufficient to the substantially (typically, not sufficient to the substantial to the substantial typically (typically, not sufficient to the substantial typically (typically, not substantial typically).	vegetation structure is not applicable, vehicle tracks, excessive ts) (vegetation structure exotic species, grazing, ge capacity and of ditching guidance for vdric soils. A ditch in surface and ditch c change vegetation). result in vegetation erground utility lines). h wetlands only)

		x from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape Re soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for
	regional indi	
	4a. ∏ A ⊡ B	Sandy soil Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
	C	Loamy or clayey soils exhibiting redoximorphic features
		Loamy or clayey gleyed soil
	∏E #	Histosol or histic epipedon
	4b. ∏ A ⊡ B	Soil ribbon < 1 inch Soil ribbon ≥1 inch
	4c. 🖸 A	No peat or muck presence
	∏В	A peat or muck presence
5.	Check a box	nto Wetland – opportunity metric ix in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.
	⊙ A ⊙ A	Little or no evidence of pollutants or discharges entering the assessment area
	EB EB	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
	Ec Ec	
6.		opportunity metric
	draining to a assessment	at apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources ssessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers ed to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.
	WS 5M FA FA	2M ☐ A ≥10% impervious surfaces
	8 ज a ज	
	FF FF	F ≥20% coverage of maintained grass/herb
		 ☐ G ≥20% coverage of clear-cut land ☐ H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations
	, ,	that prevent drainage or overbank flow from affecting the assessment area.
7.		ting as Vegetated Buffer – assessment area/wetland complex condition metric
	7a. Is asse	ssment area within 50 feet of a tributary or other open water? TNo If Yes, continue to 7b. If No, skip to Metric 8.
	Wetlan	d buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland.
	Record	a note if a portion of the buffer has been removed or disturbed.
	/b. How m	uch of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. ≥50 feet
	ВВ	From 30 to < 50 feet
	C D	From 15 to < 30 feet From 5 to < 15 feet
	ĒΕ	< 5 feet or buffer bypassed by ditches
		ry width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
		-feet wide
	💽 Yes	□ No
	Shel	tary or other open water sheltered or exposed? tered – adjacent open water with width < 2500 feet <u>and</u> no regular boat traffic. osed – adjacent open water with width ≥2500 feet <u>or</u> regular boat traffic.
8.		dth at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)
		x in each column. Select the average width for the wetland type at the assessment area (WT) and complex at the assessment areas (WC). See User Manual for WT and WC boundaries.
	WT WC	
	EA EA	≥100 feet From 80 to < 100 feet
	CC CC	From 50 to < 80 feet
	CD CD	From 40 to < 50 feet
		From 30 to < 40 feet From 15 to < 30 feet
	rgg rgg	From 5 to < 15 feet
	Дн Дн	< 5 feet

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. Answer for assessment area dominant landform. Answer for assessment area dominant landform. Consecutive days) Evidence of saturation, without evidence of inundation Consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. B Sediment deposition is excessive, but not overwhelming the wetland. C Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) CA CA ≥500 acres CB CB CB CB From 100 to < 500 acres CC CC From 50 to < 100 acres CD CD CD From 25 to < 50 acres FFOR 10 to < 25 acres FFOR 50 to < 10 acres CG CG CG From 1 to < 5 acres CH CH CH CH From 0.5 to < 1 acre CI CI CI From 0.01 to < 0.5 acre CI CI CI From 0.01 to < 0.1 acre CI CI CI From 0.01 to < 0.1 acre CI CI CI From 0.01 to < 0.1 acre or assessment area is clear-cut
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥90%) of its natural landscape size. □ B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres C D From 10 to < 50 acres E E E < 10 acres F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	 Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) ☑ A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. ☑ B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. ☑ C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

	Li Company de la
17.	Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present?
	Yes No If Yes, continue to 17b. If No, skip to Metric 18.
	17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ☐ A ≥25% coverage of vegetation ☐ B < 25% coverage of vegetation
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.
	AA WT
	C C Canopy sparse or absent
	C C Mid-story/sapling layer sparse or absent
	CA CA Dense shrub layer B B Moderate density shrub layer CC C Shrub layer sparse or absent
	☐ A ☐ A Dense herb layer ☐ B ☐ B Moderate density herb layer ☐ C ☐ C Herb layer sparse or absent
18.	Snags – wetland type condition metric
	Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A
19.	Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are
	present. By By Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.
20.	Large Woody Debris – wetland type condition metric
	Include both natural debris and man-placed natural debris. Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A
21.	Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)
	Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned
	areas indicate vegetated areas, while solid white areas indicate open water. C A C D
22.	Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive
	ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.
	A Overbank and overland flow are not severely altered in the assessment area.
	C B Overhank flow is severely altered in the assessment area

- Overland flow is severely altered in the assessment area. Both overbank <u>and</u> overland flow are severely altered in the assessment area.

Notes

Wetland GG is a palustrine forested wetland located adjacent to the NC 54 Highway and upland forest. Wetland GG abuts both sides of Stream RR.

Wetland Site Name	TTA Wetland GG	Date	11/05/13					
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP/STV					
Notes on Field Assess	ment Form (Y/N)		YES					
Presence of regulatory			YES					
Wetland is intensively managed (Y/N) Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) Assessment area is substantially altered by beaver (Y/N)								
						eriences overbank flooding during normal rainfa	III conditions (Y/N)	NO
					·	a coastal island (Y/N)	,	NO
	(,		-					
Sub-function Rating	Summary							
unction	Sub-function	Metrics	Rating					
Hydrology	Surface Storage and Retention	Condition	HIGH					
	Sub-Surface Storage and Retention	Condition	LOW					
Vater Quality	Pathogen Change	Condition	HIGH					
		Condition/Opportunity	HIGH					
		Opportunity Presence? (Y/N)	NO					
	Particulate Change	Condition	HIGH					
		Condition/Opportunity	HIGH					
		Opportunity Presence? (Y/N)	NO					
	Soluble Change	Condition	HIGH					
		Condition/Opportunity	HIGH					
		Opportunity Presence? (Y/N)	NO					
	Physical Change	Condition	HIGH					
	,	Condition/Opportunity	HIGH					
		Opportunity Presence? (Y/N)	NO					
	Pollution Change	Condition	NA					
	G	Condition/Opportunity	NA					
		Opportunity Presence? (Y/N)	NA					
	Physical Structure	Condition	MEDIUM					
	Landscape Patch Structure	Condition	LOW					
	Vegetation Composition	Condition	HIGH					
Function Rating Sum	mary Metrics/Notes		Rating					
Hydrology	Condition		HIGH					
Vater Quality	Condition	HIGH						
	Condition/Opportunity		HIGH					
	Opportunity Presence?	(Y/N)	NO					
-labitat	Conditon		MEDIUM					

Г		Rating Calculator		
	Wetland Site Name TTA Wetland H			te <u>6/18/13</u>
	Wetland Type Non-Tidal Freshw ate		Assessor Name/Organization	
	Level III Ecoregion Piedmont		Nearest Named Water Boo	-
	River Basin Cape Fear	▼	USGS 8-Digit Catalogue Ur	nit <u>03030002</u>
L	Yes No Precipitation within	48 hrs?	Latitude/Longitude (deci-degree	s) 35.955416, -78.975207
	Evidence of stressors affecting the assessme Please circle and/or make note on last page if appropriate, in recent past (for instance, appropriate to the following. • Hydrological modifications (examples: • Surface and sub-surface discharges into septic tanks, underground storage tanks. • Signs of vegetation stress (examples: • Habitat/plant community alteration (examples)	evidence of stressors is appa ximately within 10 years). Not ditches, dams, beaver dams, to the wetland (examples: disc s (USTs), hog lagoons, etc.) vegetation mortality, insect da	rent. Consider departure from refereworthy stressors include, but are dikes, berms, ponds, etc.) charges containing obvious pollutar mage, disease, storm damage, sal	not limited
	Is the assessment area intensively managed	d? Yes No		
	Regulatory Considerations (select all that and Anadromous fish Federally protected species or State en NCDWQ riparian buffer rule in effect Abuts a Primary Nursery Area (PNA) Publicly owned property N.C. Division of Coastal Management Abuts a stream with a NCDWQ classific Designated NCNHP reference commun Abuts a 303(d)-listed stream or a tributa	dangered or threatened speci Area of Environmental Concer cation of SA or supplemental o	es n (AEC) (including buffer)	rout
	What type of natural stream is associated w Blackwater Brownwater Tidal (if tidal, check one of the following Is the assessment area on a coastal island? Is the assessment area's surface water stor	boxes) Lunar Yes	Wind Both	_Yes ⊡ No
	Does the assessment area experience overl			Yes No
	sedimentation, fire-plow la	alteration to the ground surfactoreference wetland if applicable vidence of an effect. ajority of the assessment area anes, skidder tracks, bedding, hanical disturbance, herbicide	ce (GS) in the assessment area and	ee is not applicable, es: vehicle tracks, excessive ants) (vegetation structure
	B B Water storage capacity or C C Water storage capacity or	surface storage capacity and nd decrease in hydrology. Refilmington District website) for ce water only, while a ditch > regime, if applicable. Indicate the duration are not altered, duration are altered, but not substantially altered.	duration (Surf) and sub-surface sto fer to the current NRCS lateral effer the zone of influence of ditches in	ect of ditching guidance for hydric soils. A ditch oth surface and ditch to change vegetation).
	B B Majority of wetland w	with depressions able to pond with depressions able to pond with depressions able to pond pond water < 3 inches deep	water > 1 foot deep water 6 inches to 1 foot deep water 3 to 6 inches deep	

	Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for
	regional indicators. 4a. A Sandy soil B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) C Loamy or clayey soils not exhibiting redoximorphic features Loamy or clayey gleyed soil Histosol or histic epipedon
	4b. TA Soil ribbon < 1 inch
	B Soil ribbon ≥ 1 inch 4c. A No peat or muck presence
_	B A peat or muck presence
5.	Discharge into Wetland – opportunity metric Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub A Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	
	WS 5M 2M A A A A A A A A B A B A B A B A B A B
7.	 Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water? Yes No If Yes, continue to 7b. If No, skip to Metric 8. Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed. 7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. A ≥ 50 feet B From 30 to < 50 feet C From 15 to < 30 feet D From 5 to < 15 feet E < 5 feet or buffer bypassed by ditches 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width. S 15-feet wide T > 15-feet wide T Other open water (no tributary present) 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water? Yes No 7e. Is tributary or other open water sheltered or exposed? Sheltered – adjacent open water with width < 2500 feet or regular boat traffic. Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.
8.	

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. A Evidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. Sediment deposition is excessive, but not overwhelming the wetland. Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) A A A SO0 acres B B From 100 to < 500 acres C C C From 50 to < 100 acres C C C From 50 to < 100 acres C F F F From 10 to < 25 acres C F F F From 5 to < 10 acres C G C G From 1 to < 5 acres C G C G From 0.1 to < 0.5 acre C G C G From 0.1 to < 0.5 acre C G C G From 0.1 to < 0.5 acre C G C G C G From 0.1 to < 0.5 acre C G C G C G From 0.1 to < 0.5 acre C G C G C G From 0.1 to < 0.5 acre C G C G C G From 0.1 to < 0.5 acre C G C G C G From 0.1 to < 0.5 acre C G C G C G From 0.1 to < 0.5 acre C G C G C G From 0.1 to < 0.5 acre C G C G C G From 0.1 to < 0.5 acre C G C G C G From 0.1 to < 0.5 acre C G C G C G From 0.1 to < 0.5 acre C G C G C G From 0.1 to < 0.5 acre C G C G C G From 0.1 to < 0.5 acre
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥ 90%) of its natural landscape size. □ B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥ 500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres D D From 10 to < 50 acres E C C From 50 to < 100 acres F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetiand type condition metric 17a. Is vegetation present?
Yes No If Yes, continue to 17b. If No, skip to Metric 18.
17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ☐A ≥ 25% coverage of vegetation ☐B < 25% coverage of vegetation
17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT
Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent
CA CA Dense shrub layer B B Moderate density shrub layer C C Shrub layer sparse or absent
CA CA Dense herb layer B Moderate density herb layer C C Herb layer sparse or absent
18. Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). B Not A
 19. Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present. B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. C Majority of canopy trees are < 6 inches DBH or no trees.
_
 20. Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). B Not A
21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater
Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned
areas indicate vegetated areas, while solid white areas indicate open water.
22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severally after hydrologic connectivity include intensive
Examples of activities that may severely alter hydrologic connectivity include intensive diching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.
Overbank and overland flow are not severely altered in the assessment area. Overbank flow is severely altered in the assessment area.
C Overland flow is severely altered in the assessment area. Both overbank and overland flow are severely altered in the assessment area.
Notes
Wetland H is a palustrine emergent wetland located in the New Hope Creek floodplain adjacent to Stream K. Wetland H is a small, linear wetland.

Wetland Site Name	TTA Wetland H	Date	6/18/13	
Wetland Type	Non-Tidal Freshwater Marsh	Assessor Name/Organization	BP -STV	
N	0/00		VE0	
Notes on Field Assessr	· · ·		YES	
Presence of regulatory			YES NO	
Wetland is intensively managed (Y/N)				
	ated within 50 feet of a natural tributary or other	er open water (Y/N)	NO NO	
	ostantially altered by beaver (Y/N)		NO	
· · · · · · · · · · · · · · · · · · ·	riences overbank flooding during normal rainfa	all conditions (Y/N)	YES NO	
Assessment area is on a coastal island (Y/N)				
Sub-function Rating S	Gummary			
Function	Sub-function	Metrics	Rating	
Hydrology	Surface Storage and Retention	Condition	NA	
	Sub-Surface Storage and Retention	Condition	NA	
Water Quality	Pathogen Change	Condition	NA	
		Condition/Opportunity	NA	
		Opportunity Presence? (Y/N)	NA	
	Particulate Change	Condition	NA	
		Condition/Opportunity	NA	
		Opportunity Presence? (Y/N)	NA	
	Soluble Change	Condition	NA	
	5	Condition/Opportunity	NA	
		Opportunity Presence? (Y/N)	NA	
	Physical Change	Condition	NA	
	,	Condition/Opportunity	NA	
		Opportunity Presence? (Y/N)	NA NA	
	Pollution Change	Condition	NA NA	
	r shaddir Sharige	Condition/Opportunity	NA NA	
		Opportunity Presence? (Y/N)	NA NA	
	Physical Structure	Condition	MEDIUM	
labitat	Landscape Patch Structure	Condition	MEDIUM	
	Vegetation Composition	Condition	MEDIUM	
Function Betime Com	· .			
F unction Rating Sum Function	Metrics/Notes		Rating	
Hydrology	Condition		HIGH	
Nater Quality	Condition		MEDIUM	
·	Condition/Opportunity		MEDIUM	
	Opportunity Presence?	(Y/N)	NO	
Habitat	Conditon		MEDIUM	

NC WAM WETLAND ASSESSMENT FORM **Accompanies User Manual Version 4.1**

	Rat	ing Calculator	version 4.1	
Wetland Site Name	TTA Wetland HHH		Date	12/10/13
Wetland Type	Non-Tidal Freshwater Marsh	•	Assessor Name/Organization	BP/STV
Level III Ecoregion	Piedmont	-	Nearest Named Water Body	Little Creek
River Basin	Cape Fear	•	USGS 8-Digit Catalogue Unit	03030002
Yes N	o Precipitation within 48 hrs?		.atitude/Longitude (deci-degrees)	35.918546, -78.997501
Please circle and/or m appropriate, in recent p to the following. • Hydrological m • Surface and su septic tanks, ur • Signs of vegeta	s affecting the assessment area (may ake note on last page if evidence of stroast (for instance, approximately within odifications (examples: ditches, dams, b-surface discharges into the wetland (nderground storage tanks (USTs), hog lation stress (examples: vegetation more mmunity alteration (examples: mowing	essors is appare 10 years). Note , beaver dams, c (examples: disch lagoons, etc.) tality, insect dan	ent. Consider departure from reference worthy stressors include, but are no likes, berms, ponds, etc.) arges containing obvious pollutants hage, disease, storm damage, salt in	ot limited , presence of nearby
Is the assessment are	ea intensively managed? [7] Yes	s 💽 No		
Anadromous fis Federally prote Very NCDWQ riparia Abuts a Primar Publicly owned N.C. Division of Abuts a stream Designated NC	cted species or State endangered or th an buffer rule in effect y Nursery Area (PNA)	nreatened specie nmental Concern supplemental c	s (AEC) (including buffer)	ut
What type of natural	stream is associated with the wetlan	d if any? (che	k all that anniv)	
Blackwater	stream is associated with the wettan	id, if any: (che	an triat appry,	
Brownwater		-	Art	
, i	Tidal (if tidal, check one of the following boxes)			
Is the assessment area on a coastal island?				
	ea on a coastal island? Yes ea's surface water storage capacity o		stantially altered by beaver?	r Yes r No
Is the assessment are		or duration sub		C Yes C No
Is the assessment and Does the assessment 1. Ground Surface Check a box in e (VS) in the assess then rate the assess GS VS A A A No B B Se al	ea's surface water storage capacity of tarea experience overbank flooding Condition/Vegetation Condition – as ach column. Consider alteration to the sment area. Compare to reference wet essment area based on evidence of an experience over a majority of the assedimentation, fire-plow lanes, skidder the terration examples: mechanical disturbles stations (if appropriate), hydrologic as	during normal seessment area e ground surface tland if applicable effect. seessment area racks, bedding, f ance, herbicides alteration)	condition metric e (GS) in the assessment area and ve (see User Manual). If a reference (ground surface alteration examples II, soil compaction, obvious pollutant, salt intrusion [where appropriate],	vegetation structure is not applicable, s: vehicle tracks, excessive its) (vegetation structure
Is the assessment and Does the assessment 1. Ground Surface Check a box in e (VS) in the assess then rate the assess then rate the assess then rate and Subgrades Box	ea's surface water storage capacity of tarea experience overbank flooding. Condition/Vegetation Condition – as ach column. Consider alteration to the sment area. Compare to reference wet essment area based on evidence of an outseverely altered everely altered everely altered everely altered over a majority of the assedimentation, fire-plow lanes, skidder to teration examples: mechanical disturbit	during normal during normal disessment area e ground surface tland if applicable effect. disessment area acks, bedding, f ance, herbicides alteration) tion – assessm e capacity and co hydrology. Ref rict website) for while a ditch > f icable. not altered. litered, but not si ubstantially alter	condition metric (GS) in the assessment area and version (see User Manual). If a reference (ground surface alteration examples II, soil compaction, obvious pollutant, salt intrusion [where appropriate], ent area condition metric uration (Surf) and sub-surface storater to the current NRCS lateral effect he zone of influence of ditches in hy foot deep is expected to affect both abstantially (typically, not sufficient to ed (typically, alteration sufficient to ed).	vegetation structure is not applicable, e: vehicle tracks, excessive its) (vegetation structure exotic species, grazing, age capacity and it of ditching guidance for ydric soils. A ditch in surface and ditch o change vegetation). result in vegetation
Is the assessment and Does the assessment 1. Ground Surface Check a box in e (VS) in the assess then rate the assess then rate the assess then rate duals to the complete of the complete o	ca's surface water storage capacity of tarea experience overbank flooding. Condition/Vegetation Condition – as ach column. Consider alteration to the sment area. Compare to reference wet essment area based on evidence of an extraction of the severely altered everely altered everely altered everely altered over a majority of the assedimentation, fire-plow lanes, skidder the teration examples: mechanical disturbles diversity [if appropriate], hydrologic active and column. Consider surface storage Capacity and Durate ach column. Consider surface storage Consider both increase and decrease in dric soils (see USACE Wilmington Distributions of the surface water only, to consider tidal flooding regime, if applicater storage capacity and duration are all fater storage capacity or duration are al	during normal disessment area e ground surface thand if applicable effect. ssessment area racks, bedding, f ance, herbicides alteration) tion – assessm e capacity and co hydrology. Ref rict website) for while a ditch > f icable. Intered, but not so ubstantially alter oil compaction, f land type condi Select the appro	condition metric (GS) in the assessment area and version (see User Manual). If a reference (ground surface alteration examples II, soil compaction, obvious pollutant, salt intrusion [where appropriate], ent area condition metric curation (Surf) and sub-surface storater to the current NRCS lateral effect he zone of influence of ditches in hy foot deep is expected to affect both abstantially (typically, not sufficient to ed (typically, alteration sufficient to ed (typically, alterati	vegetation structure is not applicable, e: vehicle tracks, excessive its) (vegetation structure exotic species, grazing, rege capacity and it of ditching guidance for ydric soils. A ditch in surface and ditch o change vegetation). result in vegetation erground utility lines). h wetlands only)
Is the assessment and Does the assessment 1. Ground Surface Check a box in e (VS) in the assess then rate the assess then rate the asses GS VS A A A Note B Solution A B B Solution Check a box in e duration (Sub). C North Carolina hyde ≤1 foot deep is consub-surface water Surface water Surf	ca's surface water storage capacity of tarea experience overbank flooding. Condition/Vegetation Condition – as ach column. Consider alteration to the sment area. Compare to reference wet essment area based on evidence of an extensive severely altered everely altered ev	during normal seessment area e ground surface tland if applicable effect. seessment area acks, bedding, f ance, herbicides alteration) tion – assessm e capacity and co hydrology. Ref rict website) for while a ditch > f icable. not altered. litered, but not si ubstantially alter oil compaction, f land type condi Select the appro s able to pond w	condition metric (GS) in the assessment area and version (see User Manual). If a reference (ground surface alteration examples II, soil compaction, obvious pollutant, salt intrusion [where appropriate], ent area condition metric uration (Surf) and sub-surface storater to the current NRCS lateral effect he zone of influence of ditches in hy foot deep is expected to affect both abstantially (typically, not sufficient to ed (typically, alteration sufficient to ed (typically, alteratio	vegetation structure is not applicable, e: vehicle tracks, excessive its) (vegetation structure exotic species, grazing, rege capacity and it of ditching guidance for ydric soils. A ditch in surface and ditch o change vegetation). result in vegetation erground utility lines). h wetlands only)

		t from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape The soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for
	regional indi	·
	4a. 🔽 A	Sandy soil
	⊡ B ∏C	Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) Loamy or clayey soils not exhibiting redoximorphic features
	E D	Loamy or clayey gleyed soil
	∏E	Histosol or histic epipedon
	4b. 🔼 A	Soil ribbon < 1 inch
	⊡ B	Soil ribbon ≥1 inch
	4c. ⊡ A ☐ B	No peat or muck presence A peat or muck presence
5.	Discharge in	nto Wetland – opportunity metric
		c in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub).
	Examples of Surf Sub	sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.
	EA EA	Little or no evidence of pollutants or discharges entering the assessment area
	∏ В ∏ В	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the
		treatment capacity of the assessment area Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and
	F10 F10	potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive
		sedimentation, odor)
6.		opportunity metric
		at apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources seessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the
		area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers
	are consider	ed to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.
	WS 5M	2M ☐ A ≥10% impervious surfaces
	FB FB	B < 10% impervious surfaces
	Гс Гс	
	LD LD	 D ≥20% coverage of pasture E ≥20% coverage of agricultural land (regularly plowed land)
		F ≥20% coverage of maintained grass/herb
		☐ G ≥20% coverage of clear-cut land
	Гн Гн	H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.	Wetland Act	ing as Vegetated Buffer – assessment area/wetland complex condition metric
		ssment area within 50 feet of a tributary or other open water?
	Yes Wetlan	No If Yes, continue to 7b. If No, skip to Metric 8. d buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland.
	Record	a note if a portion of the buffer has been removed or disturbed.
		uch of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
	III A III B	≥50 feet From 30 to < 50 feet
	E C	From 15 to < 30 feet
		From 5 to < 15 feet < 5 feet or buffer bypassed by ditches
		ry width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
	⊙ ≤15	feet wide
		s of assessment area vegetation extend into the bank of the tributary/open water?
	7e. Is tribut	ary or other open water sheltered or exposed?
		tered – adjacent open water with width < 2500 feet <u>and</u> no regular boat traffic.
		osed – adjacent open water with width ≥2500 feet <u>or</u> regular boat traffic.
8.		dth at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) t in each column. Select the average width for the wetland type at the assessment area (WT)
		and complex at the assessment areas (WC). See User Manual for WT and WC boundaries.
	WT WC	
	B B	≥100 feet From 80 to < 100 feet
		From 50 to < 80 feet
		From 40 to < 50 feet
		From 30 to < 40 feet From 15 to < 30 feet
	G GG	
	Ен Ен	< 5 feet

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. A Evidence of short-duration inundation (< 7 consecutive days) B Evidence of saturation, without evidence of inundation C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. B Sediment deposition is excessive, but not overwhelming the wetland. C Sediment deposition is excessive and is overwhelming the wetland.
	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) CA CA S00 acres B B B From 100 to < 500 acres CC CC From 50 to < 100 acres CD CD From 25 to < 50 acres EE CE CE From 10 to < 25 acres CF CF From 5 to < 10 acres CG CG CG From 1 to < 5 acres CH CH CH From 0.5 to < 1 acre CI CI CI From 0.1 to < 0.5 acre EJ CJ CJ From 0.01 to < 0.1 acre CK CK CK < 0.01 acre or assessment area is clear-cut
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥90%) of its natural landscape size. □ B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥500 acres B B From 100 to < 500 acres C C C From 50 to < 100 acres D D From 10 to < 50 acres E E E < 10 acres F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
	 Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. C C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. C Vegetation is dominated by exotic species (>50% cover of exotics).

17.	Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present?
	Yes No If Yes, continue to 17b. If No, skip to Metric 18.
	17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ☐ A ≥25% coverage of vegetation ☐ B < 25% coverage of vegetation
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT
	Canopy closed, or nearly closed, with natural gaps associated with natural processes B B Canopy present, but opened more than natural gaps C C Canopy sparse or absent
	C C Mid-story/sapling layer parse or absent
	C C C Shrub layer sparse or absent
	C A Dense herb layer B B B Moderate density herb layer C C C Herb layer sparse or absent
18.	Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A
19.	Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
	Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.
20.	Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). B Not A
21.	Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.
22.	Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. A Overbank and overland flow are not severely altered in the assessment area. Overbank flow is severely altered in the assessment area.

X7.7.

Wetland HHH is a palustrine emergent wetland located adjacent to Stream GGG. Wetland HHH appears to have been created as a result of a former logging road, and is located in the floodplain forest of the Corps Waterfowl lands.

Overland flow is severely altered in the assessment area.

Both overbank and overland flow are severely altered in the assessment area.

Wetland Site Name _	TTA Wetland HHH	Date	12/10/13
Wetland Type _	Non-Tidal Freshwater Marsh	Assessor Name/Organization	BP/STV
Notes on Field Assessm	nent Form (Y/N)		YES
Presence of regulatory of			YES
Wetland is intensively m			NO
	ated within 50 feet of a natural tributary or other	er open water (Y/N)	YES
	stantially altered by beaver (Y/N)	er open nater (v.v.)	NO
	ences overbank flooding during normal rainfa	Il conditions (Y/N)	NO
Assessment area is on a		(,,,,,	NO
noodomonicarda id diri	a social island (Titt)		
Sub-function Rating S	ummary		
Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	NA
	Sub-Surface Storage and Retention	Condition	NA
Water Quality	Pathogen Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Particulate Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Physical Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
⊣abitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	MEDIUM
	Vegetation Composition	Condition	MEDIUM
F unction Rating Summ Function	Metrics/Notes		Rating
Hydrology	Condition		MEDIUM
Water Quality	Condition		LOW
•	Condition/Opportunity		LOW
	Opportunity Presence?	(Y/N)	NO
Habitat	Conditon		LOW

	Rating Calculato	version 4.1	
Wetland Site Nam	ne TTA Wetland I	Date 1/21/14	
Wetland Typ	Bottomland Hardw ood Forest	Assessor Name/Organization BP -STV	
Level III Ecoregio	n Piedmont 🔻	Nearest Named Water Body Sandy Cre	eek
River Basi	in Cape Fear	USGS 8-Digit Catalogue Unit 03030002	
☐Yes 🖸	No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) 35.954986	6, -78.975612
Please circle and/or appropriate, in recento the following. Hydrological if Surface and septic tanks, Signs of vege	ors affecting the assessment area (may not be within make note on last page if evidence of stressors is appart past (for instance, approximately within 10 years). No modifications (examples: ditches, dams, beaver dams, sub-surface discharges into the wetland (examples: discunderground storage tanks (USTs), hog lagoons, etc.) etation stress (examples: vegetation mortality, insect decommunity alteration (examples: mowing, clear-cutting	arent. Consider departure from reference, if teworthy stressors include, but are not limited dikes, berms, ponds, etc.) charges containing obvious pollutants, presence amage, disease, storm damage, salt intrusion, et	•
Is the assessment a	area intensively managed? []Yes []No		
Anadromous Federally prof NCDWQ ripal Abuts a Primal Publicly owne N.C. Division Abuts a strea Designated N Abuts a 303(c What type of natura Blackwater Tidal (if tidal, Is the assessment a	tected species or State endangered or threatened specinan buffer rule in effect ary Nursery Area (PNA) and property of Coastal Management Area of Environmental Conce m with a NCDWQ classification of SA or supplemental ICNHP reference community d)-listed stream or a tributary to a 303(d)-listed stream all stream is associated with the wetland, if any? (che	ies rn (AEC) (including buffer) classifications of HQW, ORW, or Trout eck all that apply) Wind Both bstantially altered by beaver?	∏ Yes ⊡ No
Does the assessme	ent area experience overbank flooding during norma	Il rainfall conditions?	No
Check a box in (VS) in the asse then rate the ass GS VS A A B B	e Condition/Vegetation Condition – assessment are each column. Consider alteration to the ground surfa ssment area. Compare to reference wetland if applical sessment area based on evidence of an effect. Not severely altered Severely altered over a majority of the assessment area sedimentation, fire-plow lanes, skidder tracks, bedding alteration examples: mechanical disturbance, herbicidaless diversity [if appropriate], hydrologic alteration)	a condition metric ce (GS) in the assessment area and vegetation sole (see User Manual). If a reference is not appli a (ground surface alteration examples: vehicle to fill, soil compaction, obvious pollutants) (vegeta	cable, racks, excessive tion structure
Check a box in duration (Sub). North Carolina h ≤ 1 foot deep is sub-surface wat Surf Sub A A A B B B B C C C C	ab-Surface Storage Capacity and Duration – assessing each column. Consider surface storage capacity and Consider both increase and decrease in hydrology. Respectively. Respectively. Respectively. Respectively. Some considered to affect surface water only, while a ditch ser. Consider tidal flooding regime, if applicable. Water storage capacity and duration are not altered. Water storage capacity or duration are altered, but not Water storage capacity or duration are substantially altered. (examples: draining, flooding, soil compaction)	duration (Surf) and sub-surface storage capacity efer to the current NRCS lateral effect of ditching r the zone of influence of ditches in hydric soils. 1 foot deep is expected to affect both surface an expected to affect both surface and substantially (typically, not sufficient to change we ered (typically, alteration sufficient to result in vegered).	g guidance for A ditch nd ditch egetation). getation
Check a box in type (WT). AA WT 3a. \(\begin{array}{cccc} AA & \begin{array}{cccc} B & \begin{array}{cccc} C & \begin{array}{ccccc} C & \begin{array}{ccccc} C & \begin{array}{cccc} C & \begin{array}{ccccc} C & \begin{array}{ccccc} C & \begin{array}{cccc} C & a	A Majority of wetland with depressions able to pond B Majority of wetland with depressions able to pond C Majority of wetland with depressions able to pond	water > 1 foot deep water 6 inches to 1 foot deep water 3 to 6 inches deep un 2 feet and 2 feet	• •

		r from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape se soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for
	regional indic 4a. A B B C C D D E	Sandy soil Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) Loamy or clayey soils not exhibiting redoximorphic features Loamy or clayey gleyed soil
	4b. []A	Histosol or histic epipedon Soil ribbon < 1 inch Soil ribbon > 1 inch
	4c. ⊡ A	Soil ribbon ≥ 1 inch No peat or muck presence A post or muck presence
5.		A peat or muck presence nto Wetland – opportunity metric
	Check a box Examples of Surf Sub	tin each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Little or no evidence of pollutants or discharges entering the assessment area
	∏в ∏в	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
	□c □c	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Check all the draining to as assessment	opportunity metric at apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the area (5M), and within 2 miles and within the watershed draining to the area (5M), each of the constal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.
	WS 5M	<u>2</u> M
	✓A ✓A □B □B	✓ A ≥ 10% impervious surfaces B < 10% impervious surfaces
		 C Confined animal operations (or other local, concentrated source of pollutants) D ≥ 20% coverage of pasture
		E ≥ 20% coverage of agricultural land (regularly plowed land)
	\Box G \Box G	 F ≥ 20% coverage of maintained grass/herb G ≥ 20% coverage of clear-cut land
	□н □н	 Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.		ing as Vegetated Buffer – assessment area/wetland complex condition metric
	Ya. Is asses	ssment area within 50 feet of a tributary or other open water? [No If Yes, continue to 7b. If No, skip to Metric 8.
		d buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. a note if a portion of the buffer has been removed or disturbed.
	ΠA	uch of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. ≥ 50 feet
		From 30 to < 50 feet From 15 to < 30 feet
	□D	From 5 to < 15 feet < 5 feet or buffer bypassed by ditches
	7c. Tributar	y width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
	7d. Do root	feet wide
		ୁଦ୍ଧ No ary or other open water sheltered or exposed? ered – adjacent open water with width < 2500 feet <u>and</u> no regular boat traffic.
		sed – adjacent open water with width ≥ 2500 feet or regular boat traffic.
8.	Check a box and the wetla	Ith at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) in each column. Select the average width for the wetland type at the assessment area (WT) and complex at the assessment areas (WC). See User Manual for WT and WC boundaries.
	WT WC	≥ 100 feet
	∏В ∏В	From 80 to < 100 feet
		From 50 to < 80 feet From 40 to < 50 feet
		From 30 to < 40 feet
	F F G	From 15 to < 30 feet From 5 to < 15 feet
	Дн Дн	< 5 feet

Í	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. A Evidence of short-duration inundation (< 7 consecutive days) B Evidence of saturation, without evidence of inundation C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
<u> </u>	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. B Sediment deposition is excessive, but not overwhelming the wetland. C Sediment deposition is excessive and is overwhelming the wetland.
	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) A A A A ≥ 500 acres B B From 100 to < 500 acres C C C From 50 to < 100 acres D D D From 25 to < 50 acres F F F From 10 to < 25 acres F F F F From 5 to < 10 acres G G G From 1 to < 5 acres H H H From 0.5 to < 1 acre J J J From 0.01 to < 0.1 acre K K K K C K < 0.01 acre or assessment area is clear-cut
1	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) A Pocosin is the full extent (≥ 90%) of its natural landscape size. B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥ 500 acres B B From 100 to < 500 acres C F From 50 to < 100 acres D D From 10 to < 50 acres E E < 10 acres Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
 	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
1	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
-	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present? Yes No If Yes, continue to 17b. If No, skip to Metric 18.	
17b. Evaluate percent coverage of assessment area vegetation for all marshes only . ☐ A ≥ 25% coverage of vegetation ☐ B < 25% coverage of vegetation	Skip to 17c for non-marsh wetlands.
17c. Check a box in each column for each stratum. Evaluate this portion of the met in airspace above the assessment area (AA) and the wetland type (WT) separatel AA WT	
	d with natural processes
Canopy closed, or nearly closed, with natural gaps associated BBB Canopy present, but opened more than natural gaps Canopy sparse or absent Canopy resent, but opened more than natural gaps associated sparse or absent	
ロスター ロスター Dense shrub layer B Moderate density shrub layer C い Shrub layer sparse or absent	
GACA Dense herb layer B Moderate density herb layer C C Herb layer sparse or absent	
18. Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to some B Not A	species present and landscape stability).
 19. Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DE present. B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 6 C Majority of canopy trees are < 6 inches DBH or no trees. 	
20. Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative B Not A	to species present and landscape stability).
21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (e Marsh only) Select the figure that best describes the amount of interspersion between vegetation ar areas indicate vegetated areas, while solid white areas indicate open water.	
22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparia Examples of activities that may severely alter hydrologic connectivity include intens ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver da Overbank and overland flow are not severely altered in the assessment area. Overbank flow is severely altered in the assessment area. Overland flow is severely altered in the assessment area. Both overbank and overland flow are severely altered in the assessment area.	ve
Notes Wetland I is a palustrine forested wetland located in the New Hope Creek floodplain. Wetland	d I is located adjacent to Stream J (Sandy Creek).

Wetland Site Name	TTA Wetland I	_ Date	1/21/14
Wetland Type _	Bottomland Hardwood Forest	Assessor Name/Organization	BP -STV
Notes on Field Assessm	pent Form (V/N)		YES
Presence of regulatory			YES
Wetland is intensively m			NO
· ·	ated within 50 feet of a natural tributary or other	er open water (Y/N)	NO
	estantially altered by beaver (Y/N)	or open water (1714)	NO
	iences overbank flooding during normal rainfa	all conditions (Y/N)	YES
Assessment area is on a			NO
	(,,,,,		
Sub-function Rating S	ummary		
unction	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-Surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Soluble Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	YES
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Habitat	Physical Structure	Condition	MEDIUM
	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	HIGH
Function Boting Summ	nary		
Function Rating Sumn Function	Metrics/Notes		Rating
Hydrology	Condition		HIGH
Nater Quality	Condition		HIGH
	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	YES
Habitat	Conditon		HIGH

	Rating Calculate	or version 4.1	
Wetland Site Name	TTA Wetland III	Date 12/10/13	
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization BP/STV	
Level III Ecoregion	Piedmont	Nearest Named Water Body Little Creek	
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit 03030002	
Yes N	o Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) 35.919039, -78.997437	
Please circle and/or mappropriate, in recent pto the following. Hydrological mapped surface and surface and surface sof vegeta	s affecting the assessment area (may not be with ake note on last page if evidence of stressors is appeast (for instance, approximately within 10 years). No odifications (examples: ditches, dams, beaver dams ab-surface discharges into the wetland (examples: disnderground storage tanks (USTs), hog lagoons, etc.) ation stress (examples: vegetation mortality, insect community alteration (examples: mowing, clear-cutting).	earent. Consider departure from reference, if oteworthy stressors include, but are not limited s, dikes, berms, ponds, etc.) scharges containing obvious pollutants, presence of nearby damage, disease, storm damage, salt intrusion, etc.)	
Is the assessment are	ea intensively managed? Tyes No		
Anadromous fis Federally prote Very NCDWQ riparia Abuts a Primar Publicly owned N.C. Division of Abuts a stream Designated NC	cted species or State endangered or threatened spe an buffer rule in effect y Nursery Area (PNA)	cies ern (AEC) (including buffer) Il classifications of HQW, ORW, or Trout	
What type of natural	stream is associated with the wetland, if any? (ch	neck all that apply)	
Blackwater	Stream is associated with the wettand, if any . (or	took dir tridt appriy)	
Brownwater	hook and of the following hoves)	, Wind , Both	
l' ' ' '	heck one of the following boxes) Lunar [Anua Fapou	
	ea on a coastal island? Yes No	hataatlalla alfaaad ku haasaa	1=
	ea's surface water storage capacity or duration s		Ю
Does the assessmen	t area experience overbank flooding during norm	nal rainfall conditions? Yes No	
Check a box in e (VS) in the assess then rate the asse GS VS A A A B B B S se al	sment area. Compare to reference wetland if applicates assert area based on evidence of an effect. ot severely altered everely altered over a majority of the assessment are edimentation, fire-plow lanes, skidder tracks, bedding	rea condition metric ace (GS) in the assessment area and vegetation structure able (see User Manual). If a reference is not applicable, ea (ground surface alteration examples: vehicle tracks, excessive, fill, soil compaction, obvious pollutants) (vegetation structure des, salt intrusion [where appropriate], exotic species, grazing,	е
Check a box in eduration (Sub). Control Carolina hydelectric Subsubsurface water Surf Subsubsubsubsubsubsubsubsubsubsubsubsubsu	Consider both increase and decrease in hydrology. Finding the considered to affect surface water only, while a ditcher. Consider tidal flooding regime, if applicable. Vater storage capacity and duration are not altered. Vater storage capacity or duration are altered, but not vater storage capacity or duration are substantially allowed.	d duration (Surf) and sub-surface storage capacity and Refer to the current NRCS lateral effect of ditching guidance for or the zone of influence of ditches in hydric soils. A ditch > 1 foot deep is expected to affect both surface and ditch t substantially (typically, not sufficient to change vegetation). Itered (typically, alteration sufficient to result in vegetation n, filling, excessive sedimentation, underground utility lines).	
Check a box in e	urface Relief – assessment area/wetland type cor	ndition metric (answer for non-marsh wetlands only)	
type (WT). AA WT	ach column for each group below. Select the app	propriate storage for the assessment area (AA) and the wetland	
	Majority of wetland with depressions able to pone	d water > 1 foot deep d water 6 inches to 1 foot deep d water 3 to 6 inches deep	

4.	Soil Texture/Structure – assessment area condition metric Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators. 4a.	
	 Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) Loamy or clayey soils not exhibiting redoximorphic features Loamy or clayey gleyed soil Histosol or histic epipedon 	
	4b. ☐ A Soil ribbon < 1 inch ☐ B Soil ribbon ≥1 inch	
	4c. C A No peat or muck presence C B A peat or muck presence	
5.	Discharge into Wetland – opportunity metric Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub	
	Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area	
	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area are potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)	nd
6.	Land Use – opportunity metric Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider source draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffer are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains econ WS 5M 2M	s
	TA TA ≥10% impervious surfaces B B B S B < 10% impervious surfaces	
	C C C Confined animal operations (or other local, concentrated source of pollutants) D D D ≥20% coverage of pasture	
	 F F F E ≥20% coverage of agricultural land (regularly plowed land) F F F F ≥20% coverage of maintained grass/herb 	
	 ☐ G ☐ G ☐ C ≥20% coverage of clear-cut land ☐ H <l< th=""><th>;</th></l<>	;
7.	Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water?	
	Yes No If Yes, continue to 7b. If No, skip to Metric 8. Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the Record a note if a portion of the buffer has been removed or disturbed. 7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer	
	C A ≥50 feet C B From 30 to < 50 feet C From 15 to < 30 feet C D From 5 to < 15 feet	
	E < 5 feet or buffer bypassed by ditches 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.	
	 ≤15-feet wide	
	 Yes	
8.	Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.	
	WT WC CA CA ≥100 feet	
	☐ B ☐ B From 80 to < 100 feet ☐ C ☐ C From 50 to < 80 feet	
	D D From 40 to < 50 feet E E From 30 to < 40 feet	
	F F From 15 to < 30 feet F G From 5 to < 15 feet F H C From 5 to < 15 feet	

9.	Inundation Duration – assessment area condition metric
	Answer for assessment area dominant landform.
	 A Evidence of short-duration inundation (< 7 consecutive days) B Evidence of saturation, without evidence of inundation
	C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10	Indicators of Deposition – assessment area condition metric
10.	Consider recent deposition only (no plant growth since deposition).
	A Sediment deposition is not excessive, but at approximately natural levels.
	B Sediment deposition is excessive, but not overwhelming the wetland.
	Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable)
	B B B From 100 to < 500 acres
	C C C From 50 to < 100 acres D D D From 25 to < 50 acres
	D D D From 25 to < 50 acres
	E E E From 10 to < 25 acres F F F From 5 to < 10 acres
	CE CE From 10 to < 25 acres CF CF From 5 to < 10 acres CG CG From 1 to < 5 acres
	H CH From 0.5 to < 1 acre
	© I © I From 0.1 to < 0.5 acre ☐ J ☐ J From 0.01 to < 0.1 acre
	C C C From 50 to < 100 acres D D D From 25 to < 50 acres E E E From 10 to < 25 acres F F F F From 5 to < 10 acres G G G G From 1 to < 5 acres H H H From 0.5 to < 1 acre I I I From 0.1 to < 0.5 acre J J J From 0.01 to < 0.1 acre K K K K < 0.01 acre or assessment area is clear-cut
	K K K < 0.01 acre <u>or</u> assessment area is clear-cut
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)
	Pocosin is the full extent (≥90%) of its natural landscape size.
	B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres C D D From 10 to < 50 acres C E E E < 10 acres Wetland type has a poor or no connection to other natural habitats
	13b. Evaluate for marshes only.
	Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts.
	Consider the eight main points of the compass.
	A No artificial edge within 150 feet in all directions
	TB No artificial edge within 150 feet in four (4) to seven (7) directions
	An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate
	species, with exotic plants absent or sparse within the assessment area. Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)
	 Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

17.	egetative Structure – assessment area/wetland type condition metric
	a. Is vegetation present? ☑ Yes ☑ No If Yes, continue to 17b. If No, skip to Metric 18.
	'b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands. ☐ A ≥25% coverage of vegetation
	☐ A ≥25% coverage of vegetation ☐ B < 25% coverage of vegetation
	c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure
	in airspace above the assessment area (AA) and the wetland type (WT) separately.
	AA WT
	© A Canopy closed, or nearly closed, with natural gaps associated with natural processes
	A Canopy closed, or nearly closed, with natural gaps associated with natural processes C B C B Canopy present, but opened more than natural gaps C C C Canopy sparse or absent A C A Dense mid-story/sapling layer B C B Moderate density mid-story/sapling layer C C C Mid-story/sapling layer sparse or absent
	EA CA Dense mid-story/sapling layer
	φ
	C C Mid-story/sapling layer sparse or absent
	து 🖸 A Dense shrub layer
	☐ A ☐ A Dense shrub layer ☐ B ☐ B Moderate density shrub layer ☐ C ☐ C Shrub layer sparse or absent
	TA TA Described laws
	「A Dense herb layer
	☐ B ☐ B Moderate density herb layer ☐ C ☐ C Herb layer sparse or absent
18.	nags – wetland type condition metric
	A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
	B Not A
	ameter Class Distribution – wetland type condition metric
	A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
	 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. C Majority of canopy trees are < 6 inches DBH or no trees.
20.	rge Woody Debris – wetland type condition metric
	clude both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
	 A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). B Not A
21	egetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater
	arsh only)
	elect the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned
	eas indicate vegetated areas, while solid white areas indicate open water. C A C B C C C D
	OMED CONTRACTOR OF THE CONTRAC
22.	
	A Overbank and overland flow are not severely altered in the assessment area.
22.	ydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) kamples of activities that may severely alter hydrologic connectivity include intensive tching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.
	D. Out to be flow in a support of the appropriate trans

- B Overbank flow is severely altered in the assessment area.
- C Overland flow is severely altered in the assessment area.
- D Both overbank and overland flow are severely altered in the assessment area.

Notes

Wetland III is a palustrine forested wetland located adjacent to Stream GGG. Wetland III provides the headwaters to Stream GGG and is located in the floodplain forest of the Corps Waterfowl lands.

1014

Wetland Site Name	TTA Wetland III	Date	12/10/13	
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP/STV	
Notes on Field Assessm	ont Form (V/N)		YES	
Presence of regulatory c			YES	
Wetland is intensively m	•		NO	
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N)				
Assessment area is substantially altered by beaver (Y/N)				
	ences overbank flooding during normal rainfa	Il conditions (Y/N)	NO NO	
Assessment area is on a		in conditions (1714)	NO	
Assessment area is on a	Coastal Island (1714)			
Sub-function Rating Su	ummary			
Function	Sub-function	Metrics	Rating	
Hydrology	Surface Storage and Retention	Condition	HIGH	
	Sub-Surface Storage and Retention	Condition	LOW	
Water Quality	Pathogen Change	Condition	HIGH	
		Condition/Opportunity	HIGH	
		Opportunity Presence? (Y/N)	NO	
	Particulate Change	Condition	HIGH	
		Condition/Opportunity	HIGH	
		Opportunity Presence? (Y/N)	NO	
	Soluble Change	Condition	HIGH	
		Condition/Opportunity	HIGH	
		Opportunity Presence? (Y/N)	NO	
	Physical Change	Condition	HIGH	
		Condition/Opportunity	HIGH	
		Opportunity Presence? (Y/N)	NO	
	Pollution Change	Condition	NA	
	•	Condition/Opportunity	NA	
		Opportunity Presence? (Y/N)	NA	
-labitat	Physical Structure	Condition	MEDIUM	
	Landscape Patch Structure	Condition	HIGH	
	Vegetation Composition	Condition	MEDIUM	
Function Rating Summ Function	Metrics/Notes		Rating	
Hydrology	Condition		HIGH	
Nater Quality	Condition		HIGH	
·	Condition/Opportunity		HIGH	
	Opportunity Presence?	(Y/N)	NO	
Habitat	Conditon		HIGH	

<u></u>	Rating Calculato	version 4.1	
Wetland Site Nam	ne TTA Wetland J	Date 6/18/13	3
Wetland Typ	Bottomland Hardw ood Forest	Assessor Name/Organization BP -ST	V
Level III Ecoregio	pn Piedmont	Nearest Named Water Body Sandy	Creek
River Basi	in Cape Fear 🔻	USGS 8-Digit Catalogue Unit 030300	002
☐Yes 🖸	No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) 35.956	380, -78.975044
Please circle and/or appropriate, in recento the following. • Hydrological in Surface and supprince suppr	ors affecting the assessment area (may not be within make note on last page if evidence of stressors is appeat past (for instance, approximately within 10 years). No modifications (examples: ditches, dams, beaver dams, sub-surface discharges into the wetland (examples: disunderground storage tanks (USTs), hog lagoons, etc.) etation stress (examples: vegetation mortality, insect decommunity alteration (examples: mowing, clear-cutting	arent. Consider departure from reference, if teworthy stressors include, but are not limited dikes, berms, ponds, etc.) charges containing obvious pollutants, preser amage, disease, storm damage, salt intrusion	nce of nearby
Is the assessment a	area intensively managed? Tyes No		
Anadromous Federally prof NCDWQ ripa Abuts a Prima Publicly owne N.C. Division Abuts a strea Designated N Abuts a 303(c What type of natura Blackwater Brownwater Tidal (if tidal, Is the assessment a	tected species or State endangered or threatened special buffer rule in effect ary Nursery Area (PNA) ed property of Coastal Management Area of Environmental Conceum with a NCDWQ classification of SA or supplemental NCNHP reference community d)-listed stream or a tributary to a 303(d)-listed stream al stream is associated with the wetland, if any? (che	ies rn (AEC) (including buffer) classifications of HQW, ORW, or Trout eck all that apply) Wind Both bstantially altered by beaver?	∏Yes ⊡ No ☑No
Check a box in (VS) in the assethen rate the ass GS VS A B B B B	e Condition/Vegetation Condition – assessment are each column. Consider alteration to the ground surfaces ment area. Compare to reference wetland if applical sessment area based on evidence of an effect. Not severely altered Severely altered over a majority of the assessment area sedimentation, fire-plow lanes, skidder tracks, bedding alteration examples: mechanical disturbance, herbicideless diversity [if appropriate], hydrologic alteration)	ce (GS) in the assessment area and vegetation (see User Manual). If a reference is not a gray a (ground surface alteration examples: vehicing fill, soil compaction, obvious pollutants) (veg	oplicable, le tracks, excessive etation structure
Check a box in duration (Sub). North Carolina h ≤ 1 foot deep is sub-surface wat Surf Sub A A B B B B C C C	ab-Surface Storage Capacity and Duration – assessing each column. Consider surface storage capacity and Consider both increase and decrease in hydrology. Repydric soils (see USACE Wilmington District website) for considered to affect surface water only, while a ditch ster. Consider tidal flooding regime, if applicable. Water storage capacity and duration are not altered. Water storage capacity or duration are altered, but not Water storage capacity or duration are substantially altochange) (examples: draining, flooding, soil compaction)	duration (Surf) and sub-surface storage capa efer to the current NRCS lateral effect of ditch r the zone of influence of ditches in hydric soi 1 foot deep is expected to affect both surface substantially (typically, not sufficient to changered (typically, alteration sufficient to result in	ning guidance for ls. A ditch e and ditch e vegetation).
Check a box in type (WT). AA W 3a. \[\begin{array}{ccccc} AA & \begin{array}{ccccc} B & \begin{array}{ccccc} C & \begin{array}{cccccccc} C & \begin{array}{ccccccccccc} C & \begin{array}{cccccccccccccccccccccccccccccccccccc	 A Majority of wetland with depressions able to pond B Majority of wetland with depressions able to pond C Majority of wetland with depressions able to pond 	water > 1 foot deep water 6 inches to 1 foot deep water 3 to 6 inches deep un 2 feet and 2 feet	• •

		x from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape xe soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for
	regional indi	
	4a. □A . □B	Sandy soil Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
	⊡B □C □D □E	Loamy or clayey soils not exhibiting redoximorphic features
	ËË	Loamy or clayey gleyed soil Histosol or histic epipedon
	4b. 🔼 A	Soil ribbon < 1 inch
	⊡ B	Soil ribbon ≥ 1 inch
	4c. ⊡ A □B	No peat or muck presence A peat or muck presence
5.	Discharge in	nto Wetland – opportunity metric
		x in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub).
	Surf Sub	sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.
	⊙ A ⊙ A	
	∏в ∏в	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
	□c □c	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and
		potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6	l and llas	
6.		opportunity metric at apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources
	draining to a	ssessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the
		area (5M), and within 2 miles <u>and</u> within the watershed draining to the assessment area (2M). Effective riparian buffers ed to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.
	WS 5M	2M
	C C	
	D D	
		G ≥ 20% coverage of clear-cut land
	□н □н	☐ H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.	Wetland Act	ting as Vegetated Buffer – assessment area/wetland complex condition metric
		ssment area within 50 feet of a tributary or other open water?
	[€] Yes Wetlan	No If Yes, continue to 7b. If No, skip to Metric 8. d buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland.
	Record	a note if a portion of the buffer has been removed or disturbed.
	7b. How m	uch of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. ≥ 50 feet
	⊡ B	From 30 to < 50 feet
	E C	From 15 to < 30 feet From 5 to < 15 feet
		< 5 feet <u>or</u> buffer bypassed by ditches
		ry width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
		-feet wide
		☑ No
		ary or other open water sheltered or exposed? tered – adjacent open water with width < 2500 feet <u>and</u> no regular boat traffic.
		osed – adjacent open water with width ≥ 2500 feet <u>or</u> regular boat traffic.
8.		dth at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)
		x in each column. Select the average width for the wetland type at the assessment area (WT) and complex at the assessment areas (WC). See User Manual for WT and WC boundaries.
	WT WC	and complex at the assessment areas (WO). Gee oser Mandarior WT and WO boundaries.
	OA OA	≥ 100 feet
	B BB	From 80 to < 100 feet From 50 to < 80 feet
	DD D	From 40 to < 50 feet
		From 30 to < 40 feet From 15 to < 30 feet
	GGG	
	Дн Дн	

4. Soil Texture/Structure – assessment area condition metric

1	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. A Evidence of short-duration inundation (< 7 consecutive days) B Evidence of saturation, without evidence of inundation C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
1	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. B Sediment deposition is excessive, but not overwhelming the wetland. C Sediment deposition is excessive and is overwhelming the wetland.
	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) A A A ≥ 500 acres B B From 100 to < 500 acres C C C From 50 to < 100 acres D D From 25 to < 50 acres F F F From 10 to < 25 acres G G G From 1 to < 5 acres H H H From 0.5 to < 1 acre J J J From 0.01 to < 0.1 acre K K K K < 0.01 acre or assessment area is clear-cut
- 1	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) A Pocosin is the full extent (≥ 90%) of its natural landscape size. B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥ 500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres D D From 10 to < 50 acres E < < 10 acres F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
į	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
i	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). B Vegetation diversity is low or has > 10% to 50% cover of exotics. C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present? Yes No If Yes, continue to 17b. If No, skip to Metric 18.
17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ☐A ≥ 25% coverage of vegetation
 ☐B < 25% coverage of vegetation 17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT A A C B C A
Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent A Dense mid-story/sapling layer B B B Moderate density mid-story/sapling layer C C Mid-story/sapling layer sparse or absent
C C Shrub layer absent
A Dense herb layer B B Moderate density herb layer C Herb layer sparse or absent
18. Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). B Not A
19. Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.
 20. Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). B Not A
21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. B C D
22. Hydrologic Connectivity, accessment area condition metric (evaluate for riporion wetlands only)
 22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Overbank and overland flow are not severely altered in the assessment area. Overbank flow is severely altered in the assessment area. Overland flow is severely altered in the assessment area. Both overbank and overland flow are severely altered in the assessment area.
Notes Wetland J is a palustrine forested wetland located in the New Hope Creek floodplain.

Wetland Site Name	TTA Wetland J	Date	6/18/13
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP -STV
Notes on Field Assessm	nent Form (Y/N)		YES
Presence of regulatory of			YES
Wetland is intensively m			NO
	ated within 50 feet of a natural tributary or other	er open water (Y/N)	YES
	stantially altered by beaver (Y/N)	, ,	NO
	iences overbank flooding during normal rainfa	III conditions (Y/N)	YES
Assessment area is on a		,	NO
	. ,		
Sub-function Rating S			
unction	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-Surface Storage and Retention	Condition	LOW
Nater Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Soluble Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	YES
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Habitat	Physical Structure	Condition	HIGH
	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	HIGH
Function Rating Sumn	narv		
-unction	Metrics/Notes		Rating
Hydrology	Condition		HIGH
Vater Quality	Condition		HIGH
	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	YES
Habitat	Conditon		HIGH

	y	version 4.1	
Wetland Site Na	ame TTA Wetland K	Date 6/18/13	
Wetland T	ype Bottomland Hardw ood Forest	Assessor Name/Organization BP -STV	
Level III Ecoreg	jion Piedmont	Nearest Named Water Body Sandy Creek	
River Ba	asin Cape Fear	USGS 8-Digit Catalogue Unit 03030002	
☐Yes [No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) 35.955265, -78.9768	843
Please circle and/c appropriate, in rece to the following. • Hydrologica • Surface and septic tanks • Signs of ver	sors affecting the assessment area (may not be within or make note on last page if evidence of stressors is apparent past (for instance, approximately within 10 years). Notal modifications (examples: ditches, dams, beaver dams, d sub-surface discharges into the wetland (examples: discs, underground storage tanks (USTs), hog lagoons, etc.) getation stress (examples: vegetation mortality, insect dant community alteration (examples: mowing, clear-cutting)	rent. Consider departure from reference, if teworthy stressors include, but are not limited dikes, berms, ponds, etc.) charges containing obvious pollutants, presence of nearby image, disease, storm damage, salt intrusion, etc.)	
Is the assessmen	t area intensively managed?		
Anadromou Federally pr NCDWQ rip Abuts a Prin Publicly ow N.C. Divisic Abuts a stre Designated Abuts a 303	rotected species or State endangered or threatened speciarian buffer rule in effect mary Nursery Area (PNA) ned property on of Coastal Management Area of Environmental Conceream with a NCDWQ classification of SA or supplemental I NCNHP reference community 3(d)-listed stream or a tributary to a 303(d)-listed stream ural stream is associated with the wetland, if any? (chemical stream is associated with the wetland, if any? (chemical stream is associated with the wetland).	ies in (AEC) (including buffer) classifications of HQW, ORW, or Trout	
Tidal (if tida		Wind Both	
Is the assessmen	t area on a coastal island?		
Is the assessmen	t area's surface water storage capacity or duration su	bstantially altered by beaver?	⊡ No
	nent area experience overbank flooding during norma		
Check a box in the ass	sedimentation, fire-plow lanes, skidder tracks, bedding,	a condition metric ce (GS) in the assessment area and vegetation structure	ure
Check a box in duration (Sub North Carolina ≤ 1 foot deep in	a hydric soils (see USACE Wilmington District website) foils considered to affect surface water only, while a ditch stater. Consider tidal flooding regime, if applicable. Water storage capacity and duration are not altered. Water storage capacity or duration are altered, but not Water storage capacity or duration are substantially altered.	duration (Surf) and sub-surface storage capacity and efer to the current NRCS lateral effect of ditching guidance the zone of influence of ditches in hydric soils. A ditch	
Check a box type (WT). AA V 3a. A B C C	e/Surface Relief – assessment area/wetland type condine ach column for each group below. Select the approximation of the column for each group below. Select the approximation of the column for each group below. Select the approximation of the column for each group below. Select the approximation of the column for each group below. Select the approximation of the column for each group below. Select the approximation of the column for each group below. Select the approximation of the column for each group below. Select the approximation of the column for each group below. Select the approximation of the column for each group below. Select the approximation of the column for each group below. Select the approximation of the column for each group below. Select the approximation of the column for each group below. Select the approximation of the column for each group below. Select the approximation of the column for each group below. Select the approximation of the column for each group below. Select the approximation of the column for each group below. Select the approximation of the column for each group below. Select the approximation of the column for each group below.	opriate storage for the assessment area (AA) and the wetle water > 1 foot deep water 6 inches to 1 foot deep	and

	Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for
	regional indicators. 4a. A Sandy soil Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) Loamy or clayey soils not exhibiting redoximorphic features Loamy or clayey gleyed soil Histosol or histic epipedon
	Histosol or histic epipedon 4b. A Soil ribbon < 1 inch
	GB Soil ribbon ≥ 1 inch
	4c. A No peat or muck presence B A peat or muck presence
5.	Discharge into Wetland – opportunity metric Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub A Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area C C C Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Land Use – opportunity metric Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. WS 5M 2M ✓ A ✓ A ✓ A ≥ 10% impervious surfaces B B B B B S < 10% impervious surfaces C C C Confined animal operations (or other local, concentrated source of pollutants) D D D D ≥ 20% coverage of pasture E E E E ≥ 20% coverage of agricultural land (regularly plowed land) F F F F ≥ 20% coverage of maintained grass/herb G G G G ≥ 20% coverage of clear-cut land H H H EH Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.	 Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water? Yes No If Yes, continue to 7b. If No, skip to Metric 8. Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed. 7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. A ≥ 50 feet B From 30 to < 50 feet C From 15 to < 30 feet D From 5 to < 15 feet E < 5 feet or buffer bypassed by ditches 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width. S 15-feet wide Other open water (no tributary present) 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water? Yes No 7e. Is tributary or other open water sheltered or exposed? Sheltered – adjacent open water with width ≥ 2500 feet and no regular boat traffic. Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.
8.	Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries. WT WC A A ≥ 100 feet B B From 80 to < 100 feet C C From 50 to < 80 feet D D From 40 to < 50 feet E From 30 to < 40 feet F From 15 to < 30 feet C G From 5 to < 15 feet H H H < 5 feet

4. Soil Texture/Structure – assessment area condition metric

	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. A Evidence of short-duration inundation (< 7 consecutive days) B Evidence of saturation, without evidence of inundation C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. B Sediment deposition is excessive, but not overwhelming the wetland. C Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) A A S 500 acres B B From 100 to < 500 acres C C C From 50 to < 100 acres C C C From 50 to < 100 acres B E E F From 10 to < 25 acres C F F F F From 5 to < 10 acres C G G G From 1 to < 5 acres C G G G From 1 to < 5 acres C G G G From 0.5 to < 1 acre C G G G From 0.1 to < 0.5 acre C G G G From 0.1 to < 0.5 acres C G G G From 0.1 to < 0.5 acres C G G G From 0.1 to < 0.5 acres C G G G From 0.1 to < 0.5 acres C G G G From 0.1 to < 0.5 acres C G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres
	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) A Pocosin is the full extent (≥ 90%) of its natural landscape size. B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely □ A ≥ 500 acres □ B From 100 to < 500 acres □ C □ C From 50 to < 100 acres □ D □ From 10 to < 50 acres □ E □ E < 10 acres □ F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. □ Yes □ No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions B No artificial edge within 150 feet in four (4) to seven (7) directions C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric
17a. Is vegetation present?
Yes No If Yes, continue to 17b. If No, skip to Metric 18. 17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.
☐A ≥ 25% coverage of vegetation
B < 25% coverage of vegetation
17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT
Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent A A Dense mid-story/sapling layer B B B Moderate density mid-story/sapling layer C C Mid-story/sapling layer sparse or absent
A Dense shrub layer B B Moderate density shrub layer C C Shrub layer sparse or absent
A Dense herb layer B B Moderate density herb layer C C Herb layer sparse or absent
18. Snags – wetland type condition metric
Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A
19. Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.
 20. Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
B Not A
 Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)
Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. [A
22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)
Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. ••••A Overbank and overland flow are not severely altered in the assessment area.
B Overbank flow is severely altered in the assessment area.
Overland flow is severely altered in the assessment area.Both overbank <u>and</u> overland flow are severely altered in the assessment area.
Notes
Wetland K is a palustrine forested wetland located in the New Hope Creek floodplain. Wetland K is located adjacent to Stream J (Sandy Creek).

Wetland Site Name	TTA Wetland K	Date	6/18/13
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP -STV
Notes on Field Assessm	pont Form (V/N)		VEQ
Notes on Field Assessm Presence of regulatory o			YES YES
Wetland is intensively m			NO
· ·	arraged (1714) ated within 50 feet of a natural tributary or othe	er open water (V/N)	YES
	stantially altered by beaver (Y/N)	open water (1714)	NO
	iences overbank flooding during normal rainfa	Il conditions (Y/N)	YES
Assessment area is on a		in conditions (1714)	NO
	a ocaciar iciaria (1711)		
Sub-function Rating S	ummary		
Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-Surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Soluble Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	YES
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Habitat	Physical Structure	Condition	MEDIUM
	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	HIGH
Function Rating Sumn	narv		
Function	Metrics/Notes		Rating
Hydrology	Condition		HIGH
Nater Quality	Condition		HIGH
	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	YES
Habitat	Conditon		HIGH

_	Nating Outstated Version 4.1
	Wetland Site Name TTA Wetland N Date 7/16/13
	Wetland Type Bottomland Hardwood Forest Assessor Name/Organization BP -STV
	Level III Ecoregion Piedmont Nearest Named Water Body New Hope Creek
	River Basin Cape Fear USGS 8-Digit Catalogue Unit 03030002
	Yes No Precipitation within 48 hrs? Latitude/Longitude (deci-degrees) 35.955336, -78.979398
	Evidence of stressors affecting the assessment area (may not be within the assessment area) Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following. • Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.) • Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.) • Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.) • Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)
	s the assessment area intensively managed? [] Yes [] No
	Anadromous fish Federally protected species or State endangered or threatened species NCDWQ riparian buffer rule in effect Abuts a Primary Nursery Area (PNA) Publicly owned property N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout Designated NCNHP reference community Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream
	Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream What type of natural stream is associated with the wetland, if any? (check all that apply) Blackwater Brownwater Tidal (if tidal, check one of the following boxes) Lunar Wind Both Sthe assessment area on a coastal island? Yes No Tyes No
	Ooes the assessment area experience overbank flooding during normal rainfall conditions?
	. Ground Surface Condition/Vegetation Condition – assessment area condition metric Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect. GS VS A A Not severely altered B Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)
	E. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable. Surf Sub A A Water storage capacity and duration are not altered. B B B Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).
	Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only) Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

4.	Soil Texture/Structure – assessment area condition metric Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators. 4a. A Sandy soil B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) C Loamy or clayey soils not exhibiting redoximorphic features D Loamy or clayey gleyed soil Histosol or histic epipedon
	 4b.
5.	Discharge into Wetland – opportunity metric Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub A A Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Land Use – opportunity metric Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. WS 5M 2M A A A A A S 10% impervious surfaces B B B A 10% impervious surfaces C C C Confined animal operations (or other local, concentrated source of pollutants) D D D D D 20% coverage of pasture E B B B A 20% coverage of agricultural land (regularly plowed land) F F F F A 20% coverage of maintained grass/herb G G G G G ≥ 20% coverage of clear-cut land H H H H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.	 Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water? Yes No If Yes, continue to 7b. If No, skip to Metric 8. Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed. 7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. A ≥ 50 feet B From 30 to < 50 feet C From 15 to < 30 feet D From 5 to < 15 feet E < 5 feet or buffer bypassed by ditches 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width. S 15-feet wide S > 15-feet wide Other open water (no tributary present) 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water? Yes No 7e. Is tributary or other open water sheltered or exposed? Sheltered – adjacent open water with width < 2500 feet or regular boat traffic. Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.
8.	Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries. WT WC A A ≥ 100 feet B B From 80 to < 100 feet C C From 50 to < 80 feet D D From 40 to < 50 feet E F From 30 to < 40 feet F F From 15 to < 30 feet G G From 5 to < 15 feet H C H < 5 feet

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. A Evidence of short-duration inundation (< 7 consecutive days) B Evidence of saturation, without evidence of inundation C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. B Sediment deposition is excessive, but not overwhelming the wetland. C Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) A A ≥ 500 acres B B From 10 to < 500 acres C C C From 50 to < 100 acres C C C From 50 to < 100 acres C C C From 10 to < 25 acres C F F F From 5 to < 10 acres C G G G From 1 to < 5 acres C G G G From 0.5 to < 1 acre C G G G From 0.1 to < 0.5 acre C G G G From 0.1 to < 0.5 acre C G G G From 0.1 to < 0.5 acres C G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G G From 0.1 to < 0.5 acres C G G G G G G G G G G G G G G G G G G G
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥ 90%) of its natural landscape size. □ B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥ 500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres C C From 50 to < 100 acres C C From 10 to < 50 acres C C From 50 to < 100 acres C From 50 to < 100 acres
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) ☑A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. ☑B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. ☑C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present? Page 17 No If Yes, continue to 17b. If No, skip to Metric 18.	
17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ☐A ≥ 25% coverage of vegetation	
TB < 25% coverage of vegetation 17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider strue in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT AB TA Canopy closed, or nearly closed, with natural gaps associated with natural processes B Canopy present, but opened more than natural gaps	cture
Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent Canopy present, but opened more than natural gaps Canopy sparse or absent	
CA Dense shrub layer BB BB Moderate density shrub layer CC CC Shrub layer sparse or absent	
CA Dense herb layer BB Moderate density herb layer C Herb layer sparse or absent	
18. Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A	
19. Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present. B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.	
Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.	
 20. Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability) B Not A 	
21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patter areas indicate vegetated areas, while solid white areas indicate open water. CA CB CC DD	ned
 22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. A Overbank and overland flow are not severely altered in the assessment area. Description of the dispersion of	
Notes Wetland N is a palustrine forested wetland located in the New Hope Creek floodplain.	

Wetland Site Name	TTA Wetland N	Date	7/16/13
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP -STV
lotos on Field Assessm	ont Form (V/N)		VES
Notes on Field Assessm Presence of regulatory o			YES YES
Netland is intensively m			NO
	anaged (1714) Ited within 50 feet of a natural tributary or othe	er open water (V/N)	YES
	stantially altered by beaver (Y/N)	open water (1714)	NO
	ences overbank flooding during normal rainfa	Il conditions (Y/N)	YES
Assessment area is on a		ii conditions (1714)	NO
nooccoment area to on c	a ocasian isiana (1714)		
Sub-function Rating Su	ummary		
unction	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-Surface Storage and Retention	Condition	LOW
Vater Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Soluble Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	YES
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Habitat	Physical Structure	Condition	HIGH
	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	HIGH
Function Rating Summ	narv		
unction	Metrics/Notes		Rating
Hydrology	Condition		HIGH
Vater Quality	Condition		HIGH
	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	YES
Habitat	Conditon		HIGH

Wetland Site Name	TTA Wetland NNN	Date 1	12/11/13	
Wetland Type	Non-Tidal Freshwater Marsh	Assessor Name/Organization	BP/STV	
Level III Ecoregion	Piedmont	Nearest Named Water Body I	Little Creek	
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030002	
	o Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.925959, -78.989055	
Please circle and/or m appropriate, in recent to the following. • Hydrological m • Surface and su septic tanks, ur • Signs of vegeta	s affecting the assessment area (may not be within take note on last page if evidence of stressors is appart (for instance, approximately within 10 years). No odifications (examples: ditches, dams, beaver dams, ab-surface discharges into the wetland (examples: dischargeround storage tanks (USTs), hog lagoons, etc.) ation stress (examples: vegetation mortality, insect data promitting attention (examples: mowing, clear-cutting)	arent. Consider departure from reference teworthy stressors include, but are not dikes, berms, ponds, etc.) charges containing obvious pollutants, amage, disease, storm damage, salt into	limited presence of nearby	
Is the assessment ar	ea intensively managed?			
Anadromous fit Federally prote Control	cted species or State endangered or threatened spec an buffer rule in effect y Nursery Area (PNA)	rn (AEC) (including buffer)	t	
Blackwater Brownwater	What type of natural stream is associated with the wetland, if any? (check all that apply) Blackwater			
	ea on a coastal island? []Yes []No ea's surface water storage capacity or duration su	hstantially altered by heaver?	Yes No	
	t area experience overbank flooding during norma	_	Yes No	
Check a box in e (VS) in the assess then rate the asses GS VS A A A N B B S al	Condition/Vegetation Condition – assessment area cach column. Consider alteration to the ground surfacts sment area. Compare to reference wetland if applicates a sessment area based on evidence of an effect. ot severely altered everely altered over a majority of the assessment area edimentation, fire-plow lanes, skidder tracks, bedding, the traction examples: mechanical disturbance, herbicide less diversity [if appropriate], hydrologic alteration)	ce (GS) in the assessment area and veole (see User Manual). If a reference is a (ground surface alteration examples: fill, soil compaction, obvious pollutantses, salt intrusion [where appropriate], e	egetation structure s not applicable, vehicle tracks, excessive s) (vegetation structure	
Check a box in eduration (Sub). (North Carolina hys 1 foot deep is consultated as Sub-surface water Surf Sub Carolina hystological sub-surface water Surf Sub Carolina hystological sub-surface Surf Sub Carolina hystological sub-surface Surf Sub Carolina hystological sub-surface Surface	re-Surface Storage Capacity and Duration – assessment column. Consider surface storage capacity and Consider both increase and decrease in hydrology. Reducing soils (see USACE Wilmington District website) for considered to affect surface water only, while a ditch > r. Consider tidal flooding regime, if applicable. Vater storage capacity and duration are not altered. Vater storage capacity or duration are altered, but not stater storage capacity or duration are substantially alternange) (examples: draining, flooding, soil compaction,	duration (Surf) and sub-surface storage for to the current NRCS lateral effect or the zone of influence of ditches in hydrogen and the substantially (typically, not sufficient to rered (typically, alteration sufficient to re	of ditching guidance for dric soils. A ditch surface and ditch change vegetation).	
Check a box in e type (WT). AA WT 3a. A A CC CC CD 3b. A Evid CB ED	Majority of wetland with depressions able to pond Majority of wetland with depressions able to pond	water > 1 foot deep water 6 inches to 1 foot deep water 3 to 6 inches deep n 2 feet and 2 feet	2,	

4.	Check a box feature. Mak regional indicata. A B C C C C D E B	Sandy soil Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) Loamy or clayey soils not exhibiting redoximorphic features Loamy or clayey gleyed soil Histosol or histic epipedon Soil ribbon < 1 inch
	⊡ B 4c. ⊡ A ⊡ B	Soil ribbon ≥ 1 inch No peat or muck presence A peat or muck presence
5.	Discharge in Check a box	Into Wetland – opportunity metric it in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Check all the draining to a assessment are consider WS 5M A A B B B C C C D D D	B < 10% impervious surfaces C Confined animal operations (or other local, concentrated source of pollutants) D ≥ 20% coverage of pasture E ≥ 20% coverage of agricultural land (regularly plowed land) F ≥ 20% coverage of maintained grass/herb G ≥ 20% coverage of clear-cut land
7.	7a. Is assed Yes Wetland Record 7b. How multiple Park Park Park Park Park Park Park Park	sing as Vegetated Buffer – assessment area/wetland complex condition metric issment area within 50 feet of a tributary or other open water? No If Yes, continue to 7b. If No, skip to Metric 8. If No, skip to Metric 8. If Yes, continue to 7b. If No, skip to Metric 8. If Yes, continue to 7b. If No, skip to Metric 8. If Yes, continue to 7b. If No, skip to Metric 8. If Yes, continue to 7b. If No, skip to Metric 8. If Yes, continue to 7b. If No, skip to Metric 8. If Yes, continue to 7b. If No, skip to Metric 8. If Yes, continue to 7b. If No, skip to Metric 8. If Yes, continue to 7b. If No, skip to Metric 8. If Yes, continue to 7b. If No, skip to Metric 8. If Yes, continue to 7b. If No, skip to Metric 8. If Yes, continue to 7b. If No, skip to Metric 8. If Yes, continue to 7b. If No, skip to Metric 8. If Yes, continue to 7b. If No, skip to 7b. If Yes, continue to 7b. If No, skip to 7b. If Yes, continue to 7b. If No, skip to 7b. If Yes, continue to 7b. If No, skip to 7b. If Yes, continue to 7b. If No, skip to 7b. If Yes, continue to 7b. If No, skip to 7b. If Yes, continue to 7b. If No, skip to 8b. If No, skip to 7b. If No,
8.	Wetland Wid	Ith at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) in each column. Select the average width for the wetland type at the assessment area (WT) and complex at the assessment areas (WC). See User Manual for WT and WC boundaries. ≥ 100 feet From 80 to < 100 feet

	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. Answer for assessment area dominant landform. Evidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. Sediment deposition is excessive, but not overwhelming the wetland. Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) A A S 500 acres B B B From 100 to < 500 acres C C C From 50 to < 100 acres C C C From 50 to < 100 acres C C C From 50 to < 100 acres C C C From 10 to < 25 acres C C C C From 5 to < 10 acres C C C C From 5 to < 10 acres C C C C From 5 to < 10 acres C C C C From 0.1 to < 5 acres C C C C From 0.5 to < 1 acre C C C C From 0.1 to < 0.5 acre C C C C C From 0.1 to < 0.1 acre C C C C C From 0.01 to < 0.1 acre C C C C C From 0.01 to < 0.1 acre C C C C C From 0.01 to < 0.1 acre C C C C C From 0.01 to < 0.1 acre C C C C C From 0.01 to < 0.1 acre C C C C C C From 0.01 to < 0.1 acre C C C C C From 0.01 to < 0.1 acre C C C C C From 0.01 to < 0.1 acre C C C C C From 0.01 to < 0.1 acre C C C C C From 0.01 to < 0.1 acre C C C C C From 0.01 to < 0.1 acre C C C C C From 0.01 to < 0.1 acre C C C C C From 0.01 to < 0.1 acre C C C C C From 0.01 to < 0.1 acre C C C C C C From 0.01 to < 0.1 acre C C C C C C From 0.01 to < 0.1 acre C C C C C C C C From 0.01 to < 0.1 acre C C C C C C C C C C From 0.01 to < 0.1 acre C C C C C C C C C C C From 0.01 to < 0.1 acre C C C C C C C C C C C C C C C From 0.01 to < 0.1 acre C C C C C C C C C C C C C C From 0.01 to < 0.1 acre C C C C C C C C C C C C C C C C C From 0.01 to < 0.1 acre C C C C C C C C C C C C C C C C C C C
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) A Pocosin is the full extent (≥ 90%) of its natural landscape size. B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥ 500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres C C From 50 to < 100 acres C C From 50 to < 100 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 40 to < 50 acres C C From 50 to < 100 acres C From 50 t
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions B No artificial edge within 150 feet in four (4) to seven (7) directions C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

17.	Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present? Proposition No. If Yes, continue to 17b. If No, skip to Metric 18.
	17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. □ A ≥ 25% coverage of vegetation □ B < 25% coverage of vegetation
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT
	Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent A A Dense mid-story/sapling layer B B B Moderate density mid-story/sapling layer C C Mid-story/sapling layer sparse or absent
	C C Shrub layer absent
	A Dense herb layer B B Moderate density herb layer C Herb layer sparse or absent
18.	Snags – wetland type condition metric Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A
19.	Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present. Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Adjority of canopy trees are < 6 inches DBH or no trees.
20.	Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A
21.	Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. CA CB CC CD D D D D D D D D D D
22.	Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Overbank and overland flow are not severely altered in the assessment area. Overbank flow is severely altered in the assessment area. Overland flow is severely altered in the assessment area. Both overbank and overland flow are severely altered in the assessment area.
Not We N.	es tland NNN is a palustrine emergent wetland located within the Farrington Road VMF area. Wetland NNN provides the headwaters to Stream

Wetland Site Name	TTA Wetland NNN	Date	12/11/13
Wetland Type	Non-Tidal Freshwater Marsh	Assessor Name/Organization	BP/STV
Natara da Etal I Adamana	F (V/A))		\/F0
Notes on Field Assessm			YES
Presence of regulatory of			YES
Wetland is intensively m			NO
	ted within 50 feet of a natural tributary or other	er open water (Y/N)	YES
	stantially altered by beaver (Y/N)		NO
·	ences overbank flooding during normal rainfa	III conditions (Y/N)	NO
Assessment area is on a	a coastal island (Y/N)		NO
Sub-function Rating Su	ummary		
Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	NA
	Sub-Surface Storage and Retention	Condition	NA
Water Quality	Pathogen Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Particulate Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	NA
	-	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Physical Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Pollution Change	Condition	NA
	S .	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Habitat	Physical Structure	Condition	MEDIUM
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	MEDIUM
Function Rating Summ	narv		
Function	Metrics/Notes		Rating
Hydrology	Condition		HIGH
Water Quality	Condition		HIGH
	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	YES
Habitat	Conditon		MEDIUM

		Rating Galcalator	*C131011 T.1	
ł	Wetland Site Name	TTA Wetland O	Date	7/17/13
	Wetland Type	Bottomland Hardw ood Forest	Assessor Name/Organization	BP -STV
	Level III Ecoregion	Piedmont	Nearest Named Water Body	New Hope Creek
	River Basin	Cape Fear	USGS 8-Digit Catalogue Uni	03030002
į		o Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.954432, -78.980868
	Please circle and/or m appropriate, in recent p to the following. • Hydrological me • Surface and su septic tanks, ur • Signs of vegeta	s affecting the assessment area (may not be within ake note on last page if evidence of stressors is appapant (for instance, approximately within 10 years). No odifications (examples: ditches, dams, beaver dams, b-surface discharges into the wetland (examples: dischargeround storage tanks (USTs), hog lagoons, etc.) ation stress (examples: vegetation mortality, insect determinantly alteration (examples: mowing, clear-cutting)	rent. Consider departure from refere teworthy stressors include, but are not dikes, berms, ponds, etc.) charges containing obvious pollutants amage, disease, storm damage, salt is	ot limited s, presence of nearby
į	Is the assessment are	ea intensively managed?		
	Anadromous fis Federally prote NCDWQ riparia Abuts a Primar Publicly owned N.C. Division of Abuts a stream Designated NC	cted species or State endangered or threatened spec an buffer rule in effect y Nursery Area (PNA)	rn (AEC) (including buffer)	ut
	Blackwater Brownwater Tidal (if tidal, ch	stream is associated with the wetland, if any? (check one of the following boxes) Lunar a on a coastal island? Yes No ea's surface water storage capacity or duration su	Wind Both	[TYes [™ No
ļ		t area experience overbank flooding during norma		Yes No
	Check a box in e (VS) in the assess then rate the asse GS VS A A A B B B Se se al	Condition/Vegetation Condition – assessment area ach column. Consider alteration to the ground surface sment area. Compare to reference wetland if applicate essment area based on evidence of an effect. ot severely altered everely altered over a majority of the assessment area edimentation, fire-plow lanes, skidder tracks, bedding, teration examples: mechanical disturbance, herbicides ss diversity [if appropriate], hydrologic alteration)	ce (GS) in the assessment area and ole (see User Manual). If a reference a (ground surface alteration examples fill, soil compaction, obvious pollutar	is not applicable, s: vehicle tracks, excessive nts) (vegetation structure
	Check a box in e duration (Sub). C North Carolina hyd ≤ 1 foot deep is co sub-surface water Surf Sub A A W B B B W C C C W	-Surface Storage Capacity and Duration – assessmach column. Consider surface storage capacity and Consider both increase and decrease in hydrology. Redric soils (see USACE Wilmington District website) for onsidered to affect surface water only, while a ditch > 1. Consider tidal flooding regime, if applicable. Vater storage capacity and duration are not altered. Vater storage capacity or duration are altered, but not surface storage capacity or duration are substantially alternange) (examples: draining, flooding, soil compaction,	duration (Surf) and sub-surface stora efer to the current NRCS lateral effect r the zone of influence of ditches in h 1 foot deep is expected to affect both substantially (typically, not sufficient to ered (typically, alteration sufficient to	t of ditching guidance for ydric soils. A ditch h surface and ditch o change vegetation).
	Check a box in e type (WT). AA WT 3a. A A BB BB CC CC CD DD 3b. A Evid CB Evid	Majority of wetland with depressions able to pond Majority of wetland with depressions able to pond	water > 1 foot deep water 6 inches to 1 foot deep water 3 to 6 inches deep n 2 feet and 2 feet	

4.	 4. Soil Texture/Structure – assessment area condition metric Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators. 4a. A Sandy soil B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) C Loamy or clayey soils not exhibiting redoximorphic features D Loamy or clayey gleyed soil E Histosol or histic epipedon 		
	4b.	Soil ribbon < 1 inch Soil ribbon ≥ 1 inch No peat or muck presence	
	В	A peat or muck presence	
5.	Check a bo	Little or no evidence of pollutants or discharges entering the assessment area	
		treatment capacity of the assessment area	
	Ec Ec		
6.	Check all the draining to a assessment are consider WS 5M A A B B B C C C C D C C C C C C C C C C C C	B < 10% impervious surfaces C Confined animal operations (or other local, concentrated source of pollutants) D ≥ 20% coverage of pasture E ≥ 20% coverage of agricultural land (regularly plowed land) F ≥ 20% coverage of maintained grass/herb G G ≥ 20% coverage of clear-cut land	
7.	7a. Is asset Yes Wetlar Record 7b. How m A B C D C D E 7c. Tributa 1 ≤ 15 7d. Do roo 1 Yes 7e. Is tribu She	ting as Vegetated Buffer – assessment area/wetland complex condition metric essment area within 50 feet of a tributary or other open water? No If Yes, continue to 7b. If No, skip to Metric 8. Ind buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. In a note if a portion of the buffer has been removed or disturbed. In a note if a portion of the buffer has been removed or disturbed. In a note if a portion of the buffer has been removed or disturbed. In a note if a portion of the buffer has been removed or disturbed. In a note if a portion of the buffer has been removed or disturbed. In a note if a portion of the average width of the wetland. In a note if a portion of the average width of the wetland. In a note if a portion of the average width of the wetland. In a note if a portion of the average width of the wetland. In a note if a portion of the average width of the wetland. In a note if a portion of the average width of the wetland. In a note if a portion of the average width of the wetland. In a note if a portion of the average width of the wetland. In a note if a portion of the average width of the wetland. In a note if a portion of the average width of the wetland. In a note if a portion of the average width of the wetland. In a note if a portion of the average width of the wetland. In a note if a portion of the average width of the wetland. In a note if a portion of the average width of the wetland. In a note if a portion of the average width of the wetland. In a note if a portion of the buffer based on the average width of the wetland. In a note if a portion of the buffer based on the average width of the wetland. In a note if a portion of the buffer based on the average width of the wetland. In a note if a portion of the buffer based on the average width of the wetland. In a note if a portion of the buffer based on the average width of the wetland. In a note if a portion of the buffer based on the average	
8.	Check a bo	≥ 100 feet From 80 to < 100 feet From 50 to < 80 feet From 40 to < 50 feet From 30 to < 40 feet From 15 to < 30 feet From 5 to < 15 feet	

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. Evidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. Sediment deposition is excessive, but not overwhelming the wetland. Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) A A ≥ 500 acres B B From 100 to < 500 acres C C C From 50 to < 100 acres C C C From 50 to < 100 acres C C C From 50 to < 10 acres C C C From 5 to < 10 acres C C C C From 5 to < 10 acres C C C C From 5 to < 10 acres C C C C From 5 to < 10 acres C C C C From 5 to < 1 acre C C C C From 0.1 to < 0.5 acre C C C C C From 0.1 to < 0.5 acres C C C C C C C C C C C C C C C C C C C
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) A Pocosin is the full extent (≥ 90%) of its natural landscape size. B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥ 500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres D D From 10 to < 50 acres E C < 10 acres F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) ☑ A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. ☑ B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. ☑ C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present? Pyes No If Yes, continue to 17b. If No, skip to Metric 18.	
17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. □ A ≥ 25% coverage of vegetation □ B < 25% coverage of vegetation	
17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT	
Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent CA Canopy sparse or absent CA Dense mid-story/sapling layer Moderate density mid-story/sapling layer Mid-story/sapling layer sparse or absent	
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	
CA CA Dense herb layer B Moderate density herb layer C Herb layer sparse or absent	
18. Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). B Not A	
19. Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.	
Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.	
 20. Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). B Not A 	
21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. B C D D D D D D D D D D D D	
 22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. A Overbank and overland flow are not severely altered in the assessment area. D Overland flow is severely altered in the assessment area. D Both overbank and overland flow are severely altered in the assessment area.	
Notes Wetland O is a palustrine forested wetland located in the New Hope Creek floodplain.	

Wetland Site Name	TTA Wetland O	Date	7/17/13
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP -STV
Notes on Field Assessment	0 or 4 Farm (MAI)		V/50
Notes on Field Assessn			YES
Presence of regulatory			YES
Wetland is intensively n		0.480	NO NO
	ated within 50 feet of a natural tributary or other	er open water (Y/N)	YES
	ostantially altered by beaver (Y/N)		NO
•	riences overbank flooding during normal rainfa	all conditions (Y/N)	YES
Assessment area is on	a coastal island (Y/N)		NO
Sub-function Rating S	Summary		
Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-Surface Storage and Retention	Condition	LOW
Nater Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Soluble Change	Condition	HIGH
	9	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	MEDIUM
	, c.com c.tom.gc	Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	YES
	Pollution Change	Condition	NA NA
	r change	Condition/Opportunity	NA NA
		Opportunity Presence? (Y/N)	NA NA
	Physical Structure	Condition	HIGH
	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	HIGH
Function Define Comm			
F unction Rating Sum r Function	Metrics/Notes		Rating
Hydrology	Condition		HIGH
Nater Quality	Condition		HIGH
•	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	YES
Habitat	Conditon		HIGH

	Rating Calculato	r Version 4.1
Wetland Site Name	TTA Wetland OOO	Date 1/21/14
Wetland Type	Basin Wetland	Assessor Name/Organization BP -STV
Level III Ecoregion	Piedmont 🔻	Nearest Named Water Body New Hope Creek
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit 03030002
Yes N	lo Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) 35.951201, -78.982724
Please circle and/or mappropriate, in recent to the following. Hydrological mesure and suspending tanks, une Signs of vegeta	rs affecting the assessment area (may not be within take note on last page if evidence of stressors is appear past (for instance, approximately within 10 years). Note to diffications (examples: ditches, dams, beaver dams, ub-surface discharges into the wetland (examples: dischargeound storage tanks (USTs), hog lagoons, etc.) ation stress (examples: vegetation mortality, insect dommunity alteration (examples: mowing, clear-cutting	arent. Consider departure from reference, if ofteworthy stressors include, but are not limited dikes, berms, ponds, etc.) charges containing obvious pollutants, presence of nearby amage, disease, storm damage, salt intrusion, etc.)
Is the assessment ar	rea intensively managed? Tyes No	
Anadromous fis Federally prote Very NCDWQ riparia Abuts a Primar Publicly owned N.C. Division of Abuts a stream Designated NC Abuts a 303(d) What type of natural Blackwater Brownwater Tidal (if tidal, cl Is the assessment ar Is the assessment ar Does the assessment Ground Surface Check a box in e (VS) in the assessment are then rate the assessment are B B S S S S S S S S S S S S S S S S S S	cated species or State endangered or threatened specian buffer rule in effect ry Nursery Area (PNA) I property If Coastal Management Area of Environmental Conce in with a NCDWQ classification of SA or supplemental CNHP reference community I-listed stream or a tributary to a 303(d)-listed stream stream is associated with the wetland, if any? (ch theck one of the following boxes) Therefore a coastal island? Therefore water storage capacity or duration substance as surface water storage capacity or duration substance as surface water storage capacity or duration substance as a coastal island? Condition/Vegetation Condition — assessment are each column. Consider alteration to the ground surface as surface as a compare to reference wetland if applicate assessment area based on evidence of an effect. Into the severely altered everely altered over a majority of the assessment are edimentation, fire-plow lanes, skidder tracks, bedding	rn (AEC) (including buffer) classifications of HQW, ORW, or Trout eck all that apply) Wind Both bstantially altered by beaver? A Yes No
2. Surface and Sub Check a box in e duration (Sub). C North Carolina hy. ≤1 foot deep is co sub-surface water Surf Sub CA C B B B W C C C C C C C C C C C C C C C	Consider both increase and decrease in hydrology. R dric soils (see USACE Wilmington District website) for considered to affect surface water only, while a ditch on the consider tidal flooding regime, if applicable. Vater storage capacity and duration are not altered. Water storage capacity or duration are altered, but not vater storage capacity or duration are substantially alteration (examples: draining, flooding, soil compaction urface Relief – assessment area/wetland type con	ment area condition metric duration (Surf) and sub-surface storage capacity and efer to the current NRCS lateral effect of ditching guidance for in the zone of influence of ditches in hydric soils. A ditch in 1 foot deep is expected to affect both surface and ditch substantially (typically, not sufficient to change vegetation). ered (typically, alteration sufficient to result in vegetation if illing, excessive sedimentation, underground utility lines). dition metric (answer for non-marsh wetlands only) repriate storage for the assessment area (AA) and the wetland
	Majority of wetland with depressions able to pond Majority of wetland with depressions able to pond	water 6 inches to 1 foot deep water 3 to 6 inches deep an 2 feet

4.	Check a box feature. Make regional indicated 4a. A S B C C C C C C C C C C C C C C C C C C	Sandy soil Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) Loamy or clayey soils not exhibiting redoximorphic features Loamy or clayey gleyed soil Histosol or histic epipedon Soil ribbon < 1 inch
	4c. 💽 A 🐧	Soil ribbon ≥1 inch No peat or muck presence A peat or muck presence
5.	Discharge int	to Wetland – opportunity metric in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Check all that draining to assessment at are considered WS 5M A A A A A A A A A A A A A A A A A A	pportunity metric t apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources sessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the rea (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers d to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. 2M
	 7a. Is assessment area within 50 feet of a tributary or other open water? ☐ Yes ☐ No If Yes, continue to 7b. If No, skip to Metric 8. Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland Record a note if a portion of the buffer has been removed or disturbed. 7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. ☐ A ≥50 feet ☐ B From 30 to < 50 feet ☐ C From 15 to < 30 feet ☐ D From 5 to < 15 feet ☐ E < 5 feet or buffer bypassed by ditches 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width. ☐ ≤15-feet wide ☐ > 15-feet wide ☐ Other open water (no tributary present) 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water? ☐ Yes ☐ No 7e. Is tributary or other open water sheltered or exposed? ☐ Sheltered — adjacent open water with width < 2500 feet and no regular boat traffic. ☐ Exposed — adjacent open water with width ≥2500 feet or regular boat traffic. 	
8,	Check a box	th at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) in each column. Select the average width for the wetland type at the assessment area (WT) and complex at the assessment areas (WC). See User Manual for WT and WC boundaries. ≥100 feet From 80 to < 100 feet From 50 to < 80 feet From 40 to < 50 feet From 30 to < 40 feet From 15 to < 30 feet From 5 to < 15 feet < 5 feet

9.	Inundation Duration – assessment area condition metric
	Answer for assessment area dominant landform. [A Evidence of short-duration inundation (< 7 consecutive days)
	Evidence of saturation, without evidence of inundation
	Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10	Indicators of Deposition – assessment area condition metric
10.	Consider recent deposition only (no plant growth since deposition).
	A Sediment deposition is not excessive, but at approximately natural levels.
	Sediment deposition is excessive, but not overwhelming the wetland.
	Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric
	Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the
	size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User
	Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.
	WT WC FW (if applicable)
	C A C A ≥500 acres C B C B From 100 to < 500 acres
	C C C C From 50 to < 500 acres
	C C C From 50 to < 100 acres D D D From 25 to < 50 acres
	E E E From 10 to < 25 acres
	C C C From 50 to < 100 acres D D D From 25 to < 50 acres E E E From 10 to < 25 acres F F F From 5 to < 10 acres
	G G G From 1 to < 5 acres
	H CH From 0.5 to < 1 acre
	☐
	D D From 25 to < 50 acres E E From 10 to < 25 acres F F F F From 5 to < 10 acres G G G G From 1 to < 5 acres H H H From 0.5 to < 1 acre I I From 0.1 to < 0.5 acre J J J From 0.01 to < 0.1 acre K K K K < 0.01 acre or assessment area is clear-cut
40	
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥90%) of its natural landscape size.
	Pocosin is the full extent (≥90%) of its natural landscape size. Pocosin is < 90% of the full extent of its natural landscape size.
12	Connectivity to Other Natural Areas – landscape condition metric
13.	13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This
	evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous
	metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility
	line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.
	Well Loosely TA TA ≥500 acres
	A CA ≥500 acres B CB From 100 to < 500 acres
	C C From 50 to < 100 acres
	D D From 10 to < 50 acres
	E E < 10 acres
	F F Wetland type has a poor or no connection to other natural habitats
	13b. Evaluate for marshes only.
	Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes)
	May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include
	non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts.
	Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions
	B No artificial edge within 150 feet in four (4) to seven (7) directions
	An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)
10.	A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate
	species, with exotic plants absent or sparse within the assessment area.
	Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species
	characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or
	clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-
	Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in
	at least one stratum.
40	
76.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) [] A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
	Vegetation diversity is high and is composed primarily of flative species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics.
	C Vegetation is dominated by exotic species (>50% cover of exotics).

	E Company of the Comp		
17.	Vegetative Structure – assessment area/wetland type condition metric		
	17a. Is vegetation present? Yes No If Yes, continue to 17b. If No, skip to Metric 18.		
	17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ☐ A ≥25% coverage of vegetation ☐ B <25% coverage of vegetation		
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT		
	A Canopy closed, or nearly closed, with natural gaps associated with natural processes B Canopy present, but opened more than natural gaps C C Canopy sparse or absent A Dense mid-story/sapling layer B C C C Mid-story/sapling layer sparse or absent		
	☐ A ☐ A Dense shrub layer ☐ B ☐ B Moderate density shrub layer ☐ C ☐ C Shrub layer sparse or absent		
	☐ A ☐ A Dense herb layer ☐ B ☐ B Moderate density herb layer ☐ C ☐ C Herb layer sparse or absent		
18.	Snags – wetland type condition metric Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability) B Not A		
19.	Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.		
	Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.		
20.	Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Description of the property of		
21.	Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. A B C C D		
22.	Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. C A Overbank and overland flow are not severely altered in the assessment area.		

- B Overbank flow is severely altered in the assessment area.
- C Overland flow is severely altered in the assessment area.
- Both overbank and overland flow are severely altered in the assessment area.

Notes

Wetland OOO is a palustrine emergent wetland located in a constructed sediment basin adjacent to development.

Wetland Site Name_	TTA Wetland OOO	Date	1/21/14
Wetland Type_	Basin Wetland	Assessor Name/Organization	BP -STV
Notes on Field Assessr	ment Form (Y/N)		YES
Presence of regulatory	• •		YES
Vetland is intensively r			NO
•	eated within 50 feet of a natural tributary or other	er open water (Y/N)	NO
	bstantially altered by beaver (Y/N)	. , ,	NO
	riences overbank flooding during normal rainfa	III conditions (Y/N)	YES
·	a coastal island (Y/N)	,	NO
Sub-function Rating S	Summary		
unction	Sub-function	Metrics	Rating
lydrology	Surface Storage and Retention	Condition	NA
	Sub-Surface Storage and Retention	Condition	NA
Vater Quality	Pathogen Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Particulate Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Physical Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Pollution Change	Condition	LOW
	<u> </u>	Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	MEDIUM
Function Rating Sumi Function	Metrics/Notes		Rating
Hydrology	Condition		LOW
Vater Quality	Condition		LOW
•	Condition/Opportunity		LOW
	Opportunity Presence?	(Y/N)	NO
Habitat	Conditon		LOW

	Rating Calculat	or Version 4.1		
Wetland Site N	Name TTA Wetland P	Date 7/17/13		
Wetland	Type Bottomland Hardwood Forest	Assessor Name/Organization BP-STV		
Level III Ecore	egion Piedmont	Nearest Named Water Body New Hope Creek		
River E	Basin Cape Fear	USGS 8-Digit Catalogue Unit 03030002		
Yes	No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) 35.953257, -78.982328		
Please circle and appropriate, in reto the following. Hydrologic Surface at septic tanl Signs of v Habitat/pla	nks, underground storage tanks (USTs), hog lagoons, etc. vegetation stress (examples: vegetation mortality, insect lant community alteration (examples: mowing, clear-cutting)	parent. Consider departure from reference, if loteworthy stressors include, but are not limited s, dikes, berms, ponds, etc.) scharges containing obvious pollutants, presence of nearby damage, disease, storm damage, salt intrusion, etc.)		
	ent area intensively managed? Yes No			
Anadromo Federally V NCDWQ r Abuts a P Publicly or N.C. Divis N.C. Divis Abuts a st Designate	Federally protected species or State endangered or threatened species NCDWQ riparian buffer rule in effect Abuts a Primary Nursery Area (PNA) Publicly owned property N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout Designated NCNHP reference community			
What type of nat	tural stream is associated with the wetland, if any? (c	heck all that apply)		
Is the assessme Is the assessme Does the assess	ter dal, check one of the following boxes) Lunar ent area on a coastal island? Yes No ent area's surface water storage capacity or duration s sment area experience overbank flooding during norm	substantially altered by beaver? Yes No		
Check a box (VS) in the a then rate the GS VS	assessment area. Compare to reference wetland if applic e assessment area based on evidence of an effect.	ace (GS) in the assessment area and vegetation structure		
©A <u>@</u> A ∏B ∏B	Severely altered over a majority of the assessment ar sedimentation, fire-plow lanes, skidder tracks, beddin	ea (ground surface alteration examples: vehicle tracks, excessive g, fill, soil compaction, obvious pollutants) (vegetation structure des, salt intrusion [where appropriate], exotic species, grazing,		
Check a box duration (Su North Carolir ≤1 foot deep	na hydric soils (see USACE Wilmington District website) of p is considered to affect surface water only, while a ditch water. Consider tidal flooding regime, if applicable. Water storage capacity and duration are not altered. Water storage capacity or duration are altered, but no water storage capacity or duration are substantially a			
Check a box type (WT). AA	age/Surface Relief – assessment area/wetland type co x in each column for each group below. Select the ap	ndition metric (answer for non-marsh wetlands only) propriate storage for the assessment area (AA) and the wetland		
∏B ⊙ C ⊡ D	☐ A Majority of wetland with depressions able to pon ☐ B Majority of wetland with depressions able to pon ☐ C Majority of wetland with depressions able to pon ☐ D Depressions able to pond water < 3 inches deep	d water 6 inches to 1 foot deep d water 3 to 6 inches deep		

Evidence that maximum depth of inundation is greater than 2 feet Evidence that maximum depth of inundation is between 1 and 2 feet K.21-616

4.	Soil Texture/Structure – assessment area condition metric Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators. 4a. A Sandy soil			
	Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) Loamy or clayey soils not exhibiting redoximorphic features Loamy or clayey gleyed soil Histosol or histic epipedon			
	4b. ☐ A Soil ribbon < 1 inch ☐ B Soil ribbon ≥1 inch			
	4c. A No peat or muck presence B A peat or muck presence			
5.	Discharge into Wetland – opportunity metric Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub			
	Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area C C C Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive			
6.	Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the			
	assessment area (5M), and within 2 miles <u>and</u> within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. WS 5M 2M FA FA ≥10% impervious surfaces B B B C C C C C C Confined animal operations (or other local, concentrated source of pollutants) D D D D D ≥20% coverage of pasture E FE FE ≥20% coverage of agricultural land (regularly plowed land) FF FF FF ≥20% coverage of maintained grass/herb G FG FG S20% coverage of clear-cut land H H H H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.			
7.	 7a. Is assessment area within 50 feet of a tributary or other open water? Yes No If Yes, continue to 7b. If No, skip to Metric 8. Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland Record a note if a portion of the buffer has been removed or disturbed. 7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. A ≥50 feet B From 30 to < 50 feet C From 15 to < 30 feet D From 5 to < 15 feet E < 5 feet or buffer bypassed by ditches 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width. ≤15-feet wide > 15-feet wide > 215-feet wide > 250 feet No Te. Is tributary or other open water sheltered or exposed? Sheltered – adjacent open water with width < 2500 feet or regular boat traffic. Exposed – adjacent open water with width ≥2500 feet or regular boat traffic. 			
8.	Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries. WT WC A A ≥100 feet B B From 80 to < 100 feet C C From 50 to < 80 feet D D From 40 to < 50 feet E F From 30 to < 40 feet F F From 15 to < 30 feet G G G From 5 to < 15 feet H C H < 5 feet			

	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. Answer for assessment area dominant landform. Evidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). Calcala A Sediment deposition is not excessive, but at approximately natural levels. Sediment deposition is excessive, but not overwhelming the wetland. Calcala A Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) A A A SA ≥500 acres B B B From 100 to < 500 acres C C C C C From 50 to < 100 acres C C C C From 50 to < 100 acres C C C C From 50 to < 10 acres C C C C C From 5 to < 10 acres C C C C C From 5 to < 10 acres C C C C C From 0.5 to < 1 acre C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C C C From 0.1 to < 0.5 acres C C C C C C C C From 5 to < 1 acre C C C C C C C C From 5 to < 1 acre C C C C C C C C From 5 to < 1 acre C C C C C C C C C C From 5 to < 1 acre C C C C C C C C C C From 5 to < 1 acre C C C C C C C C C C From 50 to < 10 acres C C C C C C C C C C From 50 to < 10 acres C C C C C C C C C C From 50 to < 10 acres C C C C C C C C C C C From 50 to < 10 acres C C C C C C C C C C From 50 to < 10 acres C C C C C C C C C C C From 50 to < 10 acres C C C C C C C C C C C From 50 to < 10 acres C C C C C C C C C C C C C From 50 to < 100 acres C C C C C C C C C C C C C C C From 50 to < 100 acres C C C C C C C C C C C C C C C C C C C
	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥90%) of its natural landscape size. □ B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres C D D From 10 to < 50 acres C E E E < 10 acres C F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
	 Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

17.	7. Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present?		
	Yes No If Yes, continue to 17b. If No, skip to Metric 18.		
	17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ≥25% coverage of vegetation < 25% coverage of vegetation		
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT		
	© A Canopy closed, or nearly closed, with natural gaps associated with natural processes B CB Canopy present, but opened more than natural gaps C C C Canopy sparse or absent		
	C A Dense mid-story/sapling layer B B B Moderate density mid-story/sapling layer C C Mid-story/sapling layer sparse or absent		
	☐ A ☐ A Dense shrub layer ☐ B ☐ B Moderate density shrub layer ☐ C ☐ C Shrub layer sparse or absent		
	☐ A ☐ A Dense herb layer ☐ B ☐ B Moderate density herb layer ☐ C ☐ C Herb layer sparse or absent		
18.	Snags – wetland type condition metric Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A		
10	Diameter Class Distribution – wetland type condition metric		
13.	A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.		
	Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.		
20.	Large Woody Debris – wetland type condition metric		
	Include both natural debris and man-placed natural debris. Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A		
21.	Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater		
	Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned		
	areas indicate vegetated areas, while solid white areas indicate open water. C A C C C C D		
	(US) (2) (1)		
22.	Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)		
	Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. A Overbank and overland flow are not severely altered in the assessment area.		

- Overbank <u>and</u> overland flow are not severely altered in the assessment area. Overbank flow is severely altered in the assessment area. Overland flow is severely altered in the assessment area. Both overbank <u>and</u> overland flow are severely altered in the assessment area.

Notes

Wetland P is a palustrine forested wetland located in the New Hope Creek floodplain. Wetland P is located at the end of Stream P.

Wetland Site Name	TTA Wetland P	Date	7/17/13
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP-STV
Notes on Field Assessm	ont Form (V/N)		YES
			YES
Presence of regulatory of			
Wetland is intensively m			NO NO
	ited within 50 feet of a natural tributary or other	er open water (1/N)	NO NO
	stantially altered by beaver (Y/N)	II anditions (MAI)	-
	ences overbank flooding during normal rainfa	iii conditions (1/N)	YES
Assessment area is on a	a coastal Island (Y/N)		NO
Sub-function Rating Su	ımmary		
unction	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-Surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	HIGH
	_	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Soluble Change	Condition	HIGH
	G	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	LOW
	,	Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	YES
	Pollution Change	Condition	NA
	•	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Physical Structure	Condition	HIGH
	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	HIGH
Function Dating Summ	201		
Function Rating Summ Function	Metrics/Notes		Rating
Hydrology	Condition		HIGH
Vater Quality	Condition		HIGH
-	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	YES
	Conditon		HIGH

Wetland Site Name TTA Wetla	nd Q	Date 7/17	/13
Wetland Type Bottomland Hardwood Forest		Assessor Name/Organization BP-STV	
Level III Ecoregion Piedmont		Nearest Named Water Body New Hope Creek	
River Basin Cape Fear USGS 8-Digit C		USGS 8-Digit Catalogue Unit 0303	30002
CYes No Precipit	ation within 48 hrs?	Latitude/Longitude (deci-degrees) 35.9	53280, -78.983068
Please circle and/or make note or appropriate, in recent past (for ins to the following. Hydrological modifications Surface and sub-surface d septic tanks, underground Signs of vegetation stress	tance, approximately within 10 years). It (examples: ditches, dams, beaver dam ischarges into the wetland (examples: distorage tanks (USTs), hog lagoons, etc.	parent. Consider departure from reference, in Noteworthy stressors include, but are not limited as, dikes, berms, ponds, etc.) ischarges containing obvious pollutants, prest.) damage, disease, storm damage, salt intrusi	sence of nearby
Is the assessment area intensiv	ely managed? TYes No		
Anadromous fish Federally protected specie NCDWQ riparian buffer rul Abuts a Primary Nursery A Publicly owned property N.C. Division of Coastal M Abuts a stream with a NCD Designated NCNHP refere	rea (PNA) anagement Area of Environmental Conc DWQ classification of SA or supplement:	ecies cern (AEC) (including buffer) al classifications of HQW, ORW, or Trout	
What type of natural stream is a	ssociated with the wetland, if any? (o	check all that apply)	
Blackwater		,	
Brownwater Tidal (if tidal, check one of	the following boxes)	Wind Both	
Is the assessment area on a coa		F. T. Marie F. Toom	
	e water storage capacity or duration	cubstantially altered by beaver?	Yes No
	rience overbank flooding during nor		
1. Ground Surface Condition/ Check a box in each colum (VS) in the assessment area. then rate the assessment are GS VS A A Not severely B Severely alte sedimentation alteration exa	Vegetation Condition – assessment and n. Consider alteration to the ground sure Compare to reference wetland if applicate a based on evidence of an effect. Altered ared over a majority of the assessment and n., fire-plow lanes, skidder tracks, bedding imples: mechanical disturbance, herbic [if appropriate], hydrologic alteration)	rea condition metric face (GS) in the assessment area and veget cable (see User Manual). If a reference is no rea (ground surface alteration examples: vel ng, fill, soil compaction, obvious pollutants) (v ides, salt intrusion [where appropriate], exotic	ation structure t applicable, nicle tracks, excessive regetation structure
Check a box in each colum duration (Sub). Consider bo North Carolina hydric soils (s ≤1 foot deep is considered to sub-surface water. Consider Surf Sub ☐ A ☐ A Water storag ☐ B ☐ B Water storag ☐ C ☐ C Water storag	th increase and decrease in hydrology. ee USACE Wilmington District website) o affect surface water only, while a ditch idal flooding regime, if applicable. e capacity and duration are not altered. e capacity or duration are altered, but no e capacity or duration are substantially a	ssment area condition metric nd duration (Surf) and sub-surface storage ca Refer to the current NRCS lateral effect of di for the zone of influence of ditches in hydric > 1 foot deep is expected to affect both surf ot substantially (typically, not sufficient to cha altered (typically, alteration sufficient to result on, filling, excessive sedimentation, undergro	itching guidance for soils. A ditch face and ditch inge vegetation).
Check a box in each colum type (WT).	ef – assessment area/wetland type con for each group below. Select the ap	ondition metric (answer for non-marsh were propriate storage for the assessment area (A	tlands only) AA) and the wetland
☐ B ☐ B Majority ☐ C ☐ C Majority ☐ D ☐ D Depress	of wetland with depressions able to por of wetland with depressions able to por of wetland with depressions able to por sions able to pond water < 3 inches dee	nd water 6 inches to 1 foot deep nd water 3 to 6 inches deep p	
	eximum depth of inundation is greater to aximum depth of inundation is between K.21-6		

	feature. Mak regional indic 4a. A B C C	from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape e soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for ators. Sandy soil Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) Loamy or clayey soils not exhibiting redoximorphic features Loamy or clayey gleyed soil Histosol or histic epipedon
	ऌ В	Soil ribbon < 1 inch Soil ribbon ≥1 inch
		No peat or muck presence A peat or muck presence
5.	Check a box	to Wetland – opportunity metric in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Check all that draining to as assessment as are considered WS 5M A A A A A A A A A A A A A A A A A A	at apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources a sessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers and to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. 2M A ≥10% impervious surfaces B < 10% impervious surfaces C Confined animal operations (or other local, concentrated source of pollutants) D ≥20% coverage of pasture E ≥20% coverage of agricultural land (regularly plowed land) F ≥20% coverage of maintained grass/herb G ≥20% coverage of clear-cut land H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.	7a. Is assess Wetland Record 7b. How mu A B C D E 7c. Tributan ≤15- 7d. Do roots T Yes 7e. Is tributa Shelt Expos	ary or other open water sheltered or exposed? ered – adjacent open water with width < 2500 feet <u>and</u> no regular boat traffic. sed – adjacent open water with width ≥2500 feet <u>or</u> regular boat traffic.
8.	Check a box	Ith at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) in each column. Select the average width for the wetland type at the assessment area (WT) nd complex at the assessment areas (WC). See User Manual for WT and WC boundaries. ≥100 feet From 80 to < 100 feet From 50 to < 80 feet From 40 to < 50 feet From 30 to < 40 feet From 15 to < 30 feet From 5 to < 15 feet < 5 feet

4. Soil Texture/Structure – assessment area condition metric

9.	Inundation Duration – assessment area condition metric
	Answer for assessment area dominant landform.
	Evidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation
	Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric
	Consider recent deposition only (no plant growth since deposition).
	Sediment deposition is not excessive, but at approximately natural levels. Sediment deposition is excessive, but not overwhelming the wetland.
	Sediment deposition is excessive, but not overwhelming the wetland. Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric
	Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the
	size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.
	WT WC FW (if applicable)
	CA CA ≥500 acres
	TB TB From 100 to < 500 acres
	C C C From 50 to < 100 acres
	C C C From 50 to < 100 acres D D D From 25 to < 50 acres
	E E E From 10 to < 25 acres
	CF CF From 5 to < 10 acres
	G G G From 1 to < 5 acres H H From 0.5 to < 1 acre G G From 0.1 to < 0.5 acre J J J From 0.01 to < 0.1 acre
	☐ H ☐ H From 0.5 to < 1 acre
	[
	D D From 25 to < 50 acres E E E From 10 to < 25 acres F F F From 5 to < 10 acres G G G From 1 to < 5 acres H H H From 0.5 to < 1 acre I I I From 0.1 to < 0.5 acre J J J From 0.01 to < 0.1 acre K K K K < 0.01 acre or assessment area is clear-cut
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥90%) of its natural landscape size.
	B Pocosin is < 90% of the full extent of its natural landscape size.
40	_
13.	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This
	evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous
	metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility
	line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.
	Well Loosely
	A A ≥500 acres
	B B From 100 to < 500 acres
	C C From 50 to < 100 acres D D From 10 to < 50 acres
	E E < 10 acres
	F Wetland type has a poor or no connection to other natural habitats
	13b. Evaluate for marshes only.
	Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14	Edge Effect – wetland type condition metric (skip for all marshes)
17.	May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include
	non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts.
	Consider the eight main points of the compass.
	A No artificial edge within 150 feet in all directions
	B No artificial edge within 150 feet in four (4) to seven (7) directions
15.	No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)
15.	No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate
15.	No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
15.	No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species
15.	No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or
15.	No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
15.	No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-
15.	No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
	No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
	No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)
	No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

	E Company of the Comp
17.	Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present? Yes No If Yes, continue to 17b. If No, skip to Metric 18.
	17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ☐ A ≥25% coverage of vegetation ☐ B <25% coverage of vegetation
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT
	Canopy closed, or nearly closed, with natural gaps associated with natural processes B B Canopy present, but opened more than natural gaps C C C Canopy sparse or absent
	C C Mid-story/sapling layer sparse or absent
	☐ A ☐ A Dense shrub layer ☐ B ☐ B Moderate density shrub layer ☐ C ☐ C Shrub layer sparse or absent
	C B B Moderate density herb layer C C C Herb layer sparse or absent
18.	Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A
19.	Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present. B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. C Majority of canopy trees are < 6 inches DBH or no trees.
20.	Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). B Not A
21.	Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

22. Hydrologic Connectivity - assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive

ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

Overbank and overland flow are not severely altered in the assessment area.

Overbank flow is severely altered in the assessment area.

Overland flow is severely altered in the assessment area.

C Both overbank and overland flow are severely altered in the assessment area.

Notes

Wetland Q is a palustrine forested wetland located in the New Hope Creek floodplain. Wetland Q provides the headwaters to Stream Q.

1 x | 0

Wetland Site Name	TTA Wetland Q	Date	7/17/13
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP-STV
Notes on Field Assessm	ent Form (Y/N)		YES
Presence of regulatory of			YES
Wetland is intensively m			NO NO
		or open water (V/N)	YES
	ated within 50 feet of a natural tributary or other	er open water (17/14)	NO
	stantially altered by beaver (Y/N)	U conditions (V/N)	-
	ences overbank flooding during normal rainfa	iii conditions (f/N)	YES
Assessment area is on a	a coastal Island (Y/N)		NO
Sub-function Rating S	ummary		
unction	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-Surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	HIGH
-		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	HIGH
	•	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Soluble Change	Condition	HIGH
	ū	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	LOW
	,	Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	YES
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Physical Structure	Condition	MEDIUM
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	HIGH
Function Deline Summ	1000		
Function Rating Summ Function	Metrics/Notes		Rating
Hydrology	Condition		HIGH
Vater Quality	Condition		HIGH
	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	YES
	Conditon		MEDIUM

Rating Calculat	or version 4. i
Wetland Site Name TTA Wetland R	Date 7/17/13
Wetland Type Headw ater Forest	Assessor Name/Organization BP/STV
Level III Ecoregion Piedmont	Nearest Named Water Body New Hope Creek
River Basin Cape Fear	USGS 8-Digit Catalogue Unit 03030002
Yes No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) 35.953257, -78.982328
Evidence of stressors affecting the assessment area (may not be with Please circle and/or make note on last page if evidence of stressors is appropriate, in recent past (for instance, approximately within 10 years). It to the following. • Hydrological modifications (examples: ditches, dams, beaver dam. • Surface and sub-surface discharges into the wetland (examples: discharges into the wetland (examples: discharges into the wetland (examples: discharges). • Signs of vegetation stress (examples: vegetation mortality, insect. • Habitat/plant community alteration (examples: mowing, clear-cutting).	parent. Consider departure from reference, if loteworthy stressors include, but are not limited s, dikes, berms, ponds, etc.) scharges containing obvious pollutants, presence of nearby damage, disease, storm damage, salt intrusion, etc.)
Regulatory Considerations (select all that apply to the assessment ar	ea)
Anadromous fish Federally protected species or State endangered or threatened species or State endangered or threatened species or State endangered or threatened species of NCDWQ riparian buffer rule in effect Abuts a Primary Nursery Area (PNA) Publicly owned property N.C. Division of Coastal Management Area of Environmental Conc Abuts a stream with a NCDWQ classification of SA or supplementate Designated NCNHP reference community Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream	ern (AEC) (including buffer) al classifications of HQW, ORW, or Trout
 What type of natural stream is associated with the wetland, if any? (c	heck all that apply)
Blackwater	
Brownwater Tidal (if tidal, check one of the following boxes) CLunar	Wind Both
Is the assessment area on a coastal island?	
Is the assessment area's surface water storage capacity or duration	substantially altered by beaver?
Does the assessment area experience overbank flooding during norr	
1. Ground Surface Condition/Vegetation Condition – assessment a Check a box in each column. Consider alteration to the ground sur (VS) in the assessment area. Compare to reference wetland if applice then rate the assessment area based on evidence of an effect. GS VS A A Not severely altered B Severely altered over a majority of the assessment as sedimentation, fire-plow lanes, skidder tracks, bedding alteration examples: mechanical disturbance, herbicities diversity [if appropriate], hydrologic alteration)	rea condition metric face (GS) in the assessment area and vegetation structure able (see User Manual). If a reference is not applicable, rea (ground surface alteration examples: vehicle tracks, excessive g, fill, soil compaction, obvious pollutants) (vegetation structure des, salt intrusion [where appropriate], exotic species, grazing,
C C Water storage capacity or duration are substantially a	nd duration (Surf) and sub-surface storage capacity and Refer to the current NRCS lateral effect of ditching guidance for for the zone of influence of ditches in hydric soils. A ditch
3. Water Storage/Surface Relief – assessment area/wetland type co Check a box in each column for each group below. Select the ap type (WT). AA WT	ndition metric (answer for non-marsh wetlands only) propriate storage for the assessment area (AA) and the wetland
3a. A A Majority of wetland with depressions able to por B B Majority of wetland with depressions able to por C C Majority of wetland with depressions able to por D D Depressions able to pond water < 3 inches deep	d water 6 inches to 1 foot deep d water 3 to 6 inches deep
3b. A Evidence that maximum depth of inundation is greater t B Evidence that maximum depth of inundation is between K.21-62	

	feature. Make regional indica 4a. A S B L C C L	from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape e soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for stors. Sandy soil Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) Loamy or clayey soils not exhibiting redoximorphic features Loamy or clayey gleyed soil Histosol or histic epipedon
	⊡ B S	Soil ribbon < 1 inch Soil ribbon ≥1 inch
		No peat or muck presence A peat or muck presence
5.	Check a box i	o Wetland – opportunity metric in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). ub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and
		potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Check all that draining to assessment at are considered WS 5M A A A A A A A A A A A A A A A A A A	
	7a. Is assess Yes Wetland Record a 7b. How muc A B C B C T C T T T T T T T T T T	ry or other open water sheltered or exposed? ered – adjacent open water with width < 2500 feet <u>and</u> no regular boat traffic. ed – adjacent open water with width ≥2500 feet <u>or</u> regular boat traffic.
8.	Check a box	th at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) in each column. Select the average width for the wetland type at the assessment area (WT) and complex at the assessment areas (WC). See User Manual for WT and WC boundaries. ≥100 feet From 80 to < 100 feet From 50 to < 80 feet From 40 to < 50 feet From 30 to < 40 feet From 15 to < 30 feet From 5 to < 15 feet < 5 feet

Soil Texture/Structure – assessment area condition metric

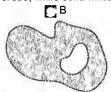
9.	Inundation Duration – assessment area condition metric
	Answer for assessment area dominant landform.
	Evidence of short-duration inundation (< 7 consecutive days)
	Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
	Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric
	Consider recent deposition only (no plant growth since deposition).
	A Sediment deposition is not excessive, but at approximately natural levels.
	Sediment deposition is excessive, but not overwhelming the wetland. Sediment deposition is excessive and is overwhelming the wetland.
	C Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric
	Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the
	size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User
	Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.
	WT WC FW (if applicable)
	A A A ≥500 acres
	B B B From 100 to < 500 acres
	C C C From 50 to < 100 acres
	D D D From 25 to < 50 acres E DE From 10 to < 25 acres
	F F F From 10 to < 25 acres
	G G G From 1 to < 5 acres
	G G G From 1 to < 5 acres G H G H From 0.5 to < 1 acre G I G I From 0.1 to < 0.5 acre
	H H H From 0.5 to < 1 acre
	☐J ☐J From 0.01 to < 0.1 acre
	D D From 25 to < 50 acres E E F F From 10 to < 25 acres F F F F From 5 to < 10 acres G G G From 1 to < 5 acres H H H From 0.5 to < 1 acre I G I F From 0.1 to < 0.5 acre J J J From 0.01 to < 0.1 acre K K K < 0.01 acre or assessment area is clear-cut
	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)
12.	A Pocosin is the full extent (≥90%) of its natural landscape size.
	B Pocosin is < 90% of the full extent (250%) or its natural landscape size.
13.	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(cs) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous
	metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility
	line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.
	Well Loosely
	A A ≥500 acres
	B B From 100 to < 500 acres
	C C From 50 to < 100 acres
	D D From 10 to < 50 acres
	E E < 10 acres F F Wetland type has a poor or no connection to other natural habitats
	13b. Evaluate for marshes only.
	Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes)
	May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include
	non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts.
	Consider the eight main points of the compass.
	A No artificial edge within 150 feet in all directions
	No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
	An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)
	Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate
	species, with exotic plants absent or sparse within the assessment area.
	Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species
	characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or
	clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
	Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-
	characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in
	at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)
	Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).
	C Vegetation is dominated by exotic species (>50% cover of exotics).

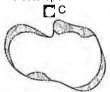
17.				assessment area/wetland type condition metric	
		ls vegetati		If Yes, continue to 17b. If No, skip to Metric 18.	
			25% cove	verage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wef rage of vegetation rage of vegetation	ilands.
				th column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. e assessment area (AA) and the wetland type (WT) separately.	Consider structure
	(© A C B C C	Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent	
		Mid-Story Canopy	A B C	Dense mid-story/sapling layer Moderate density mid-story/sapling layer Mid-story/sapling layer sparse or absent	
	i	A B C	C A C B C C	Dense shrub layer Moderate density shrub layer Shrub layer sparse or absent	
	:	den C	□ A □ B □ C	Dense herb layer Moderate density herb layer Herb layer sparse or absent	
18.	Snag ☐ A ⓒ B			ondition metric re than one) are visible (> 12-inches DBH, or large relative to species present and landscape	e stability).
19.	Diam A		of canop	tion – wetland type condition metric y trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inc	ches DBH) are
	B C			y trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH, y trees are < 6 inches DBH or no trees.	
20.		de both nat	ural debri	vetland type condition metric is and man-placed natural debris. than one) are visible (> 12 inches in diameter, or large relative to species present and lands	cape stability).

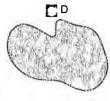
21. Vegetation/Open Water Dispersion - wetland type/open water condition metric (evaluate for Non-Tidal Freshwater

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.









22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive

ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

- Overbank and overland flow are not severely altered in the assessment area.
- Overbank flow is severely altered in the assessment area.
- Overland flow is severely altered in the assessment area.
- A B C D Both overbank and overland flow are severely altered in the assessment area.

Notes

Wetland R is a palustrine forested wetland located adjacent to commercial development and I-40. Wetland R is a basin that drains through stormwater piping under the McFarland Drive commercial development.

Wetland Site Name		Date	7/17/13
Wetland Type	Headwater Forest	Assessor Name/Organization	BP/STV
Notes on Field Assess	sment Form (Y/N)		YES
	y considerations (Y/N)		YES
Vetland is intensively			YES
•	cated within 50 feet of a natural tributary or other	er open water (Y/N)	NO
	ubstantially altered by beaver (Y/N)	or open maior (may	NO
	eriences overbank flooding during normal rainfa	Il conditions (Y/N)	YES
·	n a coastal island (Y/N)		NO
	Ta obabian blana (1711)		
Sub-function Rating	Summary		
unction	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
	Sub-Surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	LOW
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	MEDIUM
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	YES
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
-labitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	MEDIUM
Function Rating Sum	nmany		
unction	Metrics/Notes		Rating
Hydrology	Condition		LOW
Vater Quality	Condition		LOW
	Condition/Opportunity		LOW
	Opportunity Presence?	(Y/N)	YES
Habitat	Conditon		LOW

NC WAM WETLAND ASSESSMENT FORM Accompanies User Manual Version 4.1 **Rating Calculator Version 4.1** Date 7/17/13 Wetland Site Name TTA Wetland S Assessor Name/Organization BP/STV Wetland Type Headw ater Forest Nearest Named Water Body New Hope Creek Level III Ecoregion Piedmont • USGS 8-Digit Catalogue Unit 03030002 River Basin Cape Fear Latitude/Longitude (deci-degrees) 35.946871, -78.999477 No Precipitation within 48 hrs? · Yes Evidence of stressors affecting the assessment area (may not be within the assessment area) Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following. · Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.) Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.) · Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.) Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.) Yes No Is the assessment area intensively managed? Regulatory Considerations (select all that apply to the assessment area) Anadromous fish Federally protected species or State endangered or threatened species NCDWQ riparian buffer rule in effect Abuts a Primary Nursery Area (PNA) Publicly owned property N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout Designated NCNHP reference community Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream What type of natural stream is associated with the wetland, if any? (check all that apply) 9 Brownwater Tidal (if tidal, check one of the following boxes) **Wind Both** C Lunar Is the assessment area on a coastal island? Yes No. Yes Yes No. Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes Does the assessment area experience overbank flooding during normal rainfall conditions? No. Ground Surface Condition/Vegetation Condition – assessment area condition metric Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect. GS VS **™** A Not severely altered Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) Surface and Sub-Surface Storage Capacity and Duration - assessment area condition metric Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable. Surf Sub \Box A Water storage capacity and duration are not altered. Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). **●** B С \Box C Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). Water Storage/Surface Relief - assessment area/wetland type condition metric (answer for non-marsh wetlands only) Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT). AA A B C C A C C Majority of wetland with depressions able to pond water > 1 foot deep

Depressions able to pond water < 3 inches deep T D Evidence that maximum depth of inundation is greater than 2 feet Evidence that maximum depth of inundation is between 1 and 2 feet K. 21-034

Majority of wetland with depressions able to pond water 6 inches to 1 foot deep Majority of wetland with depressions able to pond water 3 to 6 inches deep

		x from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape ke soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for
	regional indi 4a.	
	4b.	Soil ribbon < 1 inch Soil ribbon ≥1 inch
	4c. ፫ A ፫ B	No peat or muck presence A peat or muck presence
5.	Check a bo	Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
6.	Check all the draining to a assessment are consider WS 5M A A A A A A A A A A A A A A A A A A	 B < 10% impervious surfaces C Confined animal operations (or other local, concentrated source of pollutants) D ≥20% coverage of pasture E ≥20% coverage of agricultural land (regularly plowed land) F ≥20% coverage of maintained grass/herb G ≥20% coverage of clear-cut land
7.	7a. Is assed Yes Wetlan Record 7b. How m A B C C C D C E 7c. Tributa ✓ ≤15 7d. Do roo ✓ Yes 7e. Is tribu ✓ She ✓ Expo	ssment area within 50 feet of a tributary or other open water? No If Yes, continue to 7b. If No, skip to Metric 8. d buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. It a note if a portion of the buffer has been removed or disturbed. uch of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. ≥50 feet From 30 to < 50 feet From 15 to < 30 feet From 5 to < 15 feet < 5 feet or buffer bypassed by ditches ry width. If the tributary is anastomosed, combine widths of channels/braids for a total width. -feet wide
8.	Check a bo	From 80 to < 100 feet From 50 to < 80 feet From 40 to < 50 feet From 30 to < 40 feet From 15 to < 30 feet From 5 to < 15 feet

4. Soil Texture/Structure – assessment area condition metric

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. Answer for assessment area dominant landform. But vidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation But vidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. B Sediment deposition is excessive, but not overwhelming the wetland. C Sediment deposition is excessive and is overwhelming the wetland.
	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) CA CA SO0 acres CB B B CB From 100 to < 500 acres CC CC From 50 to < 100 acres CD CD CD From 25 to < 50 acres CE CE CE From 10 to < 25 acres CF FF FF From 5 to < 10 acres CG G G From 1 to < 5 acres CH CH CH FROM 0.5 to < 1 acre CI CI From 0.01 to < 0.5 acre CI CI CI From 0.01 to < 0.1 acre CI CI From 0.01 to < 0.1 acre CI CI CI From 0.01 to < 0.1 acre CI CI From 0.01 to < 0.1 acre CI CI CI From 0.01 to < 0.1 acre CI CI CI From 0.01 to < 0.1 acre
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥90%) of its natural landscape size. □ B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres D D From 10 to < 50 acres E E E < 10 acres F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	 Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

	L L
17.	Vegetative Structure – assessment area/wetland type condition metric
	17a. Is vegetation present? Yes No If Yes, continue to 17b. If No, skip to Metric 18.
	17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands ≥25% coverage of vegetation □ B < 25% coverage of vegetation
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.
	AA WT AA WT AA Canopy closed, or nearly closed, with natural gaps associated with natural processes B B Canopy present, but opened more than natural gaps C C Canopy sparse or absent
	Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent A CA Dense mid-story/sapling layer B CB Moderate density mid-story/sapling layer CC Mid-story/sapling layer sparse or absent
	C C C Shrub layer sparse or absent
	C C Dense herb layer B Moderate density herb layer C C C Herb layer sparse or absent
18.	Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A
19.	Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
	Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.
20.	Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A
21.	Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.
22.	Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. A Overbank and overland flow are not severely altered in the assessment area. Overbank flow is severely altered in the assessment area.

- Overland flow is severely altered in the assessment area. Both overbank <u>and</u> overland flow are severely altered in the assessment area.

Notes

Wetland S is a palustrine forested wetland located west of North White Oak Drive and provides the headwaters for Stream R.

Wetland Site Name	TTA Wetland S	Date	7/17/13	
Wetland Type	Headwater Forest	Assessor Name/Organization	BP/STV	
Notes on Field Assessm	ont Form (V/N)		YES	
			YES	
Presence of regulatory c	,		-	
Wetland is intensively ma		0.48 D	NO	
	ted within 50 feet of a natural tributary or other	er open water (Y/N)	YES	
	stantially altered by beaver (Y/N)	W 0700	NO	
·	ences overbank flooding during normal rainfa	III conditions (Y/N)	YES	
Assessment area is on a	coastal Island (Y/N)		NO	
Sub-function Rating Su	ummary			
Function	Sub-function	Metrics	Rating	
Hydrology	Surface Storage and Retention	Condition	MEDIUM	
	Sub-Surface Storage and Retention	Condition	MEDIUM	
Water Quality	Pathogen Change	Condition	HIGH	
		Condition/Opportunity	HIGH	
		Opportunity Presence? (Y/N)	YES	
	Particulate Change	Condition	HIGH	
		Condition/Opportunity	NA	
		Opportunity Presence? (Y/N)	NA	
	Soluble Change	Condition	HIGH	
	· ·	Condition/Opportunity	HIGH	
		Opportunity Presence? (Y/N)	YES	
	Physical Change	Condition	HIGH	
		Condition/Opportunity	HIGH	
		Opportunity Presence? (Y/N)	YES	
	Pollution Change	Condition	NA	
	C	Condition/Opportunity	NA	
		Opportunity Presence? (Y/N)	NA	
	Physical Structure	Condition	HIGH	
	Landscape Patch Structure	Condition	LOW	
	Vegetation Composition	Condition	HIGH	
Function Rating Summ	an/			
unction Rating Summ	Metrics/Notes		Rating	
Hydrology	Condition		MEDIUM	
Vater Quality	Condition		HIGH	
•	Condition/Opportunity		HIGH	
	Opportunity Presence?	(Y/N)	YES	
Habitat	Conditon		HIGH	

	R	Rating Calculato	r Version 4.1	
Wetland Site Name	TTA Wetland T			Date 7/17/13
Wetland Type	Headw ater Forest	_	Assessor Name/Orga	nization BP/STV
Level III Ecoregion	Piedmont	<u>*</u>	Nearest Named Wa	ter Body New Hope Creek
River Basin	Cape Fear	•	USGS 8-Digit Catalo	gue Unit 03030002
Yes N	o Precipitation within 48 hrs?		Latitude/Longitude (deci-	degrees) 35.947070, -78.998468
Please circle and/or m appropriate, in recent p to the following. • Hydrological m • Surface and su septic tanks, ur • Signs of vegeta	s affecting the assessment area (nake note on last page if evidence of past (for instance, approximately with odifications (examples: ditches, dample of the wetlander of the discharge tanks (USTs), however, at on stress (examples: vegetation mommunity alteration (examples: mow	stressors is appa nin 10 years). No ns, beaver dams id (examples: dis og lagoons, etc.) nortality, insect di	arent. Consider departure fronteworthy stressors include, but dikes, berms, ponds, etc.) charges containing obvious parmage, disease, storm dama	out are not limited collutants, presence of nearby
Is the assessment ar	ea intensively managed? [7]	Yes 🂽 No		
Anadromous fis Federally prote Positive NCDWQ riparia Abuts a Primar Publicly owned N.C. Division o Abuts a stream Designated NC Abuts a 303(d)	cted species or State endangered or an buffer rule in effect y Nursery Area (PNA) property f Coastal Management Area of Envir with a NCDWQ classification of SA NHP reference community -listed stream or a tributary to a 303(r threatened spec ronmental Conce or supplemental (d)-listed stream	rn (AEC) (including buffer) classifications of HQW, OR\	V, or Trout
	stream is associated with the wetl	land, if any? (ch	eck all that apply)	
Blackwater Brownwater Tidal (if tidal, cl				
Tidal (if tidal, ch	neck one of the following boxes)	Lunar	Wind Both	
Is the assessment are	ea on a coastal island?	Yes 💽 No		
Is the assessment are	ea's surface water storage capacit	ty or duration su	ıbstantially altered by beav	er? Tyes No
Does the assessmen	t area experience overbank floodir	ng during norm	al rainfall conditions?	Yes No
Check a box in e (VS) in the assess then rate the asse GS VS A A N B B B S al	Condition/Vegetation Condition – each column. Consider alteration to sment area. Compare to reference we essment area based on evidence of a cot severely altered everely altered over a majority of the edimentation, fire-plow lanes, skidder teration examples: mechanical distuss diversity [if appropriate], hydrological	the ground surfa wetland if applica an effect. assessment are r tracks, bedding urbance, herbicid	ce (GS) in the assessment a ble (see User Manual). If a r a (ground surface alteration fill, soil compaction, obvious	eference is not applicable, examples: vehicle tracks, excessive s pollutants) (vegetation structure
Check a box in eduration (Sub). Control (Sub). Control (Sub). Control (Sub). Sub-surface water Surf Sub Control (Sub). Contro	e-Surface Storage Capacity and Durach column. Consider surface storage capacity and decrease dric soils (see USACE Wilmington Donsidered to affect surface water only considered to affect surface water only considered to affect surface water only dater storage capacity and duration are vater storage capacity or duration are vater storage capacity or duration are mange) (examples: draining, flooding,	rage capacity and a in hydrology. Redistrict website) for y, while a ditch applicable. are not altered. a altered, but not a substantially altered and a substantially altered.	I duration (Surf) and sub-surf efer to the current NRCS late or the zone of influence of dite of the thick of	ace storage capacity and eral effect of ditching guidance for ches in hydric soils. A ditch affect both surface and ditch surface and the ditch afficient to change vegetation).
	urface Relief – assessment area/w ach column for each group below			
3a. DA DA DB DB DC DC	Majority of wetland with depression Majority of wetland with depression	ions able to pond ions able to pond	water 6 inches to 1 foot dee	р
L 4	ence that maximum depth of inundat ence that maximum depth of inundat	_		

,	4.	Soil Texture/Structure – assessment area condition metric Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for
		regional indicators.
		 4a. Sandy soil Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) Loamy or clayey soils not exhibiting redoximorphic features Loamy or clayey gleyed soil Histosol or histic epipedon
		4b. CA Soil ribbon < 1 inch
		B Soil ribbon ≥1 inch
		4c. A No peat or muck presence B A peat or muck presence
	5.	Discharge into Wetland – opportunity metric Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub A Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and
		potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
	6.	Land Use – opportunity metric Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers
		are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. WS 5M 2M VA VA VA ≥ 10% impervious surfaces B B B S < 10% impervious surfaces C C C C C C Confined animal operations (or other local, concentrated source of pollutants) D D D D ≥ 20% coverage of pasture E F E E ≥ 20% coverage of agricultural land (regularly plowed land) F F F F F ≥ 20% coverage of maintained grass/herb G G G G ≥ 20% coverage of clear-cut land H H H H H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
	7.	 Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water?
	8.	Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries. WT WC A ≥ 100 feet B From 80 to < 100 feet C F From 50 to < 80 feet D D From 40 to < 50 feet E F From 30 to < 40 feet F F From 15 to < 30 feet G G From 5 to < 15 feet H H H < 5 feet

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. A Evidence of short-duration inundation (< 7 consecutive days) E Urdence of saturation, without evidence of inundation E Vidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). CA Sediment deposition is not excessive, but at approximately natural levels. CB Sediment deposition is excessive, but not overwhelming the wetland. CC Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) A A A ≥500 acres
	B
	H CH CH From 0.5 to < 1 acre I CI From 0.1 to < 0.5 acre J CJ From 0.01 to < 0.1 acre K K K < 0.01 acre or assessment area is clear-cut
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) A Pocosin is the full extent (≥90%) of its natural landscape size. Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres C D D From 10 to < 50 acres C E E E < 10 acres C F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	 Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

	L L		
17.	Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present?		
	Yes No If Yes, continue to 17b. If No, skip to Metric 18.		
	17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ☐ A ≥25% coverage of vegetation ☐ B < 25% coverage of vegetation		
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT		
	A Canopy closed, or nearly closed, with natural gaps associated with natural processes B B Canopy present, but opened more than natural gaps C C Canopy sparse or absent		
	C C Mid-story/sapling layer sparse or absent		
	C C Shrub layer sparse or absent		
	☐ A ☐ Dense herb layer ☐ B ☐ B Moderate density herb layer ☐ C ☐ C Herb layer sparse or absent		
18.	Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A		
19.	Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.		
	Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.		
20.	Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). B Not A		
21.	Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned		
	areas indicate vegetated areas, while solid white areas indicate open water. CA CD CD CD CD CD CD CD CD CD		
22.	Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.		

- A Overbank and overland flow are not severely altered in the assessment area.
- B Overbank flow is severely altered in the assessment area.
- C Overland flow is severely altered in the assessment area.
- Both overbank and overland flow are severely altered in the assessment area.

Notes

Wetland T is a palustrine scrub-shrub wetland located adjacent to Stream R. Wetland T has been created in a highly disturbed area that was previoulsy forested.

Wetland Site Name_	TTA Wetland T	Date	7/17/13	
Wetland Type	Headwater Forest	Assessor Name/Organization	BP/STV	
lates as Field Assess	mant Form (V/N)		YES	
Notes on Field Assessr				
Presence of regulatory	` '		YES	
Wetland is intensively r		4 0/01	NO YES	
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N)				
	bstantially altered by beaver (Y/N)		NO	
·	riences overbank flooding during normal rainfa	ll conditions (Y/N)	YES	
Assessment area is on	a coastal island (Y/N)		NO	
Sub-function Rating S	Summary			
unction	Sub-function	Metrics	Rating	
Hydrology	Surface Storage and Retention	Condition	LOW	
	Sub-Surface Storage and Retention	Condition	MEDIUM	
Vater Quality	Pathogen Change	Condition	HIGH	
		Condition/Opportunity	HIGH	
		Opportunity Presence? (Y/N)	YES	
	Particulate Change	Condition	LOW	
	·	Condition/Opportunity	NA	
		Opportunity Presence? (Y/N)	- NA	
	Soluble Change	Condition	HIGH	
	20.200 2	Condition/Opportunity	HIGH	
		Opportunity Presence? (Y/N)	YES	
	Physical Change	Condition	HIGH	
	Trysical Stiange	Condition/Opportunity	HIGH	
		Opportunity Presence? (Y/N)	YES	
	Pollution Change	Condition	NA NA	
	1 Gliddon Ghange	Condition/Opportunity	NA NA	
		Opportunity Presence? (Y/N)	NA NA	
	Physical Structure	Condition	LOW	
labitat	Landscape Patch Structure	Condition	LOW	
	Vegetation Composition	Condition	MEDIUM	
		Constant		
unction Rating Sumi function	Metrics/Notes		Rating	
lydrology	Condition		LOW	
Vater Quality	Condition		HIGH	
	Condition/Opportunity		HIGH	
	Opportunity Presence?	(Y/N)	YES	
labitat	Conditon		LOW	

		The state of the s	r version 4.1	
V	Wetland Site Nam	ne TTA Wetland TTT	Dat	te 12/11/13
	Wetland Typ	Bottomland Hardw ood Forest	Assessor Name/Organizatio	n BP/STV
ı	Level III Ecoregio	n Piedmont 🔻	Nearest Named Water Boo	ly Sandy Creek
	River Bas	in Cape Fear 🔻	USGS 8-Digit Catalogue Un	it 03030002
	🖸 Yes 🔲	No Precipitation within 48 hrs?	- Latitude/Longitude (deci-degree:	s) 35.982194, -78.956699
Ple app	ease circle and/or propriate, in recent the following. • Hydrological • Surface and septic tanks, • Signs of vege	ors affecting the assessment area (may not be within make note on last page if evidence of stressors is appoint past (for instance, approximately within 10 years). Not modifications (examples: ditches, dams, beaver dams, sub-surface discharges into the wetland (examples: distunderground storage tanks (USTs), hog lagoons, etc.) etation stress (examples: vegetation mortality, insect discommunity alteration (examples: mowing, clear-cutting)	arent. Consider departure from refer bteworthy stressors include, but are r dikes, berms, ponds, etc.) charges containing obvious pollutan amage, disease, storm damage, salt	not limited
ls t	the assessment a	area intensively managed? Tyes No		
Wh	Anadromous Federally pro NCDWQ ripa Abuts a Prim: Publicly owne N.C. Division Abuts a strea Designated N Abuts a 303(a nat type of natura Blackwater Brownwater Tidal (if tidal,	tected species or State endangered or threatened specinal buffer rule in effect ary Nursery Area (PNA) and property of Coastal Management Area of Environmental Conce im with a NCDWQ classification of SA or supplemental ICNHP reference community d)-listed stream or a tributary to a 303(d)-listed stream all stream is associated with the wetland, if any? (checked one of the following boxes) Lunar Larea on a coastal island?	rn (AEC) (including buffer) classifications of HQW, ORW, or Tr eck all that apply) Wind Both	
ls t	the assessment a	area's surface water storage capacity or duration su	ibstantially altered by beaver?	Yes No
Do	es the assessme	ent area experience overbank flooding during norma	al rainfall conditions?	Yes No
1.	Check a box in (VS) in the assethen rate the ass GS VS A A A B B B	e Condition/Vegetation Condition – assessment are each column. Consider alteration to the ground surfa assement area. Compare to reference wetland if applicated sessment area based on evidence of an effect. Not severely altered Severely altered over a majority of the assessment are sedimentation, fire-plow lanes, skidder tracks, bedding alteration examples: mechanical disturbance, herbicid less diversity [if appropriate], hydrologic alteration)	ce (GS) in the assessment area and ble (see User Manual). If a reference a (ground surface alteration example, fill, soil compaction, obvious polluta	e is not applicable, es: vehicle tracks, excessive ants) (vegetation structure
2.	Check a box in duration (Sub). North Carolina h ≤ 1 foot deep is sub-surface wat Surf Sub A A A B B B B B C C C C	ab-Surface Storage Capacity and Duration – assessing each column. Consider surface storage capacity and Consider both increase and decrease in hydrology. Resydric soils (see USACE Wilmington District website) for considered to affect surface water only, while a ditch seer. Consider tidal flooding regime, if applicable. Water storage capacity and duration are not altered. Water storage capacity or duration are altered, but not Water storage capacity or duration are substantially altochange) (examples: draining, flooding, soil compaction)	duration (Surf) and sub-surface storefer to the current NRCS lateral effer the zone of influence of ditches in 1 foot deep is expected to affect be substantially (typically, not sufficient to typically, alteration sufficient to	ct of ditching guidance for hydric soils. A ditch oth surface and ditch to change vegetation).
3.	Check a box in type (WT). AA W 3a. AB CC DD 3b. AB EV	 A Majority of wetland with depressions able to pond B Majority of wetland with depressions able to pond C Majority of wetland with depressions able to pond 	water > 1 foot deep water 6 inches to 1 foot deep water 3 to 6 inches deep an 2 feet	

4.	Check a box feature. Mak regional indic 4a. A B C C	Structure – assessment area condition metric from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape e soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for ators. Sandy soil Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) Loamy or clayey soils not exhibiting redoximorphic features Loamy or clayey gleyed soil Histosol or histic epipedon
	ВВ	Soil ribbon < 1 inch Soil ribbon ≥ 1 inch No peat or muck presence
		A peat or muck presence
5.	Check a box	to Wetland – opportunity metric in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Little or no evidence of pollutants or discharges entering the assessment area
	B BB	Noticeable evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
	□c □c	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Check all the draining to as assessment a are considere WS 5M A A B B	 □ E ≥ 20% coverage of agricultural land (regularly plowed land) □ F ≥ 20% coverage of maintained grass/herb □ G ≥ 20% coverage of clear-cut land
7.	7a. Is asses Wetland Record: 7b. How mu A B C D D E 7c. Tributan Yes 7d. Do roots Yes 7e. Is tributa Expos	ary or other open water sheltered or exposed? ered – adjacent open water with width < 2500 feet <u>and</u> no regular boat traffic. sed – adjacent open water with width ≥ 2500 feet <u>or</u> regular boat traffic.
8.	Check a box	th at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) in each column. Select the average width for the wetland type at the assessment area (WT) nd complex at the assessment areas (WC). See User Manual for WT and WC boundaries. ≥ 100 feet From 80 to < 100 feet From 50 to < 80 feet From 40 to < 50 feet From 30 to < 40 feet From 15 to < 30 feet From 5 to < 15 feet < 5 feet

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. Evidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. Sediment deposition is excessive, but not overwhelming the wetland. Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) A A ≥ 500 acres B B B From 100 to < 500 acres C C C From 50 to < 100 acres C C C From 50 to < 100 acres C C C From 50 to < 10 acres C C C From 10 to < 25 acres C C C From 10 to < 5 acres C C C C From 5 to < 10 acres C C C C From 0.5 to < 1 acre C C C C From 0.1 to < 0.5 acre C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C C From 0.1 to < 0.5 acres C C C C C C C C C C C C C C C C C C C
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) A Pocosin is the full extent (≥ 90%) of its natural landscape size. B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥ 500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres C C From 50 to < 100 acres C C From 10 to < 50 acres F S Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) ☑A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. ☑B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. ☑C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

17.	Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present? No If Yes, continue to 17b. If No, skip to Metric 18.
	17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. □ A ≥ 25% coverage of vegetation □ B < 25% coverage of vegetation
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT
	Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent Canopy sparse or absent Dense mid-story/sapling layer Moderate density mid-story/sapling layer Mid-story/sapling layer sparse or absent
	G A Dense shrub layer B B Moderate density shrub layer C C Shrub layer sparse or absent
	A Dense herb layer B B Moderate density herb layer C C Herb layer sparse or absent
18.	Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A
19.	Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present. B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. C Majority of canopy trees are < 6 inches DBH or no trees.
20.	Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A
21.	Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. CA CB CC CD DO DO DO DO DO DO DO DO
22.	Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Overbank and overland flow are not severely altered in the assessment area. Overbank flow is severely altered in the assessment area. Overland flow is severely altered in the assessment area. Both overbank and overland flow are severely altered in the assessment area.
	es tland TTT is a palustrine forested wetland abutting both sides of Stream GG. Wetland TTT is drained by Stream GG, which drains to Stream J ndy Creek).

Wetland Site Name	TTA Wetland TTT	Date	12/11/13	
Wetland Type _	Bottomland Hardwood Forest	Assessor Name/Organization	BP/STV	
			\/F0	
Notes on Field Assessn			YES YES	
Presence of regulatory considerations (Y/N) Wetland is intensively managed (Y/N)				
	estantially altered by beaver (Y/N)	W. W. 070 N	NO NO	
•	riences overbank flooding during normal rainfa	Il conditions (Y/N)	NO NO	
Assessment area is on	a coastal island (Y/N)		NO	
Sub-function Rating S	summary			
Function	Sub-function	Metrics	Rating	
Hydrology	Surface Storage and Retention	Condition	HIGH	
	Sub-Surface Storage and Retention	Condition	MEDIUM	
Water Quality	Pathogen Change	Condition	HIGH	
		Condition/Opportunity	HIGH	
		Opportunity Presence? (Y/N)	YES	
	Particulate Change	Condition	HIGH	
		Condition/Opportunity	HIGH	
		Opportunity Presence? (Y/N)	YES	
	Soluble Change	Condition	HIGH	
		Condition/Opportunity	HIGH	
		Opportunity Presence? (Y/N)	YES	
	Physical Change	Condition	HIGH	
		Condition/Opportunity	HIGH	
		Opportunity Presence? (Y/N)	YES	
	Pollution Change	Condition	NA	
		Condition/Opportunity	NA	
		Opportunity Presence? (Y/N)	NA	
Habitat	Physical Structure	Condition	LOW	
	Landscape Patch Structure	Condition	LOW	
	Vegetation Composition	Condition	HIGH	
Function Rating Sumr	narv			
Function	Metrics/Notes		Rating	
Hydrology	Condition		HIGH	
Water Quality	Condition		HIGH	
	Condition/Opportunity		HIGH	
	Opportunity Presence?	(Y/N)	YES	
Habitat	Conditon		LOW	

	Rating Galcalator	VOI OIOII TIT	
Wetland Site Name	TTA Wetland U	Date	7/18/13
Wetland Type	Basin Wetland	Assessor Name/Organization	BP/STV
Level III Ecoregion	Piedmont	Nearest Named Water Body	New Hope Creek
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030002
[☐Yes ☐Ne	o Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.959323, -78.979621
Please circle and/or mappropriate, in recent pto the following. • Hydrological me • Surface and su septic tanks, ur • Signs of vegeta	s affecting the assessment area (may not be within ake note on last page if evidence of stressors is appa past (for instance, approximately within 10 years). Not odifications (examples: ditches, dams, beaver dams, ab-surface discharges into the wetland (examples: dischargeround storage tanks (USTs), hog lagoons, etc.) ation stress (examples: vegetation mortality, insect datummunity alteration (examples: mowing, clear-cutting)	rent. Consider departure from refere teworthy stressors include, but are not dikes, berms, ponds, etc.) charges containing obvious pollutants amage, disease, storm damage, salt is	ot limited
Is the assessment are	ea intensively managed? Tyes No		
Anadromous fis Federally prote NCDWQ riparia Abuts a Priman Publicly owned N.C. Division of Abuts a stream Designated NC Abuts a 303(d) What type of natural s Blackwater Brownwater	cted species or State endangered or threatened speci an buffer rule in effect y Nursery Area (PNA) property f Coastal Management Area of Environmental Concer with a NCDWQ classification of SA or supplemental of NHP reference community -listed stream or a tributary to a 303(d)-listed stream stream is associated with the wetland, if any? (che	ies (AEC) (including buffer) classifications of HQW, ORW, or Tro ck all that apply)	ut
Tidal (if tidal, ch	heck one of the following boxes)	Wind Both	
Is the assessment are	ea on a coastal island?		
Is the assessment are	ea's surface water storage capacity or duration su	bstantially altered by beaver?	Yes No
Does the assessment	t area experience overbank flooding during norma	I rainfall conditions?	Yes No
Check a box in e (VS) in the assess then rate the asse GS VS A A A B B B Se al	Condition/Vegetation Condition – assessment area ach column. Consider alteration to the ground surfact sment area. Compare to reference wetland if applicables applicables area based on evidence of an effect. ot severely altered everely altered over a majority of the assessment area edimentation, fire-plow lanes, skidder tracks, bedding, iteration examples: mechanical disturbance, herbicide ass diversity [if appropriate], hydrologic alteration)	ce (GS) in the assessment area and ole (see User Manual). If a reference a (ground surface alteration examples fill, soil compaction, obvious pollutar	is not applicable, s: vehicle tracks, excessive nts) (vegetation structure
Check a box in e duration (Sub). C North Carolina hyd ≤ 1 foot deep is co sub-surface water Surf Sub A A W B B B W C C C W	r-Surface Storage Capacity and Duration – assessmach column. Consider surface storage capacity and Consider both increase and decrease in hydrology. Reduce soils (see USACE Wilmington District website) for considered to affect surface water only, while a ditch on sidered to affect surface water only, while a ditch or. Consider tidal flooding regime, if applicable. Vater storage capacity and duration are not altered. Vater storage capacity or duration are altered, but not solvater storage capacity or duration are substantially alternange) (examples: draining, flooding, soil compaction,	duration (Surf) and sub-surface stora efer to the current NRCS lateral effect r the zone of influence of ditches in h 1 foot deep is expected to affect both substantially (typically, not sufficient to ered (typically, alteration sufficient to	t of ditching guidance for ydric soils. A ditch n surface and ditch o change vegetation).
Check a box in e type (WT). AA WT 3a. A A B C C C C C C S 3b. A Evid B E B B	Majority of wetland with depressions able to pond Majority of wetland with depressions able to pond	water > 1 foot deep water 6 inches to 1 foot deep water 3 to 6 inches deep n 2 feet and 2 feet	

4.	Soil Texture/Structure – assessment area condition metric Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators. 4a. A Sandy soil B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) C Loamy or clayey soils not exhibiting redoximorphic features D Loamy or clayey gleyed soil Histosol or histic epipedon
	 4b.
5.	Discharge into Wetland – opportunity metric Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub A Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Land Use – opportunity metric Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. WS 5M 2M A A A A A S 10% impervious surfaces B B B A 10% impervious surfaces C C C Confined animal operations (or other local, concentrated source of pollutants) D D D D D 20% coverage of pasture E B B B A 20% coverage of agricultural land (regularly plowed land) F F F F A 20% coverage of maintained grass/herb G G G G G ≥ 20% coverage of clear-cut land H H H H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.	 Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water? Yes No If Yes, continue to 7b. If No, skip to Metric 8. Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed. 7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. A ≥ 50 feet B From 30 to < 50 feet C From 15 to < 30 feet C From 5 to < 15 feet E < 5 feet or buffer bypassed by ditches 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width. Solve 15-feet wide S > 15-feet wide
8.	Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries. WT WC A A ≥ 100 feet B B From 80 to < 100 feet C C From 50 to < 80 feet D D From 40 to < 50 feet E F From 30 to < 40 feet F F From 15 to < 30 feet G G From 5 to < 15 feet H C H < 5 feet

9.	Inundation Duration – assessment area condition metric
	Answer for assessment area dominant landform.
	A Evidence of short-duration inundation (< 7 consecutive days)
	Evidence of saturation, without evidence of inundation
	Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric
	Consider recent deposition only (no plant growth since deposition).
	Sediment deposition is not excessive, but at approximately natural levels.
	Sediment deposition is excessive, but not overwhelming the wetland.
	Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric
	Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the
	size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User
	Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable)
	WT WC FW (if applicable) □A □A □A ≥ 500 acres
	B B B From 100 to < 500 acres
	C C C From 50 to < 100 acres D D D From 25 to < 50 acres E E F From 10 to < 25 acres F F F From 5 to < 10 acres
	D D From 25 to < 50 acres
	D D From 25 to < 50 acres E E E From 10 to < 25 acres F F F From 5 to < 10 acres
	B
	H CH From 0.5 to < 1 acre
	[]
	K K < 0.01 acre or assessment area is clear-cut
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥ 90%) of its natural landscape size.
	A Pocosin is the full extent (≥ 90%) of its natural landscape size. B Pocosin is < 90% of the full extent of its natural landscape size.
13.	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This
	evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous
	metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility
	line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.
	Well Loosely
	CA CA ≥ 500 acres
	○ B
	C C From 50 to < 100 acres
	D D From 10 to < 50 acres TE TE < 10 acres
	F Wetland type has a poor or no connection to other natural habitats
	13b. Evaluate for marshes only.
	Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include
	non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts.
	Consider the eight main points of the compass.
	A No artificial edge within 150 feet in all directions
	B No artificial edge within 150 feet in four (4) to seven (7) directions C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)
	A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate
	species, with exotic plants absent or sparse within the assessment area.
	Yegetation is different from reference condition in species diversity or proportions, but still largely composed of native species
	characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or
	clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
	Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-
	characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)
	Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics.
	C Vegetation is dominated by exotic species (>50% cover of exotics).
	End a serial to destinate any exercise of the serial of th

17. Vegetative Structure – assessment area/wetland type condition metric
17a. Is vegetation present? Yes No If Yes, continue to 17b. If No, skip to Metric 18.
17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. □ A ≥ 25% coverage of vegetation □ B < 25% coverage of vegetation
17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT
Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent
G G G C Shrub layer sparse or absent
CA CA Dense herb layer B CB Moderate density herb layer CC CC Herb layer sparse or absent
 18. Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). B Not A
19. Diameter Class Distribution – wetland type condition metric Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.
 20. Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). B Not A
21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)
Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.
EA EB EC ED
22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive
ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. A Overbank and overland flow are not severely altered in the assessment area.
B Overbank flow is severely altered in the assessment area. C Overland flow is severely altered in the assessment area.
Both overbank and overland flow are severely altered in the assessment area.
Notes Wetland U is a palustrine forested wetland located adjacent to the New Hope Creek floodplain. Wetland U is a basin wetland located adjacent to Stream S.

Wetland Site Name	TTA Wetland U	Date	7/18/13	
Wetland Type	Basin Wetland	Assessor Name/Organization	BP/STV	
Natas an Field Assess			VEC	
Notes on Field Assess			YES YES	
Presence of regulatory considerations (Y/N) Wetland is intensively managed (Y/N)				
-	eriences overbank flooding during normal rainfa	all conditions (Y/N)	NO	
Assessment area is or	n a coastal island (Y/N)		NO	
Sub-function Rating	Summary			
unction	Sub-function	Metrics	Rating	
Hydrology	Surface Storage and Retention	Condition	NA	
	Sub-Surface Storage and Retention	Condition	NA	
Nater Quality	Pathogen Change	Condition	NA	
		Condition/Opportunity	NA	
		Opportunity Presence? (Y/N)	NA	
	Particulate Change	Condition	NA	
	-	Condition/Opportunity	NA	
		Opportunity Presence? (Y/N)	NA	
	Soluble Change	Condition	NA	
	Service Service Grand	Condition/Opportunity	NA	
		Opportunity Presence? (Y/N)	NA	
	Physical Change	Condition	NA	
	1 Hydiodi Chango	Condition/Opportunity	NA NA	
		Opportunity Presence? (Y/N)	NA NA	
	Pollution Change	Condition	MEDIUM	
	1 ollulon change	Condition/Opportunity	MEDIUM	
		Opportunity Presence? (Y/N)	YES	
	Physical Structure	Condition	LOW	
labitat	Landscape Patch Structure	Condition	LOW	
	Vegetation Composition	Condition	MEDIUM	
Function Rating Sum Function	nmary Metrics/Notes		Rating	
Hydrology	Condition		HIGH	
Vater Quality	Condition		MEDIUM	
Quality	Condition/Opportunity			
	Opportunity Presence?	(Y/N)	MEDIUM YES	
Habitat	Conditon		LOW	

	Rating Calcul	ator Version 4.1
Wetland Site Name	TTA Wetland UUU	Date 1/21/14
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization BP -STV
Level III Ecoregion	Piedmont	Nearest Named Water Body Sandy Creek
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit 03030002
Yes N	o Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) 35.954829, -78.974272
Please circle and/or m appropriate, in recent p to the following. • Hydrological m • Surface and su septic tanks, ur • Signs of vegeta	nderground storage tanks (USTs), hog lagoons, et	pparent. Consider departure from reference, if Noteworthy stressors include, but are not limited ms, dikes, berms, ponds, etc.) discharges containing obvious pollutants, presence of nearby c.) et damage, disease, storm damage, salt intrusion, etc.)
Is the assessment are	ea intensively managed? Tyes No	
Anadromous fis Federally prote Very NCDWQ riparia Abuts a Primar Publicly owned N.C. Division of Abuts a stream Designated NC Abuts a 303(d) What type of natural Blackwater Brownwater Tidal (if tidal, ch Is the assessment and Is the assessmen	cted species or State endangered or threatened san buffer rule in effect y Nursery Area (PNA) property f Coastal Management Area of Environmental Corwith a NCDWQ classification of SA or supplemental NHP reference community disted stream or a tributary to a 303(d)-listed streatstream is associated with the wetland, if any? The end on a coastal island? The end of the following boxes The end of the following box	ncern (AEC) (including buffer) Intal classifications of HQW, ORW, or Trout Im Interpolation (check all that apply) Wind Both Insubstantially altered by beaver? Yes No
Check a box in eduration (Sub). Control Carolina hydes 1 foot deep is consub-surface water Surf Sub Control C	Consider both increase and decrease in hydrology, dric soils (see USACE Wilmington District website onsidered to affect surface water only, while a ditc. Consider tidal flooding regime, if applicable. Vater storage capacity and duration are not altered vater storage capacity or duration are altered, but vater storage capacity or duration are substantially	and duration (Surf) and sub-surface storage capacity and Refer to the current NRCS lateral effect of ditching guidance for for the zone of influence of ditches in hydric soils. A ditch Solution > 1 foot deep is expected to affect both surface and ditch
Check a box in e type (WT). AA WT 3a. A A B B C B C C C C C C C C C C C C C C C	ach column for each group below. Select the a Majority of wetland with depressions able to po Majority of wetland with depressions able to po	ond water 6 inches to 1 foot deep and water 3 to 6 inches deep ep than 2 feet

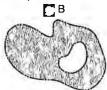
4.	Check a b	ox from each	 assessment area condition metric of the three soil property groups below. Dig soil profile in the dominant assessment area landscape ervations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for
	regional in		Tyddons within the 12 monos. God theet recent rational resulting committee of the garages as
	4a. 🌅 A	Sandy soil	
	© B C C C D	Loamy or o	clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) clayey soils not exhibiting redoximorphic features clayey gleyed soil
	ĦĔ		histic epipedon
	4b.	Soil ribbon Soil ribbon	
	4c. 💽 A	No peat or	muck presence
	ГВ	A peat or n	nuck presence
5.	Check a b Examples	oox in each co	 d – opportunity metric olumn. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). e discharges include presence of nearby septic tank, underground storage tank (UST), etc.
	Surf Su		no evidence of pollutants or discharges entering the assessment area
	EA E	B Noticeal	ble evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the nt capacity of the assessment area
	Ec E	C Noticeal potentia	ble evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and ally overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive antation, odor)
6.	Check all draining to assessme	assessment nt area (5M), ered to be 50	t least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.
	VVS 5N		≥10% impervious surfaces
	LB L		< 10% impervious surfaces
		•	Confined animal operations (or other local, concentrated source of pollutants)
			≥20% coverage of pasture ≥20% coverage of agricultural land (regularly plowed land)
	F F		≥20% coverage of maintained grass/herb
	FG F	G F G	≥20% coverage of clear-cut land
	Гн Г		Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.	Wetland A		getated Buffer – assessment area/wetland complex condition metric
•	7a. Is as	sessment are	a within 50 feet of a tributary or other open water?
	₹ Ye	es []No	If Yes, continue to 7b. If No, skip to Metric 8. ed only be present on one side of the water body. Make buffer judgment based on the average width of the wetland.
			portion of the buffer has been removed or disturbed.
	7b. How	much of the fi	irst 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
	⊡ A	≥50 feet	-506
	B	From 30 to From 15 to	
	C C	From 5 to	
	E 🔚 E	< 5 feet <u>or</u>	buffer bypassed by ditches
	7c. Tribu	itary width. If	the tributary is anastomosed, combine widths of channels/braids for a total width.
		es 🌅 No	which area regulation extend the balls of the blastary, open water.
	7e. İs trib	outary or other neltered – adja	r open water sheltered or exposed? acent open water with width < 2500 feet <u>and</u> no regular boat traffic. cent open water with width ≥2500 feet <u>or</u> regular boat traffic.
۰			Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)
8.			olumn. Select the average width for the wetland type at the assessment area (WT)
		•	ex at the assessment areas (WC). See User Manual for WT and WC boundaries.
	WT W		
			eet O to < 100 feet
		C From 50	0 to < 80 feet
		D From 40	0 to < 50 feet
		E From 30	0 to < 40 feet
	CF C		5 to < 30 feet to < 15 feet
	E H		

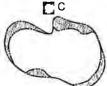
9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. Answer for assessment area dominant landform. Below Evidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. B Sediment deposition is excessive, but not overwhelming the wetland. C Sediment deposition is excessive and is overwhelming the wetland.
	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) CA CA SO0 acres B B B From 100 to < 500 acres CC CC CC From 50 to < 100 acres CD CD CD From 25 to < 50 acres CE CE From 10 to < 25 acres CF CF FF From 5 to < 10 acres CG CG CG From 0.01 to < 5 acres CH CH CH From 0.5 to < 1 acre CJ CJ CJ From 0.01 to < 0.1 acre CJ CJ CJ From 0.01 to < 0.1 acre CJ CJ CJ CS From 0.01 to < 0.1 acre CJ CJ CJ CS From 0.01 to < 0.1 acre CJ CJ CJ CS From 0.01 to < 0.1 acre CJ CJ CJ CS From 0.01 to < 0.1 acre
	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥90%) of its natural landscape size. □ B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres C D D From 10 to < 50 acres E E E < 10 acres F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
	 Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

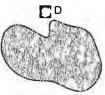
	ជ
17.	Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present?
	Yes No If Yes, continue to 17b. If No, skip to Metric 18.
	17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ☐ A ≥25% coverage of vegetation ☐ B <25% coverage of vegetation
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT
	CA Canopy closed, or nearly closed, with natural gaps associated with natural processes B Canopy present, but opened more than natural gaps C C C Canopy sparse or absent
	C C Mid-story/sapling layer sparse or absent
	C B C Shrub layer C C Shrub layer sparse or absent
	A Dense herb layer B B Moderate density herb layer C C C Herb layer sparse or absent
18.	Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A
19.	Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
	B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.
20.	Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A
21.	Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

21.









22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

Overbank and overland flow are not severely altered in the assessment area.

Overbank flow is severely altered in the assessment area.

Overland flow is severely altered in the assessment area.

Both overbank and overland flow are severely altered in the assessment area.

Notes

Wetland UUU is a palustrine forested wetland located in the Sandy Creek floodplain.

Wetland Site Name	TTA Wetland UUU	Date	1/21/14	
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP -STV	
John on Field Assesses	and Farm (M/N)		YES	
Notes on Field Assessm			YES	
Presence of regulatory considerations (Y/N)				
Vetland is intensively ma			NO NO	
	ted within 50 feet of a natural tributary or othe	er open water (Y/N)	YES	
	stantially altered by beaver (Y/N)		NO NO	
	ences overbank flooding during normal rainfa	Il conditions (Y/N)	YES	
Assessment area is on a	coastal island (Y/N)		NO	
Sub-function Rating Su	ımmary			
unction	Sub-function	Metrics	Rating	
lydrology	Surface Storage and Retention	Condition	HIGH	
	Sub-Surface Storage and Retention	Condition	LOW	
Vater Quality	Pathogen Change	Condition	HIGH	
		Condition/Opportunity	HIGH	
		Opportunity Presence? (Y/N)	YES	
	Particulate Change	Condition	HIGH	
	•	Condition/Opportunity	HIGH	
		Opportunity Presence? (Y/N)	YES	
	Soluble Change	Condition	HIGH	
		Condition/Opportunity	HIGH	
		Opportunity Presence? (Y/N)	YES	
	Physical Change	Condition	HIGH	
	Thyologic Change	Condition/Opportunity	HIGH	
		Opportunity Presence? (Y/N)	YES	
	Pollution Change	Condition	NA	
	1 Shatish Shangs	Condition/Opportunity	NA	
		Opportunity Presence? (Y/N)	NA	
labitat	Physical Structure	Condition	HIGH	
rabitat	Landscape Patch Structure	Condition	HIGH	
	Vegetation Composition	Condition	HIGH	
unction Rating Summ	Metrics/Notes		Rating	
lydrology	Condition		HIGH	
Vater Quality	Condition			
•	Condition/Opportunity		HIGH	
	Opportunity Presence? (Y/N)		YES	
Habitat	Conditon		HIGH	

		Rating Calculator	1 CI 3 O II 7. I	
	Wetland Site Name	TTA Wetland V	Date	7/18/13
ı	Wetland Type	Bottomland Hardw ood Forest	Assessor Name/Organization	BP/STV
ı	Level III Ecoregion	Piedmont	Nearest Named Water Body	New Hope Creek
ı	River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030002
	[☐Yes ☐Ne	o Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.959323, -78.980116
	Please circle and/or mappropriate, in recent pto the following. • Hydrological me • Surface and su septic tanks, ur • Signs of vegeta	s affecting the assessment area (may not be within ake note on last page if evidence of stressors is appa past (for instance, approximately within 10 years). Not odifications (examples: ditches, dams, beaver dams, ab-surface discharges into the wetland (examples: dischargeround storage tanks (USTs), hog lagoons, etc.) ation stress (examples: vegetation mortality, insect data formmunity alteration (examples: mowing, clear-cutting)	arent. Consider departure from refere teworthy stressors include, but are not dikes, berms, ponds, etc.) charges containing obvious pollutants amage, disease, storm damage, salt is	ot limited
	Is the assessment are	ea intensively managed? Tyes No		
	Anadromous fis Federally prote NCDWQ riparia Abuts a Priman Publicly owned N.C. Division of Abuts a stream Designated NC Abuts a 303(d) What type of natural s Blackwater Brownwater	cted species or State endangered or threatened speci an buffer rule in effect y Nursery Area (PNA) property f Coastal Management Area of Environmental Concer with a NCDWQ classification of SA or supplemental of NHP reference community -listed stream or a tributary to a 303(d)-listed stream stream is associated with the wetland, if any? (che	rn (AEC) (including buffer) classifications of HQW, ORW, or Tro	ut
ı	•		wind []Both	
		ea on a coastal island?		
		ea's surface water storage capacity or duration su		Yes No
ļ	Does the assessmen	t area experience overbank flooding during norma	I rainfall conditions?	Yes No
	Check a box in e (VS) in the assess then rate the asse GS VS A A A B B B Se al	Condition/Vegetation Condition – assessment area cach column. Consider alteration to the ground surface sment area. Compare to reference wetland if applicablessment area based on evidence of an effect. ot severely altered everely altered everely altered over a majority of the assessment area edimentation, fire-plow lanes, skidder tracks, bedding, iteration examples: mechanical disturbance, herbicide is significant to the state of the propriate of the second state of the second sta	ce (GS) in the assessment area and only (see User Manual). If a reference a (ground surface alteration examples fill, soil compaction, obvious pollutar	is not applicable, s: vehicle tracks, excessive nts) (vegetation structure
	Check a box in eduration (Sub). Control Carolina hydroxide a foot deep is consub-surface water Surf Sub Control Contr	P-Surface Storage Capacity and Duration – assessmach column. Consider surface storage capacity and Consider both increase and decrease in hydrology. Redric soils (see USACE Wilmington District website) for onsidered to affect surface water only, while a ditch > r. Consider tidal flooding regime, if applicable. Vater storage capacity and duration are not altered. Vater storage capacity or duration are altered, but not solvater storage capacity or duration are substantially alternange) (examples: draining, flooding, soil compaction,	duration (Surf) and sub-surface stora efer to the current NRCS lateral effect r the zone of influence of ditches in h 1 foot deep is expected to affect both substantially (typically, not sufficient te ered (typically, alteration sufficient to	t of ditching guidance for ydric soils. A ditch n surface and ditch o change vegetation).
	Check a box in e type (WT). AA WT 3a. A A BB BB CC CC CD DD 3b. A Evid CB Evid	Majority of wetland with depressions able to pond Majority of wetland with depressions able to pond	water > 1 foot deep water 6 inches to 1 foot deep water 3 to 6 inches deep n 2 feet and 2 feet	

4.	Soil Texture/Structure – assessment area condition metric Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators. 4a. A Sandy soil B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) C Loamy or clayey soils not exhibiting redoximorphic features D Loamy or clayey gleyed soil Histosol or histic epipedon 4b. A Soil ribbon < 1 inch
	©B Soil ribbon ≥ 1 inch 4c. □A No peat or muck presence □B A peat or muck presence
5.	
	treatment capacity of the assessment area Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Land Use – opportunity metric Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. WS 5M 2M A A A A A A A A ≥ 10% impervious surfaces B B B B A A 10% impervious surfaces C C C C C Confined animal operations (or other local, concentrated source of pollutants) D D D D D A 20% coverage of pasture E B B B A 20% coverage of agricultural land (regularly plowed land) F F F F A 20% coverage of maintained grass/herb G G G G G ≥ 20% coverage of clear-cut land H H H H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.	 Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water?
8.	Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries. WT WC A A ≥ 100 feet B B From 80 to < 100 feet C C From 50 to < 80 feet D D From 40 to < 50 feet E F From 30 to < 40 feet F F From 15 to < 30 feet C G G From 5 to < 15 feet H H H < 5 feet

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. Evidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. B Sediment deposition is excessive, but not overwhelming the wetland. C Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) A A ≥ 500 acres B B From 100 to < 500 acres C C C From 50 to < 100 acres C C C From 50 to < 100 acres C C C From 50 to < 100 acres C C C From 10 to < 25 acres C C C From 10 to < 25 acres C C C From 5 to < 10 acres C C C From 0.5 to < 1 acre C C C From 0.1 to < 0.5 acre C C C From 0.1 to < 0.5 acre C C C C From 0.1 to < 0.5 acres C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C C From 0.1 to < 0.5 acres C C C C C C From 0.1 to < 0.5 acres C C C C C C From 0.1 to < 0.5 acres C C C C C C From 0.1 to < 0.5 acres C C C C C C From 0.1 to < 0.5 acres C C C C C C From 0.1 to < 0.5 acres C C C C C C C From 0.1 to < 0.5 acres C C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C C From 0.1 to < 0.5 acres C C C C From 0.1 to < 0.5 acres C C C C From 0.1 to < 0.5 acres C C C C From 0.1 to < 0.5 acres C C C C From 0.1 to
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) A Pocosin is the full extent (≥ 90%) of its natural landscape size. Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥ 500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres C C From 50 to < 100 acres C C From 10 to < 50 acres C C T C From 10 to < 50 acres C C C From 50 to < 100 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C From 10 to < 50 acres C C C
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present? Yes No If Yes, continue to 17b. If No, skip to Metric 18.	
17b. Evaluate percent coverage of assessment area vegetation for all marsh A ≥ 25% coverage of vegetation B < 25% coverage of vegetation	es only. Skip to 17c for non-marsh wetlands.
17c. Check a box in each column for each stratum. Evaluate this portion of in airspace above the assessment area (AA) and the wetland type (WT) and WT	
Canopy closed, or nearly closed, with natural gaps Canopy present, but opened more than natural gap Canopy sparse or absent Canopy sparse or absent Dense mid-story/sapling layer Moderate density mid-story/sapling layer Mid-story/sapling layer sparse or absent	
C C Shrub layer sparse or absent	
© A	
18. Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large re B Not A	lative to species present and landscape stability).
19. Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast hypersent.	
Majority of canopy trees have stems between 6 and 12 inches DBH, fe Majority of canopy trees are < 6 inches DBH or no trees.	w are > 12-inch DBH.
Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large B Not A	ge relative to species present and landscape stability).
21. Vegetation/Open Water Dispersion – wetland type/open water condition in Marsh only)	metric (evaluate for Non-Tidal Freshwater
Select the figure that best describes the amount of interspersion between vegerareas indicate vegetated areas, while solid white areas indicate open water. B C	etation and open water in the growing season. Patterned
22. Hydrologic Connectivity – assessment area condition metric (evaluate for Examples of activities that may severely alter hydrologic connectivity included itching, fill, sedimentation, channelization, diversion, man-made berms, but a Overbank and overland flow are not severely altered in the assessment area.	de intensive eaver dams, and stream incision.
Overland flow is severely altered in the assessment area. Both overbank <u>and</u> overland flow are severely altered in the assessment	ent area.
Notes Wetland V is a palustrine forested wetland located in the New Hope Creek floodpla abuts Stream S.	in located south of and adjacent to US 15/501. Wetland V

Wetland Site Name	TTA Wetland V	Date	7/18/13
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP/STV
	. =		\/_a
Notes on Field Assessm			YES
Presence of regulatory c			YES
Wetland is intensively ma			NO
	ted within 50 feet of a natural tributary or other	er open water (Y/N)	YES
	stantially altered by beaver (Y/N)		NO
	ences overbank flooding during normal rainfa	III conditions (Y/N)	NO
Assessment area is on a	a coastal island (Y/N)		NO
Sub-function Rating Su	ummary		
unction	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
	Sub-Surface Storage and Retention	Condition	LOW
Vater Quality	Pathogen Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
	Particulate Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
	Soluble Change	Condition	LOW
	Ç	Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
	Physical Change	Condition	LOW
	, ,	Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
	Pollution Change	Condition	NA NA
	3.	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	MEDIUM
Function Rating Summ	arv		
unction	Metrics/Notes		Rating
Hydrology	Condition		LOW
Vater Quality	Condition		LOW
	Condition/Opportunity		LOW
	Opportunity Presence?	(Y/N)	NO
Habitat	Conditon		LOW

rating baloalate	VC131011 4.1
Wetland Site Name TTA Wetland VV	Date 11/05/13
Wetland Type Non-Tidal Freshwater Marsh	Assessor Name/Organization BP/STV
Level III Ecoregion Piedmont	Nearest Named Water Body New Hope Creek
River Basin Cape Fear	USGS 8-Digit Catalogue Unit 03030002
Yes No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) 35.959164, -78.982133
Evidence of stressors affecting the assessment area (may not be within Please circle and/or make note on last page if evidence of stressors is approappropriate, in recent past (for instance, approximately within 10 years). Note to the following. • Hydrological modifications (examples: ditches, dams, beaver dams) • Surface and sub-surface discharges into the wetland (examples: disseptic tanks, underground storage tanks (USTs), hog lagoons, etc.) • Signs of vegetation stress (examples: vegetation mortality, insect discharges) • Habitat/plant community alteration (examples: mowing, clear-cutting)	arent. Consider departure from reference, if oteworthy stressors include, but are not limited , dikes, berms, ponds, etc.) ocharges containing obvious pollutants, presence of nearby amage, disease, storm damage, salt intrusion, etc.)
Is the assessment area intensively managed?	
Regulatory Considerations (select all that apply to the assessment are Anadromous fish Federally protected species or State endangered or threatened species of NCDWQ riparian buffer rule in effect Abuts a Primary Nursery Area (PNA) Publicly owned property N.C. Division of Coastal Management Area of Environmental Concertable Abuts a stream with a NCDWQ classification of SA or supplemental Designated NCNHP reference community Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream	cies ern (AEC) (including buffer)
What type of natural stream is associated with the wetland, if any? (check one of the following boxes) Blackwater Brownwater Tidal (if tidal, check one of the following boxes) Lunar Is the assessment area on a coastal island? Yes No]Wind []Both
Is the assessment area's surface water storage capacity or duration su	
Does the assessment area experience overbank flooding during norm: Ground Surface Condition/Vegetation Condition – assessment area Check a box in each column. Consider alteration to the ground surface (VS) in the assessment area. Compare to reference wetland if applications.	ea condition metric ace (GS) in the assessment area and vegetation structure
then rate the assessment area based on evidence of an effect. GS VS	
sedimentation, fire-plow lanes, skidder tracks, bedding	ra (ground surface alteration examples: vehicle tracks, excessive , fill, soil compaction, obvious pollutants) (vegetation structure es, salt intrusion [where appropriate], exotic species, grazing,
2. Surface and Sub-Surface Storage Capacity and Duration – assess Check a box in each column. Consider surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. R North Carolina hydric soils (see USACE Wilmington District website) for ≤ 1 foot deep is considered to affect surface water only, while a ditch sub-surface water. Consider tidal flooding regime, if applicable. Surf Sub	I duration (Surf) and sub-surface storage capacity and defer to the current NRCS lateral effect of ditching guidance for or the zone of influence of ditches in hydric soils. A ditch
 A Water storage capacity and duration are not altered. B B Water storage capacity or duration are altered, but not C Water storage capacity or duration are substantially altered. 	substantially (typically, not sufficient to change vegetation). ered (typically, alteration sufficient to result in vegetation a, filling, excessive sedimentation, underground utility lines).
3. Water Storage/Surface Relief – assessment area/wetland type con Check a box in each column for each group below. Select the appropriate (WT). AA WT 3a. A Majority of wetland with depressions able to pond the majority of wetland with depressions able to pond the majority of wetland with depressions able to pond to pond the majority of wetland with depressions able to pond water < 3 inches deep	water > 1 foot deep
3b. A Evidence that maximum depth of inundation is greater the Evidence that maximum depth of inundation is between 1 Evidence that maximum depth of inundation is less than	and 2 feet

4.	Soil Texture/Structure – assessment area condition metric Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators. 4a. A Sandy soil B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) C Loamy or clayey soils not exhibiting redoximorphic features D Loamy or clayey gleyed soil Histosol or histic epipedon 4b. A Soil ribbon < 1 inch
	©B Soil ribbon ≥ 1 inch 4c. ○A No peat or muck presence ○B A peat or muck presence
5.	Discharge into Wetland – opportunity metric Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub A Little or no evidence of pollutants or discharges entering the assessment area
	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Land Use – opportunity metric Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. WS 5M 2M A A A A ≥ 10% impervious surfaces B B B B A < 10% impervious surfaces C C C C Confined animal operations (or other local, concentrated source of pollutants) D D D D D S 20% coverage of pasture E B B S A 20% coverage of agricultural land (regularly plowed land) F F F F A 20% coverage of maintained grass/herb G G G G G ≥ 20% coverage of clear-cut land H H H H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.	Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water? Yes No If Yes, continue to 7b. If No, skip to Metric 8. Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed. 7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. A ≥ 50 feet B From 30 to < 50 feet C From 15 to < 30 feet D From 5 to < 15 feet E < 5 feet or buffer bypassed by ditches 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width. ≤ 15-feet wide S > 15-feet wide S > 15-feet wide N or oots of assessment area vegetation extend into the bank of the tributary/open water? Yes No 7e. Is tributary or other open water sheltered or exposed? Sheltered – adjacent open water with width < 2500 feet or regular boat traffic. Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.
8.	Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries. WT WC A A ≥ 100 feet B B From 80 to < 100 feet C C From 50 to < 80 feet D D From 40 to < 50 feet E F From 30 to < 40 feet F F From 15 to < 30 feet C G From 5 to < 15 feet H H H < 5 feet

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. A Evidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. Sediment deposition is excessive, but not overwhelming the wetland. Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) A A ≥ 500 acres B B From 100 to < 500 acres
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) A Pocosin is the full extent (≥ 90%) of its natural landscape size. B Pocosin is < 90% of the full extent of its natural landscape size.
13.	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥ 500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres C From 50 to < 100 acres C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C From 10 to < 50 acres C From 10 to < 50 acres C From 10 to < 50 acres C From 10 to < 50 acres C From 10 to < 50 acres C From 10 to < 50 acres C From
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) □ A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. □ B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. □ C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). B Vegetation diversity is low or has > 10% to 50% cover of exotics. C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric
17a. Is vegetation present? Yes No If Yes, continue to 17b. If No, skip to Metric 18.
17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. A ≥ 25% coverage of vegetation B < 25% coverage of vegetation
17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.
AA WT A Canopy closed, or nearly closed, with natural gaps associated with natural processes B Canopy present, but opened more than natural gaps C C Canopy sparse or absent
Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent Canopy sparse or absent Canopy sparse or absent Dense mid-story/sapling layer Moderate density mid-story/sapling layer Mid-story/sapling layer sparse or absent
GA Dense shrub layer B B Moderate density shrub layer C C Shrub layer sparse or absent
GA CA Dense herb layer B B Moderate density herb layer C C Herb layer sparse or absent
 18. Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). B Not A
19. Diameter Class Distribution – wetland type condition metric Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.
 20. Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). B Not A
21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)
Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. A B B C C D
 22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. A Overbank and overland flow are not severely altered in the assessment area. B Overbank flow is severely altered in the assessment area.
Overland flow is severely altered in the assessment area. Both overbank and overland flow are severely altered in the assessment area.
Notes Wetland VV is a palustrine emergent wetland located in the New Hope Creek floodplain, located north of and adjacent to US 15/501. Wetland VV abuts Stream S.

Wetland Site Name	TTA Wetland VV	Date	11/05/13
Wetland Type	Non-Tidal Freshwater Marsh	Assessor Name/Organization	BP/STV
Niger of Early Assessed	F (V/A))		\/F0
Notes on Field Assessm			YES
Presence of regulatory of			YES
Wetland is intensively m		0.400	YES
	tted within 50 feet of a natural tributary or othe	er open water (Y/N)	YES
	stantially altered by beaver (Y/N)	H PC 0700	NO NO
•	ences overbank flooding during normal rainfa	III conditions (Y/N)	NO
Assessment area is on a	a coastal island (Y/N)		NO
Sub-function Rating Su	ummary		
Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	NA
	Sub-Surface Storage and Retention	Condition	NA
Water Quality	Pathogen Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Particulate Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	NA
	-	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Physical Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Pollution Change	Condition	NA
	S .	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	MEDIUM
	Vegetation Composition	Condition	MEDIUM
Function Rating Summ	narv		
Function	Metrics/Notes		Rating
Hydrology	Condition		MEDIUM
Water Quality	Condition		LOW
	Condition/Opportunity		LOW
	Opportunity Presence?	(Y/N)	YES
Habitat	Conditon		LOW

	Rating Calculat	or Version 4.1	
Wetland Site Name	TTA Wetland VVV	Date 1/21/14	
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization BP -STV	
Level III Ecoregion	Piedmont	Nearest Named Water Body Sandy Creek	
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit 03030002	
Yes N	lo Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) 35.955307, -78.973797	
Please circle and/or mappropriate, in recent to the following. Hydrological mesure and suspended to surface and suspended tanks, use Signs of vegetal	nderground storage tanks (USTs), hog lagoons, etc.	parent. Consider departure from reference, if Noteworthy stressors include, but are not limited s, dikes, berms, ponds, etc.) scharges containing obvious pollutants, presence of nearby damage, disease, storm damage, salt intrusion, etc.)	
	rea intensively managed? [Yes [No	.	
	rations (select all that apply to the assessment ar	ea)	
NCDWQ ripari Abuts a Primari Publicly owned N.C. Division of	ected species or State endangered or threatened spe an buffer rule in effect ry Nursery Area (PNA)	ern (AEC) (including buffer)	
Designated NO	CNHP reference community)-listed stream or a tributary to a 303(d)-listed stream		
What type of natural Blackwater Brownwater	stream is associated with the wetland, if any? (c		
Is the assessment area on a coastal island?			
is the assessment a	rea's surface water storage capacity or duration		No
is the assessment ar			No
Is the assessment at Does the assessment 1. Ground Surface Check a box in a (VS) in the assessment at	rea's surface water storage capacity or duration of the area experience overbank flooding during normal condition/Vegetation Condition – assessment a each column. Consider alteration to the ground surfament area. Compare to reference wetland if applicates applicates area based on evidence of an effect. Not severely altered ever a majority of the assessment area dedimentation, fire-plow lanes, skidder tracks, bedding	nal rainfall conditions? Yes No	
Is the assessment and Does the assessment 1. Ground Surface Check a box in a (VS) in the assess then rate the assess then rate the assess then rate and Surface and Surface and Surface and Surface and Surface and Surface water Surface water Surface water Surface Surface water Surface	rea's surface water storage capacity or duration of the area experience overbank flooding during normal condition. Condition — assessment a each column. Consider alteration to the ground surposessment area. Compare to reference wetland if applicessment area based on evidence of an effect. Not severely altered severely altered severely altered over a majority of the assessment area edimentation, fire-plow lanes, skidder tracks, bedding alteration examples: mechanical disturbance, herbices diversity [if appropriate], hydrologic alteration) co-surface Storage Capacity and Duration — assess each column. Consider surface storage capacity and Consider both increase and decrease in hydrology. Addic soils (see USACE Wilmington District website) considered to affect surface water only, while a ditch in Consider tidal flooding regime, if applicable. Water storage capacity and duration are not altered. Water storage capacity or duration are altered, but not water storage capacity or duration are substantially as	rea condition metric face (GS) in the assessment area and vegetation structure able (see User Manual). If a reference is not applicable, rea (ground surface alteration examples: vehicle tracks, excessing, fill, soil compaction, obvious pollutants) (vegetation structure ides, salt intrusion [where appropriate], exotic species, grazing,	
Is the assessment and Does the assessment 1. Ground Surface Check a box in a (VS) in the assessment then rate the assessment than the company of the compa	rea's surface water storage capacity or duration of the area experience overbank flooding during normal condition. Consider alteration to the ground surface column. Consider alteration to the ground surfaces and area. Compare to reference wetland if applicates applicate the column area based on evidence of an effect. Not severely altered over a majority of the assessment area dedimentation, fire-plow lanes, skidder tracks, bedding a literation examples: mechanical disturbance, herbicates diversity [if appropriate], hydrologic alteration) Desurface Storage Capacity and Duration — assess and column. Consider surface storage capacity and Consider both increase and decrease in hydrology, working soils (see USACE Wilmington District website) considered to affect surface water only, while a ditch of the consider tidal flooding regime, if applicable. Water storage capacity and duration are not altered. Water storage capacity or duration are altered, but not of the consider storage capacity or duration are substantially a strange) (examples: draining, flooding, soil compactic surface Relief — assessment area/wetland type consider column for each group below. Select the application are substantially and column for each group below.	rea condition metric face (GS) in the assessment area and vegetation structure fable (see User Manual). If a reference is not applicable, rea (ground surface alteration examples: vehicle tracks, excessing, fill, soil compaction, obvious pollutants) (vegetation structure ides, salt intrusion [where appropriate], exotic species, grazing, sment area condition metric and duration (Surf) and sub-surface storage capacity and Refer to the current NRCS lateral effect of ditching guidance for for the zone of influence of ditches in hydric soils. A ditch > 1 foot deep is expected to affect both surface and ditch of substantially (typically, not sufficient to change vegetation). altered (typically, alteration sufficient to result in vegetation)	ve
Is the assessment at Does the assessment 1. Ground Surface Check a box in a (VS) in the assessment at the assessment a	rea's surface water storage capacity or duration of the area experience overbank flooding during normal condition. Consider alteration to the ground surface column. Consider to reference wetland if applicate the application of the assessment area based on evidence of an effect. Into severely altered the assessment and application of the assessment and application of the assessment and application of the assessment and application of the assessment and application of the assessment and application of the assessment and application of the assessment and application of the assessment and application of the assessment and application of the application of	rea condition metric face (GS) in the assessment area and vegetation structure fable (see User Manual). If a reference is not applicable, rea (ground surface alteration examples: vehicle tracks, excessing, fill, soil compaction, obvious pollutants) (vegetation structure ides, salt intrusion [where appropriate], exotic species, grazing, sment area condition metric and duration (Surf) and sub-surface storage capacity and Refer to the current NRCS lateral effect of ditching guidance for for the zone of influence of ditches in hydric soils. A ditch > 1 foot deep is expected to affect both surface and ditch obt substantially (typically, not sufficient to change vegetation). altered (typically, alteration sufficient to result in vegetation on, filling, excessive sedimentation, underground utility lines). Indition metric (answer for non-marsh wetlands only) Peropriate storage for the assessment area (AA) and the wetland and water > 1 foot deep and water > 1 foot deep and water 3 to 6 inches deep	ve

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4.	Soil Texture/Structure – assessment area condition metric Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape (a three Notice of the three soil property groups below. Dig soil profile in the dominant assessment area landscape (a three Notice of the three soil property groups below. Dig soil profile in the dominant assessment area landscape (a three Notice of the three soil property groups below. Dig soil profile in the dominant assessment area landscape (b) The three soil profile in the dominant assessment area landscape (c) The three soil profile in the dominant assessment area landscape (c) The three soil profile in the dominant assessment area landscape (c) The three soil profile in the dominant assessment area landscape (c) The three soil profile in the dominant assessment area landscape (c) The three soil profile in the dominant assessment area landscape (c) Three soil profile in the dominant assessment area landscape (c) Three soil profile in the dominant assessment area landscape (c) Three soil profile in the dominant assessment area landscape (c) Three soil profile in the dominant assessment area landscape (c) Three soil profile in the dominant assessment area landscape (c) Three soil profile in the dominant assessment area landscape (c) Three soil profile in the dominant assessment area landscape (c) Three soil profile in the dominant assessment area landscape (c) Three soil profile in the dominant assessment area landscape (c) Three soil profile in the dominant assessment area landscape (c) Three soil profile in the dominant assessment area landscape (c) Three soil profile in the dominant assessment area landscape (c) Three soil profile in the dominant assessment area landscape (c) Three soil profile in the dominant assessment area landscape (c) Three soil profile in the dominant assessment area landscape (c) Three soil profile in the dominant assessment area landscape (c) Three soil profile in the dominan
	feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.
	 4a. Sandy soil Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) Loamy or clayey soils not exhibiting redoximorphic features Loamy or clayey gleyed soil Histosol or histic epipedon
	4b. ☐ A Soil ribbon < 1 inch ☐ B Soil ribbon ≥1 inch
	4c. A No peat or muck presence A peat or muck presence
5.	Discharge into Wetland – opportunity metric Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub
	Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Land Use – opportunity metric Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles <u>and</u> within the watershed draining to the assessment area (5M), and within 2 miles <u>and</u> within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. WS 5M 2M ✓ A ✓ A ≥ 10% impervious surfaces
	B B B < 10% impervious surfaces C C C Confined animal operations (or other local, concentrated source of pollutants) D D D ≥20% coverage of pasture E E E ≥20% coverage of agricultural land (regularly plowed land) F F F F ≥20% coverage of maintained grass/herb G G G ≥20% coverage of clear-cut land H H H H H H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.	 Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water? Yes No If Yes, continue to 7b. If No, skip to Metric 8. Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed. 7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. A ≥50 feet B From 30 to < 50 feet C From 15 to < 30 feet D From 5 to < 15 feet E < 5 feet or buffer bypassed by ditches 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width. S=15-feet wide > 15-feet wide Other open water (no tributary present) 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water? Yes No 7e. Is tributary or other open water sheltered or exposed? Sheltered – adjacent open water with width ≥2500 feet and no regular boat traffic. Exposed – adjacent open water with width ≥2500 feet or regular boat traffic.
8.	Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries. WT WC A A ≥100 feet B B From 80 to < 100 feet C C From 50 to < 80 feet D D From 40 to < 50 feet E F From 30 to < 40 feet F F From 15 to < 30 feet G G From 5 to < 15 feet H C H < 5 feet

9.						
Answer for assessment area dominant landform.						
	 A Evidence of short-duration inundation (< 7 consecutive days) B Evidence of saturation, without evidence of inundation 					
	Evidence of saturation, without evidence of mundation (7 to 30 consecutive days or more)					
10.	Indicators of Deposition – assessment area condition metric					
	Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels.					
	B Sediment deposition is excessive, but not overwhelming the wetland.					
	C Sediment deposition is excessive and is overwhelming the wetland.					
11	Wetland Size – wetland type/wetland complex condition metric					
• • • •	Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the					
	size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User					
	Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.					
	WT WC FW (if applicable)					
	C A C A ≥500 acres C B C B From 100 to < 500 acres					
	D D D From 25 to < 50 acres					
	D D D From 25 to < 50 acres E E E From 10 to < 25 acres					
	F F From 5 to < 10 acres					
	G G G G From 1 to < 5 acres H G H From 0.5 to < 1 acre					
	☐ H ☐ H From 0.5 to < 1 acre					
	☐					
	C C C From 50 to < 100 acres D D D From 25 to < 50 acres E E E From 10 to < 25 acres F F F From 5 to < 10 acres G G G G From 1 to < 5 acres CH CH CH From 0.5 to < 1 acre CI CI From 0.1 to < 0.5 acre CJ CJ From 0.01 to < 0.1 acre CK CK CK < 0.01 acre or assessment area is clear-cut					
	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)					
	A Pocosin is the full extent (≥90%) of its natural landscape size. B Pocosin is < 90% of the full extent of its natural landscape size.					
	Connectivity to Other Natural Areas – landscape condition metric					
	13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This					
	evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous					
	metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility					
	line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.					
	Well Loosely ☐ A ☐ A ≥500 acres					
	B B From 100 to < 500 acres					
	C C From 50 to < 100 acres					
	B B From 100 to < 500 acres C C From 50 to < 100 acres D D From 10 to < 50 acres					
	FE FE < 10 acres					
	C. C. C. C. C. C. C. C. C. C. C. C. C. C					
	13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.					
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include					
	non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts.					
	Consider the eight main points of the compass.					
	No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut					
	C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut					
15.	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)					
	Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate					
	species, with exotic plants absent or sparse within the assessment area.					
	B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or					
	characteristic of the wetland type. This may include communities of weedy halive species that develop after deal-cutting of clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.					
	Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-					
	characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in					
	at least one stratum.					
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)					
	Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).					
	C Vegetation is dominated by exotic species (>50% cover of exotics).					

	E					
17.	7. Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present?					
	1	Yes	No	If Yes, continue to 17b. If No, skip to Metric 18.		
		_A ≥2	5% cove	verage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. rage of vegetation rage of vegetation		
		n airspace	above th	th column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure assessment area (AA) and the wetland type (WT) separately.		
			WT CB CC	Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent		
	Č	Mild-Story	A B C	Dense mid-story/sapling layer Moderate density mid-story/sapling layer Mid-story/sapling layer sparse or absent		
	d	ODJUS A B C	CA B CC	Dense shrub layer Moderate density shrub layer Shrub layer sparse or absent		
	-	C A B C	A B C	Dense herb layer Moderate density herb layer Herb layer sparse or absent		
	18. Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). B Not A					
19.	Diam			tion – wetland type condition metric		
	A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.					
	B C	.,,		y trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. y trees are < 6 inches DBH or no trees.		

20. Large Woody Debris – wetland type condition metric

Include both natural debris and man-placed natural debris.

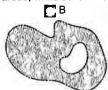
A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).

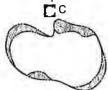
B Not A

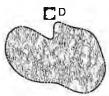
21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.









22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

C A Overbank and overland flow are not severely altered in the assessment area.

B Overbank flow is severely altered in the assessment area.

C Overland flow is severely altered in the assessment area.

Both overbank and overland flow are severely altered in the assessment area.

Notes

Wetland VVV is a palustrine forested wetland located in the Sandy Creek floodplain.

Wetland Site Name	TTA Wetland VVV		DD OT (
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP -STV
Notes on Field Assess	ment Form (Y/N)		YES
	considerations (Y/N)		YES
Vetland is intensively	· · ·		NO
	cated within 50 feet of a natural tributary or other	er open water (Y/N)	NO
	ubstantially altered by beaver (Y/N)	()	NO
	eriences overbank flooding during normal rainfa	II conditions (Y/N)	YES
•	a coastal island (Y/N)	in conditions (1711)	NO
ASSESSMENT AICA IS OF	ra coasta islana (1714)		
Sub-function Rating	Summary		
unction	Sub-function	Metrics	Rating
lydrology	Surface Storage and Retention	Condition	HIGH
	Sub-Surface Storage and Retention	Condition	LOW
Vater Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Soluble Change	Condition	HIGH
	ů	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	LOW
	,	Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	YES
	Pollution Change	Condition	NA
	r challer change	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Physical Structure	Condition	HIGH
	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	HIGH
	- ogotalion o omponion		
unction Rating Sum			Detina
unction	Metrics/Notes		Rating HIGH
Hydrology Notos Quality	Condition Condition		HIGH
Vater Quality	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	YES
Habitat	Conditon	\····/	HIGH

		Rating Calculate	7 70101011 1111	
Wetland Si	ite Name	TTA Wetland W	Da	te 7/30/13
Wetla	and Type	Bottomland Hardw ood Forest	Assessor Name/Organization	n BP/STV
Level III Ed	coregion	Piedmont ▼	Nearest Named Water Boo	ly Little Creek
Riv	er Basin	Cape Fear	USGS 8-Digit Catalogue Un	it 03030002
Yes	s 🌅 No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degree	s) 35.958192, -78.982022
Please circle appropriate, in to the followin • Hydrol • Surfac septic • Signs	and/or main recent page. Illogical mode and sulting tanks, under the control of vegeta	s affecting the assessment area (may not be within ake note on last page if evidence of stressors is apposant (for instance, approximately within 10 years). Not odifications (examples: ditches, dams, beaver dams be-surface discharges into the wetland (examples: distinct derground storage tanks (USTs), hog lagoons, etc.) tition stress (examples: vegetation mortality, insect dommunity alteration (examples: mowing, clear-cutting)	arent. Consider departure from refer oteworthy stressors include, but are in , dikes, berms, ponds, etc.) scharges containing obvious pollutan amage, disease, storm damage, salt	not limited
Is the assess	sment are	ea intensively managed? []Yes []No		
Anadri Federa NCDW Abuts Public N.C. D Abuts Design Abuts Blacky Brown Tidal (Is the assess	romous fistrally protect VQ riparia a Primary cly owned Division of a stream nated NC a 303(d)-f natural swater water (if tidal, chesment are	cted species or State endangered or threatened special buffer rule in effect by Nursery Area (PNA) property if Coastal Management Area of Environmental Concessification of SA or supplemental NHP reference community listed stream or a tributary to a 303(d)-listed stream stream is associated with the wetland, if any? (chance one of the following boxes) Lunar La on a coastal island?	ern (AEC) (including buffer) classifications of HQW, ORW, or Tr eck all that apply) Wind Both	
Is the assess	sment are	ea's surface water storage capacity or duration s	ubstantially altered by beaver?	Yes No
Does the ass	sessment	area experience overbank flooding during norm	al rainfall conditions?	Yes 🖸 No
Check a (VS) in the rate GS \	he assessed the assessed the assessed the assessed VS A No. B Second alternation and the assessed the assessed the assessed to the assessed the assessed to th	Condition/Vegetation Condition – assessment are ach column. Consider alteration to the ground surfactment area. Compare to reference wetland if applications area area based on evidence of an effect. Out severely altered everely altered over a majority of the assessment area dimentation, fire-plow lanes, skidder tracks, bedding teration examples: mechanical disturbance, herbicides diversity [if appropriate], hydrologic alteration)	ace (GS) in the assessment area and ble (see User Manual). If a reference ace (ground surface alteration example statistics, fill, soil compaction, obvious polluta	e is not applicable, es: vehicle tracks, excessive ants) (vegetation structure
Check a duration North Ca ≤ 1 foot of sub-surfa Surf A	(Sub). Common each (Sub). Common	Surface Storage Capacity and Duration – assess ach column. Consider surface storage capacity and consider both increase and decrease in hydrology. Refric soils (see USACE Wilmington District website) for soils dered to affect surface water only, while a ditch is consider tidal flooding regime, if applicable. The storage capacity and duration are not altered, after storage capacity or duration are altered, but not later storage capacity or duration are substantially altering (examples: draining, flooding, soil compaction).	d duration (Surf) and sub-surface sto tefer to the current NRCS lateral effer or the zone of influence of ditches in > 1 foot deep is expected to affect be substantially (typically, not sufficient tered (typically, alteration sufficient to	ct of ditching guidance for hydric soils. A ditch oth surface and ditch to change vegetation).
	T box in early T). WT A A A B B B C C C D D A Evide	Majority of wetland with depressions able to pond Majority of wetland with depressions able to pond Majority of wetland with depressions able to pond Majority of wetland with depressions able to pond Depressions able to pond water < 3 inches deep ence that maximum depth of inundation is greater the ence that maximum depth of inundation is between 1	I water > 1 foot deep I water 6 inches to 1 foot deep I water 3 to 6 inches deep an 2 feet	

4.	Soil Texture/Structure – assessment area condition metric Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators. 4a. A Sandy soil B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) C Loamy or clayey soils not exhibiting redoximorphic features D Loamy or clayey gleyed soil Histosol or histic epipedon
	4b. ☐A Soil ribbon < 1 inch ☐B Soil ribbon ≥ 1 inch
	4c. A No peat or muck presence B A peat or muck presence
5.	Discharge into Wetland – opportunity metric Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub A Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Land Use – opportunity metric Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. WS 5M 2M A 2M A ≥ 10% impervious surfaces B B F B < 10% impervious surfaces C C C Confined animal operations (or other local, concentrated source of pollutants) D D D D D 20% coverage of pasture B B E 20% coverage of agricultural land (regularly plowed land) F F F F S 20% coverage of maintained grass/herb G G G G S 20% coverage of clear-cut land H H H H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.	 Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water?
8.	Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries. WT WC A A ≥ 100 feet B B From 80 to < 100 feet C C From 50 to < 80 feet D D From 40 to < 50 feet E F From 30 to < 40 feet F F From 15 to < 30 feet G G From 5 to < 15 feet H C H < 5 feet

	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. A Evidence of short-duration inundation (< 7 consecutive days) B Evidence of saturation, without evidence of inundation C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. Sediment deposition is excessive, but not overwhelming the wetland. C Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) A A A ≥ 500 acres B B From 100 to < 500 acres C C C From 50 to < 100 acres C C C From 50 to < 100 acres C C C From 50 to < 100 acres C C C From 10 to < 25 acres C C C From 5 to < 10 acres C C C From 5 to < 10 acres C C C From 5 to < 10 acres C C C From 0.1 to < 0.5 acres C C C From 0.1 to < 0.5 acres C C C From 0.1 to < 0.5 acre
	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) A Pocosin is the full extent (≥ 90%) of its natural landscape size. B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥ 500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres C C From 50 to < 100 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 10 to < 50 acres C C From 40 to < 50 acres C C From 50 to < 100 acres C From 50 to < 100 acres C From 50 to < 100 acres C From 50 to < 100 acres C From 50 to < 100 acres C From 50 to < 100 acres C From 50 to < 100 acres C From 50 to < 100 acres C From 50 t
	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present? Yes No If Yes, continue to 17b. If No, skip to Metric 18.				
17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh v A ≥ 25% coverage of vegetation B < 25% coverage of vegetation	vetlands.			
17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT	s. Consider structure			
Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent Canopy sparse or absent Canopy sparse or absent Canopy sparse or absent Canopy sparse or absent Canopy sparse or absent Canopy sparse or absent Canopy sparse or absent Canopy sparse or absent Canopy sparse or absent Canopy present, but opened more than natural gaps Canopy sparse or absent				
CA Dense shrub layer B B Moderate density shrub layer C C Shrub layer sparse or absent				
C C Herb layer aparse or absent				
18. Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landsca B Not A	pe stability).			
19. Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 in present.	nches DBH) are			
Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.				
20. Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and land B Not A	dscape stability).			
21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Fresh Marsh only)	hwater			
Select the figure that best describes the amount of interspersion between vegetation and open water in the growing areas indicate vegetated areas, while solid white areas indicate open water.	season. Patterned			
EA EB EC ED				
22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive				
ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Overbank and overland flow are not severely altered in the assessment area. Overbank flow is severely altered in the assessment area.				
Overbank flow is severely altered in the assessment area. Overland flow is severely altered in the assessment area. Both overbank <u>and</u> overland flow are severely altered in the assessment area.				
Notes Wetland W is a palustrine forested/emergent wetland located in the New Hope Creek floodplain, located south of and ad	liacent to US 15/501.			
	•			

Wetland Site Name	TTA Wetland W	Date	7/30/13
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP/STV
Notes on Field Assessr			YES
Presence of regulatory	· ·		YES
Wetland is intensively managed (Y/N)			NO
	cated within 50 feet of a natural tributary or other	er open water (Y/N)	YES NO
Assessment area is substantially altered by beaver (Y/N)			
Assessment area expe	riences overbank flooding during normal rainfa	all conditions (Y/N)	NO
Assessment area is on	a coastal island (Y/N)		NO
Sub-function Rating S	Summary		
Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-Surface Storage and Retention	Condition	MEDIUM
Water Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Particulate Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Soluble Change	Condition	HIGH
	S	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	MEDIUM
	ya. aaga	Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	YES
	Pollution Change	Condition	NA
	1 ollation change	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Habitat	Physical Structure	Condition	LOW
rabitat	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	MEDIUM
Formation Policy C			
Function Rating Sumplements Function	Metrics/Notes		Rating
Hydrology	Condition		HIGH
Water Quality	Condition		HIGH
•	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	YES
Habitat	Conditon		LOW

	Rating Calculate	r Version 4.1			
Wetland Site Name	TTA Wetland WW	Date 11/05/13			
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization BP/STV			
Level III Ecoregion	Piedmont	Nearest Named Water Body Chapel Creek			
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit 03030002			
Yes No	o Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) 35.905366, -79.02	28462		
Please circle and/or mappropriate, in recent properties to the following. Hydrological mass Surface and surface and surface septic tanks, uresum Signs of vegeta	s affecting the assessment area (may not be with ake note on last page if evidence of stressors is approast (for instance, approximately within 10 years). No odifications (examples: ditches, dams, beaver dams b-surface discharges into the wetland (examples: disnderground storage tanks (USTs), hog lagoons, etc.) ation stress (examples: vegetation mortality, insect dommunity alteration (examples: mowing, clear-cutting)	arent. Consider departure from reference, if oteworthy stressors include, but are not limited , dikes, berms, ponds, etc.) charges containing obvious pollutants, presence of neart amage, disease, storm damage, salt intrusion, etc.)	by		
Is the assessment are	ea intensively managed? TYes No				
Regulatory Considerations (select all that apply to the assessment area) Anadromous fish Federally protected species or State endangered or threatened species NCDWQ riparian buffer rule in effect Abuts a Primary Nursery Area (PNA) Publicly owned property N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout Designated NCNHP reference community Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream What type of natural stream is associated with the wetland, if any? (check all that apply) Blackwater Brownwater Tidal (if tidal, check one of the following boxes) Lunar Wind Both Is the assessment area on a coastal island? Yes No Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No 1. Ground Surface Condition/Vegetation Condition — assessment area condition metric Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect. GS VS A Not severely altered Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure					
2. Surface and Sub-Check a box in each duration (Sub). Control Carolina hydroxidation (Sub) ≤1 foot deep is consub-surface water. Surface water. Surface water. Surface water. Surface Control Contro	consider both increase and decrease in hydrology. Redric soils (see USACE Wilmington District website) for soils (see USACE Wilmington District website) for soils (see USACE Wilmington District website) for soil soils (see USACE Wilmington District website) for soils (see USACE Wilmington) for soils a district soils (see USACE Wilmington) for soil soils (see USACE Wilmington) for duration are substantially altituding) (examples: draining, flooding, soil compaction curface Relief – assessment area/wetland type con	I duration (Surf) and sub-surface storage capacity and efer to the current NRCS lateral effect of ditching guidant the zone of influence of ditches in hydric soils. A ditched in the total foot deep is expected to affect both surface and ditched substantially (typically, not sufficient to change vegetation ered (typically, alteration sufficient to result in vegetation, filling, excessive sedimentation, underground utility line dition metric (answer for non-marsh wetlands only)	on). I es).		
type (WT). AA WT 3a. A A B B C C C D D 3b. A Evide	Majority of wetland with depressions able to pond Majority of wetland with depressions able to pond Majority of wetland with depressions able to pond Majority of wetland with depressions able to pond Depressions able to pond water < 3 inches deep ence that maximum depth of inundation is greater that maximum depth of inundation is between 1	water 6 inches to 1 foot deep water 3 to 6 inches deep an 2 feet	etland		

 4. Soil Texture/Structure – assessment area condition metric Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators. 4a. A Sandy soil B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) 		
	C C C C C C C C C C C C C C C C C C C	Loamy or clayey soils not exhibiting redoximorphic features Loamy or clayey gleyed soil Histosol or histic epipedon
	4b. 🔼 A 💽 B	Soil ribbon < 1 inch Soil ribbon ≥1 inch
		No peat or muck presence A peat or muck presence
5.	Check a box	nto Wetland – opportunity metric t in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.
	EA EA EB EB	Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
	Ec Ec	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Check all the draining to as assessment are considered WS 5M A A B B B B C C C C C C C C C C C C C C	 E ≥20% coverage of agricultural land (regularly plowed land) F ≥20% coverage of maintained grass/herb
	FG FG FH FH	 G ≥20% coverage of clear-cut land H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.	 7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water?	
8.	Check a box	Ith at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) in each column. Select the average width for the wetland type at the assessment area (WT) and complex at the assessment areas (WC). See User Manual for WT and WC boundaries. ≥100 feet From 80 to < 100 feet From 50 to < 80 feet From 40 to < 50 feet From 30 to < 40 feet From 15 to < 30 feet From 5 to < 15 feet < 5 feet

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. Answer for assessment area dominant landform. Evidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). CA Sediment deposition is not excessive, but at approximately natural levels. CB Sediment deposition is excessive, but not overwhelming the wetland. CC Sediment deposition is excessive and is overwhelming the wetland.
	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) CA CA CA ≥500 acres CB CB CB CB From 100 to < 500 acres CC CC From 50 to < 100 acres CD CD CD From 25 to < 50 acres CB CB CB From 10 to < 25 acres CB CB CB From 5 to < 10 acres CB CB CB From 5 to < 10 acres CB CB CB From 1 to < 5 acres CB CB CB From 0.5 to < 1 acre CB CB CB From 0.01 to < 0.5 acre CB CB CB From 0.01 to < 0.1 acre CB CB CB From 0.01 to < 0.1 acre CB CB CB CB From 0.01 to < 0.1 acre CB CB CB CB From 0.01 to < 0.1 acre CB CB CB CB From 0.01 to < 0.1 acre CB CB CB CB From 0.01 to < 0.1 acre
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥90%) of its natural landscape size. □ B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres D D From 10 to < 50 acres E E E < 10 acres F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
	 Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) ⚠ A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. ⚠ B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. ⚠ C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

	Li Company de la company de la			
17.	7. Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present?			
	Yes No If Yes, continue to 17b. If No, skip to Metric 18.			
	17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ☐ A ≥25% coverage of vegetation ☐ B < 25% coverage of vegetation			
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT			
	A Canopy closed, or nearly closed, with natural gaps associated with natural processes B B Canopy present, but opened more than natural gaps C C Canopy sparse or absent			
	C A Dense mid-story/sapling layer B B Moderate density mid-story/sapling layer C C Mid-story/sapling layer sparse or absent			
	C A Dense shrub layer B DB Moderate density shrub layer C C C Shrub layer sparse or absent			
	E A Dense herb layer B D B Moderate density herb layer C C C Herb layer sparse or absent			
18.	Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A			
19.	 Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present. 			
	Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.			
	Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A			
21.	1. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. CA CD D			
	Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. A Overbank and overland flow are not severely altered in the assessment area. Overbank flow is severely altered in the assessment area.			

- Overland flow is severely altered in the assessment area.
- Both overbank and overland flow are severely altered in the assessment area.

Notes

Wetland WW is a palustrine forested/emergent wetlands located adjacent to Chapel Branch, a NCDWR mitigation stream. Wetland WW is on park lands.

Wetland Site Name	TTA Wetland WW	Date	11/05/13
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP/STV
Notes on Field Assessm	opt Form (V/NI)		VEC
Notes on Field Assessm Presence of regulatory c	·		YES
			YES
Wetland is intensively man	* ' '		NO
	ted within 50 feet of a natural tributary or other	er open water (Y/N)	YES
	stantially altered by beaver (Y/N)	H 199 A/AD	NO
	ences overbank flooding during normal rainfa	all conditions (Y/N)	NO NO
Assessment area is on a	a coastal Island (Y/N)		NO
Sub-function Rating Su	ımmary		
unction	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
	Sub-Surface Storage and Retention	Condition	LOW
Vater Quality	Pathogen Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
	Particulate Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Soluble Change	Condition	HIGH
	C	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Physical Change	Condition	LOW
	,	Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
	Pollution Change	Condition	NA NA
	. Grand, Grange	Condition/Opportunity	NA NA
		Opportunity Presence? (Y/N)	NA NA
	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	HIGH
Function Rating Summ	07/		
unction kating summ	Metrics/Notes		Rating
lydrology	Condition		LOW
Vater Quality	Condition		MEDIUM
	Condition/Opportunity		MEDIUM
	Opportunity Presence?	(Y/N)	NO
Habitat	Conditon		LOW

			Rating Calcula	ator Version 4.1	
w	etland Site Name	TTA Wetland WWW		Dat	e 1/22/14
	Wetland Type	Bottomland Hardwood Fores	t 💌	Assessor Name/Organizatio	n BP -STV
L	evel III Ecoregion	Piedmont	_	Nearest Named Water Bod	y New Hope Creek
	River Basin	Cape Fear		USGS 8-Digit Catalogue Un	it 03030002
	Yes No	Precipitation within 48 hrs	17	Latitude/Longitude (deci-degrees	35.952950, -78.978619
Plea appl	se circle and/or materials in recent propriate, in recent propriate, in recent propriate following. Hydrological materials in Surface and surface and	past (for instance, approximately odifications (examples: ditches b-surface discharges into the waterground storage tanks (UST)	ce of stressors is ally within 10 years). , dams, beaver danetland (examples: s), hog lagoons, etoon mortality, insection	pparent. Consider departure from refer Noteworthy stressors include, but are r ms, dikes, berms, ponds, etc.) discharges containing obvious pollutant c.) t damage, disease, storm damage, salt	not limited
ls th	e assessment are	ea intensively managed?	Yes No		
Is the state of th	Anadromous fis Federally protec NCDWQ riparia Abuts a Priman Publicly owned N.C. Division of Abuts a stream Designated NC Abuts a 303(d)- at type of natural s Blackwater Brownwater Tidal (if tidal, ch assessment are as the assessment Ground Surface of Check a box in e (VS) in the assess then rate the assess	cted species or State endanger in buffer rule in effect y Nursery Area (PNA) property f Coastal Management Area of with a NCDWQ classification of NHP reference community disted stream or a tributary to a stream is associated with the neck one of the following boxes; as on a coastal island? The coastal island? The coastal island? The coastal island? The coastal island?	Environmental Cor of SA or supplement 303(d)-listed streat wetland, if any? Lunar Yes No pacity or duration coding during no on – assessment on to the ground st nce wetland if appl	ncern (AEC) (including buffer) Intal classifications of HQW, ORW, or Tr Intal Intercept (check all that apply) Intercept Wind Intercept Both In substantially altered by beaver? Intercept	_ Yes
	∏В ∏В Se se ali	edimentation, fire-plow lanes, sk	ridder tracks, bedd disturbance, herbi	area (ground surface alteration example ing, fill, soil compaction, obvious polluta cides, salt intrusion [where appropriate]	nts) (vegetation structure
	Check a box in e duration (Sub). C North Carolina hyo ≤1 foot deep is co sub-surface water Surf Sub A A W B B B W C C C W	ach column. Consider surface consider both increase and decidic soils (see USACE Wilmingtonsidered to affect surface water. Consider tidal flooding regime (ater storage capacity and duraticater storage capacity or duraticater storage capacity or duraticater storage capacity or duraticater storage capacity or duraticater storage capacity or duraticater storage capacity or duraticater storage capacity or duraticater storage capacity or duraticater.	e storage capacity a rease in hydrology. ton District website er only, while a ditcl , if applicable. tion are not altered on are altered, but i on are substantially	essment area condition metric and duration (Surf) and sub-surface sto Refer to the current NRCS lateral effe) for the zone of influence of ditches in h > 1 foot deep is expected to affect bo not substantially (typically, not sufficient altered (typically, alteration sufficient to ion, filling, excessive sedimentation, un	ct of ditching guidance for hydric soils. A ditch th surface and ditch to change vegetation).
3.	Water Storage/Si Check a box in e type (WT). AA WT 3a. A A A B B B C C C D D 3b. A Evide	urface Relief – assessment ar ach column for each group b Majority of wetland with dep Majority of wetland with dep	rea/wetland type of elow. Select the a pressions able to pressions	condition metric (answer for non-mar appropriate storage for the assessment and water > 1 foot deep and water 6 inches to 1 foot deep and water 3 to 6 inches deep ep than 2 feet	sh wetlands only)

4.	Soil Texture/Structure – assessment area condition metric Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators. 4a. A Sandy soil B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) C Loamy or clayey soils not exhibiting redoximorphic features C Loamy or clayey gleyed soil B Histosol or histic epipedon
	4b. ☐ A Soil ribbon < 1 inch ☐ B Soil ribbon ≥1 inch
	4c. A No peat or muck presence A peat or muck presence
5.	Discharge into Wetland – opportunity metric Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub
	Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Land Use – opportunity metric Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles <u>and</u> within the watershed draining to the assessment area (5M), and within 2 miles <u>and</u> within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. WS 5M 2M RA A A ≥10% impervious surfaces B B B B B C C C C C Confined animal operations (or other local, concentrated source of pollutants) ≥20% coverage of pasture
	□ E □ E ≥20% coverage of agricultural land (regularly plowed land) □ F □ F □ F ≥20% coverage of maintained grass/herb □ G □ G □ G ≥20% coverage of clear-cut land □ H
	Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water? ☐ Yes ☐ No
8.	Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries. WT WC A A ≥100 feet B B From 80 to < 100 feet C C From 50 to < 80 feet D D From 40 to < 50 feet E E From 30 to < 40 feet F F From 15 to < 30 feet C G G From 5 to < 15 feet C H C H < 5 feet

9.	Inundation Duration – assessment area condition metric
	Answer for assessment area dominant landform.
	A Evidence of short-duration inundation (< 7 consecutive days)
	Evidence of saturation, without evidence of inundation Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric
	Consider recent deposition only (no plant growth since deposition).
	Sediment deposition is not excessive, but at approximately natural levels. Sediment deposition is excessive, but not overwhelming the wetland.
	Sediment deposition is excessive, but not overwhelming the wetland. Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the
	size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User
	Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.
	WT WC FW (if applicable)
	□ A □ A ≥500 acres
	B B From 100 to < 500 acres
	C C C From 50 to < 100 acres D D D From 25 to < 50 acres
	D D D From 25 to < 50 acres
	E E E From 10 to < 25 acres
	F F F From 5 to < 10 acres G G G From 1 to < 5 acres
	ਰਿ ਰਿਓ From 1 to < 5 acres ਰਿਮ ਰਿਮ ਰਿਮ From 0.5 to < 1 acre
	☐ H ☐ H From 0.5 to < 1 acre ☐ I ☐ I From 0.1 to < 0.5 acre
	J J From 0.01 to < 0.1 acre
	C C C From 50 to < 100 acres D D D From 25 to < 50 acres E E E From 10 to < 25 acres F F F F From 5 to < 10 acres G G G G From 1 to < 5 acres H H H From 0.5 to < 1 acre I I I From 0.1 to < 0.5 acre J J J From 0.01 to < 0.1 acre K K K K K < 0.01 acre or assessment area is clear-cut
	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)
	A Pocosin is the full extent (≥90%) of its natural landscape size.
	B Pocosin is < 90% of the full extent of its natural landscape size.
13.	Connectivity to Other Natural Areas – landscape condition metric
	13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This
	evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous
	metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility
	line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.
	Well Loosely
	☐ A ☐ A ≥500 acres ☐ B ☐ B From 100 to < 500 acres
	☑ B ☑ B From 100 to < 500 acres ☑ C ☑ C From 50 to < 100 acres
	D D From 10 to < 50 acres
	E E < 10 acres
	F F Wetland type has a poor or no connection to other natural habitats
	13b. Evaluate for marshes only.
	Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes)
	May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include
	non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts.
	Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions
	No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)
13.	Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate
	species, with exotic plants absent or sparse within the assessment area.
	TB Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species
	characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or
	clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
	Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-
	characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in
	at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)
	Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
	Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).
	vegetation is dominated by exotic species (200% cover of exotics).

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17.	. Vegetative Structure – assessment area/wetland type condition metric				
	17a. Is vegetation present? Yes No If Yes, continue to 17b. If No, skip to Metric 18.				
17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ☐ A ≥25% coverage of vegetation ☐ B < 25% coverage of vegetation					
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT				
	A Canopy closed, or nearly closed, with natural gaps associated with natural processes B CB Canopy present, but opened more than natural gaps C C C Canopy sparse or absent				
	C C Mid-story/sapling layer sparse or absent				
	C C Shrub layer sparse or absent				
	☐ A ☐ A Dense herb layer ☐ B ☐ B Moderate density herb layer ☐ C ☐ C Herb layer sparse or absent				
18.	Snags – wetland type condition metric Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A				
19.	Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.				
	Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.				
20.	Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). B Not A				
21.	Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.				
22.	Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, man-mace berms, beaver dams, and stream incision.				

Overbank and overland flow are not severely altered in the assessment area.

Overbank flow is severely altered in the assessment area.

Overland flow is severely altered in the assessment area.

Both overbank and overland flow are severely altered in the assessment area.

Notes

Wetland WWW is a palustrine forested wetland located in the New Hope Creek floodplain.

Wetland Site Name	TTA Wetland WWW	Date	1/22/14
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP -STV
Notes on Field Assess	ment Form (Y/N)		YES
Presence of regulatory			YES
Wetland is intensively	, ,		NO
· ·	cated within 50 feet of a natural tributary or othe	er open water (Y/N)	NO
	ibstantially altered by beaver (Y/N)		NO
	eriences overbank flooding during normal rainfa	II conditions (Y/N)	YES
•	n a coastal island (Y/N)		NO
	, ,		
Sub-function Rating			
Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-Surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Soluble Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	YES
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Habitat	Physical Structure	Condition	HIGH
	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	HIGH
Function Rating Sum	nmary.		
Function Rating Sum	Metrics/Notes		Rating
Hydrology	Condition		HIGH
Water Quality	Condition		HIGH
	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	YES
Habitat	Conditon		HIGH

	Rating Calculator	1 CI 3 O II 4. I	
Wetland Site Name TTA V	/etland XX	Date	9/18/13
Wetland Type Botte	omland Hardw ood Forest	Assessor Name/Organization	BP/STV
Level III Ecoregion Pied	mont 🔻	Nearest Named Water Body	New Hope Creek
River Basin Cap	e Fear 🔻	USGS 8-Digit Catalogue Unit	: 03030002
Yes No Pre	cipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.954826, -78.977794
Please circle and/or make not appropriate, in recent past (fo to the following. • Hydrological modificat • Surface and sub-surfa septic tanks, undergro • Signs of vegetation str	ting the assessment area (may not be within the on last page if evidence of stressors is appear instance, approximately within 10 years). Not stresser instance, approximately within 10 years). Not ions (examples: ditches, dams, beaver dams, de discharges into the wetland (examples: discurd storage tanks (USTs), hog lagoons, etc.) ess (examples: vegetation mortality, insect daty alteration (examples: mowing, clear-cutting,	rent. Consider departure from refere eworthy stressors include, but are no dikes, berms, ponds, etc.) harges containing obvious pollutants mage, disease, storm damage, salt i	ot limited
Is the assessment area inte	nsively managed? Tyes No		
Anadromous fish Federally protected sp NCDWQ riparian buffe Abuts a Primary Nurse Publicly owned proper N.C. Division of Coast Abuts a stream with a Designated NCNHP re Abuts a 303(d)-listed s	ery Area (PNA) ty al Management Area of Environmental Concert NCDWQ classification of SA or supplemental of ference community tream or a tributary to a 303(d)-listed stream is associated with the wetland, if any? (che	es n (AEC) (including buffer) classifications of HQW, ORW, or Tro	ut
Tidal (if tidal, check or	e of the following boxes)	Wind Both	
Is the assessment area on a	coastal island?		
Is the assessment area's su	rface water storage capacity or duration sul	ostantially altered by beaver?	Yes No
	experience overbank flooding during normal		Yes No
Check a box in each co (VS) in the assessment a then rate the assessmen GS VS A A Not seve B B Severely sediment alteration	ion/Vegetation Condition – assessment area lumn. Consider alteration to the ground surfacturea. Compare to reference wetland if applicable tarea based on evidence of an effect. rely altered altered over a majority of the assessment area ation, fire-plow lanes, skidder tracks, bedding, examples: mechanical disturbance, herbicide risty [if appropriate], hydrologic alteration)	te (GS) in the assessment area and le (see User Manual). If a reference ground surface alteration examples fill, soil compaction, obvious pollutar	is not applicable, s: vehicle tracks, excessive nts) (vegetation structure
Check a box in each co duration (Sub). Conside North Carolina hydric soi ≤ 1 foot deep is consider sub-surface water. Consi Surf Sub A A Water sto B B Water sto C C Water sto	the Storage Capacity and Duration – assessmumn. Consider surface storage capacity and or both increase and decrease in hydrology. Resist (see USACE Wilmington District website) for ed to affect surface water only, while a ditch of deritidal flooding regime, if applicable. Torage capacity and duration are not altered. Drage capacity or duration are altered, but not so orage capacity or duration are substantially alte (examples: draining, flooding, soil compaction,	duration (Surf) and sub-surface stora fer to the current NRCS lateral effect the zone of influence of ditches in h 1 foot deep is expected to affect both substantially (typically, not sufficient to tred (typically, alteration sufficient to	t of ditching guidance for ydric soils. A ditch n surface and ditch o change vegetation).
Check a box in each co type (WT). AA WT 3a. A A A A A A A A A A A A A A A A A A A	Relief – assessment area/wetland type cond lumn for each group below. Select the appropriate ority of wetland with depressions able to pond wority of wetland with depressions able to pond wority of wetland with depressions able to pond woressions able to pond water < 3 inches deep at maximum depth of inundation is greater than at maximum depth of inundation is between 1 at maximum depth of inundation is less than 1	water > 1 foot deep water 6 inches to 1 foot deep water 3 to 6 inches deep 1 2 feet and 2 feet	

		x from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape ke soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for
	regional indi 4a. A B B C C D D E	Sandy soil Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) Loamy or clayey soils not exhibiting redoximorphic features Loamy or clayey gleyed soil
	4b. []A	Histosol or histic epipedon Soil ribbon < 1 inch Soil ribbon > 1 inch
	4c. A	Soil ribbon ≥ 1 inch No peat or muck presence A part or muck presence
5.		A peat or muck presence nto Wetland – opportunity metric
	Check a box Examples of Surf Sub	x in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Little or no evidence of pollutants or discharges entering the assessment area
	∏в ∏в	treatment capacity of the assessment area
	□c □c	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Check all the draining to a assessment	opportunity metric nat apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers ared to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.
	WS 5M	2M
	□A □A ☑B ☑B	☑ B < 10% impervious surfaces
		☐ E ≥ 20% coverage of agricultural land (regularly plowed land)
	□F □F □G	☐ F ≥ 20% coverage of maintained grass/herb ☐ G ≥ 20% coverage of clear-cut land
		H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.		ting as Vegetated Buffer – assessment area/wetland complex condition metric
	7a. Is asse	essment area within 50 feet of a tributary or other open water? No If Yes, continue to 7b. If No, skip to Metric 8.
	Record	d buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. I a note if a portion of the buffer has been removed or disturbed.
	C A	uch of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. ≥ 50 feet
	∏B ∏B	From 30 to < 50 feet From 15 to < 30 feet
	E P	From 5 to < 15 feet < 5 feet or buffer bypassed by ditches
	7c. Tributa	ry width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
	7d. Do roo	-feet wide
	7e. Is tribut	tary or other open water sheltered or exposed? Itered – adjacent open water with width < 2500 feet <u>and</u> no regular boat traffic. bosed – adjacent open water with width ≥ 2500 feet <u>or</u> regular boat traffic.
8.		dth at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)
		x in each column. Select the average width for the wetland type at the assessment area (WT) and complex at the assessment areas (WC). See User Manual for WT and WC boundaries.
	CA CA	
	B BB	From 80 to < 100 feet From 50 to < 80 feet
	DD D	From 40 to < 50 feet
		From 30 to < 40 feet From 15 to < 30 feet
	G G	From 5 to < 15 feet
	⊠н ⊠н	< 5 feet

4. Soil Texture/Structure – assessment area condition metric

	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. A Evidence of short-duration inundation (< 7 consecutive days) B Evidence of saturation, without evidence of inundation C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. Sediment deposition is excessive, but not overwhelming the wetland. C Sediment deposition is excessive and is overwhelming the wetland.
11.	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) A A S 500 acres B B From 100 to < 500 acres C C C From 50 to < 100 acres C C C From 50 to < 100 acres B E E F From 10 to < 25 acres C F F F F From 5 to < 10 acres C G G G From 1 to < 5 acres C G G G From 1 to < 5 acres C G G G From 0.5 to < 1 acre C G G G From 0.1 to < 0.5 acre C G G G From 0.1 to < 0.5 acres C G G G From 0.1 to < 0.5 acres C G G G From 0.1 to < 0.5 acres C G G G From 0.1 to < 0.5 acres C G G G From 0.1 to < 0.5 acres C G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres C G G G G From 0.1 to < 0.5 acres
	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) A Pocosin is the full extent (≥ 90%) of its natural landscape size. B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely □ A ≥ 500 acres □ B From 100 to < 500 acres □ C □ C From 50 to < 100 acres □ D □ From 10 to < 50 acres □ E □ E < 10 acres □ F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. □ Yes □ No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions B No artificial edge within 150 feet in four (4) to seven (7) directions C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present? Yes No If Yes, continue to 17b. If No, skip to Metric 18.	
17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. □ A ≥ 25% coverage of vegetation □ B < 25% coverage of vegetation	
17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT	cture
Canopy closed, or nearly closed, with natural gaps associated with natural processes Canopy present, but opened more than natural gaps Canopy sparse or absent A CA Dense mid-story/sapling layer B B Moderate density mid-story/sapling layer C C Mid-story/sapling layer sparse or absent	
☐ A ☐ A Dense shrub layer ☐ B ☐ B Moderate density shrub layer ☐ C ☐ C Shrub layer sparse or absent	
A CA Dense herb layer B B Moderate density herb layer CC CC Herb layer sparse or absent	
18. Snags – wetland type condition metric A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). B Not A	
19. Diameter Class Distribution – wetland type condition metric Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.	
Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.	
 20. Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A 	
21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)	
Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterr areas indicate vegetated areas, while solid white areas indicate open water. A B C D	ied
22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Overbank and overland flow are not severely altered in the assessment area. Overbank flow is severely altered in the assessment area.	
Overland flow is severely altered in the assessment area. Both overbank <u>and</u> overland flow are severely altered in the assessment area.	
Notes Wetland XX is a palustrine forested wetland located in the New Hope Creek floodplain.	

Wetland Site Name	TTA Wetland XX	Date	9/18/13
Wetland Type _	Bottomland Hardwood Forest	Assessor Name/Organization	BP/STV
Notes on Field Assessm	pont Form (V/N)		YES
Presence of regulatory			YES
Netland is intensively m			NO
	ated within 50 feet of a natural tributary or othe	er open water (V/N)	NO
	estantially altered by beaver (Y/N)	or open water (1714)	NO
	iences overbank flooding during normal rainfa	all conditions (Y/N)	NO
Assessment area is on			NO
	(1/1.4)		
Sub-function Rating S	ummary		
unction	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-Surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Particulate Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Soluble Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Habitat	Physical Structure	Condition	MEDIUM
	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	HIGH
Function Rating Sumn	narv		
unction Rating Summ	Metrics/Notes		Rating
Hydrology	Condition		нідн
Nater Quality	Condition		HIGH
	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	NO
Habitat	Conditon		HIGH

	Training C	Calculator Version 4.1	
Wetland Site Name	TTA Wetland Y	Date 7/31/13	
Wetland Type	Basin Wetland	Assessor Name/Organization BP/STV	
Level III Ecoregion	Piedmont	Nearest Named Water Body Little Creek	
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit 03030002	
Yes No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) 35.914784, -78.9950	06
Please circle and/or ma appropriate, in recent p to the following. Hydrological mo Surface and sul septic tanks, un Signs of vegeta	past (for instance, approximately within 10 years) odifications (examples: ditches, dams, beauth-surface discharges into the wetland (examples ground storage tanks (USTs), hog lagoc	rs is apparent. Consider departure from reference, if ears). Noteworthy stressors include, but are not limited ver dams, dikes, berms, ponds, etc.) inples: discharges containing obvious pollutants, presence of nearby ons, etc.) insect damage, disease, storm damage, salt intrusion, etc.)	
Is the assessment are	ea intensively managed? [] Yes	· No	
Regulatory Considera	ations (select all that apply to the assess	ment area)	
 ✓ NCDWQ riparia ✓ Abuts a Primary ✓ Publicly owned ✓ N.C. Division of ✓ Abuts a stream ✓ Designated NC 	cted species or State endangered or threate in buffer rule in effect / Nursery Area (PNA) property Coastal Management Area of Environment	al Concern (AEC) (including buffer) elemental classifications of HQW, ORW, or Trout	
What type of natural s	stream is associated with the wetland, if	any? (check all that apply)	
Blackwater	,		
Brownwater Tidal (if tidal ch	eck one of the following boxes)	nar 🕝 Wind 🦳 Both	
i i i i i i i i i i i i i i i i i i i			
15 the assessment are		♠¹ NΩ	
le the secondaries are		No	™ No
	ea's surface water storage capacity or du	ration substantially altered by beaver?	⊙ No
		ration substantially altered by beaver?	™ No
1. Ground Surface Concects a box in early (VS) in the assess then rate the assess GS VS A A A A A A A A A A A A A A A A A A A	ea's surface water storage capacity or dust area experience overbank flooding during Condition/Vegetation Condition – assess ach column. Consider alteration to the grownent area. Compare to reference wetland assment area based on evidence of an effect of severely altered everely altered over a majority of the assess dimentation, fire-plow lanes, skidder tracks,	ration substantially altered by beaver? Ing normal rainfall conditions? Tyes No Insert area condition metric und surface (GS) in the assessment area and vegetation structure if applicable (see User Manual). If a reference is not applicable, t. Insert area (ground surface alteration examples: vehicle tracks, exceed bedding, fill, soil compaction, obvious pollutants) (vegetation structure, herbicides, salt intrusion [where appropriate], exotic species, grazin	essive Ire
Does the assessment 1. Ground Surface Coneck a box in earth (VS) in the assessment then rate the assessment then rate the assessment then rate the assessment then rate the assessment then rate the assessment then rate the assessment then rate the assessment then rate the assessment then rate the assessment then rate the assessment then rate the assessment then rate the assessment then rate the assessment then rate the assessment then rate the assessment the assessment the rate of	ca's surface water storage capacity or dust area experience overbank flooding during Condition/Vegetation Condition — assess ach column. Consider alteration to the grown area. Compare to reference wetland assment area based on evidence of an effect of severely altered everely altered everely altered everely altered exercises dimentation, fire-plow lanes, skidder tracks, the eration examples: mechanical disturbance as diversity [if appropriate], hydrologic altered exercises and consider surface storage capacity and Duration—ach column. Consider surface storage capacity in considered to affect surface water only, while account of the consider tidal flooding regime, if applicable atter storage capacity and duration are not a later storage capacity or duration are altered atter storage capacity or duration are substater in the capacity or duration are capacity or duration are capacity or durati	ration substantially altered by beaver? In genormal rainfall conditions? In Yes In	essive ire g,
1. Ground Surface Coheck a box in each (VS) in the assess then rate the assess the	ca's surface water storage capacity or dust area experience overbank flooding during Condition/Vegetation Condition – assess ach column. Consider alteration to the grownent area. Compare to reference wetland assment area based on evidence of an effect of severely altered everely altere	ration substantially altered by beaver? Ing normal rainfall conditions? Ing normal rainfall conditions? Ing yes Ing normal rainfall conditions? Ing yes Ing normal rainfall conditions? Ing yes I	essive are g,
1. Ground Surface Coheck a box in early (VS) in the assess then rate the assess th	ca's surface water storage capacity or dust area experience overbank flooding during Condition/Vegetation Condition – assess ach column. Consider alteration to the grownent area. Compare to reference wetland assment area based on evidence of an effect of severely altered everely altere	ration substantially altered by beaver? Ing normal rainfall conditions? The No Imment area condition metric und surface (GS) in the assessment area and vegetation structure if applicable (see User Manual). If a reference is not applicable, it. Imment area (ground surface alteration examples: vehicle tracks, exceed bedding, fill, soil compaction, obvious pollutants) (vegetation structure, herbicides, salt intrusion [where appropriate], exotic species, grazing tition) - assessment area condition metric pacity and duration (Surf) and sub-surface storage capacity and cology. Refer to the current NRCS lateral effect of ditching guidance ebsite) for the zone of influence of ditches in hydric soils. A ditch a ditch is a ditch is a lateral effect both surface and ditch is a lateral effect. In but not substantially (typically, not sufficient to change vegetation) antially altered (typically, alteration sufficient to result in vegetation impaction, filling, excessive sedimentation, underground utility lines). In the appropriate storage for the assessment area (AA) and the wetlands only) the appropriate storage for the assessment area (AA) and the wetlands only water 3 to 6 inches deep are to pond water 3 to 6 inches deep are deep deep deep deep deep deep deep de	essive are g,

	Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for
	regional indicators.
	4a. CA Sandy soil By Bullian Sandy soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
	 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) C Loamy or clayey soils not exhibiting redoximorphic features
	🌅 D 👚 Loamy or clayey gleyed soil
	E Histosol or histic epipedon
	4b. A Soil ribbon < 1 inch
	Soil ribbon ≥1 inch
	4c. A No peat or muck presence B A peat or muck presence
5.	Discharge into Wetland – opportunity metric
	Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub).
	Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub
	A Little or no evidence of pollutants or discharges entering the assessment area
	B Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the
	treatment capacity of the assessment area TC TC Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and
	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive
	sedimentation, odor)
6.	Land Use – opportunity metric
	Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources
	draining to assessment area within entire upstream watershed (WS), within 5 miles <u>and</u> within the watershed draining to the assessment area (5M), and within 2 miles <u>and</u> within the watershed draining to the assessment area (2M). Effective riparian buffers
	are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.
	WS 5M 2M □ A □ A ≥10% impervious surfaces
	FAFA ≥10% impervious surfaces FBFB FB < 10% impervious surfaces
	C C C Confined animal operations (or other local, concentrated source of pollutants)
	「□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
	FEFF ≥20% coverage of agricultural land (regularly plowed land) FFFFF ≥20% coverage of maintained grass/herb
	「G 「G ≥20% coverage of clear-cut land
	F H F H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.	Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric
	7a. Is assessment area within 50 feet of a tributary or other open water?
	Yes FNo If Yes, continue to 7b. If No, skip to Metric 8. Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland.
	Record a note if a portion of the buffer has been removed or disturbed.
	7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
	☐ A ≥50 feet ☐ B From 30 to < 50 feet
	C From 15 to < 30 feet
	□ D From 5 to < 15 feet
	E < 5 feet or buffer bypassed by ditches 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
	7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water? Tyes Tyo
	7e. Is tributary or other open water sheltered or exposed?
	Sheltered – adjacent open water with width < 2500 feet <u>and</u> no regular boat traffic. Exposed – adjacent open water with width ≥2500 feet <u>or</u> regular boat traffic.
8.	Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT)
	and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.
	WT WC
	A A ≥100 feet B B From 80 to < 100 feet
	C C From 50 to < 80 feet
	CD CD From 40 to < 50 feet
	☐ E ☐ F From 30 to < 40 feet ☐ F ☐ F From 15 to < 30 feet
	CG CG From 5 to < 15 feet
	H H < 5 feet

4. Soil Texture/Structure – assessment area condition metric

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. Answer for assessment area dominant landform. Buildence of short-duration inundation (< 7 consecutive days) Buildence of saturation, without evidence of inundation Buildence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). CA Sediment deposition is not excessive, but at approximately natural levels. Sediment deposition is excessive, but not overwhelming the wetland. CC Sediment deposition is excessive and is overwhelming the wetland.
	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) CA CA CA ≥500 acres CB CB CB From 100 to < 500 acres CC CC CC From 50 to < 100 acres CD CD CD From 25 to < 50 acres CB CB CB From 10 to < 25 acres CB CB CB From 10 to < 25 acres CB CB CB From 5 to < 10 acres CB CB CB From 5 to < 10 acres CB CB CB From 1 to < 5 acres CB CB CB From 0.5 to < 1 acre CB CB CB From 0.1 to < 0.5 acre CB CB CB From 0.01 to < 0.1 acre CB CB CB CB From 0.01 to < 0.1 acre CB CB CB CB From 0.01 to < 0.1 acre CB CB CB CB From 0.01 to < 0.1 acre CB CB CB CB CB From 0.01 to < 0.1 acre CB CB CB CB CB From 0.01 to < 0.1 acre CB CB CB CB CB CB From 0.01 to < 0.1 acre CB CB CB CB CB CB CB CB CB CB CB CB CB C
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) ☐ A Pocosin is the full extent (≥90%) of its natural landscape size. ☐ B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥500 acres B B From 100 to < 500 acres C C C From 50 to < 100 acres D D From 10 to < 50 acres E E E < 10 acres F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
	 Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) ⚠ A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. ⚠ B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. ⚠ C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present? ☐ No Yes Yes If Yes, continue to 17b. If No, skip to Metric 18. 17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands. ≥25% coverage of vegetation В < 25% coverage of vegetation 17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. WT Canopy closed, or nearly closed, with natural gaps associated with natural processes \square A ŒB □C Canopy present, but opened more than natural gaps Canopy sparse or absent Mid-Story Dense mid-story/sapling layer Moderate density mid-story/sapling layer Mid-story/sapling layer sparse or absent Dense shrub laver Moderate density shrub layer Shrub layer sparse or absent Dense herb layer Moderate density herb layer В Herb layer sparse or absent 18. Snags - wetland type condition metric Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). ☐ A B Not A 19. Diameter Class Distribution - wetland type condition metric Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. C Majority of canopy trees are < 6 inches DBH or no trees. 20. Large Woody Debris - wetland type condition metric Include both natural debris and man-placed natural debris.

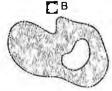
Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).

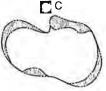
Not A

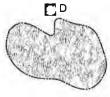
21. Vegetation/Open Water Dispersion - wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.









22. Hydrologic Connectivity - assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive

ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

Overbank and overland flow are not severely altered in the assessment area.

Overbank flow is severely altered in the assessment area.

C Overland flow is severely altered in the assessment area.

Both overbank and overland flow are severely altered in the assessment area.

Wetland Y is a palustrine forested wetland located adjacent to George King Road. Wetland Y is an isolated basin located in an upland forest

Wetland Site Name	TTA Wetland Y	Date	7/31/13
Wetland Type	Basin Wetland	Assessor Name/Organization	BP/STV
Notes on Field Assessm			YES
Presence of regulatory of	considerations (Y/N)		YES
Vetland is intensively m	nanaged (Y/N)		NO
Assessment area is loca	ated within 50 feet of a natural tributary or othe	er open water (Y/N)	NO
Assessment area is sub	stantially altered by beaver (Y/N)		NO
Assessment area experi	iences overbank flooding during normal rainfa	Il conditions (Y/N)	NO
Assessment area is on a	a coastal island (Y/N)		NO
Sub-function Rating S	ummary		
unction	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	NA
	Sub-Surface Storage and Retention	Condition	NA
Vater Quality	Pathogen Change	Condition	NA
•		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Particulate Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	NA
	Colubia Chango	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Physical Change	Condition	NA
	1 Hysical Change	Condition/Opportunity	NA NA
		Opportunity Presence? (Y/N)	NA NA
	Pollution Change	Condition	MEDIUM
	Pollution Change	Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	YES
	Physical Structure	Condition	HIGH
Tabilal	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	HIGH
		Condition	
Function Rating Sumn Function	nary Metrics/Notes		Rating
Hydrology	Condition		HIGH
Vater Quality	Condition		MEDIUM
•	Condition/Opportunity		MEDIUM
	Opportunity Presence?	(Y/N)	YES
⊣abitat	Conditon		MEDIUM

Rating Calculator Version 4.1 Date 09/19/13 Wetland Site Name TTA Wetland YY • Assessor Name/Organization BP/STV Wetland Type Non-Tidal Freshw ater Marsh ▼ Nearest Named Water Body Chapel Creek Level III Ecoregion Piedmont • River Basin Cape Fear USGS 8-Digit Catalogue Unit 03030002 Latitude/Longitude (deci-degrees) 35.905386, -79.01855 • Yes No Precipitation within 48 hrs? Evidence of stressors affecting the assessment area (may not be within the assessment area) Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following. · Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.) · Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.) · Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.) • Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.) Is the assessment area intensively managed? Yes No. Regulatory Considerations (select all that apply to the assessment area) Anadromous fish Federally protected species or State endangered or threatened species アーニー NCDWQ riparian buffer rule in effect Abuts a Primary Nursery Area (PNA) Publicly owned property N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout Designated NCNHP reference community Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream What type of natural stream is associated with the wetland, if any? (check all that apply) Blackwater Brownwater **Both** Tidal (if tidal, check one of the following boxes) Lunar Lunar Wind | Is the assessment area on a coastal island? Yes ■ No Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No Ground Surface Condition/Vegetation Condition - assessment area condition metric Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect. GS VS **Ω** A □ B Not severely altered • A Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive ГВ sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) Surface and Sub-Surface Storage Capacity and Duration - assessment area condition metric Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable. Surf Sub **⊙** A A Water storage capacity and duration are not altered. B C Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). ∏В Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation C change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only) Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT). AA WT CA CA Majority of wetland with depressions able to pond water > 1 foot deep В Majority of wetland with depressions able to pond water 6 inches to 1 foot deep ΕВ Majority of wetland with depressions able to pond water 3 to 6 inches deep C **.** □ D Depressions able to pond water < 3 inches deep Evidence that maximum depth of inundation is greater than 2 feet 3b. 🗀 A Evidence that maximum depth of inundation is between 1 and 2 feet

16	4.	Soil Texture/Structure – assessment area condition metric Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape
		feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for
		regional indicators. 4a. [A Sandy soil
		Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) Loamy or clayey soils not exhibiting redoximorphic features Loamy or clayey gleyed soil
		E Histosol or histic epipedon
		4b. ☐ A Soil ribbon < 1 inch ☐ B Soil ribbon ≥1 inch
		4c. A No peat or muck presence A peat or muck presence
	5.	Discharge into Wetland – opportunity metric
		Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub
		Little or no evidence of pollutants or discharges entering the assessment area By By By By By Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the
		treatment capacity of the assessment area Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
	•	Land Use – opportunity metric
	U .	Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles <u>and</u> within the watershed draining to the assessment area (5M), and within 2 miles <u>and</u> within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.
		WS 5M 2M
		□ A □ A ≥10% impervious surfaces □ B □ B < 10% impervious surfaces
		C C C Confined animal operations (or other local, concentrated source of pollutants)
		□ □ □ □ □ ≥20% coverage of pasture
		F F F ≥20% coverage of agricultural land (regularly plowed land) ≥20% coverage of maintained grass/herb
		G G G ≥20% coverage of clear-cut land
		H H H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
	7.	Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water?
		Yes No If Yes, continue to 7b. If No, skip to Metric 8. Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland Record a note if a portion of the buffer has been removed or disturbed.
		7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer.
		C A ≥50 feet B From 30 to < 50 feet
		B From 30 to < 50 feet C From 15 to < 30 feet D From 5 to < 15 feet
		E < 5 feet or buffer bypassed by ditches
		7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
		[≤15-feet wide
		7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water? Yes No
		7e. Is tributary or other open water sheltered or exposed?
		Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic. Exposed – adjacent open water with width ≥2500 feet or regular boat traffic.
	8.	Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT)
		and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.
		_ A _ A ≥100 feet
		B From 80 to < 100 feet
		C C From 50 to < 80 feet D D From 40 to < 50 feet
		E E From 30 to < 40 feet
		F F From 15 to < 30 feet
		☐ G ☐ G From 5 to < 15 feet
		TH TH < 5 feet

9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. A Evidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. B Sediment deposition is excessive, but not overwhelming the wetland. C Sediment deposition is excessive and is overwhelming the wetland.
	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) CA CA ≥500 acres CB CB CB From 100 to < 500 acres CC CC From 50 to < 100 acres CD CD From 25 to < 50 acres CE CE CE From 10 to < 25 acres CF CF CF From 5 to < 10 acres CG CG CG From 1 to < 5 acres CH CH CH CH From 0.5 to < 1 acre CI CI CI From 0.1 to < 0.5 acre CI CI CI From 0.01 to < 0.1 acre CI CI CI From 0.01 to < 0.1 acre CI CI CI CI CI From 0.01 to < 0.1 acre CI CI CI CI CI CI CI Acree CI CI CI CI CI CI CI CI CI CI CI CI CI C
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥90%) of its natural landscape size. □ B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres D From 10 to < 50 acres E E E < 10 acres F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
	 Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) ☑ A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. ☑ B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. ☑ C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

17.	Vegetative Structure – assessment area/wetland type condition metric
	17a. Is vegetation present? Provided Types Provide
	17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ☐ A ≥25% coverage of vegetation ☐ B < 25% coverage of vegetation
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT
	A Canopy closed, or nearly closed, with natural gaps associated with natural processes B CB Canopy present, but opened more than natural gaps C C C Canopy sparse or absent
	C C Mid-story/sapling layer sparse or absent
	CA Dense shrub layer B B B Moderate density shrub layer C C C Shrub layer sparse or absent
	C C C Herb layer sparse or absent
18.	Snags – wetland type condition metric Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A
	Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
	Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.
20.	Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A
21.	Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. C A C C D
22.	Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. A Overbank and overland flow are not severely altered in the assessment area. Overbank flow is severely altered in the assessment area. Overland flow is severely altered in the assessment area. Both overbank and overland flow are severely altered in the assessment area.

Notes

Wetland YY is a palustrine emergent wetland located adjacent to Finley Golf Course Road and upland forest. Wetland YY provides the headwaters to Stream SS.

Wetland Site Name _	TTA Wetland YY	_ Date	09/19/13
Wetland Type _	Non-Tidal Freshwater Marsh	Assessor Name/Organization	BP/STV
Notes on Field Assessm	nent Form (Y/N)		YES
Presence of regulatory of	· ·		YES
Wetland is intensively m	, ,		NO
	ated within 50 feet of a natural tributary or other	er open water (Y/N)	YES
	stantially altered by beaver (Y/N)	or open water (1714)	NO
	iences overbank flooding during normal rainfa	Il conditions (V/N)	NO
Assessment area is on a		in conditions (1774)	NO
ASSESSMENT LICE IS ON E	a doddan idiana (1714)		NO
Sub-function Rating S	ummary		
Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	NA
	Sub-Surface Storage and Retention	Condition	NA
Water Quality	Pathogen Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Particulate Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Physical Change	Condition	NA
	,	Condition/Opportunity	NA NA
		Opportunity Presence? (Y/N)	NA
	Pollution Change	Condition	- NA
	Ÿ	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Physical Structure	Condition	MEDIUM
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	MEDIUM
Franchisco Bullion C			
Function Rating Summ Function	Metrics/Notes		Rating
Hydrology	Condition		нідн
Nater Quality	Condition		MEDIUM
-	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	YES
			MEDIUM

MEDIUM

Overall Wetland Rating

			Rating Calculato	or Version 4.1	
W	etland Site Name	TTA Wetland YYY		_ Daf	te 1/22/14
	Wetland Type	Bottomland Hardwood Fores	t 💌	Assessor Name/Organizatio	n BP -STV
L	evel III Ecoregion	Piedmont	▼	Nearest Named Water Bod	ly New Hope Creek
	River Basin	Cape Fear	•	USGS 8-Digit Catalogue Un	it 03030002
	Yes N	o Precipitation within 48 hrs	?	Latitude/Longitude (deci-degrees	s) 35.953209, -78.978240
Plea app to the state of the st	ase circle and/or m ropriate, in recent p re following. Hydrological m Surface and su septic tanks, ur Gigns of vegeta Habitat/plant co ne assessment are Anadromous fis Federally prote NCDWQ riparia Abuts a Primar Publicly owned N.C. Division o Abuts a stream Designated NC Abuts a 303(d)	past (for instance, approximately odifications (examples: ditches, ib-surface discharges into the wonderground storage tanks (USTs ation stress (examples: vegetationmunity alteration (examples: ea intensively managed? ations (select all that apply to shooted species or State endangered buffer rule in effect y Nursery Area (PNA) property f Coastal Management Area of E	e of stressors is apparation within 10 years). No dams, beaver dams etland (examples: diss), hog lagoons, etc.) on mortality, insect d mowing, clear-cutting. Yes No the assessment are ed or threatened specifically of the stream and	arent. Consider departure from referoteworthy stressors include, but are referoteworthy stressors include, but are referonce, dikes, berms, ponds, etc.) scharges containing obvious pollutant damage, disease, storm damage, salt g, exotics, etc.) ea) cies ern (AEC) (including buffer) I classifications of HQW, ORW, or Tr	not limited ts, presence of nearby t intrusion, etc.)
Is the Doctor	Blackwater Brownwater Tidal (if tidal, cl he assessment ar he assessment ar es the assessmen Ground Surface Check a box in e (VS) in the assess then rate the asses GS VS A A A N B B S al	heck one of the following boxes) ea on a coastal island? ea's surface water storage cap t area experience overbank flo Condition/Vegetation Condition each column. Consider alteration essment area. Compare to reference essment area based on evidence oot severely altered everely altered everely altered over a majority of edimentation, fire-plow lanes, sk teration examples: mechanical	Lunar Yes No pacity or duration so poding during norm on – assessment are on to the ground surfa- nce wetland if applica- e of an effect. If the assessment are didder tracks, bedding disturbance, herbicid	Wind Both Ubstantially altered by beaver? It rainfall conditions?	e is not applicable, es: vehicle tracks, excessive ants) (vegetation structure
2.	Surface and Sub Check a box in eduration (Sub). (North Carolina hy ≤1 foot deep is consub-surface water Surf Sub A A A W B B B W C C C W	Consider both increase and decredric soils (see USACE Wilmingtonsidered to affect surface water. Consider tidal flooding regime. Vater storage capacity and durativater storage capacity or duratio vater storage capacity or duratio vater storage capacity or duratio	d Duration – assess e storage capacity and rease in hydrology. Fon District website) for on Only, while a ditch is if applicable. ion are not altered. In are altered, but not on are substantially altered.	sment area condition metric d duration (Surf) and sub-surface sto Refer to the current NRCS lateral effe or the zone of influence of ditches in > 1 foot deep is expected to affect bo t substantially (typically, not sufficient tered (typically, alteration sufficient to n, filling, excessive sedimentation, un	ect of ditching guidance for hydric soils. A ditch oth surface and ditch to change vegetation).
3.	Water Storage/S Check a box in e type (WT). AA WT 3a. A A B B B C C C	each column for each group be Majority of wetland with dep	elow. Select the apprendictions able to pond		rsh wetlands only) area (AA) and the wetland

C Evidence that maximum depth of inundation is less than 1 foot

4.	Check a hox	from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape
		e soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for
	regional indic	
		Sandy soil
		Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
		Loamy or clayey soils not exhibiting redoximorphic features Loamy or clayey gleyed soil
		Histosol or histic epipedon
	==	Soil ribbon < 1 inch Soil ribbon ≥1 inch
		No peat or muck presence
	БВ	A peat or muck presence
5.		to Wetland – opportunity metric
		in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub).
	Surf Sub	sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.
		Little or no evidence of pollutants or discharges entering the assessment area
	EA EA	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the
	., .,	treatment capacity of the assessment area
	Ec Ec	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and
		potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive
		sedimentation, odor)
6.		ppportunity metric
		at apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources
	draining to as	sessment area within entire upstream watershed (WS), within 5 miles <u>and</u> within the watershed draining to the
		area (5M), and within 2 miles <u>and</u> within the watershed draining to the assessment area (2M). Effective riparian buffers and to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.
	WS 5M	2M
	VA VA	✓ A ≥10% impervious surfaces
	Гв Гв	☐ B < 10% impervious surfaces
		C Confined animal operations (or other local, concentrated source of pollutants)
		D ≥20% coverage of pasture
		 E ≥20% coverage of agricultural land (regularly plowed land) F ≥20% coverage of maintained grass/herb
	, , , ,	F \ge 20% Coverage of maintained grassment
	Le Le	
		「G ≥20% coverage of clear-cut land
		☐ G ≥20% coverage of clear-cut land
7	Гн Гн	 G ≥20% coverage of clear-cut land H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.	ГН ГН Wetland Act	 ☐ G ≥20% coverage of clear-cut land ☐ H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations
7.	Wetland Act 7a. Is asset Yes	G ≥20% coverage of clear-cut land Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. Ing as Vegetated Buffer – assessment area/wetland complex condition metric issment area within 50 feet of a tributary or other open water? FNo If Yes, continue to 7b. If No, skip to Metric 8.
7.	Wetland Act 7a. Is asset Tyes Wetland	G ≥20% coverage of clear-cut land Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. Ing as Vegetated Buffer – assessment area/wetland complex condition metric issment area within 50 feet of a tributary or other open water? No If Yes, continue to 7b. If No, skip to Metric 8. It buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland.
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7.	Wetland Act 7a. Is asser Yes Wetland Record 7b. How me	G ≥20% coverage of clear-cut land Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. Ing as Vegetated Buffer – assessment area/wetland complex condition metric issment area within 50 feet of a tributary or other open water? No If Yes, continue to 7b. If No, skip to Metric 8. It buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. In a note if a portion of the buffer has been removed or disturbed. In of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. ≥50 feet
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7.	Wetland Act 7a. Is asset Yes Wetland Record 7b. How me A B C D E	G ≥20% coverage of clear-cut land Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. Ing as Vegetated Buffer – assessment area/wetland complex condition metric issment area within 50 feet of a tributary or other open water? No If Yes, continue to 7b. If No, skip to Metric 8. It buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. In a note if a portion of the buffer has been removed or disturbed. In of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. ≥50 feet From 30 to < 50 feet From 15 to < 30 feet From 5 to < 15 feet < 5 feet or buffer bypassed by ditches
7.	Wetland Act 7a. Is asset Yes Wetland Record 7b. How me A B C D E 7c. Tributar	G ≥20% coverage of clear-cut land Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. Ing as Vegetated Buffer – assessment area/wetland complex condition metric issment area within 50 feet of a tributary or other open water? No If Yes, continue to 7b. If No, skip to Metric 8. It buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. In a note if a portion of the buffer has been removed or disturbed. In order that is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. ≥50 feet From 30 to < 50 feet From 15 to < 30 feet From 5 to < 15 feet < 5 feet or buffer bypassed by ditches y width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
7.	Wetland Act 7a. Is asset Yes Wetland Record 7b. How me A B C D E 7c. Tributar	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. Ing as Vegetated Buffer – assessment area/wetland complex condition metric issment area within 50 feet of a tributary or other open water? No If Yes, continue to 7b. If No, skip to Metric 8. Ib buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. In a note if a portion of the buffer has been removed or disturbed. Inch of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. ≥50 feet From 30 to < 50 feet From 15 to < 30 feet From 5 to < 15 feet < 5 feet or buffer bypassed by ditches y width. If the tributary is anastomosed, combine widths of channels/braids for a total width. If the tributary is anastomosed, combine widths of channels/braids for a total width. If the tributary is anastomosed, combine widths of channels/braids for a total width. If the tributary is anastomosed, combine widths of channels/braids for a total width. If the tributary is anastomosed, combine widths of channels/braids for a total width. If the tributary is anastomosed, combine widths of channels/braids for a total width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
7.	Wetland Act 7a. Is asset	Eittle or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. Ing as Vegetated Buffer – assessment area/wetland complex condition metric is ment area within 50 feet of a tributary or other open water? FNo If Yes, continue to 7b. If No, skip to Metric 8. If buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. In a note if a portion of the buffer has been removed or disturbed. In the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. ≥50 feet From 30 to < 50 feet From 5 to < 30 feet From 5 to < 15 feet < 5 feet or buffer bypassed by ditches y width. If the tributary is anastomosed, combine widths of channels/braids for a total width. If the tributary is anastomosed, combine water (no tributary present) s of assessment area vegetation extend into the bank of the tributary/open water?
7.	Wetland Act 7a. Is asset Yes Wetland Record 7b. How me A B C C D E 7c. Tributar C ≤15- 7d. Do root Yes	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. Ing as Vegetated Buffer – assessment area/wetland complex condition metric issment area within 50 feet of a tributary or other open water? No If Yes, continue to 7b. If No, skip to Metric 8. It buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. In onte if a portion of the buffer has been removed or disturbed. In of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. ≥50 feet From 30 to < 50 feet From 5 to < 30 feet From 5 to < 30 feet From 5 to < 15 feet < 5 feet or buffer bypassed by ditches y width. If the tributary is anastomosed, combine widths of channels/braids for a total width. If the tributary is anastomosed, combine widths of the tributary present) s of assessment area vegetation extend into the bank of the tributary/open water? No
7.	Wetland Act 7a. Is asses	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. Ing as Vegetated Buffer – assessment area/wetland complex condition metric issment area within 50 feet of a tributary or other open water? No If Yes, continue to 7b. If No, skip to Metric 8. It buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. In a note if a portion of the buffer has been removed or disturbed. It is not if the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. So feet From 30 to < 50 feet From 5 to < 30 feet From 5 to < 15 feet The tributary is anastomosed, combine widths of channels/braids for a total width. If the tributary is anastomosed, combine widths of channels/braids for a total width. If the tributary is anastomosed, combine widths of the tributary present) is of assessment area vegetation extend into the bank of the tributary/open water? No arey or other open water sheltered or exposed? erred – adjacent open water with width < 2500 feet and no regular boat traffic.
7.	Wetland Act 7a. Is asses	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. Ing as Vegetated Buffer – assessment area/wetland complex condition metric issment area within 50 feet of a tributary or other open water? No If Yes, continue to 7b. If No, skip to Metric 8. It buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. In onte if a portion of the buffer has been removed or disturbed. In of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. ≥50 feet From 30 to < 50 feet From 5 to < 30 feet From 5 to < 30 feet From 5 to < 15 feet < 5 feet or buffer bypassed by ditches y width. If the tributary is anastomosed, combine widths of channels/braids for a total width. If the tributary is anastomosed, combine widths of the tributary present) s of assessment area vegetation extend into the bank of the tributary/open water? No
	Wetland Act 7a. Is asset	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. Ing as Vegetated Buffer – assessment area/wetland complex condition metric improve water area within 50 feet of a tributary or other open water? No If Yes, continue to 7b. If No, skip to Metric 8. Ibuffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. In or if a portion of the buffer has been removed or disturbed. In or if if if if if if if if if if if if if
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	Wetland Act 7a. Is asses	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent area. Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent area. Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent area. Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent area. Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent area. Little or no opportunity to prevent area. Little or no opportunity to prevent area. Little or no opportunity may result from hydrologic alterations that prevent area. Little or no opportunity may result from hydrologic alterations. Little or no opportunity may result from hydrologic alterations. Little or no opportunity may result from hydrologic alterations. Little or no opportunity may result from the assessment area. Little or no opportunity may result from hydrologic alterations. Little or no opportunity may result from the assessment area. Little or no opportunity opportunity may result from the assessment area. Little or no opp
	Wetland Act 7a. Is asset	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. In gas Vegetated Buffer – assessment area/wetland complex condition metric issment area within 50 feet of a tributary or other open water? □ No If Yes, continue to 7b. If No, skip to Metric 8. It buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. In one if a portion of the buffer has been removed or disturbed. In other first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. ≥50 feet From 30 to < 50 feet From 5 to < 30 feet From 5 to < 15 feet < 5 feet or buffer bypassed by ditches y width. If the tributary is anastomosed, combine widths of channels/braids for a total width. If the tributary is anastomosed, combine widths of the tributary present) so of assessment area vegetation extend into the bank of the tributary/open water? □ No arry or other open water sheltered or exposed? ered – adjacent open water with width ≥2500 feet and no regular boat traffic. sed – adjacent open water with width ≥2500 feet or regular boat traffic. Ith at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) in each column. Select the average width for the wetland type at the assessment area (WT) ind complex at the assessment areas (WC). See User Manual for WT and WC boundaries.
	Wetland Act 7a. Is asset	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. In gas Vegetated Buffer – assessment area/wetland complex condition metric issment area within 50 feet of a tributary or other open water? No If Yes, continue to 7b. If No, skip to Metric 8. It buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. In other first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. 50 feet From 30 to < 50 feet From 15 to < 30 feet From 15 to < 30 feet From 15 to < 30 feet From 15 feet or buffer bypassed by ditches y width. If the tributary is anastomosed, combine widths of channels/braids for a total width. If the tributary is anastomosed, combine widths of channels/braids for a total width. If the tributary is anastomosed, combine widths of the tributary present) So assessment area vegetation extend into the bank of the tributary/open water? No ary or other open water sheltered or exposed? ered – adjacent open water with width < 2500 feet and no regular boat traffic. Ith at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) in each column. Select the average width for the wetland type at the assessment area (WT) and complex at the assessment areas (WC). See User Manual for WT and WC boundaries.
	Wetland Act 7a. Is asses	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. In gas Vegetated Buffer − assessment area/wetland complex condition metric is sment area within 50 feet of a tributary or other open water? ENO If Yes, continue to 7b. If No, skip to Metric 8. It buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. a note if a portion of the buffer has been removed or disturbed. In of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. ≥50 feet From 30 to < 50 feet From 5 to < 15 feet <5 feet or buffer bypassed by ditches y width. If the tributary is anastomosed, combine widths of channels/braids for a total width. feet wide
	Wetland Act 7a. Is asses	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. Ing as Vegetated Buffer – assessment area/wetland complex condition metric is improvement area within 50 feet of a tributary or other open water? In No If Yes, continue to 7b. If No, skip to Metric 8. Ibuffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. In ord if a portion of the buffer has been removed or disturbed. In of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. ≥50 feet From 30 to < 50 feet From 30 to < 50 feet From 35 to < 15 feet < 5 feet or buffer bypassed by ditches yo width. If the tributary is anastomosed, combine widths of channels/braids for a total width. If the tributary is anastomosed, combine widths of the tributary present) so of assessment area vegetation extend into the bank of the tributary/open water? No not not not not not not not not not not
	Wetland Act 7a. Is asses	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. Ing as Vegetated Buffer – assessment area/wetland complex condition metric issment area within 50 feet of a tributary or other open water? In No If Yes, continue to 7b. If No, skip to Metric 8. Ib uffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. a note if a portion of the buffer has been removed or disturbed. So feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. ≥50 feet From 30 to < 50 feet From 5 to < 15 feet < 5 feet or buffer bypassed by ditches ywidth. If the tributary is anastomosed, combine widths of channels/braids for a total width. Seet wide
	Wetland Act 7a. Is asses	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. Ing as Vegetated Buffer – assessment area/wetland complex condition metric is improvement area within 50 feet of a tributary or other open water? In No If Yes, continue to 7b. If No, skip to Metric 8. Ibuffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. In ord if a portion of the buffer has been removed or disturbed. In of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. ≥50 feet From 30 to < 50 feet From 30 to < 50 feet From 35 to < 15 feet < 5 feet or buffer bypassed by ditches yo width. If the tributary is anastomosed, combine widths of channels/braids for a total width. If the tributary is anastomosed, combine widths of the tributary present) so of assessment area vegetation extend into the bank of the tributary/open water? No not not not not not not not not not not
	Wetland Act 7a. Is asset	Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. Ing as Vegetated Buffer – assessment area/wetland complex condition metric is sment area within 50 feet of a tributary or other open water? If Yes, continue to 7b. If No, skip to Metric 8. Ibuffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. a note if a portion of the buffer has been removed or disturbed. In of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. ≥50 feet From 30 to < 50 feet From 15 to < 30 feet From 30 to < 50 feet From 5 to < 15 feet < 5 feet or buffer bypassed by ditches If the tributary is anastomosed, combine widths of channels/braids for a total width. If the tributary is anastomosed, combine widths of channels/braids for a total width. If the tributary is anastomosed, combine widths of the tributary present) So of assessment area vegetation extend into the bank of the tributary/open water? No ary or other open water sheltered or exposed? ered – adjacent open water with width ≥2500 feet and no regular boat traffic. Ith at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) In each column. Select the average width for the wetland type at the assessment area (WT) Ind complex at the assessment areas (WC). See User Manual for WT and WC boundaries. ≥100 feet From 80 to < 100 feet From 50 to < 80 feet

9.	Inundat	tion Duration	– assessment area co	ndition metric			
			ent area dominant landfor				
			short-duration inundation				
	<u> </u>		saturation, without eviden		-1' /7 to 00		
	CC	Evidence of it	ong-duration inundation of	or very long-duration inunc	ation (7 to 30 consecutive days or	more)	
10.	Indicate	ors of Depos	ition – assessment area	a condition metric			
	Conside	er recent depo	sition only (no plant grov	vth since deposition).			
		Sediment dep	position is not excessive,	but at approximately natu	ral levels.		
	☐ B	Sediment dep	position is excessive, but	not overwhelming the we	land.		
	C	Sediment der	position is excessive and	is overwhelming the wetla	ınd.		
11	Wetland	d Size – wetl:	and type/wetland comp	lex condition metric			
•••					ent. This metric evaluates three as	pects of the wetland area: the	
		Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User					
					. If assessment area is clear-cut,		
	,		if applicable)		•		
		GA GA	≥500 acres				
	== :	В В	From 100 to < 500 acr	res			
	C	CC CC	From 50 to < 100 acre	es			
	D i		From 25 to < 50 acres	;			
	∰E .		From 10 to < 25 acres	;			
	F	er Eller Eller Eller	From 5 to < 10 acres				
	G	gg gg	From 1 to < 5 acres				
	⊘ Η ∣	ODH CH	From 0.5 to < 1 acre				
			From 0.1 to < 0.5 acre				
			From 0.01 to < 0.1 ac				
	EK ∤	EK EK	< 0.01 acre or assess	ment area is clear-cut			
12.	Wetland	d Intactness	- wetland type conditio	n metric (evaluate for P	ocosins only)		
			e full extent (≥90%) of its				
	B B	Pocosin is < 9	90% of the full extent of it	ts natural landscape size.			
12		tivity to Othe	er Natural Areas – lands	sana condition matria			
	eva	aluates wheth	er the wetland is well co	nnected (Well) and/or loos	umn). Involves a GIS effort with ely connected (Loosely) to the land oundaries are formed by four-lane	dscape patch, the contiguous	
	line	line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wider					
	W	,					
	9	A 🖪 A	≥500 acres				
	○	В 💽 В	From 100 to < 500 acres				
	<u></u>	C C	From 50 to < 100 acres				
	9	D D	From 10 to < 50 acres				
	9	E E	< 10 acres		and and brokettake		
	9	F 📴 F	vvetiand type has a poor	or no connection to other	natural naditats		
		aluate for ma	-				
	9	Yes 🌅 No	Wetland type has a surfa	ace hydrology connection	o open waters/stream or tidal wetl	ands.	
14.	Edge Et	ffect – wetlar	nd type condition metric	c (skip for all marshes)			
• • • •					vetland type boundary to artificial e	edges. Artificial edges include	
					egularly maintained utility line com		
			ain points of the compass				
	• A	No artificial ed	dge within 150 feet in all	directions		-	
	В			ır (4) to seven (7) directior			
	E A B C	An artificial ed	dge occurs within 150 fee	et in more than four (4) dir	ections <u>or</u> assessment area is clea	ır-cut	
15		ive Composi	tion — seeseement ares	condition matric (skin	or all marshes and Pine Flat)		
					their proportions. Lower strata co	omposed of appropriate	
						omposed of appropriate	
		species, with exotic plants absent or sparse within the assessment area. B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species					
	characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or						
					not dominant, over a large portion		
					ected species are unnaturally abse		
		characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in					
		at least one s	•	•			
16	Vocatat	ino Divorcit.	_ acceptement area	adition matria (avaluata	or Non-tidal Frachwater March	anly)	
10.		-		•	for Non-tidal Freshwater Marsh of species (<10% cover of exotics).	Jiny,	
		-		% to 50% cover of exotics	•		
	Ħc ·			cies (>50% cover of exotic			
		. 23344401110		,	- ,		

	ជ							
17.	Vegetative Structure – assessment area/wetland type condition metric							
	17a. Is vegetation present?							
	Yes No If Yes, continue to 17b. If No, skip to Metric 18.							
	17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ☐ A ≥25% coverage of vegetation ☐ B < 25% coverage of vegetation							
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.							
	AA WT Canopy closed, or nearly closed, with natural gaps associated with natural processes BCBC Canopy present, but opened more than natural gaps CCCC Canopy sparse or absent							
	☐ A ☐ A Dense mid-story/sapling layer ☐ B ☐ B Moderate density mid-story/sapling layer ☐ C ☐ C Mid-story/sapling layer sparse or absent							
	C A Dense shrub layer B B B Moderate density shrub layer C C Shrub layer sparse or absent							
	☐ A Dense herb layer ☐ B ☐ B Moderate density herb layer ☐ C ☐ C Herb layer sparse or absent							
18.	Snags – wetland type condition metric Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A							
19.	Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.							
	Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.							
20.	Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). B Not A							
21.	Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)							
	Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. CA C D							
22.	Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.							

Overbank <u>and</u> overland flow are not severely altered in the assessment area.

Overbank flow is severely altered in the assessment area.

C Overland flow is severely altered in the assessment area.

Both overbank and overland flow are severely altered in the assessment area.

Notes

Wetland YYY is a palustrine forested wetland located in the New Hope Creek floodplain.

Wetland Site Name	TTA Wetland YYY	Date	1/22/14		
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP -STV		
Notes on Field Assessm	ont Form (V/N)		YES		
			YES		
Presence of regulatory considerations (Y/N) Westered is intensively managed (Y/N)					
Wetland is intensively managed (Y/N) Assessment area is legated within 50 feet of a natural tributany or other open water. (Y/N)					
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) Assessment area is substantially altered by beaver (Y/N)					
Assessment area is substantially altered by beaver (Y/N) Assessment area experiences overbank flooding during normal rainfall conditions (Y/N)					
Assessment area is on a		in conditions (7777)	YES NO		
133633IIIGIIL AICA IS OII A	Coastarisiand (The)				
Sub-function Rating Su	ımmary				
unction	Sub-function	Metrics	Rating		
lydrology	Surface Storage and Retention	Condition	HIGH		
	Sub-Surface Storage and Retention	Condition	LOW		
Vater Quality	Pathogen Change	Condition	HIGH		
		Condition/Opportunity	HIGH		
		Opportunity Presence? (Y/N)	YES		
	Particulate Change	Condition	HIGH		
		Condition/Opportunity	HIGH		
		Opportunity Presence? (Y/N)	YES		
	Soluble Change	Condition	HIGH		
		Condition/Opportunity	HIGH		
		Opportunity Presence? (Y/N)	YES		
	Physical Change	Condition	LOW		
		Condition/Opportunity	LOW		
		Opportunity Presence? (Y/N)	YES		
	Pollution Change	Condition	- NA		
		Condition/Opportunity	NA		
		Opportunity Presence? (Y/N)	NA		
labitat	Physical Structure	Condition	HIGH		
	Landscape Patch Structure	Condition	HIGH		
	Vegetation Composition	Condition	HIGH		
unction Rating Summ	an.				
unction Rating Summ	Metrics/Notes		Rating		
lydrology					
Vater Quality	Condition/Opportunity Opportunity Presence? (Y/N)				
abitat Conditon			HIGH		

	Rating Calculat	tor version 4.1	
Wetland Site Name TT/	A Wetland Z	Date	7/31/13
Wetland Type B	ottomland Hardwood Forest	Assessor Name/Organization	BP/STV
Level III Ecoregion P	redmont 🔻	Nearest Named Water Body	Little Creek
River Basin C	ape Fear	USGS 8-Digit Catalogue Unit	03030002
Yes No I	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.913953, -78.996808
Evidence of stressors aff Please circle and/or make appropriate, in recent past to the following. Hydrological modifi Surface and sub-suseptic tanks, under Signs of vegetation Habitat/plant comm Is the assessment area in Regulatory Consideration Anadromous fish Federally protected NCDWQ riparian by NCDWQ riparian by Publicly owned proportion N.C. Division of Co Abuts a stream with Designated NCNHF Abuts a 303(d)-liste What type of natural stre Blackwater Brownwater	fecting the assessment area (may not be with note on last page if evidence of stressors is applications (examples: ditches, dams, beaver dam urface discharges into the wetland (examples: discharges into the wetland (examples: discharges into the wetland (examples: discharges into the wetland (examples: discharges into the wetland, if any? (discharges) into the wetland (examples: discharges) wegetation mortality, insect nunity alteration (examples: mowing, clear-cutting intensively managed? Tyes No Is species or State endangered or threatened specifies or State endangered or threatened specifies rule in effect ursery Area (PNA) perty astal Management Area of Environmental Concinna NCDWQ classification of SA or supplemental Preference community and stream or a tributary to a 303(d)-listed stream area is associated with the wetland, if any? (displayed)	hin the assessment area) parent. Consider departure from reference to the worthy stressors include, but are not us, dikes, berms, ponds, etc.) ischarges containing obvious pollutants.) damage, disease, storm damage, salt in ung, exotics, etc.) rea) ecies tern (AEC) (including buffer) al classifications of HQW, ORW, or Troughter than the check all that apply)	nce, if of limited , presence of nearby ntrusion, etc.)
Tidal (if tidal, check	cone of the following boxes)	C Wind C Both	
Is the assessment area o			.
Is the assessment area's	surface water storage capacity or duration	substantially altered by beaver?	Yes No
Does the assessment are	ea experience overbank flooding during nor	nal rainfall conditions?	Yes No
Check a box in each (VS) in the assessmenthen rate the assessmenthen rate the assessmenthen rate the assessmenthen rate the assessmenthen rate that assessmenthen rate as a second results of the control	ndition/Vegetation Condition – assessment and column. Consider alteration to the ground surent area. Compare to reference wetland if application area based on evidence of an effect. Reverely altered rely altered over a majority of the assessment and entation, fire-plow lanes, skidder tracks, beddiration examples: mechanical disturbance, herbic diversity [if appropriate], hydrologic alteration)	face (GS) in the assessment area and value (see User Manual). If a reference rea (ground surface alteration examples ag, fill, soil compaction, obvious pollutan	is not applicable, : vehicle tracks, excessive ts) (vegetation structure
Check a box in each duration (Sub). Cons North Carolina hydric ≤1 foot deep is consic sub-surface water. Co Surf Sub	rface Storage Capacity and Duration – assess column. Consider surface storage capacity and sider both increase and decrease in hydrology, soils (see USACE Wilmington District website) dered to affect surface water only, while a ditch onsider tidal flooding regime, if applicable. In storage capacity and duration are not altered, in storage capacity or duration are altered, but not restorage capacity or duration are substantially age) (examples: draining, flooding, soil compactions)	nd duration (Surf) and sub-surface stora Refer to the current NRCS lateral effect for the zone of influence of ditches in hy > 1 foot deep is expected to affect both of substantially (typically, not sufficient to altered (typically, alteration sufficient to	of ditching guidance for ydric soils. A ditch surface and ditch contact and co
•	ce Relief – assessment area/wetland type co column for each group below. Select the ap	•	
3a CA CA I	Majority of wetland with depressions able to por Majority of wetland with depressions able to por	•	
	Majority of wetland with depressions able to por Depressions able to pond water < 3 inches deep	nd water 3 to 6 inches deep	

4.	Soil Texture/Structure – assessment area condition metric Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators. 4a. A Sandy soil B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) C Loamy or clayey soils not exhibiting redoximorphic features
	D Loamy or clayey gleyed soil E Histosol or histic epipedon
	4b. ☐ A Soil ribbon < 1 inch ☐ B Soil ribbon ≥1 inch
	4c. A No peat or muck presence B A peat or muck presence
5.	Discharge into Wetland – opportunity metric Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub
	 A Little or no evidence of pollutants or discharges entering the assessment area B B Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Land Use – opportunity metric Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. WS 5M 2M VA A A ≥10% impervious surfaces C C C C C C Confined animal operations (or other local, concentrated source of pollutants) D D D D ≥20% coverage of pasture E E E E ≥20% coverage of agricultural land (regularly plowed land) F F F F S ≥20% coverage of maintained grass/herb G G G G S ≥20% coverage of clear-cut land H H H H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations
7.	that prevent drainage or overbank flow from affecting the assessment area. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water? Yes SNo If Yes, continue to 7b. If No, skip to Metric 8. Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland Record a note if a portion of the buffer has been removed or disturbed. 7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. A ≥50 feet B From 30 to < 50 feet C From 15 to < 30 feet D From 5 to < 15 feet E < 5 feet or buffer bypassed by ditches 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width. S15-feet wide S15-feet wide Other open water (no tributary present) 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water? Yes No 7e. Is tributary or other open water sheltered or exposed? Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic. Exposed – adjacent open water with width ≥2500 feet or regular boat traffic. Exposed – adjacent open water with width ≥2500 feet or regular boat traffic.
0.	Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries. WT WC A A ≥100 feet B B From 80 to < 100 feet C C From 50 to < 80 feet D D From 40 to < 50 feet E F From 30 to < 40 feet F F From 15 to < 30 feet C G G From 5 to < 15 feet H H H < 5 feet

9.	Inundation Duration – assessment area condition metric
	Answer for assessment area dominant landform.
	Evidence of short-duration inundation (< 7 consecutive days) Evidence of saturation, without evidence of inundation
	Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition).
	Sediment deposition is not excessive, but at approximately natural levels.
	B Sediment deposition is excessive, but not overwhelming the wetland.
	C Sediment deposition is excessive and is overwhelming the wetland.
11,	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the
	size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User
	Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.
	WT WC FW (if applicable)
	□ A □ A ≥500 acres
	CB CB From 100 to < 500 acres
	C C C From 50 to < 100 acres D D D From 25 to < 50 acres
	D D D From 25 to < 50 acres E E E From 10 to < 25 acres
	E E From 10 to < 25 acres
	GF GF From 5 to < 10 acres GG GG From 1 to < 5 acres
	GGGGFrom 1 to < 5 acres
	☐ H ☐ H From 0.5 to < 1 acre ☐ I ☐ I ☐ From 0.1 to < 0.5 acre ☐ J ☐ J From 0.01 to < 0.1 acre
	C C C From 50 to < 100 acres D D D From 25 to < 50 acres E E E From 10 to < 25 acres F F F F From 5 to < 10 acres G G G G From 1 to < 5 acres C H C H From 0.5 to < 1 acre I I I From 0.1 to < 0.5 acre G J J From 0.01 to < 0.1 acre C K K K K < 0.01 acre or assessment area is clear-cut
12	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)
12.	A Pocosin is the full extent (≥90%) of its natural landscape size.
	B Pocosin is < 90% of the full extent of its natural landscape size.
12	Connectivity to Other Natural Areas – landscape condition metric
13.	13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This
	evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous
	metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility
	line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.
	Well Loosely
	A ≥500 acres
	© B From 100 to < 500 acres C C From 50 to < 100 acres
	D D From 10 to < 50 acres
	E E < 10 acres
	F F Wetland type has a poor or no connection to other natural habitats
	13b. Evaluate for marshes only.
	Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
4.4	
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include
	non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts.
	Consider the eight main points of the compass.
	A No artificial edge within 150 feet in all directions
	B No artificial edge within 150 feet in four (4) to seven (7) directions
	An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)
	Yegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate
	species, with exotic plants absent or sparse within the assessment area.
	B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species
	characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or
	clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
	Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in
	at least one stratum.
4-	
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) T: A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
	Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).
	- · · · · · · · · · · · · · · · · · · ·

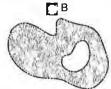
	£				
47		atativa C	4	consoment area buestand tune condition matric	
17.			ation prese	assessment area/wetland type condition metric nt?	
		Yes		If Yes, continue to 17b. If No, skip to Metric 18.	
	17b	ΠA	≥25% cove	overage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wet erage of vegetation erage of vegetation	lands.
	17c			ch column for each stratum. Evaluate this portion of the metric for non-marsh wetlands.	Consider structure
				he assessment area (AA) and the wetland type (WT) separately.	
		à C		Canopy closed, or nearly closed, with natural gaps associated with natural processes	
		oue 🔁		Canopy present, but opened more than natural gaps	
		Canc		Canopy sparse or absent	
		Story	A CA	Dense mid-story/sapling layer	
		Mid-Story Canopy	А <u>С</u> В С <u>С</u> С	Moderate density mid-story/sapling layer Mid-story/sapling layer sparse or absent	
				Dense shrub layer	
		Shrub	A ☐A B ⓒB C ☐C	Moderate density shrub layer	
				Shrub layer sparse or absent	
		e 📮	A CA	Dense herb layer	
		Herb	A CB CCC	Moderate density herb layer Herb layer sparse or absent	
40	en-			condition metric	
10.				orrettion metric are than one) are visible (> 12-inches DBH, or large relative to species present and landscape	stability).
	€ A	Not A	- '		• •
19.	Dia	meter Cla	ıss Distribi	ution – wetland type condition metric	
		-		by trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inc	hes DBH) are
	ПВ	prese		by trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.	
		Major		by trees are < 6 inches DBH or no trees.	
20.	Lar	ge Wood	y Debris –	wetland type condition metric	
		ude both i	natural debi	ris and man-placed natural debris.	
	€ A B		٠,	e than one) are visible (> 12 inches in diameter, or large relative to species present and lands	cape stability).

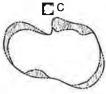
Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned

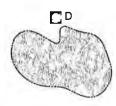
21. Vegetation/Open Water Dispersion - wetland type/open water condition metric (evaluate for Non-Tidal Freshwater

areas indicate vegetated areas, while solid white areas indicate open water.









22. Hydrologic Connectivity - assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive

ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

- Overbank and overland flow are not severely altered in the assessment area.
- Overbank flow is severely altered in the assessment area.
- Overland flow is severely altered in the assessment area.
- Both overbank and overland flow are severely altered in the assessment area.

Notes

Wetland Z is a palustrine forested/emergent wetland located in the floodplain forest of the Corps Waterfowl lands.

NC WAM Wetland Rating Sheet Accompanies User Manual Version 4.1 Rating Calculator Version 4.1

Wetland Site Name	TTA Wetland Z	Date	7/31/13
Wetland Type_	Bottomland Hardwood Forest	Assessor Name/Organization	BP/STV
Notes on Field Assessr	ment Form (Y/N)		YES
Presence of regulatory	, ,		YES
Wetland is intensively r			NO
	ated within 50 feet of a natural tributary or other	er open water (Y/N)	NO
	ostantially altered by beaver (Y/N)	, , ,	NO
	riences overbank flooding during normal rainfa	III conditions (Y/N)	NO
Assessment area is on		,	NO
Sub-function Rating S	Summary		
unction	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-Surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Particulate Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Soluble Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	YES
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Habitat	Physical Structure	Condition	HIGH
	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	HIGH
Function Rating Sumr Function	mary Metrics/Notes		Rating
Hydrology	Condition		HIGH
Vater Quality	Condition		HIGH
	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	YES
-labitat	Conditon		HIGH

NC WAM WETLAND ASSESSMENT FORM Accompanies User Manual Version 4.1 Rating Calculator Version 4.1

	Ri	ating Calculator	VEISION 4.1	
Wetland Site Name	TTA Wetland ZZ			Pate 7/17/13
Wetland Type	Bottomland Hardw ood Forest	¥	Assessor Name/Organizat	BP/STV
Level III Ecoregion	Piedmont	▼	Nearest Named Water Be	ody Chapel Creek
River Basin	Cape Fear	*	USGS 8-Digit Catalogue L	Jnit 03030002
Yes N	o Precipitation within 48 hrs?		Latitude/Longitude (deci-degre	ees) 35.905663, -79.029793
Please circle and/or mappropriate, in recent to the following. Hydrological msurface and suseptic tanks, unsurface of vegeta	s affecting the assessment area (make note on last page if evidence of spast (for instance, approximately within odifications (examples: ditches, dams b-surface discharges into the wetland and derground storage tanks (USTs), hogotion stress (examples: vegetation motor motor of the discourage of the surface tressors is appar n 10 years). Not s, beaver dams, l (examples: disc g lagoons, etc.) prtality, insect da	ent. Consider departure from ref eworthy stressors include, but are dikes, berms, ponds, etc.) harges containing obvious polluta mage, disease, storm damage, sa	e not limited	
Is the assessment ar	ea intensively managed? [7] Ye	es 💽 No		
☐ Anadromous fis ☐ Federally prote ☐ NCDWQ riparia ☐ Abuts a Primar ☐ Publicly owned ☐ N.C. Division o ☐ Abuts a stream ☐ Designated NC	cted species or State endangered or t an buffer rule in effect y Nursery Area (PNA)	chreatened specie nmental Concerr or supplemental c	es n (AEC) (including buffer)	Trout
Blackwater Brownwater	stream is associated with the wetla neck one of the following boxes)	nd, if any? (che		
			F J -	
Is the assessment are	ea on a coastal island?	es 🂽 No	<u>E</u>]	
	ea on a coastal island?Yeea's surface water storage capacity			∑ Yes ∑ No
Is the assessment are		or duration sub	ostantially altered by beaver?	CYes CNo
Is the assessment and Does the assessment 1. Ground Surface Check a box in e (VS) in the assess then rate the asses GS VS A A A A B B S S S S S S S S S S S S S S S S S S	ea's surface water storage capacity	g during normal ssessment area he ground surface etland if applicable n effect. assessment area tracks, bedding, ibance, herbicides	pstantially altered by beaver? I rainfall conditions? I condition metric I e (GS) in the assessment area all e (see User Manual). If a reference (ground surface alteration exampfill, soil compaction, obvious pollu	nd vegetation structure nce is not applicable, ples: vehicle tracks, excessive strants) (vegetation structure
Is the assessment and Does the assessment 1. Ground Surface Check a box in e (VS) in the assess then rate the asses GS VS A A A No B B B So alt le 2. Surface and Sub Check a box in e duration (Sub). O North Carolina hyo ≤1 foot deep is co sub-surface water Surf Sub A A A W B B B W C C C C W	ea's surface water storage capacity t area experience overbank flooding Condition/Vegetation Condition – a ach column. Consider alteration to the ment area. Compare to reference we assment area based on evidence of ar out severely altered everely altered over a majority of the a edimentation, fire-plow lanes, skidder the teration examples: mechanical distur-	g during normal ssessment area he ground surface that area he ground surface he ground surface he ground surface he alteret he area he ground surface he capacity and of he hydrology. Re he capacity and of hydrology. Re he capaci	pstantially altered by beaver? I rainfall conditions? I condition metric The (GS) in the assessment area as the (see User Manual). If a reference (ground surface alteration examplish, soil compaction, obvious pollutes, salt intrusion [where appropriate the appropriate of the current NRCS lateral effect to the current NRCS lateral effect to the current of the condition of the condition of the condition of the condition of the current of the current NRCS lateral effect to the current of the condition of the condition of the condition of the current of the c	nd vegetation structure nce is not applicable, poles: vehicle tracks, excessive structure el, exotic species, grazing, torage capacity and fect of ditching guidance for in hydric soils. A ditch both surface and ditch int to change vegetation). to result in vegetation
Is the assessment and Does the assessment 1. Ground Surface Check a box in e (VS) in the assess then rate the asses then rate the asses GS VS A A A No B B B So ali le 2. Surface and Sub Check a box in e duration (Sub). O North Carolina hyo ≤1 foot deep is of sub-surface water Surf Sub A A W B B B W C C C W ch 3. Water Storage/So Check a box in e type (WT). AA WT 3a. A A B B B	ea's surface water storage capacity t area experience overbank flooding Condition/Vegetation Condition – a ach column. Consider alteration to the sment area. Compare to reference we resement area based on evidence of ar not severely altered everely altered over a majority of the action examples: mechanical disturb ses diversity [if appropriate], hydrologic -Surface Storage Capacity and Dura ach column. Consider surface storage consider both increase and decrease in dric soils (see USACE Wilmington Dis considered to affect surface water only, considered to affect surface water only, cater storage capacity and duration are acter storage capacity or duration are acter storage capacity and duration are acter storage capacity and duration are acter stora	g during normal ssessment area he ground surface he ground surface he ground surface he ground surface he ground surface he ground surface he ground surface he ground surface he ground surface he ground sessessment area tracks, bedding, he bance, herbicides he alteration) he capacity and con hydrology. Re he capacity and con hydrology. Re herrict website) for while a ditch > holicable. he not altered. Select the appro- her able to pond we has able to pond we	pstantially altered by beaver? I rainfall conditions? I condition metric te (GS) in the assessment area as the (see User Manual). If a reference (ground surface alteration examplish, soil compaction, obvious pollush, salt intrusion [where appropriate duration (Surf) and sub-surface street to the current NRCS lateral effect to the current NRCS lateral effect to the current of ditches in a foot deep is expected to affect the ubstantially (typically, not sufficient filling, excessive sedimentation, uppriate storage for the assessment ovater > 1 foot deep vater 6 inches to 1 foot deep	nd vegetation structure nce is not applicable, ples: vehicle tracks, excessive stants) (vegetation structure ne), exotic species, grazing, torage capacity and fect of ditching guidance for n hydric soils. A ditch both surface and ditch int to change vegetation). to result in vegetation underground utility lines). arsh wetlands only)
Is the assessment and Does the assessment 1. Ground Surface Check a box in e (VS) in the assess then rate the asses GS VS A A A No B B B So ali le 2. Surface and Sub Check a box in e duration (Sub). O North Carolina hyo ≤1 foot deep is co sub-surface water Surf Sub CA A W B B B W C C C W ch 3. Water Storage/So Check a box in e type (WT). AA WT 3a. A WT 3a. A WT 3a. A EVID	ea's surface water storage capacity that area experience overbank flooding. Condition/Vegetation Condition — a cach column. Consider alteration to the sement area. Compare to reference we essment area based on evidence of an ot severely altered everely altered ever a majority of the action examples: mechanical disturbs so diversity [if appropriate], hydrologic e-Surface Storage Capacity and Dura ach column. Consider surface storage consider both increase and decrease in dric soils (see USACE Wilmington Disposidered to affect surface water only, atter storage capacity and duration are atter storage capacity or duration are atter storage capacity or duration are atter storage capacity or duration are atter storage capacity or duration are atter storage capacity or duration are atter storage capacity or duration are atter storage capacity or duration are atter storage capacity or duration are atter storage capacity or duration are atter storage capacity or duration are atter storage capacity or duration are attered to the column for each group below. Majority of wetland with depression	g during normal ssessment area the ground surface the ground surface the ground surface the ground surface the ground surface the ground surface the ground surface the ground surface the ground surface the ground surface the ground surface the ground sessessment area tracks, bedding, the the capacity and concept the ground surface the capacity and concept the ground surface the not altered. The production of the ground surface	pstantially altered by beaver? I rainfall conditions? I condition metric te (GS) in the assessment area at the (see User Manual). If a reference (ground surface alteration examplifil, soil compaction, obvious pollus, salt intrusion [where appropriate the appropriate that area condition metric duration (Surf) and sub-surface states for the current NRCS lateral effect to the current NRCS lateral effect to the current of ditches in a foot deep is expected to affect the ubstantially (typically, not sufficient filling, excessive sedimentation, unition metric (answer for non-material storage for the assessment of the session of the se	nd vegetation structure nce is not applicable, ples: vehicle tracks, excessive stants) (vegetation structure ne), exotic species, grazing, torage capacity and fect of ditching guidance for n hydric soils. A ditch both surface and ditch int to change vegetation). to result in vegetation underground utility lines). arsh wetlands only)

		k from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape ke soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for cators. Sandy soil
	EB ED ED E	Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) Loamy or clayey soils not exhibiting redoximorphic features Loamy or clayey gleyed soil Histosol or histic epipedon
	4b. 🖸 A	Soil ribbon < 1 inch Soil ribbon ≥1 inch
	4c. 💽 A	No peat or muck presence A peat or muck presence
5.	Check a box	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
6.	Check all the draining to a assessment are consider WS 5M A A A A A A A A A A A A A A A A A A	 □ B < 10% impervious surfaces □ C Confined animal operations (or other local, concentrated source of pollutants) □ D ≥20% coverage of pasture
7.	7a. Is asse Yes Wetlan Record 7b. How m A B C D E 7c. Tributa ≤15 7d. Do root Yes 7e. Is tribut Expo	sing as Vegetated Buffer – assessment area/wetland complex condition metric issment area within 50 feet of a tributary or other open water? No If Yes, continue to 7b. If No, skip to Metric 8. If No, skip to Metric 8. If No isseed – adjacent open water with width ≥ 2500 feet or regular boat traffic.
8.	Check a box	and complex at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) and complex at the assessment areas (WC). See User Manual for WT and WC boundaries. ≥100 feet From 80 to < 100 feet From 50 to < 80 feet From 40 to < 50 feet From 30 to < 40 feet From 15 to < 30 feet From 5 to < 15 feet < 5 feet

4. Soil Texture/Structure – assessment area condition metric

	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. A Evidence of short-duration inundation (< 7 consecutive days) B Evidence of saturation, without evidence of inundation C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)
	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. B Sediment deposition is excessive, but not overwhelming the wetland. C C Sediment deposition is excessive and is overwhelming the wetland.
	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) CA CA SO0 acres B B B From 100 to < 500 acres CC CC From 50 to < 100 acres CD CD CD From 25 to < 50 acres CE CE CE From 10 to < 25 acres CF FF From 5 to < 10 acres CG CG GG From 1 to < 5 acres CH CH CH CH From 0.5 to < 1 acre CI CI From 0.01 to < 0.5 acre CI CI From 0.01 to < 0.1 acre CI CI From 0.01 to < 0.1 acre CI CI CI From 0.01 to < 0.1 acre
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥90%) of its natural landscape size. □ B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres C D From 10 to < 50 acres E E E < 10 acres F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions No artificial edge within 150 feet in four (4) to seven (7) directions An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
	 Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. ▶ B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. ▶ Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
16.	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

	G Company of the Comp
17.	Vegetative Structure – assessment area/wetland type condition metric 17a. Is vegetation present? Yes No If Yes, continue to 17b. If No, skip to Metric 18.
	17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ☐ A ≥25% coverage of vegetation ☐ B <25% coverage of vegetation
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT
	C C Mid-story/sapling layer sparse or absent
	☐ A ☐ A Dense shrub layer ☐ B ☐ B Moderate density shrub layer ☐ C ☐ C Shrub layer sparse or absent
	☐ A ☐ A Dense herb layer ☐ B ☐ B Moderate density herb layer ☐ C ☐ C Herb layer sparse or absent
18.	Snags – wetland type condition metric Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A
19.	Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
	Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.
20.	Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). B Not A
21.	Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water. CA CB CC CD CD CD CD CD CD CD CD
22.	Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only) Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. A Overbank and overland flow are not severely altered in the assessment area.

- B Overbank flow is severely altered in the assessment area.
- C Overland flow is severely altered in the assessment area.
- D Both overbank and overland flow are severely altered in the assessment area.

Notes

Wetland ZZ is a palustrine forested/emergent wetlands located adjacent to the US 501 Highway and a school. Wetland ZZ provides the headwaters to Stream UU.

NC WAM Wetland Rating Sheet Accompanies User Manual Version 4.1 Rating Calculator Version 4.1

Wetland Site Name	TTA Wetland ZZ	Date	7/17/13
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	BP/STV
Notes on Field Assessm	pent Form (V/N)		YES
Presence of regulatory			YES
Vetland is intensively n	· · ·		NO NO
-	ated within 50 feet of a natural tributary or other	er open water (V/NI)	YES
	estantially altered by beaver (Y/N)	er open water (1714)	NO
	iences overbank flooding during normal rainfa	All conditions (V/N)	NO
		in conditions (1714)	NO
Assessment area is on	a coastai isianu (17N)		
Sub-function Rating S	ummary		
unction	Sub-function Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	MEDIUM
	Sub-Surface Storage and Retention	Condition	MEDIUM
Vater Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	YES
	Soluble Change	Condition	HIGH
	Ÿ	Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	LOW
	, e.c.a. e.tage	Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	YES
	Pollution Change	Condition	NA
	1 Shallon Shangs	Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA NA
	Physical Structure	Condition	LOW
labitat	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	MEDIUM
unction Rating Sumn	nary Metrics/Notes		Rating
lydrology	Condition		MEDIUM
Vater Quality	Condition		HIGH
	Condition/Opportunity		HIGH
	Opportunity Presence?	(Y/N)	YES
Habitat	Conditon		LOW

NC WAM WETLAND ASSESSMENT FORM Accompanies User Manual Version 4.1 Rating Calculator Version 4.1

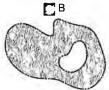
Wetland Type Bottomland Hardwood Forest Level III Ecoregion River Bain Cape Fear V USGS 8-Digit Catalogue Unit 030300002 Latitude/Longitude (deci-degrees) 35.953209, -78.97824 Evidence of stressors affecting the assessment area (may not be within the assessment area) Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following. - Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.) - Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.) - Signs of vegetation stress (examples: wegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.) - Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.) Is the assessment area intensively managed? - Yes - No Regulatory Considerations (select all that apply to the assessment area) - Anadromous fish - Federally protected species or State endangered or threatened species - NCDWQ riparian buffer rule in effect - Abuts a Primary Nursery Area (PNA) - Publicity owned property - N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) - Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout - Designated NCNHP reference community - Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream - What type of natural stream is associated with the wetland, If any? (check all that apply) - Blackwater - Brownwater - Tidd (If tidal, check one of the following boxes) - Lunar - Wind - Both	
River Basin	
River Basin	
Evidence of stressors affecting the assessment area (may not be within the assessment area) Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following. • Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.) • Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.) • Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.) • Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.) Is the assessment area intensively managed? — Yes — No Regulatory Considerations (select all that apply to the assessment area) — Anadromous fish — Federally protected species or State endangered or threatened species NCDWQ riparian buffer rule in effect — Abuts a Primary Nursery Area (PNA) — Publicly owned property — N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) — Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout — Designated NCNHP reference community — Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream What type of natural stream is associated with the wetland, if any? (check all that apply) — Blackwater — Brownwater — Tidal (if tidal, check one of the following boxes) — Lunar — Wind — Both	
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Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following. • Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.) • Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.) • Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.) • Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.) Is the assessment area intensively managed? — Yes — No Regulatory Considerations (select all that apply to the assessment area) — Anadromous fish — Federally protected species or State endangered or threatened species • NCDWQ riparian buffer rule in effect — Abuts a Primary Nursery Area (PNA) — Publicity owned property • N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) — Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout — Designated NCNHP reference community — Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream What type of natural stream is associated with the wetland, if any? (check all that apply) — Blackwater — Brownwater — Tidal (if tidal, check one of the following boxes) — Lunar — Wind — Both	0
Regulatory Considerations (select all that apply to the assessment area) Anadromous fish Federally protected species or State endangered or threatened species NCDWQ riparian buffer rule in effect Abuts a Primary Nursery Area (PNA) Publicly owned property N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer) Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout Designated NCNHP reference community Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream What type of natural stream is associated with the wetland, if any? (check all that apply) Blackwater Brownwater Tidal (if tidal, check one of the following boxes) Lunar Wind Both	
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Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No Ground Surface Condition/Vegetation Condition – assessment area condition metric Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable,	™ No
then rate the assessment area based on evidence of an effect. GS VS A PA Not severely altered Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excess sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structur alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing less diversity [if appropriate], hydrologic alteration)	Э
2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable. Surf Sub C A A Water storage capacity and duration are not altered. C B B Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). C C C Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).	ıΓ
 3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only) Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT). AA WT 3a. A Majority of wetland with depressions able to pond water > 1 foot deep B B Majority of wetland with depressions able to pond water 6 inches to 1 foot deep C C C Majority of wetland with depressions able to pond water 3 to 6 inches deep D D Depressions able to pond water < 3 inches deep 3b. A Evidence that maximum depth of inundation is greater than 2 feet Evidence that maximum depth of inundation is between 1 and 2 feet 	d

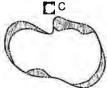
4.	Soil Texture/Structure – assessment area condition metric Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators. 4a. A Sandy soil B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres) C Loamy or clayey soils not exhibiting redoximorphic features C D Loamy or clayey gleyed soil B Histosol or histic epipedon
	4b. ☐ A Soil ribbon < 1 inch ☐ B Soil ribbon ≥1 inch 4c. ☐ A No peat or muck presence
5.	Discharge into Wetland – opportunity metric Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc. Surf Sub
	Little or no evidence of pollutants or discharges entering the assessment area Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)
6.	Land Use – opportunity metric Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion. WS 5M 2M A PA PA ≥10% impervious surfaces B B B B B A < 10% impervious surfaces C C C C C Confined animal operations (or other local, concentrated source of pollutants) D D D D ≥20% coverage of pasture E F F F S ≥20% coverage of agricultural land (regularly plowed land) F F F F F ≥20% coverage of maintained grass/herb G G G G ≥20% coverage of clear-cut land H H H H H H Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area.
7.	 Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric 7a. Is assessment area within 50 feet of a tributary or other open water? Yes No If Yes, continue to 7b. If No, skip to Metric 8. Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed. 7b. How much of the first 50 feet from the bank is weltand? Descriptor E should be selected if ditches effectively bypass the buffer. A ≥50 feet B From 30 to < 50 feet C From 15 to < 30 feet D From 5 to < 15 feet E < 5 feet or buffer bypassed by ditches 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width. ≤15-feet wide > 15-feet wide Other open water (no tributary present) 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water? Yes No No 7e. Is tributary or other open water sheltered or exposed? Sheltered – adjacent open water with width ≥2500 feet and no regular boat traffic. Exposed – adjacent open water with width ≥2500 feet or regular boat traffic.
8.	Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only) Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries. WT WC A A ≥100 feet B B From 80 to < 100 feet C C From 50 to < 80 feet D D From 40 to < 50 feet E F F From 30 to < 40 feet G G From 5 to < 15 feet H H C H < 5 feet

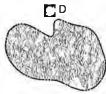
9.	Inundation Duration – assessment area condition metric Answer for assessment area dominant landform. Answer for assessment area dominant landform. By Evidence of short-duration inundation (< 7 consecutive days) By Evidence of saturation, without evidence of inundation Consecutive days or more)
10.	Indicators of Deposition – assessment area condition metric Consider recent deposition only (no plant growth since deposition). A Sediment deposition is not excessive, but at approximately natural levels. B Sediment deposition is excessive, but not overwhelming the wetland. C C Sediment deposition is excessive and is overwhelming the wetland.
	Wetland Size – wetland type/wetland complex condition metric Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column. WT WC FW (if applicable) C A A A ≥500 acres C B B B From 100 to < 500 acres C C C C From 50 to < 100 acres C D C D From 50 to < 50 acres C E C E From 10 to < 25 acres C F F F From 5 to < 10 acres C G C G From 1 to < 5 acres C H H C H From 0.5 to < 1 acre C J C J C J From 0.01 to < 0.1 acre C K C K C K < 0.01 acre or assessment area is clear-cut
12.	Wetland Intactness – wetland type condition metric (evaluate for Pocosins only) □ A Pocosin is the full extent (≥90%) of its natural landscape size. □ B Pocosin is < 90% of the full extent of its natural landscape size.
	Connectivity to Other Natural Areas – landscape condition metric 13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide. Well Loosely A A ≥500 acres B B From 100 to < 500 acres C C From 50 to < 100 acres D D From 10 to < 50 acres E E E < 10 acres F F Wetland type has a poor or no connection to other natural habitats 13b. Evaluate for marshes only. Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.
14.	Edge Effect – wetland type condition metric (skip for all marshes) May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass. A No artificial edge within 150 feet in all directions B No artificial edge within 150 feet in four (4) to seven (7) directions C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut
15.	 Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat) ⚠ A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area. ⚠ B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata. ⚠ C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.
	Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only) Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics). Vegetation diversity is low or has > 10% to 50% cover of exotics. Vegetation is dominated by exotic species (>50% cover of exotics).

	E C
17.	Vegetative Structure – assessment area/wetland type condition metric
	17a. Is vegetation present?
	Yes No If Yes, continue to 17b. If No, skip to Metric 18.
	17b. Evaluate percent coverage of assessment area vegetation for all marshes only . Skip to 17c for non-marsh wetlands. ☐ A ≥25% coverage of vegetation ☐ B <25% coverage of vegetation
	17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately. AA WT
	A Canopy closed, or nearly closed, with natural gaps associated with natural processes B Canopy present, but opened more than natural gaps C C C Canopy sparse or absent
	C A Dense mid-story/sapling layer B B B Moderate density mid-story/sapling layer C C Mid-story/sapling layer sparse or absent
	☐ A ☐ A Dense shrub layer ☐ B ☐ B Moderate density shrub layer ☐ C ☐ C Shrub layer sparse or absent
	☐ A ☐ A Dense herb layer ☐ B ☐ B Moderate density herb layer ☐ C ☐ C Herb layer sparse or absent
18.	Snags – wetland type condition metric Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability). Not A
	Diameter Class Distribution – wetland type condition metric A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
	Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH. Majority of canopy trees are < 6 inches DBH or no trees.
20.	Large Woody Debris – wetland type condition metric Include both natural debris and man-placed natural debris. Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability). Not A
21.	Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only) Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.
	\square^{A} \square^{B} \square^{C} \square^{D}









22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive

ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

- A B C D Overbank and overland flow are not severely altered in the assessment area.
- Overbank flow is severely altered in the assessment area.
- Overland flow is severely altered in the assessment area.
 - Both overbank and overland flow are severely altered in the assessment area.

Wetland ZZZ is a palustrine forested wetland located in the New Hope Creek floodplain.

NC WAM Wetland Rating Sheet Accompanies User Manual Version 4.1 Rating Calculator Version 4.1

Wetland Site Name _	TTA Wetland ZZZ	Date	1/22/14		
Wetland Type _	Bottomland Hardwood Forest	Assessor Name/Organization	BP -STV		
Notes on Field Assessm	nent Form (Y/N)		YES		
Presence of regulatory considerations (Y/N)					
Wetland is intensively managed (Y/N) Assessment area is located within 50 feet of a natural tributary or other open water (Y/N)					
					Assessment area is substantially altered by beaver (Y/N)
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N)					
Assessment area is on a coastal island (Y/N)					
	,				
Sub-function Rating S	ummary				
Function	Sub-function	Metrics	Rating		
Hydrology	Surface Storage and Retention	Condition	HIGH		
	Sub-Surface Storage and Retention	Condition	LOW		
Water Quality	Pathogen Change	Condition	HIGH		
		Condition/Opportunity	HIGH		
		Opportunity Presence? (Y/N)	YES		
	Particulate Change	Condition	HIGH		
		Condition/Opportunity	HIGH		
		Opportunity Presence? (Y/N)	YES		
	Soluble Change	Condition	HIGH		
		Condition/Opportunity	HIGH		
		Opportunity Presence? (Y/N)	YES		
	Physical Change	Condition	LOW		
		Condition/Opportunity	LOW		
		Opportunity Presence? (Y/N)	YES		
	Pollution Change	Condition	NA		
		Condition/Opportunity	NA		
		Opportunity Presence? (Y/N)	NA		
Habitat	Physical Structure	Condition	HIGH		
	Landscape Patch Structure	Condition	HIGH		
	Vegetation Composition	Condition	HIGH		
F					
Function Rating Sumn -unction	Metrics/Notes		Rating		
Hydrology	Condition				
Water Quality	Condition		HIGH		
,	Condition/Opportunity				
	Opportunity Presence? (Y/N)				
Habitat	Conditon				



Natural Resources Technical Report - Appendices

Appendix E: Coordination Correspondence

August 9, 2011

Linda Pearsall, Program Director The North Carolina Natural Heritage Program 1601 Mail Service Center Raleigh, NC 27699-1601

(919) 715-4195 linda.pearsall@ncdenr.gov

Dear Ms. Pearsall,

The New Hope Creek Corridor Advisory Committee is a body set up in 1992 by the City and County of Durham, Orange County and the Town of Chapel Hill to advise them on implementation of the New Hope Corridor Plan. (1) The Committee is presently reviewing a Triangle Transit draft Alternatives Analysis (AA) study that will identify a "Locally Preferred Alternative (LPA)" for a Light Rail Transit (LRT) "mainline" between Chapel Hill and Durham. (2)

The route currently identified as "preferred" is shown crossing the bottomlands of the New Hope Creek Corridor at a new "mid-block" location, south of 15-501 and north of Old Chapel Hill Road, and running east-west between the vicinity of Garrett Road and Southwest Durham Drive (previously known as Watkins Road). (3) The area of this proposed crossing is identified in the NCNHP's <u>Durham County Inventory of Important Natural Areas</u>, <u>Plants and Wildlife</u> as "the 15/501 Bottomlands," a significant natural area occupying "a highly strategic location within the New Hope Wildlife Corridor... between the New Hope Gamelands and the Korstian and Durham Divisions of Duke Forest." The Executive Summary of the <u>Inventory</u> goes on to state that, the "New Hope Creek Bottomland Forest [which includes the 15/501 Bottomlands as an internal section] contains some of the best Piedmont/Mountain Swamp Forest and Piedmont/Mountain Bottomland Forest remaining in North Carolina. ... The 800-acre site also provides important wildlife habitat." (4)

The Inventory also states (pdf p. 77) that the "15/501 Bottomlands" area is an "extensive tract of bottomland hardwood forest providing habitat needed by forest-interior species," and that it is a "critical link in the New Hope and Mud Creek Wildlife Corridors." It says (pdf p. 21), "the sites that comprise the New Hope Corridor...combine to create a macro-site that is ranked as Regionally Significant, based not only on its overall size and habitat values, but also on its connections to other key refuge areas in Orange and Chatham counties.") It further states (pdf p. 46) "that the sites identified in [the Inventory, of which the 15/501 Bottomlands is one,] still possess functioning ecosystems is probably as much a reflection of the strength of the connection between them as their intrinsic features such as size, forest maturity, of lack of internal fragmentation. In a connected system of natural areas, population loses at any one site can to some degree be compensated by animals moving in from sites where reproduction has been more successful."

The Inventory expresses its concern about threats to connectivity in the area in question. In describing the "Mount Moriah Bottomlands and Slopes," the next New Hope Corridor natural area site up stream (and across US 15-501) from the 15/501 Bottomlands, it states the area's "proximity to the rapidly developing US 15-501 commercial strip also makes it the link in this [corridor] system most likely to break, at least with regard to the more disturbance-sensitive species of wildlife." (pdf p. 58) It speaks of the openness to wildlife of this section of the New Hope Wildlife Corridor being kept, in part, by "the existence of large tracts of unfragmented bottomlands on either side of the highway." (pdf p. 59)

There is an additional concern expressed in the Inventory regarding the floodplain nature of most of the Corridor lands in the area in question. "Buffers areas are ...needed to protect key tracts along even some of the largest expanses of forested habitat found in the region. Despite their size and fairly high level of protection, most of the protected sites along New Hope Creek ... are essentially bottomlands. During the winter floods, most of their acreage can be under water,... [One] of the main consequences of development of the adjoining uplands is that all the habitat available to certain terrestrial species will again become "edge," at least during the late winter - typically during the time when stresses on animal populations are at their greatest." (pdf p. 45)

The New Hope Advisory Committee is concerned that building the mainline of a transit system directly through this wetland ecosystem would have significant negative impacts on the natural functions that have been identified by the Inventory.

The draft TTA document also proposes up slope and to the west of the 15/501 Bottomlands, an 18 acre "Patterson Place Maintenance Facility" with a rail line spur, along the western edge of the New Hope Creek floodplain, to connect the Facility with the LRT mainline, LPA, route mentioned above. In addition to the problem of its covering land up slope from the 15/501 Bottomlands with a significant amount of impervious surface we feel a facility that would wash rail cars and store and use lubricants and other chemicals, a "spill" type land use, could pose special long term negative impacts to the Corridor. (5)

There is also proposed, also up slope and to the west of the 15/501 Bottomlands, a "Patterson Place" LRT station, just to the west of SW Durham Drive. This is the easternmost, and nearest to the 15/501 Bottomlands, of the several locations considered. (6) It is our opinion that any LRT station area will be the focus of intense development, "crucial to the viability of the LRT project" (as the project proponents put it) and will have potential long term negative impacts on the Corridor. This would be especially so for a LRT station area located just west of SW Durham Drive.

The Committee is profoundly concerned about the impacts to natural systems and to recreational and educational uses that would be created by any crossings of the New Hope Creek Corridor, except where crossings currently exist. (7) Any rail line structures built for a transit system, even elevated, will permanently fragment the Corridor and introduce noise and vibration into it. (8)

The Committee believes there is an alternative route with much less environmental impact. It would go directly adjacent to the south side of new US 15-501 bridge. One clear advantage of this route for an LRT alignment across the New Hope Creek floodplain is that it would avoid not only the new break in the forest canopy but also the two additional edge areas that the proposed "mid-block" alignment would impact, since it would use the existing edge area along the south side of the existing US 15-501 right-of-way. (9) We also believe there are better areas, away from the slopes above the Corridor lands, than those proposed for an LRT maintenance facility and a transit station.

The Committee is writing to request the NC Natural Heritage Program to review and comment on the transit corridor proposed by Triangle Transit as it relates to the resources identified in the NHP natural resources inventory studies. It would be most helpful if the Program could answer the question of impacts to the New Hope Creek Corridor of the proposed "mid-block" transit route and an alternative route directly adjacent to the south side of new US 15-501 bridge. Also, comments on impacts to the New Hope Creek Corridor of the sites proposed for an LRT maintenance facility (and connecting rail spur) and a transit station would be appreciated.

Yours truly,

Robert G. Healy Chair, New Hope Creek Corridor Advisory Committee



North Carolina Department of Environment and Natural Resources Office of Conservation, Planning, and Community Affairs

Beverly Eaves Perdue, Governor

Linda Pearsall, Director

Dee Freeman, Secretary

September 9, 2011

Robert G. Healy, Chair New Hope Creek Corridor Advisory Committee 839 Sedgefield Street Durham, NC 27705

Re: Locally Preferred Alternative Study, Light Rail Transit, New Hope Creek Corridor

Dear Mr. Healy,

Thank you for bringing this matter to our attention. Although we attended meetings during an earlier phase in the development of this project, we have not been informed of any recent progress, including the implementation of a Locally Preferred Alternative Study. You are correct that the selection of alternative routes across the natural area we have identified along New Hope Creek is an issue that concerns us.

In cooperation with Durham and Orange counties, the Natural Heritage Program has documented the ecological significance of the New Hope Creek Corridor in reports going back to 1987. The portion of the corridor that occurs in vicinity of the proposed project is described in both our general natural areas inventory of Durham County (Hall and Sutter 1999) and in a survey of the Corps lands surrounding the Jordan Lake project (LeGrand 1999). Sections upstream are included in our inventory of Orange County natural areas (Sather and Hall 1988; Sorrie 2004) and sections downstream in our inventory of Chatham County (Hall and Boyer 1992). These surveys document the presence of a number of exemplary natural communities and rare species of plants and animals within the New Hope floodplain. Within the immediate vicinity of the proposed project, we have recorded high quality occurrences of the Piedmont/Mountain Levee Forest and Piedmont/Mountain Bottomland Forest natural communities and the State Threatened Big Shellbark Hickory (*Carya laciniosa*). Equally important, these surveys have all noted that New Hope Creek floodplain is an integral part of a much larger system of natural areas, extending from Duke Forest in the headwater area down to the Jordan Lake Game Lands and even farther downstream along the Cape Fear all the way into the Coastal Plain.

As you note in your letter, the citizens, conservation groups, and local governments in the Durham area, along with the State, have already made major investments in protecting the continuity of this corridor. The construction by NC DOT of the new bridge at the US 15-501 crossing of New Hope Creek is one of the most noteworthy examples in the state where efforts were made to accommodate the passage of wildlife beneath the span. The ongoing acquisition of conservation preserves and easements to bridge the gap between Duke Forest and the Jordan Lake Project lands, involving the efforts of multiple parties, has also strongly contributed to maintaining the connectivity along this vast natural landscape.

We hope that these examples will be matched by the careful selection of a route for the Light Rail Transit across the New Hope Floodplain that will minimize as much as possible the disruptive impacts to its wildlife and natural

1601 Mail Service Center, Raleigh, North Carolina 27699-1601 Phone: 919-715-4195 \ FAX: 919-715-3060 Internet: www.oneNCNaturally.org North Carolina Naturally

ecosystems. We strongly prefer an alignment that adjoins the existing US 15-501 corridor, keeping the disturbance within an already highly disturbed area.

In addition to the direct impacts of the alignment across the floodplain, we have concerns about the potential for significant secondary and cumulative impacts to result from this project. In particular, we note in the Addendum to the Alternatives Analysis that a transit station (Patterson Place Station) has been proposed to be located immediately adjoining the New Hope floodplain on the western side of the LTR alignment that crosses the floodplain to the south of the existing US 15-501 corridor. We also understand that a LTR maintenance facility is being considered for the same general area. Both of these projects have the potential to contribute a significant amount of noise and traffic to this area, as well as other impacts such as water quality degradation. We believe that the selection of sites for these additional projects will be strongly linked to the selection of the preferred alignment of the LTR and should be considered – along with their potential impacts -- as part of the Locally Preferred Alternative Study.

We are glad to provide information for the Alternatives study directly, and to work with the Durham City-County Planning Department, NC Department of Transportation, Triangle Transit Authority, Army Corps of Engineers, and local conservation organizations, such as your own, to try to identify an alternative that poses the least harm to the New Hope ecosystems. Please let us know if there is any other information that we can supply to you.

Sincerely,

Linda Pearsall, Director

Cc: Andy Henry, Durham-Chapel Hill-Carrboro Metropolitan Planning Organization

David King, Triangle Transit Authority

Inda Searral

Helen Youngblood, Durham City-County Planning Department

Sheri Bryant, NC Wildlife Resources Commission

Francis Farrell, US Army Corps of Engineers



Beverly Eaves Perdue Governor Division of Water Quality Charles Wakild, P.E Director

Received

Dee Freeman Secretary

June 6, 2012

MEMORANDUM

To: Juanita Shearer-Swink, Triangle Transit

From: Rob Ridings, NC Division of Water Quality, Transportation Permitting Unit

Subject: Scoping comments on proposed Durham-Orange Light Rail Transit Project in Durham and

Orange Counties.

The following is DWQ's scoping comments for the referenced project. Preliminary analysis of the project reveals the potential for impacts to streams, buffers, and jurisdictional wetlands in the project area. More specifically, potential impacts to the following streams and/or their tributaries:

Stream Name	River Basin & Subbasin	Stream Classifications	Stream Index Number	303(d) Listing?
Morgan Creek	Cape Fear 06	WS-IV; NSW	16-41-2-(5.5)	Yes
Bolin Creek	Cape Fear 06	WS-IV; NSW	16-41-1-15-1-(4)	No
Little Creek	Cape Fear 06	WS-IV; NSW	16-41-1-15-(0.5)	Yes
New Hope Creek	Cape Fear 05	WS-IV; NSW	16-41-1-(11.5)	Yes
Sandy Creek	Cape Fear 05	WS-V; NSW	16-41-1-11	No
Third Fork Creek	Cape Fear 05	WS-IV; NSW	16-41-1-12	No
Ellerbe Creek	Neuse 01	WS-IV; NSW	27-5-(0.7)	Yes

Further investigations at a higher resolution should be undertaken to verify the presence of other streams and/or jurisdictional wetlands in the area. In the event that any jurisdictional areas are identified, the Division of Water Quality requests that Triangle Transit consider the following environmental issues for the proposed project:

Project Specific Comments:

1. The streams in the project corridor are WS-IV (or WS-V); NSW waters of the State. NCDWQ is very concerned with sediment and erosion impacts that could result from this project. NCDWQ recommends that highly protective sediment and erosion control BMPs be implemented to reduce the risk of nutrient runoff to these streams. NCDWQ requests that design plans provide treatment of the storm water runoff through best management practices as detailed in the most recent version of NCDWQ's Stormwater Best Management Practices.

Transportation and Permitting Unit 1650 Mail Service Center, Raleigh, North Carolina 27699-1617 Location: 512 N. Salisbury St. Raleigh, North Carolina 27604 Phone: 919-807-6300 \ FAX: 919-807-6492 Internet: www.ncwaterguality.org



- 2. Morgan Creek, Little Creek, New Hope Creek, and Ellerbe Creek are on the state's 303(d) list for impaired use for aquatic life. NCDWQ is very concerned with sediment and erosion impacts that could result from this project. NCDWQ recommends that the most protective sediment and erosion control BMPs be implemented in accordance with *Design Standards in Sensitive Watersheds* (15A NCAC 04B .0124) to reduce the risk of further impairment to these waters. NCDWQ requests that design plans provide treatment of the storm water runoff through best management practices as detailed in the most recent version of NCDWQ *Stormwater Best Management Practices*.
- 3. This project is within the Jordan Lake and Neuse River Basins. Riparian buffer impacts shall be avoided and minimized to the greatest extent possible pursuant to 15A NCAC 2B.0267 and 15A NCAC 2B.0233, respectively. New development activities located in the protected 50-foot wide riparian areas within the basin shall be limited to "uses" identified within and constructed in accordance with 15A NCAC 2B.0267 and 15A NCAC 2B.0233. Buffer mitigation may be required for buffer impacts resulting from activities classified as "allowable with mitigation" within the "Table of Uses" section of the Buffer Rules or require a variance under the Buffer Rules. A buffer mitigation plan, including use of the NC Ecosystem Enhancement Program, must be provided to NCDWQ prior to approval of the Water Quality Certification. Buffer mitigation may be required for buffer impacts resulting from activities classified as "allowable with mitigation" within the "Table of Uses" section of the Buffer Rules or require a variance under the Buffer Rules. A buffer mitigation plan, including use of the NC Ecosystem Enhancement Program, must be provided to NCDWQ prior to approval of the Water Quality Certification.

General Project Comments:

- The environmental document should provide a detailed and itemized presentation of the proposed impacts to wetlands, buffers and streams with corresponding mapping. If mitigation is necessary as required by 15A NCAC 2H.0506(h), it is preferable to present a conceptual (if not finalized) mitigation plan with the environmental documentation. Appropriate mitigation plans will be required prior to issuance of a 401 Water Quality Certification.
- 2. Environmental impact statement alternatives shall consider design criteria that reduce the impacts to streams and wetlands from storm water runoff. These alternatives shall include road designs that allow for treatment of the storm water runoff through best management practices as detailed in the most recent version of NCDWQ's Stormwater Best Management Practices Manual, July 2007, such as grassed swales, buffer areas, preformed scour holes, retention basins, etc.
- 3. After the selection of the preferred alternative and prior to an issuance of the 401 Water Quality Certification, the applicant is respectfully reminded that they will need to demonstrate the avoidance and minimization of impacts to wetlands (and streams) to the maximum extent practical. In accordance with the Environmental Management Commission's Rules {15A NCAC 2H.0506(h)}, mitigation will be required for impacts of greater than 1 acre to wetlands. In the event that mitigation is required, the mitigation plan shall be designed to replace appropriate lost functions and values. The NC Ecosystem Enhancement Program may be available for use as wetland mitigation.
- 4. In accordance with the Environmental Management Commission's Rules {15A NCAC 2H.0506(h)}, mitigation will be required for impacts of greater than 150 linear feet to any single stream. In the event that mitigation is required, the mitigation plan shall be designed to replace appropriate lost functions and values. The NC Ecosystem Enhancement Program may be available for use as stream mitigation.

- Future documentation, including the 401 Water Quality Certification Application, shall continue to include an itemized listing of the proposed wetland, buffer, and stream impacts with corresponding mapping.
- 6. NCDWQ is very concerned with sediment and erosion impacts that could result from this project. The applicant shall address these concerns by describing the potential impacts that may occur to the aquatic environments and any mitigating factors that would reduce the impacts.
- An analysis of cumulative and secondary impacts anticipated as a result of this project is required.
 The type and detail of analysis shall conform to the NC Division of Water Quality Policy on the
 assessment of secondary and cumulative impacts dated April 10, 2004.
- 8. The applicant is respectfully reminded that all impacts, including but not limited to, bridging, fill, excavation and clearing, and rip rap to jurisdictional wetlands, streams, and riparian buffers need to be included in the final impact calculations. These impacts, in addition to any construction impacts, temporary or otherwise, also need to be included as part of the 401 Water Quality Certification Application.
- 9. Where streams must be crossed, NCDWQ prefers bridges be used in lieu of culverts. However, we realize that economic considerations often require the use of culverts. Please be advised that culverts should be countersunk to allow unimpeded passage by fish and other aquatic organisms. Moreover, in areas where high quality wetlands or streams are impacted, a bridge may prove preferable. When applicable, the applicant should not install the bridge bents in the creek, to the maximum extent practicable.
- 10. Whenever possible, NCDWQ prefers spanning structures. Spanning structures usually do not require work within the stream or grubbing of the streambanks and do not require stream channel realignment. The horizontal and vertical clearances provided by bridges shall allow for human and wildlife passage beneath the structure. Fish passage and navigation by canoeists and boaters shall not be blocked. Bridge supports (bents) should not be placed in the stream when possible.
- 11. Bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means (grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. Please refer to the most current version of NCDWO's Stormwater Best Management Practices.
- 12. Sediment and erosion control measures should not be placed in wetlands or streams.
- 13. Borrow/waste areas should avoid wetlands to the maximum extent practical. Impacts to wetlands in borrow/waste areas will need to be presented in the 401 Water Quality Certification and could precipitate compensatory mitigation.
- 14. The 401 Water Quality Certification application will need to specifically address the proposed methods for stormwater management. More specifically, stormwater shall not be permitted to discharge directly into streams or surface waters.
- 15. This project will require a 404 application to the Corps of Engineers and corresponding 401 Water Quality Certification. Please be advised that a 401 Water Quality Certification requires satisfactory protection of water quality to ensure that water quality standards are met and no wetland or stream uses are lost. Final permit authorization will require the submittal of a formal application by the applicant and written concurrence from NCDWQ. Please be aware that any approval will be

contingent on appropriate avoidance and minimization of wetland and stream impacts to the maximum extent practical, the development of an acceptable stormwater management plan, and the inclusion of appropriate mitigation plans where appropriate.

- 16. If concrete is used during construction, a dry work area shall be maintained to prevent direct contact between curing concrete and stream water. Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills.
- 17. If temporary access roads or detours are constructed, the site shall be graded to its preconstruction contours and elevations. Disturbed areas shall be seeded or mulched to stabilize the soil and appropriate native woody species shall be planted. When using temporary structures the area shall be cleared but not grubbed. Clearing the area with chain saws, mowers, bush-hogs, or other mechanized equipment and leaving the stumps and root mat intact allows the area to re-vegetate naturally and minimizes soil disturbance.
- 18. Unless otherwise authorized, placement of culverts and other structures in waters and streams shall be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and down stream of the above structures. The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by NCDWQ. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact NCDWQ for guidance on how to proceed and to determine whether or not a permit modification will be required.
- 19. If multiple pipes or barrels are required, they shall be designed to mimic natural stream cross section as closely as possible including pipes or barrels at flood plain elevation, floodplain benches, and/or sills may be required where appropriate. Widening the stream channel should be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage.
- If foundation test borings are necessary; it shall be noted in the document. Geotechnical work is approved under Nationwide Permit No. 6 for Survey Activities.
- Sediment and erosion control measures sufficient to protect water resources must be implemented
 and maintained in accordance with the most recent version of North Carolina Sediment and Erosion
 Control Planning and Design Manual and the most recent version of NCS000250.
- 22. All work in or adjacent to stream waters shall be conducted in a dry work area. Approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual such as sandbags, rock berms, cofferdams and other diversion structures shall be used to prevent excavation in flowing water.
- 23. While the use of National Wetland Inventory (NWI) maps, NC Coastal Region Evaluation of Wetland Significance (NC-CREWS) maps and soil survey maps are useful tools, their inherent inaccuracies require that qualified personnel perform onsite wetland delineations prior to permit approval.

- 24. Heavy equipment should be operated from the bank rather than in stream channels in order to minimize sedimentation and reduce the likelihood of introducing other pollutants into streams. This equipment shall be inspected daily and maintained to prevent contamination of surface waters from leaking fuels, lubricants, hydraulic fluids, or other toxic materials.
- 25. Riprap shall not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be properly designed, sized and installed.
- 26. Riparian vegetation (native trees and shrubs) shall be preserved to the maximum extent possible. Riparian vegetation must be reestablished within the construction limits of the project by the end of the growing season following completion of construction

Thank you for requesting our input at this time. The applicant is reminded that issuance of a 401 Water Quality Certification requires that appropriate measures be instituted to ensure that water quality standards are met and designated uses are not degraded or lost. If you have any questions or require additional information, please contact Rob Ridings at 919-807-6403.

cc: US Army Corps of Engineers, Raleigh Field Office Chris Militscher, Environmental Protection Agency (electronic copy only) File Copy



◯ North Carolina Wildlife Resources Commission **◯**

Gordon Myers, Executive Director

MEMORANDUM

TO: Juanita Shearer-Swink, FASLA

Project Manager, Triangle Transit

FROM: Travis Wilson, Highway Project Coordinator

Habitat Conservation Program

DATE: June 12, 2012

SUBJECT: Response to the scoping notification regarding fish and wildlife concerns for the

proposed Durham-Orange Light Rail Transit Project, Durham and Orange

Counties, North Carolina.

This memorandum responds to a request for our concerns regarding impacts on fish and wildlife resources resulting from the subject project. Biologists on the staff of the N. C. Wildlife Resources Commission (NCWRC) have reviewed the proposed project. Our comments are provided in accordance with certain provisions of the National Environmental Policy Act (42 U.S.C. 4332(2)(c)) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667d).

The Triangle Transit Authority in coordination with the Federal Transit Authority has initiated the scoping process for the Durham-Orange Light Rail Transit Project. The proposed project will include the development of approximately 17 miles of light rail transit service from UNC hospitals in Orange County to east Durham in Durham County. The following are specific items of concerns within this corridor:

The project study area includes a portion of Jordan Game Land. Located on US Army Corps of Engineers (USACE) property, Jordan Game Land is managed by NCWRC for public use, and included in this section of the game land is the Upper Little Creek waterfowl impoundment. This area has also been documented as Little Creek Bottomlands and Slopes Significant Natural Heritage Area (SNHA) by NC Department of Natural Resources, Natural Heritage Program. Public conservation areas are an important resource; however in an urbanizing setting such as this the significance of these areas is elevated. As the surrounding landscape develops habitat is minimized and the continuity of that habitat is fragmented. Coinciding with that loss is the difficulty to mitigate for impacts to these areas. Direct impacts to the Little Creek portion of Jordan Game Land would likely have significant and irremediable effects to this area. Therefore NCWRC request that TTA broaden the study area to develop an avoidance alternative for the Jordan Game Land.

Mailing Address: Division of Inland Fisheries • 1721 Mail Service Center • Raleigh, NC 27699-1721

Telephone: (919) 707-0220 • **Fax:** (919) 707-0028

New Hope Creek is also traversed by this project, although the project does not directly impact conservation property, the New Hope Creek corridor provides an important ecological connection between Duke Forest and Jordan Game Land. Extensive conservation effort in this area has resulted in the preservation of multiple properties within this corridor by NC Ecosystem Enhancement Program and NC Clean Water Management Trust Fund. Additionally, during the planning and design of the recent Highway 15/501 improvements federal and state agencies as well as local organizations coordinated with NCDOT to incorporate a longer bridge crossing at New Hope Creek to improve habitat connectivity. Any light rail crossing in this area should not undermine the efforts and funding that provided a much improved ecological linkage.

To help facilitate document preparation and the review process our general informational needs are outlined below:

1. Description of fishery and wildlife resources within the project area, including a listing of federally or state designated threatened, endangered, or special concern species. Potential borrow areas to be used for project construction should be included in the inventories. A listing of designated plant species can be developed through consultation with:

NC Natural Heritage Program
Dept. of Environment & Natural Resources
1601 Mail Service Center
Raleigh, NC 27699-1601.
WWW.ncnhp.org

and,

NCDA Plant Conservation Program

P. O. Box 27647 Raleigh, N. C. 27611 (919) 733-3610

- 2. Description of any streams or wetlands affected by the project. The need for channelizing or relocating portions of streams crossed and the extent of such activities.
- 3. Cover type maps showing wetland acreages impacted by the project. Wetland acreages should include all project-related areas that may undergo hydrologic change as a result of ditching, other drainage, or filling for project construction. Wetland identification may be accomplished through coordination with the U. S. Army Corps of Engineers (USACE). If the USACE is not consulted, the person delineating wetlands should be identified and criteria listed.
- 4. Cover type maps showing acreages of upland wildlife habitat impacted by the proposed project. Potential borrow sites should be included.
- 5. The extent to which the project will result in loss, degradation, or fragmentation of wildlife habitat (wetlands or uplands).

- 6. Mitigation for avoiding, minimizing or compensating for direct and indirect degradation in habitat quality as well as quantitative losses.
- 7. A cumulative impact assessment section which analyzes the environmental effects of construction and quantifies the contribution of this individual project to environmental degradation.
- 8. A discussion of the probable impacts on natural resources which will result from secondary development facilitated by the project.
- 9. If construction of this facility is to be coordinated with other state, municipal, or private development projects, a description of these projects should be included in the environmental document, and all project sponsors should be identified.

Thank you for the opportunity to provide input in the early planning stages for this project. If we can further assist your office, please contact me at (919) 528-9886.

cc: Sarah McRae, USFWS
Rob Ridings, NCDWQ
John Thomas, USACE
Michael Hosey, USACE
Brian Smart, FTA
Jeff Weisner, URS
Melba McGee, DENR
Allison Weakley, NHP



received. 12

June 14, 2012

Cindy Yu-Robinson
Public Outreach Coordinator
Durham-Orange LRT Project
P.O. Box 580
Morrisville, North Carolina 27560
By fax to 919.461.1415
By email to info@ourtransitfuture.com

RE: Comments on Scoping for Durham-Orange LRT Project: NEPA requires that locating the tracks within the Right of Way of 15-501 be evaluated

Dear Ms. Yu-Robinson,

Thank you for your service to our region in helping to expand public transit opportunities. As your transit plan correctly identifies, there is a need for more options for public transit as projected growth increases traffic on our roads and pollution of our air. Planning for this growth puts pressure on the remaining green space and wildlife habitat remaining in the Triangle, space that local land trusts and conservation organizations have fought hard to protect. As we plan for new transit options it is critical that we not plan on damaging what remains of wildlife habitat and green space.

The mission of Triangle Land Conservancy (TLC) is to protect important open space - stream corridors, forests, wildlife habitat, farmland and natural areas - in Chatham, Durham, Johnston, Lee, Orange, and Wake Counties to help keep our region a healthy and vibrant place to live and work. For this reason, we thank you for your commitment to fully analyze a track alignment that would place the tracks within the existing right of way of 15-501 for the Durham-Orange LRT Project as an alternative under the NEPA process.

On the edge of two of the fastest-growing cities in North Carolina, New Hope Creek is a gift of nature within an hour's drive of a million people. In its upper reaches north of Chapel Hill, the New Hope tumbles like a rugged mountain stream, boulder-strewn and wild, twisting below rock bluffs and snaking through a narrow valley in Duke Forest. Below, the lower New Hope changes character abruptly. There, in the highly developed corridor between Durham and Chapel Hill, New Hope becomes a lazy floodplain stream meandering its way south to Jordan Lake, the drinking water supply for thousands of Triangle residents. Miraculously, New Hope remains clean and forested for almost its entire length, a haven for hikers and wildlife, even as it winds between the two towns' shopping centers, offices, and subdivisions. But it will stay that way only through concerted public and private action.

The New Hope Creek Corridor south of 15-501 [the "15-501 Bottomlands"] extending to Old Chapel Hill Road is a forested, wetland area, with New Hope Creek essentially flowing down

the center of it. The Scoping Booklet you produced acknowledges the value of these lands. The Scoping Booklet says:

"New Hope Creek: Because of the ecologically sensitive wetlands associated with New Hope and Sandy Creeks and potential impacts to nature trails and publically owned lands, reasonable alternative design options including, but not limited to a LRT alignment in the New Hope Creek area that is adjacent to, or within the existing US 15-501 right-of-way, will also be studied in the DEIS to investigate ways to minimize or avoid impacts to environmental resources." See Booklet at pages 8-9.

While the maps in the Scoping Booklet show that the route through the 15-501 bottomlands is the only "Route to be Studied Further," the text of the Scoping Booklet indicates that you have committed to evaluating an alternative routing within the right of way of 15-501. We understand this to mean that the text supersedes the map legend and that routing within the right of way of 15-501 will be studied further within the DEIS itself. You may wish to clear up this point on your maps as you go forward.

In the scoping process, all reasonable alternatives must be considered and evaluated, even if the agency has already decided it prefers another alternative. Analysis of alternatives is the "heart" of an environmental impact statement. See 40 C.F.R. § 1502.14. Indeed, this is true *especially* when an agency has identified a preferred alternative. While some residents may not wish to have US 15-501 right of way routing considered, it is not reasonable to exclude it from consideration. NC DOT specifically designed aspects of the 15-501 bridge over New Hope Creek to allow this possibility.

The 15-501 Bottomlands is not an isolated natural area, but a central and strategic link in a much larger block of wetlands called the "New Hope Creek Bottomland Forest," which extends from the shores of Jordan Lake to a point just beyond Erwin Road in the Duke Forest. According to the NC Natural Heritage Program, this larger block of wildlands is one of the two best remaining of its type in North Carolina. Most of the adverse environmental impacts associated with "locally preferred alternative" crossing of New Hope Creek could be avoided by locating the tracks within the Right of Way of 15-501 with the main New Hope Creek transit crossing at the new highway bridge. This alternative has been supported by many local organizations including the Durham Open Space and Trails Commission (DOST) and the New Hope Creek Corridor Advisory Committee.

We thank you for committing to evaluate this alternative in your scoping booklet. We look forward to further opportunities to partner with you in future to protect this valuable resource.

Sincerely,

Thomas H. McGuire

Interim Executive Director

Tom Mc Emiro

Triangle Land Conservancy



United States Department of the Interior

FISH AND WILDLIFE SERVICE Raleigh Field Office Post Office Box 33726 Raleigh, North Carolina 27636-3726

15 June 2012

Triangle Regional Transit Program Attn: Juanita Shearer-Swink PO Box 530 Morrisville, NC 27650

Dear Ms. Shearer-Swink:

This letter is in response to your request for scoping comments from the U.S. Fish and Wildlife Service (Service) on the potential environmental effects of the proposed Durham-Orange Light Rail Transit Project in Durham and Orange Counties, North Carolina. These comments provide information in accordance with provisions of the Fish and Wildlife Coordination Act (16 U.S.C. 661-667d) and section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543).

The Federal Transit Administration (FTA) and the Triangle Transit plan to develop approximately 17 miles of light rail transit service from UNC Hospitals in Chapel Hill, Orange County to NCCU in Durham, Durham County. There are currently no known occurrences of federally protected species in the vicinity of the proposed project, however, the Service has concerns regarding the potential environmental impacts to wetland resources within the proposed corridor.

The proposed study area for alignment options C1 and C2 crosses Little Creek at the Orange/Durham County line. This portion of the corridor crosses the Jordan Game Land which is owned by the US Army Corps of Engineers (USACE) and managed by the NC Wildlife Resources Commission (NCWRC). This area has been designated by the NC Natural Heritage Program (NCNHP) as the Little Creek Bottomlands and Slopes Significant Natural Heritage Area (SNHA), which is an area of land and/or water that has been recognized as being important for the protection of the State's biodiversity, including high-quality or rare natural communities, rare species, and special animal habitats. The Service is concerned not only about impacts to the ecological integrity of SNHA and ability of the public to use the area as a game land, but also those potential impacts to the Upper Little Creek waterfowl impoundment which serve as mitigation for adverse impacts from the construction of Jordan Lake. The Service requests that the study area be expanded to include areas that may not impact the Game Land.

The proposed project also crosses New Hope Creek near the Orange/Durham County line. In the early 1990s as part of the National Wetlands Priority Conservation Planning mandate from the Emergency Wetlands Resources Act of 1986, the Service designated approximately 1,500 acres of the New Hope Creek Corridor as a regionally important wetland that warrants protection because of resource value and vulnerability. The significance of this piedmont swamp forest is as an ecological corridor that connects habitat between Duke Forest and Jordan Game Land. There are several recognized SNHAs in the vicinity of this study area, including the Dry Creek/Mount Moriah Bottomland, New Hope Creek Aquatic Habitat, New Hope Creek Slopes and New Hope Creek Bottomland Forest. Considerable conservation efforts have resulted in significant habitat connectivity along the New Hope Creek corridor. A rail crossing in the New Hope Creek Study Area should not impact habitat connections that have been established.

For transportation improvement projects, the Service recommends the following general conservation

measures to avoid or minimize environmental impacts to fish and wildlife resources:

- 1. Wetland and forest impacts should be avoided and minimized to the maximal extent practical. Areas exhibiting high biodiversity or ecological value important to the watershed or region should be avoided. Proposed highway/rail projects should be aligned along or adjacent to existing roadways, utility corridors or other previously disturbed areas in order to minimize habitat loss and fragmentation. Highway shoulder and median widths should be reduced through wetland areas;
- Crossings of streams and associated wetland systems should use existing crossings and/or occur
 on a bridge structure wherever feasible. Bridges should be long enough to allow for sufficient
 wildlife passage along stream corridors. Where bridging is not feasible, culvert structures that
 maintain natural water flow and hydraulic regimes without scouring or impeding fish and wildlife
 passage should be employed;
- 3. Bridges and approaches should be designed to avoid any fill that will result in damming or constriction of the channel or flood plain. To the extent possible, piers and bents should be placed outside the bank-full width of the stream. If spanning the flood plain is not feasible, culverts should be installed in the flood plain portion of the approach to restore some of the hydrological functions of the flood plain and reduce high velocities of flood waters within the affected area;
- 4. Bridge designs should include provisions for roadbed and deck drainage to flow through a vegetated buffer prior to reaching the affected stream. This buffer should be large enough to alleviate any potential effects from run-off of storm water and pollutants;
- 5. Off-site detours should be used rather than construction of temporary, on-site bridges. For projects requiring an on-site detour in wetlands or open water, such detours should be aligned along the side of the existing structure which has the least and/or least quality of fish and wildlife habitat. At the completion of construction, the detour area should be entirely removed and the impacted areas be planted with appropriate vegetation, including trees if necessary;
- 6. If unavoidable wetland or stream impacts are proposed, a plan for compensatory mitigation to offset unavoidable impacts should be provided early in the planning process. Opportunities to protect mitigation areas in perpetuity via conservation easements, land trusts or by other means should be explored at the outset;
- 7. Wherever appropriate, construction in sensitive areas should occur outside fish spawning and migratory bird nesting seasons. In waterways that may serve as travel corridors for fish, in-water work should be avoided during moratorium periods associated with migration, spawning and sensitive pre-adult life stages. The general moratorium period for anadromous fish is February 15 June 30;
- 8. Best Management Practices (BMP) for Construction and Maintenance Activities should be implemented; and
- 9. Activities within designated riparian buffers should be avoided or minimized.

Section 7(a)(2) of the Endangered Species Act requires that all federal action agencies (or their designated non-federal representatives), in consultation with the Service, insure that any action federally authorized, funded, or carried out by such agencies is not likely to jeopardize the continued existence of any

Durham-Orange Light Rail Transit Project 15 June 2012: Page 3

federally-listed threatened or endangered species. A biological assessment/evaluation may be prepared to fulfill the section 7(a)(2) requirement and will expedite the consultation process. To assist you, a county-by-county list of federally protected species known to occur in North Carolina and information on their life histories and habitats can be found on our web page at http://nc-es.fws.gov/es/countyfr.html.

Although the NCNHP database does not indicate any known occurrences of federally listed species near the project vicinity, use of the NCNHP data should not be substituted for actual field surveys if suitable habitat occurs near the project site. The NCNHP database only indicates the presence of known occurrences of listed species and does not necessarily mean that such species are not present. It may simply mean that the area has not been surveyed. If suitable habitat occurs within the project vicinity for any listed species, surveys should be conducted to determine presence or absence of the species.

If you determine that the proposed action may affect (i.e., likely to adversely affect or not likely to adversely affect) a listed species, you should notify this office with your determination, the results of your surveys, survey methodologies, and an analysis of the effects of the action on listed species, including consideration of direct, indirect, and cumulative effects, before conducting any activities that might affect the species. If you determine that the proposed action will have no effect (i.e., no beneficial or adverse, direct or indirect effect) on listed species, then you are not required to contact our office for concurrence.

We reserve the right to review any federal permits that may be required for this project, at the public notice stage. Therefore, it is important that resource agency coordination occur early in the planning process in order to resolve any conflicts that may arise and minimize delays in project implementation. In addition to the above guidance, we recommend that the environmental documentation for this project include the following in sufficient detail to facilitate a thorough review of the action:

- 1. A clearly defined and detailed purpose and need for the proposed project, supported by tabular data, if available, and including a discussion of the project's independent utility;
- 2. A description of the proposed action with an analysis of all alternatives being considered, including a "no action" alternative;
- 3. A description of the fish and wildlife resources, and their habitats, within the project impact area that may be directly or indirectly affected;
- 4. The extent and acreage of waters of the U.S., including wetlands, that are to be impacted by filling, dredging, clearing, ditching, or draining. Acres of wetland impact should be differentiated by habitat type based on the wetland classification scheme of the National Wetlands Inventory (NWI). Wetland boundaries should be verified by the U.S. Army Corps of Engineers;
- 5. The anticipated environmental impacts, both temporary and permanent, that would be likely to occur as a direct result of the proposed project. The assessment should also include the extent to which the proposed project would result in indirect and cumulative effects to natural resources;
- 6. Design features and construction techniques which would be employed to avoid or minimize impacts to fish and wildlife resources, both direct and indirect, and including fragmentation and direct loss of habitat;
- 7. Design features, construction techniques, or any other mitigation measures which would be employed at wetland crossings and stream channel relocations to avoid or minimize impacts to waters of the US; and,

Durham-Orange Light Rail Transit Project 15 June 2012: Page 4

8. If unavoidable wetland or stream impacts are proposed, project planning should include a compensatory mitigation plan for offsetting the unavoidable impacts.

The Service appreciates the opportunity to comment on this project. Please continue to advise us during the progression of the planning process, including your official determination of the impacts of this project. If you have any questions regarding our response, please contact Sarah McRae at sarah mcrae@fws.gov or 919-856-4520x16.

Sincerely,

Pete Berljalmin Field Supervisor

Ce: Brian Smart, FTA

Travis Wilson, NCWRC Michael Hosey, USACE Allison Weakley, NCNHP

John Kent, New Hope Creek Corridor Advisory Committee



North Carolina Department of Environment and Natural Resources Office of Conservation, Planning, and Community Affairs

Beverly Eaves Perdue Governor Linda Pearsall Director Dee Freeman Secretary

June 18, 2012

SUBMITTED VIA EMAIL AND US MAIL

Juanita Shearer-Swink Triangle Regional Transit Program P.O. Box 530 Morrisville, NC 27560

SUBJECT:

Scoping - Durham-Orange Light Rail Transit Project

Dear Ms. Shearer-Swink:

We are writing in response to the request for comments during scoping for the proposed Durham-Orange Light Rail Transit project. The North Carolina Natural Heritage Program (NCNHP) has previously commented on the Locally Preferred Alternative Study conducted for this project. We appreciate this opportunity to provide information about the possible direct, secondary, or cumulative impacts to Significant Natural Heritage Areas (SNHAs) located along alternative alignments for the proposed Light Rail Transit (LRT) on Little Creek and New Hope Creek.

Direct Impacts

Alignment Alternatives C1 and C2 both cross the Little Creek Bottomlands and Slopes SNHA. Of the two, Alternative C1 would have the greater direct impact to the natural area, since it crosses the Little Creek floodplain along a proposed new alignment that will pass through currently undeveloped forest. Land that will be affected by this alternative is on property owned by the US Army Corps of Engineers (USACOE) that was acquired specifically to mitigate for wildlife habitat lost during the construction of the Jordan Reservoir project. This area is currently managed by the State of North Carolina as a part of the Jordan Lake Game Land.

Alternative C2 follows existing roadways, crossing the Little Creek floodplain adjacent to NC 54 and then following George King Road, a currently unpaved road that divides the USACOE-owned property, all of which is included in the SNHA. Although this alternative follows existing travel corridors, some use may be made of the USACOE property in order to construct the LRT.

Only one alignment across the New Hope Creek floodplain was considered in the Locally Preferred Alternatives Study, transecting a wide tract of bottomland forest located on a privately owned property just north (about 0.1 miles) of the USACOE/NC Game Land boundary. We commend the decision – mentioned in the Scoping Booklet – to include an

Mailing address: 1601 Mail Service Center, Raleigh, North Carolina 27699-1601

Location: 217 W. Jones Street, Raleigh NC 27604

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One North Carolina *Naturally* Natural Resources Planning and Conservation Juanita Shearer-Swink June 18, 2012

additional alternative along the US 15-501 right-of-way within the NEPA review process. The exact alignment of this alternative, however, is not illustrated in the Booklet.

The direct impacts resulting from the construction of the LRT along either of these alignments may cause the loss of some high quality habitats classified by the Natural Heritage Program as Piedmont Bottomland Forest (on both New Hope and Little Creeks), Mesic Mixed Hardwood Forest (on Little Creek) and Piedmont Levee Forest (on New Hope Creek). Of particular concern are potential impacts to the population of *Carya laciniosa* (Big Shellbark Hickory) in the New Hope Creek Bottomland Forest SNHA, south of US15-501; this is the only population of this species known to occur in the Piedmont, one of only 5 known to occur in the state, and this is considered to be the best quality population.

Additional rare species that are reported from the vicinity of the proposed project are listed below:

Significant Natural Heritage		Federal	State	Last Observation
Area (SNHA)	Species (Common name)	Status	Status	Observation
Little Creek Bottomlands				
and Slopes	Carex bushii (Bush's Sedge)		SR-P	1968
Little Creek Bottomlands				
and Slopes	Dichanthelium annulum (Ringed Witch Grass)		SR-P	Pre-1902
Little Creek Bottomlands				
and Slopes	Monotropsis odorata (Sweet Pinesap)	FSC	SC-V	1927
Little Creek Bottomlands				
and Slopes	Tridens chapmanii (Chapman's Redtop)		T	1894
New Hope Creek				
Bottomland Forest	Carya laciniosa (Big Shellbark Hickory)		Т	1999

FSC = Federal Species of Concern

T = State Threatened

SC-V = State Special Concern, Vulnerable

SR-P = Significantly Rare in North Carolina, Peripheral

Secondary (Indirect) Impacts

All of these proposed alternatives are likely to have significant secondary impacts, particularly the alternatives along new alignments. In addition to the direct effects of habitat loss resulting from land clearing, opening the canopy of the forest will create edge effects on the remaining stands, which is likely to encourage the growth of invasive species. Effects extending well beyond the actual footprint of the project will result from disruption of animal movements along these important travel corridors. Impacts to the New Hope Creek floodplain are especially important in this regard because it provides connections between the Jordan Lake Game Land to the south and several other protected natural areas to the north, including Duke Forest, Boulevard Lands, and New Hope Preserve. The Little Creek floodplain similarly provides a connection between the Jordan Lake Game Land and a series undeveloped, predominately publically-owned tracts extending west to US 15-501 and located in the 100 year floodplain of Jordan Lake, which gives them at least some protection from development.

Juanita Shearer-Swink June 18, 2012

Cumulative Impacts

Impacts of this project will take place in the context of a large amount of development that is either already happening around the margins of New Hope Creek and Little Creek floodplains – we have reviewed several in the last few years – or that is currently in the planning and review stage, or that can be expected to occur in the near future. A significant portion of this development can be expected to result from this project itself. As stated in the Scoping Booklet, construction of the LRT is not only intended to expand transit options between Durham and Chapel Hill but also to foster development within certain areas and to promote economic growth. This linkage between the LRT and future development is very clearly stated in the NC 54-I40 Corridor Study, which we recently reviewed and submitted comments on. For the area covered by this study, selection of alternative alignments for the LRT is strongly tied with development that will closely impinge upon the SNHA and public lands. For many species of wildlife, close proximity to dense human development and other activities is very disruptive, leading to effective loss, degradation, and fragmentation of habitats, even where the vegetation and physical features of the landscape remain otherwise the same.

Recommendations for Analysis of Impacts

All three types of expected impacts should be thoroughly addressed in any environmental documents produced for this project. Field surveys should be conducted to determine the significance of direct impacts as well as the indirect impacts on adjoining areas of habitat. For the analysis of indirect impacts, we suggest that the study area be extended from the USACOE-owned lands to US 15-501 along Little Creek and to both the Korstian and Durham Divisions of Duke Forest along New Hope and Mud Creeks. The Natural Heritage Program has conducted inventories of some of these tracts in the past, which may be of some use in this analysis (LeGrand, 1999; Hall and Sutter, 1999). Cumulative impacts should be considered both in terms of the development the project itself will contribute to – including transit stations and associated facilities, shopping centers, and planned developments – as well as additional development that is projected to occur within the overall study area of this project (as modified above).

In assessing the potential for impacts to the SNHAs resulting from this project, we request that the analysis include a greater range of alternative alignments than were considered in the Locally Preferred Alternative Study. Specifically, we echo the request made by NC Wildlife Resources Commission that consideration be given to modifying the C-1 alternative so that it avoids direct impact to Jordan Game Lands and the Significant Natural Heritage Areas We also recommend that an alternative which follows existing transportation corridors, including the NC 54 right-of-way from the Friday Center to I-40, and then following the I-40 right-of-way north to the proposed Leigh Farms transit hub be studied. This alignment would involve the least amount of impact to the Little Creek floodplain, Jordan Game Lands and the SNHA. Similarly, we would like to see a full assessment be given to an alignment following the US 15-501 right-of-way across New Hope Creek as noted in at the bottom of page 8 in the scoping booklet.

Recommendations for Avoidance, Minimization, and Mitigation of Impacts

In general, we would like to see the following design features be incorporated into the proposed project:

• Selection of alignments that avoid or minimize impacts as much as possible to significant natural areas, following already disturbed transportation corridors as much as possible.

Juanita Shearer-Swink June 18, 2012

- Design of floodplain crossings that maintain or enhance wildlife movements.
- Establishment of buffers between the identified natural areas and any development that results from or is otherwise associated with the creation of the LRT and related transportation improvements.

We commend the effort this project represents to plan and manage the tremendous growth that is occurring within this area. However, we would like to point out that protection of local natural areas and the species and ecosystems they support results from the efforts of Orange and Durham counties with strong support of their citizens and various state agencies. Protection of the wildlife movement corridor along New Hope Creek in particular has received a great deal of attention, with private conservation organizations, county government agencies, and state agencies all contributing to the protection of natural areas within this area. For example, the new bridge on US 15-501 was designed explicitly to accommodate the movement of animals between the USACOE lands at the upper end of Jordan Lake and Duke Forest and other conservation lands located north of US 15-501.

The above mentioned bridge on US 15-501 clearly illustrates that transportation planning can be done in conjunction with protecting, or even enhancing, the functions of natural ecosystems. We would like to see that example be followed in the development of the LRT and related transportation plans. A cooperative, collaborative planning effort, involving conservation-minded citizens and agencies as well as transportation and land use planners, will facilitate the development of a truly comprehensive solution to the problems associated with future growth within this region.

Thank you for the opportunity to comment on this proposed project during the scoping process. Please feel free to contact us if you have any questions or we can assist further.

Sincerely,

Linda Pearsall

cc:

Brian Smart, FTA Melba McGee, NCDENR Sarah McRae, USFWS Michael Hosey, USACOE Rob Ridings, NCDWQ Andy Henry, DCHC MPO

MEMO

TO: Greg Northcutt, Director of Capital Development

FROM: Ed Harrison

SUBJECT: Comments on scoping for LPA PEIS, Durham-Orange corridor

DATE: June 18, 2012

REPLY TO: ed.harrison@mindspring.com

I am familiar with the project and its environs for a number of reasons: three decades of continuous natural community fieldwork and identification in Durham and Orange Counties; 18 years of association with Triangle Transit's regional planning process, including the past 2.5 years as a member of the Board of Trustees; over a decade as a Chapel Hill Town Council member, with the last 2.5 years dealing with corridor concerns.

My remarks focus on three station areas and/or corridors and associated issues:

- 1. An uncommon/"vulnerable" natural community type potentially within the C-1 alternative corridor
- 2. Possible inadequate length of bridging in C-1 corridor
- 3. Potential impact on built lot by C-1 corridor at eastern edge of Meadowmont
- 4. Pedestrian access issues for the Hamilton Road station
- 5. Ability to extend future fixed guideway to west/north of UNC Hospitals station (Consult ToCH staff)

1. AN UNCOMMON/"VULNERABLE" NATURAL COMMUNITY TYPE POTENTIALLY WITHIN THE C-1 ALTERNATIVE CORRIDOR

Natural community of concern: Piedmont Swamp Forest

As defined by the adopted LPA, the C-1 corridor where it crosses the Little Creek floodplain, appears to intersect with an area with inundation periods greater than would be expected in an "average" Piedmont Bottomland Hardwood Forest in the Triassic Basin. This is based on satellite photos of the area that were not in the LPA documents.

In Michael Schafale's 2011 edition of the "Guide to the Natural Communities of North Carolina – Fourth Approximation," he differentiates between the true "Piedmont Swamp Forest" and Piedmont Bottomland Hardwood Forest. Shown first is the differentiation, and then the community description.

DIFFERENTIATING PIEDMONT SWAMP FROM BOTTOMLAND FOREST

Comments: There has been substantial confusion in the nomenclature of Piedmont swamps versus bottomland forests. The oak-dominated, broad Triassic basin floodplains have been called swamps in some of the literature and bottomlands

elsewhere. However, these floodplains include both wetter swamps that stay flooded for long periods, and slightly drier oak-dominated areas that correspond to this subtype. The 3rd Approximation contributed to the confusion by mixing descriptions of these heterogeneous floodplains. The 4th Approximation attempts to reduce confusion by defining Piedmont Bottomland Forest as the portion of the flooding gradient where most oaks occur, and defining Piedmont Swamp Forest as the wettest sites, where only the most water-tolerant trees (including *Quercus lyrata* but not most other oak species) predominate.

PIEDMONT SWAMP FOREST GNR

Synonyms: *Acer rubrum - Fraxinus pennsylvanica / Saururus cernuus* Forest (CEGL006606). Ecological Systems: Southern Piedmont Large Floodplain Forest (CES202.324).

Concept: Type covers communities of the wetter parts of large Piedmont floodplains, generally backswamps and large sloughs but possibly depressions on terraces. These areas are flooded for prolonged periods and support species tolerant of longer hydroperiod, such as *Fraxinus pennsylvanica*, *Ulmus americana*, *Acer rubrum var. trilobum*, and *Quercus lyrata*.

Distinguishing Features: Piedmont Swamp Forest is distinguished from all other Piedmont floodplain types by its flood-tolerant species composition, generally dominated by *Fraxinus pennsylvanica*, *Ulmus americana*, *Acer rubrum*, or *Quercus lyrata*. The lower strata are similarly water-tolerant, with a relatively depauperate herb layer, generally dominated by *Carex* spp., *Saururus cernuus*, or *Boehmeria cylindrica*.

In my recent examination of known examples of this community type, the predominance of wetland obligate trees such as Overcup Oak (Q. lyrata) and Black Willow (Salix nigra) shading wide sloughs full of Lizardtail (Saururus cernuus)seems to capture the essence of Piedmont Swamp Forest. No other oak species are visible. Also, there are frequently visible Marsh Rabbits – seen nowhere else in the Piedmont landscape.

The "GNR" appellation indicates that it is "Globally Nor Ranked." I'm told that this is because neighboring states with Piedmont rivers and creeks have not clearly identified the community type, most notably South Carolina.

The closest described Natureserve community type is the Red Maple-Green Ash/Lizard Tail forest.

Reference:

http://www.natureserve.org/explorer/servlet/NatureServe?searchCommunityUid=ELEMENT_GLOBAL.2.685450

Global Status: G3G4 (14Feb2012)

Rounded Global Status: G3 - Vulnerable

Reasons: This association is geographically restricted to the Mid-Atlantic Coastal Plain and in limited areas of the Piedmont. It occurs in small patches, generally less than 20 acres. As of December 2011, it is ranked as S3 in Maryland and S3S4 in Virginia, where it is reportedly widespread in the backswamps of the Coastal Plain. In New Jersey, this type is documented from Great Swamp on the transition from Inner Coastal Plain to Piedmont. This type also is likely to occur in Delaware but its classification requires further resolution there. Beaver impoundments have been observed to threaten this vegetation.

2. POSSIBLE INADEQUATE LENGTH OF BRIDGING IN C-1 CORRIDOR

My examination of the agency supplied satellite photo of the LPA corridor crossing Little Creek, using other topo maps to compare with topo on that one, suggests that the floodplain bridging would need to be extended at least 20 percent in length on the eastern end to deal with likely flooding. Am simply basing this on the latest FEMA elevations. I would recommend a re-examination of likely flooding extent on the eastern end of the crossing.

3. POTENTIAL IMPACT ON BUILT LOT BY C-1 CORRIDOR AT EASTERN EDGE OF MEADOWMONT

Based on field examination today, the easternmost lot now shown as having impact from Corridor C-1 in the adopted LPA, is undergoing site development. The advertised price for the house to be built there, plus the usual pricing for Meadowmont single family lots, suggests that it would be a very expensive condemnation to gain use of that single area, lot 302. The alignment available for examination last year did not show the alignment in that location, although it was a very short distance away. In the event C-1 is used, it should be tweaked to avoid this expensive property – which would be expensive even if unbuilt.

4. PEDESTRIAN ACCESS ISSUES FOR THE HAMILTON ROAD STATION

As someone who has frequently crossed NC 54 at Hamilton Road – most often by bicycle – I see no way to integrate the future redevelopment in Glen Lennox within the station area without a grade-separated crossing. An extended pedestrian signal – which by Triangle standards tops out at 15 seconds – would back peak hour street traffic on NC 54 through adjoining signalized intersections. The approved NC 54 plan (May 9 2012 MPO action) does not appear to include such a grade-separated crossing. Based on recent examples elsewhere in nearby counties, the 2012 cost of such a facility would be in the millions of dollars. Given the importance of the Glen Lennox buildout to the success of this station area, it would be helpful if this access issue could be included in the scope in some way. I was involved with the Glen Lennox planning process as the first Council Member brought into neighborhood meetings on the redevelopment proposal, and then as Council liaison to the Neighborhood Conservation District Committee that produced the concept plan.

5. ABILITY TO EXTEND FUTURE FIXED GUIDEWAY TO NORTHWEST OF UNC HOSPITALS STATION

The UNC Hospitals station location needs to be examined for how it affects the ability of transit providers to extend a fixed guideway to the northwest, toward Carrboro and beyond. Town of Chapel Hill staff have flagged that as a potential issue with the location as shown in the LPA, or as contemplated by UNC.

NOTE: I can be available for follow up on these concerns if it is helpful.

REPLY TO ATTENTION OF

DEPARTMENT OF THE ARMY

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

June 19, 2012

Regulatory Division

Action ID No. SAW 2012 00957

Mr. Brian Smart Federal Transit Administration 230 Peachtree Street NW, Suite 800 Atlanta, GA 30303

Dear Mr. Smart:

Reference is made to the e-mail from Ms. Juanita Shearer-Swink with the Triangle Transit received on May 24, 2012, requesting scoping comments on the proposed Durham-Orange Light Rail Transit Project located on new linear alignment from UNC Hospitals in Chapel Hill, Orange County, North Carolina, to Austin Avenue in Durham, Durham County, North Carolina. This correspondence addresses concerns from both the Operations and Regulatory Divisions with the U.S. Army Corps of Engineers, Wilmington District. Comments from Operations address their concerns pertaining to the project's proposed impacts to Corps owned property within the Jordan lake watershed and Regulatory's comments specifically address the project's impacts to waters of the United States, including adjacent wetlands, subject to our regulatory authority pursuant to Section 404 of the Clean Water Act.

First of all, with regards to our concerns pertaining to Operations, please reference the proposed alternatives shown crossing government property along Little Creek at B. Everett Jordan Lake. This property is under the stewardship of US Army Corps of Engineers (USACE), Wilmington District, Operations Division. A route crossing this property would require an easement from the federal government. Requests for use of government property administered by USACE are reviewed in compliance with USACE policies for out granting of government property and the National Environmental Policy Act (NEPA). The decision to approve or deny a requested use would be made after the review process has been completed and the requirements of NEPA have been satisfied. If a route crossing government property is proposed, the EIS being prepared for the Federal Transit Authority (FTA) may satisfy the NEPA requirements for our land use request review process. However, in order to meet our NEPA requirements the discussion of alternatives must include routes that do not impact public lands. The EIS scoping document does not include discussion or depiction of alternatives off of government property. Alternative routes should be added and/or the study area should be increased to include alternatives to the north and east of those currently depicted crossing public lands along Little Creek. The discussion of impacts due to routes crossing public lands should include impacts due to relocation of existing roads, utilities, etc. Routes crossing public land must be avoided, if possible, and impacts minimized, if public lands cannot be avoided. Mitigation would be required for any unavoidable adverse impacts on public lands.

The congressionally authorized purposes of the Jordan Lake project are flood control, water supply, water quality, recreation, and fish and wildlife conservation. In addition to these authorized purposes, the permanent wildlife lands in the area which include the Little Creek Waterfowl Impoundment, serve as mitigation for adverse impacts from the construction of Jordan Lake. The area is leased to the State of North Carolina and managed by the North Carolina Wildlife Resources Commission (NCWRC) as part of their game lands program. Portions of a Significant Natural Heritage Area as designated by the NC Natural Heritage Program (NCNHP) are located in the proposed alignments. The proposed alignments are within the lake's flood storage pool, which is subject to inundation to elevation 245 feet mean sea level. If you require any additional information regarding use of public lands at Jordan Lake, please contact Mr. Michael Hosey, Operations Division at 919-542-4501, extension 26.

In regards to our Regulatory concerns, our review is based on the information provided at the Scoping meeting for regulatory agencies held on May 2, 2012, and the referenced e-mail. It appears that the proposed light

rail project may impact jurisdictional waters of Little Creek and New Hope Creek of the Cape Fear watershed (HUC 03030002). Department of the Army (DA) permit authorization, pursuant to Section 404 of the Clean Water Act of 1977, as amended, will be required for the discharge of excavated or fill material into waters of the United States or any adjacent wetlands in conjunction with this project, including disposal of construction debris. Specific permit requirements will depend on design of the project, extent of fill work within the waters of the United States, construction methods, and other factors including temporary construction, support facilities (i.e. rail stations, maintenance shop facilities), facility maintenance access, mechanized land clearing and dewatering activities.

Please be aware that the Department of the Army and the U.S. Environmental Protection Agency signed a memorandum of agreement (MOA) on November 15, 1989, establishing procedures for DA permit authorization in compliance with Clean Water Act Section 404(b)(1) Guidelines. First of all DA permits are available only for work dependent upon being located within a jurisdictional waters of the United States that are the least environmentally damaging practical alternative. Once that alternative is determined, then the DA permit authorization requires that the project design avoids and minimize impacts to jurisdictional waters. Finally for those impacts that cannot be avoided and minimized appropriate and practical mitigation will be required.

With reference to the provided Scoping Information Booklet (SIB), we offer the following comments:

- a. Widening of an existing transportation corridor through a jurisdictional waters systems (i.e. wetlands) most often is preferred over a new alignment or realignment of the existing linear transportation corridor. The existing linear transportation corridor has already impacted the jurisdictional water systems. The SIB includes such an alternative for the crossing of the Little Creek system along the NC 54 corridor. However, the SIB crossing of the New Hope Creek system does not include such an alternative even though such an alternative appears to exist along the US 15/501 corridor. We recommend that such an alternative should be included in the Scoping review. Although not discussed in the SIB, other new alignment alternatives were discussed at in your May 2, 2012, workshop. In our discussions you stated that the details of these reviewed alternatives were available and in documents located on the project web page. We have reviewed the web page documents and could not find the referenced other new alignment alternatives details. Again we request that you provide the referenced details to be included in our scoping review comments for your proposed transportation project.
- b. Linear transportation projects often result in the unavoidable crossings of jurisdictional waters systems with the need to connect logical termini associated with the project purpose. However, these crossings should be made perpendicular and at the narrowest point of the jurisdiction waters system. Maps included with the SIB shows such an opportunity within the defined project study area located north of the C1 alternative for the Little Creek crossing. The SIB maps also show another opportunity for avoidance in the crossing of New Hope Creek adjacent to the US 15/501 bridge crossing. We recommend that such alternatives should be included in the Scoping review.
- c. DA permit authorization requires minimization of unavoidable impacts to jurisdictional waters. Review of construction methods often result in the best opportunities for such required minimization efforts. Although not discussed in the SIB, aerial segments were discussed at your May 2, 2012, workshop and in documents located on the project web page. We recommend the aerial crossings (i.e. bridging) of the proposed projects unavoidable crossings of jurisdictional waters.
- d. The SIB identified two large jurisdictional water systems (i.e. Little Creek and New Hope Creek). However it did not identify other jurisdictional streams channels and/or adjacent wetlands that no doubt exist in a 17 mile linear corridor. Such information is necessary for your planning that should include avoidance and minimization of impacts to jurisdictional waters. We recommend a jurisdictional delineation and mapping of jurisdictional waters for the proposed project 17 mile corridor.
- e. The SIB discusses the use of top down construction to minimize impacts, however, discussions of plans for permanent access roads for the maintenance of the LRT track and the possibility for impacts to jurisdictional waters from the installation of those roads should be included in the scoping review.
- f. Potential boarding stations and maintenance yards were identified in the SIB, however, a more robust discussion regarding impacts to jurisdictional features from the construction of the stations and maintenance yards should be included in the scoping review.

g. Final comment, your scoping review should include discussion of plans for compensatory mitigation of unavoidable impacts to jurisdictional waters associated with the proposed project.

Thank you in advance for completing our Customer Survey Form. This can be accomplished by visiting our web site at http://per2.nwp.usace.army.mil/survey.html and completing the survey on-line. We value your comments and appreciate your taking the time to complete a survey each time you interact with our office.

Thank you for the opportunity to comment on the scoping review of your proposed project. We encourage and look forward to the continuing coordination with you in the planning and development of this project. Should you have any questions pertaining to Regulatory concerns, please contact Mr. Thomas at the Raleigh Field Office at 919-554-4884, ext. 25.

Sincerely,

Chief, Regulatory Division

-3-





DEPARTMENT OF THE ARMY

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

July 26, 2012

Regulatory Division

SUBJECT: Action ID. 2012 00957, Durham-Orange Light Rail Transit Project

Ms. Yvette G. Taylor, Ph.D. Federal Transit Administration 230 Peachtree Street NW, Suite 800 Atlanta, GA 30303

Dear Ms. Taylor:



Reference your letter dated June 27, 2012, in which you invited us to participate as a Cooperating agency in the development of the Environmental Impact Statement (EIS) for the proposed Durham-Orange Light Rail Transit Project located on new linear alignment from UNC Hospitals in Chapel Hill, Orange County, North Carolina, to Austin Avenue in Durham, Durham County, North Carolina. In addition, you have also requested that we participate as a Participating Agency pursuant to Section 6002 of SAFETEA-LU.

In accordance with the Council on Environmental Quality, (40 CFR 1501.6 Cooperating Agencies), we agree to participate as a Cooperating Agency. It is our intention to formally adopt the Federal Transit Administration (FTA) National Environmental Policy Act (NEPA) document, in whole or in part, provided it meets our requirements relative to Section 404 of the Clean Water Act and NEPA when the Record of Decision (or Finding of No Significant Impact, as appropriate) is completed.

Please note that other program commitments will preclude us from funding or writing any portion of the subject document. However, it is our intention to fully participate in the development of the necessary document throughout the NEPA process. It is also our intention that at the end of this process, our requirements pursuant to Section 404 of the Clean Water Act, including our Public Interest Review, and Section 10 of the Rivers and Harbors Act would be fully satisfied. Regarding these identified regulatory requirements, please reference our letter to you dated June 19, 2012. This letter responded to your request for comments concerning your scoping review of the identified project. Please be aware that as a cooperating agency, we would have the same concerns that were identified in our June 19th letter including, but not limited to, the evaluation of alternatives which may have less environmental impact. In the event that your NEPA analysis does not adequately address our program responsibilities, a supplemental NEPA document may become necessary.

Finally, we also agree to Participating Agency status, pursuant to Section 6002 of SAFETEA-LU, and will provide you with issues of concern regarding environmental or socioeconomic

impacts as early as possible in the planning process that could substantially delay or prevent our agency from granting a permit for the project.

Thank you for your time and cooperation. Questions or comments may be addressed to Mr. James Lastinger, Raleigh Regulatory Field Office, 3331 Heritage Trade Drive, Wake Forest, North Carolina, 27587, or telephone 919-554-4884, extension 32.

Thank you in advance for completing our Customer Survey Form. This can be accomplished by visiting our web-site at http://per2.nwp.usace.army.mil.survey.html and completing the survey on-line. We value your comments and appreciate your taking the time to complete a survey each time you interact with our office.

Sincerely,

Jean B. Gibby

Jean B. Hilly

Acting Chief, Regulatory Division

Copy Furnished:

Mr. Michael Hosey B. Everett Jordan Dam and Lake P.O. Box 144 Moncure, NC 27559



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

July 27, 2012

Mr. Brian Smart Transportation Planner Federal Transit Administration, Region IV 230 Peachtree Street NW, Suite 800 Atlanta, Georgia 30303



SUBJ: EPA Scoping Comments for the Environmental Impact Statement (EIS) on the Durham-Orange Light Rail Transit Project, Durham and Orange Counties, North Carolina.

Dear Mr. Smart:

Thank you for the opportunity to comment on the above subject document. Pursuant to Section 309 of the Clean Air Act, the U.S. Environmental Protection Agency (EPA), Region 4, reviewed materials that include information on the proposed project, and accepted the Federal Transit Administration's (FTA's) request to act as a cooperating and participating agency on the proposed project.

The Durham-Orange Light Rail Transit Project involves light rail transit and station planning in a 17-mile corridor between Durham and UNC Chapel Hill. Bus coverage and frequency will also be expanded. The proposed project will provide connections to North Carolina Central University, downtown Durham, Duke University, Duke University Medical Center, Durham Veterans Administration Medical Center, the Friday Center, UNC Hospitals and several park-and-ride lots. Connections will also be made to Amtrak and various buses in downtown Durham. The purpose of the proposed transit investment in the Durham-Orange County (D-O) Corridor is to provide solutions that address the need to enhance mobility, expand transit options between Durham and Chapel Hill, serve populations with high propensity for transit use and foster compact development.

The proposed project currently includes the development and analysis of three primary alternatives between the University of North Carolina Hospitals and east Durham. The alternatives evaluated include a No-Build Alternative that serves as the baseline condition; a Transportation Systems Management (TSM) Alternative consisting of an enhanced bus network that provides a level of transit service and capacity similar to that of a fixed-guideway transit service; and a Light Rail Transit (LTR) Alternative consisting of a new fixed-guideway rail alignment and support facilities. This alternative represents the locally preferred alternative as currently proposed. EPA notes that the federally preferred alternative for the project will be selected in the FEIS.

EPA wishes to note that we support the use of light-rail transit technology for this project. Optimizing the use of existing transportation corridors can reduce the amount of greenfield acreage that would be disturbed, if new alignments were selected. However, we also understand that such projects are not without their impacts. So, we have attached some detailed comments for your consideration.

EPA appreciates the opportunity to provide these scoping comments and look forward to working with you on the proposed project. If you have any further questions or concerns, you may contact Ntale Kajumba at (404) 562-9620.

Sincerely,

Heinz J. Mueller, Chief NEPA Program Office

Office of Policy and Management

cc: Detailed EPA Comments

EPA Detailed Scoping Comments on Durham-Orange Light Rail Transit Project

Alternatives: The alternatives analysis evaluation document considered various alignments and the alignments that best met the project purpose and need. The alternatives considered include a No-Build Alternative and two build alternatives. The alternatives analysis and the locals both identified the Light Rail Transit (LRT) Alternative as the technology that best satisfies the purpose and need. Rationale for selection of the alternative is included in the document. EPA notes that there a few alternative alignments within the corridor (e.g., Alternative C1 and 2) that will require further study. These alternatives also involve environmental resource consideration. The DEIS should indicate discuss the rationale for rejecting any proposed alternative.

Air Quality: The Draft EIS should contain a discussion of the regulatory transportation air quality requirements, air quality concerns in the project area, and a carbon monoxide (CO) analysis. The document should assess existing air quality conditions in terms of National Ambient Air Quality Standards (NAAQS), Federal Prevention of Significant Deterioration (PSD) increments, and state air quality standards (if they are more stringent than the federal regulations). Based on our review, Durham and Orange County, NC is currently unclassifiable or in attainment of the National Ambient Air Quality Standards. EPA recommends that the project implement overall diesel emission reduction activities through various measures such as: switching to cleaner fuels, retrofitting current equipment with emission reduction technologies, repowering older engines with newer cleaner engines, replacing older vehicles, and reducing idling through operator training and/or contracting policies. EPA can assist in the future development or implementation of these options.

Mobile Sources Air Toxics: Evaluation of project should include consideration of the impacts of air toxics emissions from trains, buses and vehicular traffic on nearby population centers and sensitive populations. The EIS should include an inventory of air toxics emissions (including diesel emissions) from both stationary and mobile sources that serve the facility, including the locomotives, switchers, tractors, and support equipment, etc. It should also include a screening level evaluation of the potential impacts of these emissions on neighboring populations. The screening level evaluation could be conducted using the approach described in EPA's Air Toxics Risk Assessment Reference Library (ATRA Library). We refer the project applicant to the ATRA Library, Volume 1 Section 3.3.3 for further detail

(http://epa.gov/ttn/fera/risk_atra_main.html). The evaluation should include a description of recent literature concerning the impact of air toxics emissions on near-transportation receptors, including sensitive receptors such as children and the elderly. If sensitive receptors exist within the project area and mobile source air toxic issues are projected to increase, the evaluation should also describe the methods that will be used to mitigate any unavoidable emissions and impacts.

Water Quality: Pollution Control: Best Management Practices (BMPs) should be used to reduce erosion during and after construction. Typical BMPs include the use of staked hay bales, silt fences, sediment ponds, mulching and reseeding, and appropriate buffer zones along water bodies. The document should include an erosion control plan or reference North Carolina's Erosion and Sediment Control Planning and Design Manual and document FTA's and Triangle Transit's commitment to compliance. Compliance should include National Pollutant Discharge Elimination System (NPDES) permit coverage for the construction activity, compliance with the

Storm Water Management Program and proper and maintenance of BMPs. BMPs for the design operational life of the facility should also be considered.

The document should discuss any proposed crossings of water bodies. In general, crossings should be minimized. Unavoidable crossings should be strategically placed to reduce harm by avoiding fish spawning areas, avoiding fringe wetlands, approaching at right angles to streams, etc. If the proposed project includes disturbance of one or more acres of land during construction, and point source discharges into waters of the United, coverage under EPA's storm water NPDES General Permit or state equivalent is required. Contact North Carolina's Department of Environment and Natural Resources Water Quality Division for further information on the NPDES program.

Aquatic Resources: To fully evaluate this proposal, the requirements of the Section 404 (b) (1) Guidelines (Guidelines) must be fully and completely considered if this project is to move forward. The objective of the Guidelines is to require would-be dischargers of fill material to avoid and minimize impacts, and compensate for those which are unavoidable. To do this the applicant will have to, at a minimum, fully consider: developing the least environmentally damaging practicable alternative and associated requirements of section 230.10 (a). The least environmentally damaging alternative is determined by utilizing the project's "basic project purpose". If the basic project purpose can be achieved by less environmentally damaging means then EPA would prefer those. The EIS should also include information which addresses the Guidelines' prohibition on allowing the potential effects of the fill to cause violations of state water quality standards, applicable toxic effluent standards, jeopardize threatened and/or endangered species or their habitat. If unavoidable impacts to wetlands, streams and floodplain are involved, information will be needed outlining how impacts have been avoided and how the unavoidable impacts will be compensated. Compensation for any unavoidable impacts will have to comply with Subpart J, Compensatory Mitigation for Losses of Aquatic Resources (a.k.a., the Mitigation Rule of 2008).

Noise: Noise impacts should be predicted for the no build and each of the build alternatives. State-of-the-art noise modeling should be provided and consistent methods used by North Carolina Department of Transportation. EPA looks to FTA to provide federal oversight and consistency in approach, methodology and mitigation. The EIS should document construction noise attributable to the project. Typical noise levels produced by construction equipment (e.g., trucks, front end loaders, pile drivers, etc.) within 50 feet, which are available in the literature, should be disclosed. The total project construction time (months, years) should also be estimated in order to help assess the magnitude of the construction noise impact. Attempts should also be made to estimate the temporary construction time associated with any one feature along the ROW or section thereof. For example, how long is construction expected to take near any given affected residence or for an average mile of construction? This information will allow affected residents and businesses to approximate their degree of noise disturbance during construction.

Although temporary, construction noise should be reasonably mitigated in residential areas. Construction should not start before 7AM or continue after 7PM during the work week (5-6 days) and be discontinued on Sundays and on locally-observed federal and/or state holidays. In addition, the use of a hush house should be considered around any stationary equipment to shield

noise at its source, and all motorized equipment should be properly tuned to the manufacturer's specifications for additional source reduction. All construction equipment should be equipped with noise attenuation devices, such as mufflers and insulated engine housings. Such mitigative methods should be made a contractual obligation that is periodically reviewed in the field by FTA, Triangle Transit or third-party inspectors.

The document should predict what noise levels can be expected from the project, and the distance to the closest residence/receptor. Background (ambient) noise levels should also be included in the document. EPA prefers that noise impacts are measured using the Leq(h) metric since it provides an average level during peak traffic periods as opposed to the L10 metric which provides a less specific level that is not exceeded more than 10 percent of the time. The NEPA evaluation should also estimate the projected incremental increase of noise. Generally, EPA considers all increases over 10 dBA at any given noise level as a significant increase. Comparisons to any noise guidelines (e.g., DOT/FTA) or city ordinances are also appropriate. EPA has a target noise level (not a guideline or standard) of DNL 55 dBA for outdoor areas where people spend a varying amount of time (such as residences). In addition, OSHA regulations apply for all employees affected by job noises.

Noise abatement should be considered by FTA when project noise impacts approach the DOT Noise Abatement Criteria or if they meet or exceed the existing noise levels by 10 dBA (expecially if the existing noise levels are 50 dBA and above). Forms of noise and/or visual mitigation include, but are not limited to, vegetative screens, vegetated earthen berms (suburban areas), fabricated noise barriers, and alignment shifts. Avoiding noise impacts via alignment shifts is frequently more effective than mitigation.

Archeological and Historic Property: The EIS should identify potential archeological sites and historic properties within the project area. If present, the EIS should document that proper coordination with the State Historic Preservation Office (SHPO) has occurred. EPA encourages use of the NEPA process as a mechanism for compliance with Section 106 of the National Historic Preservation Act. The EIS should discuss any avoidance or minimization measures and procedures for events such as unearthing archaeological sites during prospective construction. Such procedures should include work cessation in the area until the SHPO and/ the Tribes approve of continued construction.

Threatened or Endangered Species: EPA principally defers to and encourages continued coordination with the National Marine Fisheries Service (NMFS) and the U.S. Fish & Wildlife Service regarding assessments of federally-protected threatened or endangered species. Impacts to threatened and endangered species should be discussed and assessed in the EIS.

Environmental Justice: Pursuant to the executive order 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" (February 11, 1994) and its accompanying memorandum, the EIS should examine the effect of the transportation facilities on minority and/or low-income populations. The EIS should identify, analyze and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. The EIS should include a demographics analysis of the affected project

area. Some of this information can be found at the U.S. Census Bureau, U.S. Bureau of Labor Statistics, LAUS, and the U.S. Bureau of Economic Analysis, REIS. Publically available EPA Web-based tools like *EJView*: http://http://epamap14.epa.gov/ejmap/entry.html and *NEPAssist*: https://oasext.epa.gov/NEPA/ can also be used to conduct preliminary screening level EJ reviews. This information should be used in conjunction with information acquired during the public involvement and ground verification processes. Based on the coordination documents, the public involvement process has been robust and should continue to provide opportunities for communities to help identify potential effects, and minimization and mitigation measures. A summary of the communities' potential environmental justice concerns and the agencies response to those concerns should be included in the EIS. EPA notes that effort to improve access to public meetings, official documents, and notices to affected communities are being made. Efforts to minimize and mitigate adverse impacts should be outlined or analyzed in EISs, whenever feasible, should address significant and adverse environmental effects of proposed federal actions on minority communities and low income communities.

Children's Health: The EIS should evaluate potential environmental and human health effects of the proposed project on children. Information identifying children under 18 (demographics) within the surrounding area and schools in proximity to the transportation corridors and stations should be included in the EIS. Both the impacts and benefits of the proposed project on this population should be assessed.

Indirect and Cumulative Impacts - Transit projects have both direct and indirect effects on the environment. NEPA requires the assessment and disclosure of reasonably foreseeable effects of transportation projects or the indirect effects of the project. Cumulative impacts are "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions." It is suggested that the spacial/temporal criteria of the analysis be given and that they be uniform throughout the analyses of the project, if appropriate. Such consideration should include other transit projects in the Durham and Orange County area and other private, local, state, or federal projects in general -- particularly those with similar impacts -- that are existing, proposed or are expected to occur within the reasonably foreseeable future (10-20 year horizon).



MEMORANDUM

To: Project File

From: Jeff Weisner, AICP

Planning Department Manager, URS Corporation

Date: August 28, 2013

Subject: Durham-Orange (D-O) Light Rail Transit (LRT) Project

Interagency Meeting, August 27, 2013

RECORD OF MEETING

Attendees:

*indicates attendance by Phone

Myra Immings* Federal Transit Administration (FTA)

Stan Mitchell* FTA
Ntale Kajumba* EPA
Dana Perkins* FAA

Clarence Coleman Federal Highway Administration (FHWA)
Michael Hosey U.S. Army Corps of Engineers (USACE)

Francis Ferrell USACE John Thomas USACE

Sarah McRae
U.S. Fish and Wildlife (USFW)
Ellen Reckhow
Triangle Transit (Board)
Ed Harrison
Triangle Transit (Board)
Triangle Transit (Board)

Deloris Hall* N.C. Office of State Archeology

Allison Weakley N.C. Department of Environment and Natural Resources (DENR)

Rob Ridings DENR

Travis Wilson* N.C. Wildlife Commission
Phillip Vereen* NCDOT Public Transportation
Tamara Shaw* NCDOT Public Transportation

Eric Midkiff* NCDOT – Project Development and Environmental Analysis (PDEA)

Michael Craig NCDOT – Division 5
Mike Kneis NCDOT – Division 5

John Hodges-Copple Triangle J Council of Governments (TJCOG)

David Bonk Town of Chapel Hill

Andy Henry Durham Chapel Hill Carrboro Metropolitan Planning Organization (DCHC MPO)

Helen Youngblood Durham City County Planning Department (Durham Planning)

Hannah Jacobson Durham Planning Meg Scully Durham Planning



Page 2

Charlie Welsh New Hope Creek Corridor Advisory Committee (NHCCAC)

Bob Healy NHCCAC
John Kent NHCCAC
Pam Karriker Citizen
Terry Rekeweg Citizen

The Project Team

David King Triangle Transit Greg Northcutt Triangle Transit Patrick McDonough **Triangle Transit** Deborah Ross* Triangle Transit Juanita Shearer-Swink Triangle Transit **Brad Schultz Triangle Transit** Geoff Greene **Triangle Transit** Darcy Zorio **Triangle Transit** Tanner Adamson **Triangle Transit** Charlie Benton **URS** Corporation Paul Himberger **URS** Corporation Gavin Poindexter **URS** Corporation Jeff Weisner **URS** Corporation Cyndy Yu-Robinson **URS** Corporation **CH** Engineering Tom Hepler

An interagency meeting for the Durham-Orange (D-O) Light Rail Transit (LRT) Project was held on Tuesday, August 27, 2013 at the UNC Friday Center in Chapel Hill, NC, from 1:00 to 3:00 PM. The purpose of the meeting was to discuss the current status of the D-O LRT Project, alternative alignments and proposed station locations, alternative locations for the rail operations and maintenance facility, and the responses to current comments. The August 2013 Draft D-O LRT Project Environmental Methodologies Report was also presented and discussed.

Following is a list of project alignment segments and discussion topics which are covered in detail below:

- UNC-Hospitals Alternative Station Location
- UNC Finley Golf Course / NC 54 Options
- C1/C2 and Minimization Alternatives (Friday Center to Leigh Village Segment)
- I-40 Options Study
- New Hope Creek Area
- Duke Medical Center / Durham VA Medical Center Station Locations



- Track Separation
- Rail Operations and Maintenance Facility Sites
- Environmental Methodologies

UNC-Hospitals Alternative Station Location

The alternative alignments under consideration within the vicinity of UNC Chapel Hill include the Locally Preferred Alternative (LPA) as well as two new alternatives that place the UNC Hospitals station closer to the university in order to penetrate further into campus. The new alternative alignment would also necessitate a slight change with the Mason Farm Road station.

No comments, questions or concerns were expressed with this segment.

UNC Finley Golf Course / NC 54 Options

An alternative alignment has been designed to avoid possible impacts to the tee boxes and the cart paths, most specifically near the third hole. This alignment departs from the LPA in the vicinity of Finley Golf Course Road and would run adjacent to the south side of NC 54.

The Town of Chapel Hill representative asked about the inclusion of a previously identified alternative alignment that would extend southwards from the Friday Center, run south of the hotel and penetrate the proposed Woodmont development, thereby moving the Woodmont LRT station farther away from NC 54. It was indicated that this request would be considered.

C1, C2 and Minimization Alternatives:

It was explained that the Minimization Alternative is being reevaluated as part of addressing comments received during Scoping to include an alternative that completely avoids Federal lands. The three alternative alignments (Minimization, C1 and C2) will be studied in a white paper to document and determine the specific impacts of each alignment on environmental and community resources, as well as from a technical feasibility perspective. It was further explained that comments from residents opposed to the C1 Alternative were received during Scoping; the Minimization Alternative would include C1.

The DENR representative asked why the NC 54/Farrington Road alternative was not still included. It was explained that this alignment was considered during the review of corridors and alignments for further study. It was eliminated from further consideration due to a number of issues including those identified in the NC 54 Interchange Study and further coordination with NCDOT which indicated that this alignment would not be feasible.

A USACE representative asked about the impacts to residents along the Minimization Alternative. It was explained that the effects, which had not yet been studied in depth, will be examined and analyzed as part of the DEIS.

The DENR representative asked a question regarding the mitigation necessary for USACE land acquired as part of a new location alternative. USACE indicated that mitigation would not be



required within any transit easements, but would be required for any new location acquisitions.

Conversation ensued regarding the original transit easement along the Minimization/C1 alternatives. It was explained that while this formed the starting point for analysis, the alignment has shifted slightly through the Alternatives Analysis process.

Triangle Transit Board Member Harrison (also Chapel Hill Mayor Pro Tem) asked about like/contiguous mitigation land and how it impacted the crossings of these natural resources. USACE explained that this would be determined at a future time in the project when more specific details regarding impacts have been analyzed and evaluated. A DENR representative reminded the audience that these lands are already mitigation property.

I-40 Options Study:

The alternative alignments that were considered as part of an I-40 Options Study were presented. These included alternatives to avoid locating the transit alignment within NCDOT right-of-way in order to accommodate any future lane widening. The presentation included a typical cross section of the currently proposed segment of the D-O LRT alignment which provides for programmed future widening, safety and shoulder lanes. The results of the Study were presented, including impacts created by the LPA and alternative alignments to property, grade crossings, wetlands and historic resources as well as general cost.

No questions, comments or concerns were expressed in this segment.

New Hope Creek Area:

A number of alignment options, primarily between the proposed Gateway Station and the proposed MLK Jr. Parkway Station, were explained in great detail including: the LPA, two northern alignments (along US 15-501) and two southern alignments (along Old Chapel Hill Road). Further opportunities and constraints were explained with each of the alternatives. A White Paper, similar to the I-40 Options Study is currently being prepared and will be available for review in the future analyzing the Old Chapel Hill Road alternatives. The two northern US 15-501 options will be carried forward through the DEIS.

A NHCCAC representative asked why, given NCDOT's planned expansion and general policy along US 15-501, the project team would not pursue design options which assume that no lane widening would occur across New Hope Creek. Another NHCCAC representative explained that an EA/FONSI "Greensheet" indicates that a wing-wall design was incorporated into the design of the existing (newly constructed) New Hope Creek Bridge, for specific transit purposes. It was indicated that the project team would continue close coordination with NCDOT regarding the proposed actions along US 15-501 (including possible interchanges as part of the freeway conversion project) and that these comments and questions would be considered as part of the DEIS. The potential impacts to businesses along US 15-501 between Garrett Road and MLK Jr. Parkway as a result of the project were also explained.



A Durham Planning representative asked about the differences in station locations through this area, most notably the Patterson Place and MLK Jr. Parkway Stations. The project team explained that while the initial locations of these stations were determined through the station area planning process, further refinement to these station areas would be determined as the DEIS moves forward and as the alignments are refined.

The NCDENR representative asked why the project did not include any station options closer to US 15-501 either in the vicinity of SW Durham Drive (towards New Hope Commons) or Garrett Road. The project team explained that LRT stations are primarily located in areas that have the potential for easy pedestrian access preferably within a ¼ to ½ mile radius. The station, particularly near Patterson Place, is intended to serve a larger walkable area that would include current and future phases of the overall Patterson Place development including portions of SW Durham Drive. The station area planning process also considers the potential for future higher-density development, not just existing conditions. The US-15 501 corridor presents a major barrier for pedestrian access (even at signalized intersections). The NCDOT proposed interchange at SW Durham Drive as part of the freeway conversion process would provide additional challenges for a station.

The TJCOG representative asked why consideration was not being given to an alternative alignment that passed just south of the LPA in the vicinity of New Hope Creek, crossing the Federal Lands at the narrowest section of wetlands. The project team indicated that this general area would be studied (including costs) in a White Paper, similar to the I-40 Options Study. In response to some initial analysis, the current LPA alignment has already been modified to avoid impacts to Durham County Parcels designated as "Open Space", which could be construed as a Section 4(f) Resource. Additional challenges including the location of Jurisdictional Wetlands were also discussed.

Concerns regarding the need to maintain and provide for the wildlife connectivity that currently exists along the New Hope Creek Corridor were discussed as were the forested areas remaining in the vicinity of Patterson Place and New Hope Creek and how best to preserve them. A comment was also made regarding the amount of impact an interchange would have on the SW Durham Drive intersection.

The NHCCAC indicated that there was an existing transit easement which was made as part of the development plans for the New Hope Creek Apartments, or Colonial Grande at New Hope that brought the alignment from Patterson Place to US 15-501.

Duke Medical Center / Durham VA Medical Center Stations:

The three station loptions along Erwin Road in the vicinity of Duke Medical Center and the Durham VA Medical Center (DVAMC) and the reasoning behind each of their respective locations were presented. Through coordination with the DVAMC, Option C, or the Eye Care Center Drive alternative, was determined to be the DVAMC's preferred station. Relative to the other alternatives, Option C appears to have the least negative impact on Erwin Road and the intersection at Fulton Street, the adjacent medical complexes and overall pedestrian and vehicular



circulation. Coordination with Duke University has not yet occurred.

Triangle Transit Board Member Reckhow (also Durham County Commissioner) indicated that there was a general consensus and support for the Eye Care Center Drive Station location. The project team explained however, that all alternatives would be carried forward during the Station Planning Process as part of the DEIS.

NHCCAC asked about emergency vehicle access along Trent Road. The project team indicated that these issues would be analyzed and addressed through the Transportation/Traffic studies conducted as part of the DEIS.

Track Separation:

The D-O LRT project includes a segment between the 9th Street and Alston Ave/NCCU LRT Station which will operate on separate exclusive tracks within the North Carolina Railroad (NCRR) corridor. Current discussions between the project team and representatives of the NCRR have indicated that the separation between freight and LRT tracks operating within the NCRR corridor may need to be 40-foot and/or 54-foot (rather than approx. 26 feet which occurs in other communities). A brief explanation of the impacts which the 40-foot and 54-foot separation requirements would have on adjacent structures and buildings within this segment of the alignment was given.

A FTA representative asked whether the Federal Railroad Administration (FRA) had weighed in on track separation. Triangle Transit General Manager David King responded that FRA doesn't have a standard regarding this type of track separation. (Once a rail vehicle is more than 25 feet away from operating railroad tracks, it is no longer considered to be adjacent; there are maintenance requirements associated with rail vehicles that would operate with less than 25 feet of separation.)

General discussion continued regarding the evaluation of the impacts of the expanded track separation distances of 40 feet and 54 feet; the basis of original 26-foot separation and the general path forward towards reaching an agreement.

Rail Operations and Maintenance Facility (ROMF)sites

The ongoing analysis of sites for the LRT Rail Operations and Maintenance Facility was discussed along with the type of comments received from various stakeholder groups; the combination of two potential sites into a hybrid site and the addition of a new alternative site at the project terminus in east Durham.

No questions, comments, or concerns were expressed regarding this project element.

Environmental Methodologies Report:

After providing a general overview of the Environmental Methodologies report, the Project Team asked for a general discussion, comments, and any suggestions that would help provide concurrence moving forward. A general review of the corridor and boundaries was given through the use of Google Earth. Questions and discussion of specific topics are covered below:



Socio-Economic Boundary:

A Durham Planning representative suggested that we expand the boundary in several locations after coordination with the Town of Chapel Hill and the City of Durham to help capture contiguous neighborhoods, identified EJ communities, and any other populations that would be important in analyzing effects. A question was asked regarding the status of alternative ROMF site near the Alston Avenue station. It was explained that this has not yet been shown to the public.

Water / Natural Resources:

The project team indicated that while we already have people in the field collecting data, the process is still early enough along to modify based on input, suggestions and comments. A brief review of the standards, manuals, regulations and industry practice that are being used were explained.

NCDENR asked whether DWQ would be involved in the field review and review of the DEIS. The project team clarified that both DWQ and the USACE would be involved.

USACE asked whether the 245 feet above Mean Sea Level (MSL) standard that exists for Jordan Lake would be addressed. The project team said that it would. USACE indicated they would need to be aware should this not be met.

NCDENR wanted to know if both Federal and State-listed species would be analyzed in the DEIS, as this was not clearly defined in the Methodology Report. It was clarified that both Federal and State-listed species would be included.

<u>Cultural/Historic/Archaeological Resources:</u>

A brief explanation was given regarding the Areas of Potential Effect, the general methodology and the initial field work already being conducted.

Concurrence of the methodology was given by the representative from the Office of State Archeology.

There were no further comments, questions, or concerns regarding the Environmental Methodologies Report.

Transportation:

It was explained that due to the complexity of this section as well as the close coordination necessary with the Town of Chapel Hill, City/County of Durham and NCDOT, that this would become a standalone methodology report. A brief review of the types of data collected and the proposed collection and analysis methods were explained. It was further explained that this would include a robust bicycle/pedestrian connectivity component.

No questions, comments or concerns were expressed in this section.



Miscellaneous:

A USACE representative asked about the inclusion and analysis of potential 4(f) resources, as there was no mention in the Environmental Methodology report. The project team indicated that this will be addressed and analyzed in full throughout the DEIS, but that a section in Methodology report would be added to clarify. The project team added that the alignment was only recently shifted slightly to avoid a parcel designated as a potential 4(f) resource and that additional shifts similar to this would occur through design to minimize or avoid potential impacts.

The FAA representative commented that all airports within 5 miles of the project need to be identified. The FAA concerns include the use Best Management Practices for stormwater management or other activities that would create habitat that would encourage wildlife usage, such as water fowl, that could endanger aircraft. A revised circular regarding recommended separation distances was referenced to help address these issues.

A NHCCAC representative asked about future land use projections, buildable/unbuildable lands, and the resulting area available for development. The project team explained that through the Indirect and Cumulative Effects documentation as part of the DEIS, these issues, among others would be fully evaluated and documented. The project team further clarified the difference between using base year projections as well as 2040 projections.

NCDENR asked if the location of the proposed interchanges as part of the freeway conversion project could be placed on a map for visualization purposes. It was indicated that the team would continue to closely work with NCDOT regarding proposed designs and how they may influence the project.

Discussion occurred regarding the release of information related to the Archaeological Report; distribution methods, to whom, and when. It was explained that the technical report is typically only provided on a need-to-know or case-by-case basis due to the sensitive nature of the sites. It was further indicated that the public will not see the report under any circumstances, only a summary. This position is the same as with Threatened and Endangered Species identifications.

The DENR representative asked whether Natural Resources and Parklands would be assessed from an indirect and direct perspective only. It was indicated again that a cumulative effects study would be conducted to address potential impacts to all resources as a result of the project. This would be well-documented in the DEIS. .

FTA indicated that indirect and cumulative effects are of great importance to them as well and they will be interested the forthcoming analysis and documentation.

ACTION ITEMS

☐ The Project Team will distribute maps showing the various alignment options and study

URS

Durham-Orange LRT Project Interagency Meeting Meeting Record August 28, 2013 Page 9

area boundaries after the presentation for comment.

The Project Team will look at additional various alternative alignments through the New Hope Creek area that impact less area of wetlands.
The Project Team will modify the Environmental Methodology Report to reflect both Federal and State-listed species.
The Project Team will modify the Environmental Methodology Report to reflect analysis and potential impacts to 4(f) resources.
The Project Team will review new FAA circular regarding recommended separation distances.
The Project Team will coordinate with NCDOT to determine potential interchange locations along US 15-501.
The Project Team will enhance the section regarding Cumulative Effects in the Environmental Methodology, further explaining and clarifying the analysis.
Agencies will provide comments within 2 weeks from August 27 th , 2013 (September 10 th) to the following contact: JShearerSwink@triangletransit.org. ON SEP 10, TRIANGLE TRANSIT

Meeting Adjourned

The above Meeting Minutes are the author's synopsis of what was stated. The program will rely on these minutes as the record of all matters discussed and conclusions reached during this meeting unless written changes are sent to the author within seven calendar days of receipt of these Minutes.

EXTENDED THE DUE DATE FOR AGENCY COMMENTS BY 2 WEEKS TO SEPTEMBER 24, 2013.

JW/cyr

cc: Attendees
PMC@TriangleTransit.org
URS File

Benton, Charles

From: Benton, Charles

Sent: Wednesday, July 09, 2014 2:12 PM

To: 'Finnegan, John'

Subject: RE: TTA - DO-LRT EO data request

Thank you.

Regards,

Charlie Benton, P.W.S

Senior Environmental Scientist

URS Corporation-North Carolina
1600 Perimeter Park Drive, Suite 400
Raleigh, North Carolina 27560
charles.benton@urs.com
919.461.1100 Main
919.461.1435 Direct

Please note my NEW Mobile # is now 919.946.3122

919.461.1415 Fax



From: Finnegan, John [mailto:john.finnegan@ncdenr.gov]

Sent: Wednesday, July 09, 2014 2:09 PM

To: Benton, Charles

Subject: RE: TTA - DO-LRT EO data request

Hi Charlie,

I've attached a DBF file identifying the EO records. Also attached is document which describes the file attributes. Let me know if you have questions, or if you need more detail on any of the records.

John

John Finnegan, Conservation Information Manager john.finnegan@ncdenr.gov

919-707-8630

North Carolina Natural Heritage Program
Office of Land and Water Stewardship
North Carolina Department of Environment and Natural Resources
1601 MSC
Raleigh, NC 27699-1601

Email correspondence to and from this address is subject to the North Carolina Public Records Law and may be disclosed to third parties.

From: Benton, Charles [mailto:charles.benton@urs.com]

Sent: Tuesday, July 08, 2014 9:49 AM

To: Finnegan, John

Cc: Poindexter, Gavin; Himberger, Paul **Subject:** TTA - DO-LRT EO data request

Dear Mr. Finnegan,

URS is assisting the Triangle Transit Authority (TTA) on planning the Durham-Orange Light Rail Transit (D-O LRT) project in Durham and Orange counties, North Carolina. As part of the is planning effort, URS is preparing environmental documentation that includes a discussion of protected species and communities. We would like to request information on the element occurrences that are documented in your agencies database within a 1-mile buffer of the project alternatives.

Please find attached a DBF file of the selected records that was exported from the EO shapefile attribute table, as well as a map of the study area.

Please let me know if you have any questions regarding this request.

Thank you,

Charlie Benton, P.W.S

Senior Environmental Scientist

URS Corporation-North Carolina
1600 Perimeter Park Drive, Suite 400
Raleigh, North Carolina 27560
charles.benton@urs.com
919.461.1100 Main
919.461.1435 Direct
Please note my NEW Mobile # is now 919.946.3122
919.461.1415 Fax



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U.S. ARMY CORPS OF ENGINEERS

WILMINGTON DISTRICT

Action Id. 201200957

County: Durham-Orange

U.S.G.S. Quad: Southwest Durham

NOTIFICATION OF JURISDICTIONAL DETERMINATION

Property Owner/Agent: <u>Triangletransit / David King</u>

Address:

P.O. Box 13787.

Research Triangle Park, NC 27709

Telephone No.:

919 549-9999

Property description:

Size (acres)

400

Nearest Town Durham-Chapel Hill

Nearest Waterway

Little-New HopeCreek

River Basin

Haw

USGS HUC

03030002

Coordinates:

N 35.958951 W -78.981665

Location description Proposed Durham-Orange Light Rail corridor from UNC Hospitals in Chapel Hill, Orange County, North Carolina, to Austin Avenue in Durham, Durham County, North Carolina adjacent to Little Creek and New Hope Creek in the Haw River Basin.

Per your request dated September 4, 2014, this determination is modified to include addendum 1 thru 3 verification of jurisdictional waters as defined by in field flagging and provided mapping included with referenced request.

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.
- There are waters of the U.S. including wedlands 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 defineation, you may wish to obtain a consultant. To be considered final, any defineation must be verified by the Corps.

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

4 4*		
Action	ш	1.

The property is located in one of the 20 Coastal Counties subject to regulation under the Coastal Area Management Act (CAMA). You should contact the Division of Coastal Management in Washington, NC, at (252) 946-6481 to determine their requirements.

Placement of dredged or fill material within waters of the US and/or wetlands without a Department of the Army permit may constitute a violation of Section 301 of the Clean Water Act (33 USC § 1311). If you have any questions regarding this determination and/or the Corps regulatory program, please contact <u>John Thomas</u> at <u>919 554-4884 ext. 25</u>.

C. Basis For Determination

There are stream channels within your project site which are tributaries of Little Creek & New Hope Creek which flows into the Haw River and the Atlantic Ocean.

D. Remarks

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

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

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

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR part 331.5, and that it has been received by the District Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by <u>July 12, 2014</u>.

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 05/12/2014

Expiration Date

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete the Customer Satisfaction Survey located at our website at http://regulatory.usacesurvey.com/ to complete the survey online.

Copy furnished:

Brandon Phillips, 900 West Trade Street, Suite 715, Charlotte, NC 28202-1144

United States Department of Agriculture
Natural Resources Conservation Service
4407 Bland Road, Suite 117
Raleigh, North Carolina 27609

Milton Cortés, Assistant State Soil Scientist Telephone No.: (919) 873-2171 Fax No.: (919) 873-2157 E-mail: milton.cortes@nc.usda.gov

July 31, 2014

Paul Himberger Environmental Planner URS Corporation – North Carolina 1600 Perimeter Park Drive Morrisville, NC 27560

Dear Mr. Himberger;

The following information is in response to your request asking for information on farmlands in the Durham-Orange Light Rail Transit Project, URS Corporation, NC.

Projects are subject to Farmland Protection Policy Act (FPPA) requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a Federal agency or with assistance from a Federal agency.

For the purpose of FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land.

Farmland means prime or unique farmlands as defined in section 1540(c)(1) of the Act or farmland that is determined by the appropriate state or unit of local government agency or agencies with concurrence of the Secretary to be farmland of statewide of local importance.

"Farmland" does not include land already in or committed to urban development or water storage. Farmland ``already in" urban development or water storage includes all such land with a density of 30 structures per 40-acre area. Farmland already in urban development also includes lands identified as ``urbanized area" (UA) on the Census Bureau Map, or as urban area mapped with a ``tint overprint" on the USGS topographical maps, or as ``urban-built-up" on the USDA Important Farmland Maps. See over for more information.

Soils inventory on your project location shows highly populated metropolitan areas or committed to urban development. The area in question meets one or more of the above criteria for Non-Farmland. No farmland area will be affected or converted. Documents submitted and a copy of this letter will be saved for any further consultation. You are exempt from filling the CPA-106 neither the AD1006 at this time. Use this letter as proof of exemption.

If you have any questions, do not hesitate to contact me.

Sincerely,

Milton Cortes

Assistant State Soil Scientist

Projects and Activities Subject to FPPA

Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a Federal agency or with assistance from a Federal agency.

Assistance from a Federal agency includes:

- Acquiring or disposing of land.
- Providing financing or loans.
- Managing property.
- Providing technical assistance

Activities that may be subject to FPPA include:

- State highway construction projects, (through the Federal Highway Administration)
- Airport expansions
- Electric cooperative construction projects
- Railroad construction projects
- Telephone company construction projects
- Reservoir and hydroelectric projects
- Federal agency projects that convert farmland
- Other projects completed with Federal assistance.

Activities not subject to FPPA include:

- · Federal permitting and licensing
- Projects planned and completed without the assistance of a Federal agency
- Projects on land already in urban development or used for water storage
- Construction within an existing right-of-way purchased on or before August 4, 1984
- Construction for national defense purposes
- Construction of on-farm structures needed for farm operations
- Surface mining, where restoration to agricultural use is planned
- Construction of new minor secondary structures such as a garage or storage shed.

United States Department of Agriculture
Natural Resources Conservation Service
4407 Bland Road, Suite 117
Raleigh, North Carolina 27609

Milton Cortés, Assistant State Soil Scientist Telephone No.: (919) 873-2171 Fax No.: (919) 873-2157 E-mail: milton.cortes@nc.usda.gov

March 24, 2015

Paul Himberger Environmental Planner URS Corporation – North Carolina 1600 Perimeter Park Drive Morrisville, NC 27560

Dear Mr. Himberger;

The following information is in response to your request asking for information on Durham-Orange Light Rail Transit Project-Modified as of March 15, 2015, URS Corporation, NC.

Projects are subject to Farmland Protection Policy Act (FPPA) requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a Federal agency or with assistance from a Federal agency.

For the purpose of FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land.

Farmland means prime or unique farmlands as defined in section 1540(c)(1) of the Act or farmland that is determined by the appropriate state or unit of local government agency or agencies with concurrence of the Secretary to be farmland of statewide of local importance.

"Farmland" does not include land already in or committed to urban development or water storage. Farmland ``already in" urban development or water storage includes all such land with a density of 30 structures per 40-acre area. Farmland already in urban development also includes lands identified as ``urbanized area" (UA) on the Census Bureau Map, or as urban area mapped with a ``tint overprint" on the USGS topographical maps, or as ``urban-built-up" on the USDA Important Farmland Maps. See over for more information.

Soils inventory on your project proposed modified alignments locations shows highly populated metropolitan areas or committed to urban development. The area in question meets one or more of the above criteria for Non-Farmland. No farmland area will be affected or converted. Documents submitted the proposed modified alignments and a copy of this letter will be saved for any further consultation. You are exempt from filling the AD1006 or the CPA-106 at this time. Use this letter as proof of exemption.

If you have any questions, do not hesitate to contact me.

Sincerely,

Milton Cortes

Assistant State Soil Scientist

Milton Cortes

Helping People Help the Land

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Projects and Activities Subject to FPPA

Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a Federal agency or with assistance from a Federal agency.

Assistance from a Federal agency includes:

- Acquiring or disposing of land.
- Providing financing or loans.
- Managing property.
- Providing technical assistance

Activities that may be subject to FPPA include:

- State highway construction projects, (through the Federal Highway Administration)
- Airport expansions
- Electric cooperative construction projects
- Railroad construction projects
- Telephone company construction projects
- Reservoir and hydroelectric projects
- Federal agency projects that convert farmland
- Other projects completed with Federal assistance.

Activities not subject to FPPA include:

- Federal permitting and licensing
- Projects planned and completed without the assistance of a Federal agency
- Projects on land already in urban development or used for water storage
- Construction within an existing right-of-way purchased on or before August 4, 1984
- Construction for national defense purposes
- Construction of on-farm structures needed for farm operations
- Surface mining, where restoration to agricultural use is planned
- Construction of new minor secondary structures such as a garage or storage shed.



Natural Resources Technical Report - Appendices

Appendix F: Qualifications of Contributors

Contributor: Charles Benton, PWS, PWD

Education: B.A. Ecology, 1996

Experience: Environmental Scientist, AECOM-URS Corporation, 2002–Present

Environmental Scientist, Frederick P. Clark Associates, 2000-2002

Environmental Scientist, EcolSciences, Inc, 1998-2000

Environmental Scientist, Booz, Allen, and Hamilton, Inc, 1997-1998

Responsibilities: Author, data collection

Contributor: Paul Himberger

Education: M.E.S. Environmental Studies 2008 | B.S. Environmental Science, 2006 | Experience: Environmental Scientist, AECOM-URS Corporation, 2009—Present

Responsibilities: Author, data collection

Contributor: Paul Gerlach

Education: M.E.M. Environmental Management 2013 | B.S. Biological Sciences, 2011

Experience: Environmental Scientist, AECOM-URS Corporation, 2014–Present

Responsibilities: GIS analysis, document preparation

Contributor: William B. Fulton, LSS, PSC, PWS Education: B.S. Natural Resources, 2003

Experience: Project Environmental Scientist, STV/RWA, 2011–2014

Principal, Carolina Environmental Consultants, 2009-2011

Field Office Manager, Soil and Environmental Consultants, 2008-2009 Project Manager, Soil and Environmental Consultants, 2004-2008 Environmental Scientist, Environmental Investigations, 2003-2004

Responsibilities: Wetland and stream delineations, soil evaluations, GPS/GIS mapping, document

preparation

Contributor: Michael Iagnocco, P.W.S. Education: B.S. Biological Sciences, 1978

Experience: Proj. Manager/Sr. Environmental Scientist, STV/RWA, 2003-Present

Project Manager/Principal, Law Environmental, 1996-2003 Sr. Environmental Scientist, Woolpert, LLP, 1990-1996

Project Manager, Carpenter Environmental Associates, 1981-1990 Environmental Scientist, Lawler, Matusky & Skelly, Inc., 1980-1981

Responsibilities: Wetland and stream delineations and assessment, impact assessment, Section

404 permitting, document preparation, quality assurance

Contributor: Joshua Kotheimer

Education: Graduate Certificate in G.I.S., 2013

B.S. Environmental Technology and Management, 2011

B.A. Chemistry, 2011

Experience: Environmental Scientist, STV/RWA, 2013-Present

Research Assistant, 2012-2013

Responsibilities: Wetland and stream delineations, GPS/GIS mapping, document preparation

Durham-Orange Light Rail Transit Project | July 24, 2015 | F-1