

DRAFT NATURAL RESOURCES TECHNICAL REPORT

**Proposed New Interchange on I-440/US 1 at Ridge Road to Connect to
Crabtree Valley Avenue
Wake County, North Carolina**

**STIP I-5870
WBS Element No. 46307**



**THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Environmental Coordination and Permitting**

April 2018

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1.0 INTRODUCTION

The North Carolina Department of Transportation (NCDOT) proposes to construct a new interchange on I-440/US 1 at Ridge Road to connect to Crabtree Valley Avenue and to revise the existing I-440/US 1 interchange with US 70 (Glenwood Avenue) (STIP I-5870) in Wake County (Figures 1 and 2). The project is to be planned in conjunction with project B-5676, the replacement of Bridge 494 on SR 1670 (Blue Ridge Road) over Crabtree Creek. The project will also include improvements to the intersection of US 70 (Glenwood Avenue) and Blue Ridge Road/Lead Mine Road west of I-440. The following Natural Resources Technical Report (NRTR) has been prepared to assist in the preparation of a document for the purposes of the National Environmental Policy Act (NEPA).

2.0 METHODOLOGY

All work was conducted in accordance with the NCDOT Environmental Coordination and Permitting's Preparing Natural Resources Technical Reports Procedure and the latest NRTR Template dated November 2017. Field work was conducted on April 5, 10, 11, 12, 13, and 19, 2018. Jurisdictional areas identified in the study area will be verified by the U.S. Army Corps of Engineers (USACE) and the North Carolina Division of Water Resources (NCDWR) as determined by NCDOT. The jurisdictional determination package is provided in Appendix D. The qualifications of the principal personnel contributing to the field work and document are provided in Appendix B.

3.0 TERRESTRIAL COMMUNITIES

Ten (10) terrestrial communities were identified in the study area. Figure 4 shows the location and extent of these terrestrial communities. Terrestrial community data are presented in the context of total coverage of each type within the study area (Table 1).

Table 1. Coverage of terrestrial communities in the study area

Community	Dominant Species (scientific name)	Coverage (ac.)
Headwater Forest	American Hornbeam (<i>Carpinus caroliniana</i>) River Birch (<i>Betula nigra</i>) Sweet Gum (<i>Liquidambar styraciflua</i>)	2.8
Bottomland Hardwood Forest	American Hornbeam (<i>Carpinus caroliniana</i>) Green Ash (<i>Fraxinus pennsylvanica</i>) Tulip Tree (<i>Liriodendron tulipifera</i>)	1.4
Non-Tidal Freshwater Marsh	Box Elder (<i>Acer negundo</i>) Common Cattail (<i>Typha latifolia</i>) Arrow Arum (<i>Peltandra virginica</i>)	0.3
Floodplain pool	Box Elder (<i>Acer negundo</i>) American Hornbeam (<i>Carpinus caroliniana</i>) Sycamore (<i>Platanus occidentalis</i>)	1.1
Piedmont Bottomland Forest (Typic Low Subtype)	Box Elder (<i>Acer negundo</i>) Sugar Maple (<i>Acer saccharum</i>) Sycamore (<i>Platanus occidentalis</i>)	1.4
Piedmont Levee Forest (Beech Subtype)	American Beech (<i>Fagus grandifolia</i>) Loblolly Pine (<i>Pinus taeda</i>) Sycamore (<i>Platanus occidentalis</i>)	21.2
Piedmont Levee Forest (Typic Subtype)	Red Maple (<i>Acer rubrum</i>) Sycamore (<i>Platanus occidentalis</i>) Tulip Tree (<i>Liriodendron tulipifera</i>)	42.5
Mesic Mixed Hardwood Forest (Piedmont Subtype)	American Beech (<i>Fagus grandifolia</i>) English Ivy (<i>Hedera helix</i>) Tulip Tree (<i>Liriodendron tulipifera</i>)	16.4
Basic Mesic Forest (Piedmont Subtype)	Loblolly Pine (<i>Pinus taeda</i>) Sweet Gum (<i>Liquidambar styraciflua</i>) Tulip Tree (<i>Liriodendron tulipifera</i>)	16.2
Maintained/Disturbed	Bermuda Grass (<i>Cynodon dactylon</i>) English Ivy (<i>Hedera helix</i>) Tall Fescue (<i>Festuca arundinacea</i>)	2.6
Total		104.9

4.0 PROTECTED SPECIES

4.1 Endangered Species Act Protected Species

As of March 21, 2018, the United States Fish and Wildlife Service (USFWS) lists five (5) federally protected species, under the Endangered Species Act (ESA) for Wake County (Table 2). For each species, a discussion of the presence or absence of habitat is included below along with the Biological Conclusion rendered based on survey results in the study area.

Table 2. ESA federally protected species listed for Wake County.

Scientific Name	Common Name	Federal Status	Habitat Present	Biological Conclusion
<i>Notropis mekistocholas</i>	Cape Fear Shiner	E	No	No Effect
<i>Picoides borealis</i>	Red-cockaded Woodpecker	E	Yes	Unresolved
<i>Alasmidonta heterodon</i>	Dwarf Wedgemussel	E	Yes	Unresolved
<i>Parvaspina steinstansana</i>	Tar River Spinymussel	E	Yes	Unresolved
<i>Rhus michauxii</i>	Michaux's Sumac	E	Yes	Unresolved

E - Endangered

Cape Fear Shiner

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

Biological Conclusion: No Effect

The Cape Fear Shiner is not known to occur in the Neuse River basin, this project is in the Neuse River basin.

The constituent elements for the Cape Fear Shiner include: clean streams with gravel, cobble, and boulder substrates with pools, riffles, shallow runs; slack water areas with large rock outcrops; and side channels and pools with water of good quality and relatively low silt loads. The stream channels within the project area exhibited poor macroinvertebrate populations indicating impaired water quality. However, the physical conditions of several stream systems exhibit habitat characteristics required by the Cape Fear Shiner. A review of NHP records on March 21, 2018 indicates no known occurrences within 1.0 mile of the study area.

Red-cockaded Woodpecker

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

Biological Conclusion: Unresolved

The need for a Red-cockaded Woodpecker (RCW) survey will be evaluated by NCDOT.

The Red-cockaded Woodpecker (RCW) typically occupies open, mature stands of southern pines, particularly Longleaf Pine (*Pinus palustris*), for foraging and nesting/roosting habitat. The RCW excavates cavities for nesting and roosting in living pine trees, aged 60 years or older, which are contiguous with pine stands at least 30 years of age to provide foraging habitat. While no Longleaf Pine stands were observed within the study area, areas of mature Loblolly Pine stands were observed. No Red-cockaded Woodpeckers were observed during the NRTR site visits. A review of NHP records on March 21, 2018 indicates no known occurrences within 1.0 mile of the study area.

Dwarf Wedgemussel

USFWS optimal survey window: year round

Biological Conclusion: Unresolved

This information will be provided by the NCDOT BSG.

The Dwarf Wedgemussel 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. Such habitat is present within the study area. A review of NHP records on March 21, 2018 indicates no known occurrences within 1.0 mile of the study area.

Tar River Spinymussel

USFWS optimal survey window: year round

Biological Conclusion: Unresolved

This information will be provided by the NCDOT BSG.

The Tar River Spinymussel requires a stream with fast flowing, well-oxygenated, circumneutral pH water. The bottom should be composed of unconsolidated gravel and coarse sand. The water needs to be relatively silt-free, and stream banks should be stable, typically with many roots from adjacent riparian trees and shrubs. Such habitat is present within the study area. A review of NHP records on March 21, 2018 indicates no known occurrences within 1.0 mile of the study area.

Michaux's Sumac

USFWS optimal survey window: May – October

Biological Conclusion: Unresolved

Habitat for Michaux's Sumac is present within the study area. The plant is found in areas such as 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. The plant is shade intolerant and, therefore, grows best where disturbance (e.g., mowing, clearing, grazing, and periodic fire) maintains its open habitat. No occurrences of Michaux's Sumac were observed during the NRTR site visits. However, the NRTR site visits were conducted in April, outside the optimal survey window. A foot survey of all potential habitat will be conducted during the survey window and report of findings reported to NCDOT within two weeks of the survey. A review of NHP records on March 21, 2018 indicates no known occurrences within 1.0 mile of the study area.

4.2 Bald and Golden Eagle Protection Act

The Bald Eagle is protected under the Bald and Golden Eagle Protection Act, which is enforced by the USFWS. Habitat for the Bald Eagle primarily consists of mature forests in proximity to large bodies of open water for foraging. Large dominant trees are utilized for nesting sites, typically within 1.0 mile of open water.

A desktop-GIS assessment of the project study area, as well as the area within a 1.0-mile radius of the project limits, was performed on March 26, 2018 using May 1, 2017 color aerials. Water bodies large enough or sufficiently open to be considered potential feeding sources were identified within the study area and within 1.0 mile of the study area. Since there was foraging habitat within and near the review area, a survey of the project study area and the area within 660 feet of the project limits was conducted. No Bald Eagles or Bald Eagle nests were observed during the NRTR site visits. Additionally, a review of the NHP database on March 21, 2018 revealed no known occurrences of this species within 1.0 mile of the project study area.

4.3 Essential Fish Habitat

The National Marine Fisheries Service (NMFS) has not identified any Essential Fish Habitat in the study area.

5.0 WATER RESOURCES

Water resources in the study area are part of the Neuse River basin [U.S. Geological Survey (USGS) Hydrologic Unit 03020201]. Twenty-one (21) streams were identified in the study area (Table 3). The location of each stream is shown in Figure 3.

Table 3. Streams in the study area

Stream Name	Map ID	NCDWR Index Number	Best Usage Classification	Bank Height (ft)	Bankfull width (ft)	Depth (in)
Hare Snipe Creek	Hare Snipe Creek, SA	27-33-12-(2)	C; NSW	6	25	6-24
UT to Hare Snipe Creek	SB	27-33-12-(2)	C; NSW	5	3	6
UT to Hare Snipe Creek	SC	27-33-12-(2)	C; NSW	1	3	1-2
Crabtree Creek	Crabtree Creek	27-33-(10)	C; NSW	15	60	N/A
UT to Crabtree Creek	SD	27-33-(10)	C; NSW	2-5	4-6	1-8
UT to Crabtree Creek	SE	27-33-(10)	C; NSW	2	2	6
UT to Crabtree Creek	SF	27-33-(10)	C; NSW	8	4	4
Mine Creek	Mine Creek, SG	27-33-14	C; NSW	7	25	24
UT to Crabtree Creek	SH	27-33-(10)	C; NSW	3	6	6
UT to Crabtree Creek	SI	27-33-(10)	C; NSW	2	3	3
UT to Crabtree Creek	SJ	27-33-(10)	C; NSW	1	1.5	4
UT to Crabtree Creek	SK	27-33-(10)	C; NSW	8	18	8
UT to Crabtree Creek	SL	27-33-(10)	C; NSW	2	5	3
UT to Crabtree Creek	SM	27-33-(10)	C; NSW	3	5	2
UT to House Creek	SN	27-33-(10)	C; NSW	5	5	2
House Creek	House Creek, SO	27-33-13	C; NSW	8	25	12
UT to Crabtree Creek	SP	27-33-(10)	C; NSW	5.5	15	4
UT to Crabtree Creek	SQ	27-33-(10)	C; NSW	2.5	4	6
UT to Crabtree Creek	SR	27-33-(10)	C; NSW	2.5	10	6
UT to Crabtree Creek	SS	27-33-(10)	C; NSW	4	3	3
UT to Crabtree Creek	ST	27-33-(10)	C; NSW	4	7	8

There are no designated Outstanding Resource Water (ORW), High Quality Waters (HQW) or water supply watersheds (WS-I or WS-II) within the study area or within 1.0 mile downstream of the study area. The North Carolina 2016 Final 303(d) list of impaired waters identifies three streams in the study area as impaired waters: Hare Snipe Creek as an impaired water due to benthos poor; Mine Creek as an impaired water due to benthos fair; and Crabtree Creek as an impaired water due to benthos fair and PCB Fish Tissue Advisory.

One (1) surface water was identified in the study area (Table 4). The location of the surface water is shown in Figure 3.

Table 4. Surface waters in the study area

Surface Water	Jurisdictional	Map ID of Connection	Area (ac) in Study Area
PA	Yes	SR	1.8

6.0 REGULATORY CONSIDERATIONS

6.1 Clean Water Act Waters of the U.S.

Twenty-one (21) jurisdictional streams were identified in the study area (Table 5). The location of these streams is shown on Figure 3. North Carolina Stream Assessment Method (NCSAM) and NCDWR stream identification forms are included a separate Preliminary Jurisdictional Determination (PJD) Package. All jurisdictional streams in the study area have been designated as warm water streams for the purposes of stream mitigation.

Table 5. Characteristics of jurisdictional streams in the study area

Map ID	Length (ft.)	Classification	Compensatory Mitigation Required	River Basin Buffer
Hare Snipe Creek, SA	1501	Perennial	Yes	Subject
SB*	392	Perennial	Yes	Not Subject
SC	79	Intermittent	Yes	Not Subject
Crabtree Creek	13,388	Perennial	Yes	Subject
SD	1,089	Perennial	Yes	Not Subject
SE	298	Perennial	Yes	Subject
SF	642	Intermittent	Yes	Not Subject
SF*	1,100	Perennial	Yes	Not Subject
Mine Creek, SG	163	Perennial	Yes	Subject
SH	428	Perennial	Yes	Subject
SI	115	Perennial	Yes	Subject
SJ	15	Perennial	Yes	Not Subject
SK	1,638	Perennial	Yes	Subject
SL*	149	Intermittent	Yes	Not Subject
SM	288	Intermittent	Yes	Not Subject
SM	227	Perennial	Yes	Not Subject
SN	822	Perennial	Yes	Not Subject
House Creek, SO	3,118	Perennial	Yes	Subject
SP	398	Perennial	Yes	Not Subject
SQ*	130	Perennial	Yes	Not Subject
SR	960	Perennial	Yes	Subject
SS	1,168	Intermittent	Yes	Not Subject
ST	127	Intermittent	Yes	Subject
ST	800	Perennial	Yes	Subject
Total	29,035			

* NCSAM forms are available in the PJD package

Nineteen (19) jurisdictional wetlands were identified within the study area (Table 6). The location of these wetlands is shown on Figure 3. All wetlands in the study area are

located within the Neuse River basin [USGS Hydrologic Unit 03020201]. USACE wetland determination forms and NCWAM forms for each site are included in a separate PJD Package.

Table 6. Characteristics of jurisdictional wetlands in the study area

Map ID	NCWAM Classification	NCWAM Rating	Hydrologic Classification	Area (ac.) in Study Area
WA	Headwater Forest	High	Riparian	0.3
WB	Headwater Forest	Medium	Riparian	<0.1
WC	Headwater Forest	High	Riparian	0.1
WD	Headwater Forest	High	Riparian	0.3
WE	Headwater Forest	High	Riparian	0.1
WF	Floodplain Pool	High	Riparian	<0.1
WG	Headwater Forest	Low/Medium ¹	Riparian	0.8
WH	Floodplain Pool	High	Riparian	0.1
WI	Headwater Forest	Low	Riparian	0.1
WJ	Headwater Forest	Medium	Riparian	<0.1
WK	Headwater Forest	Low	Riparian	0.4
WL	Headwater Forest	High	Riparian	0.5
WM	Bottomland Hardwood Forest	Medium	Riparian	<0.1
WN	Bottomland Hardwood Forest	Medium	Riparian	0.4
WO	Headwater Forest	Low	Riparian	0.2
WP	Bottomland Hardwood Forest	Low	Riparian	<0.1
WQ	Bottomland Hardwood Forest	Medium	Riparian	0.9
WR	Non-Tidal Freshwater Marsh	High	Riparian	0.3
WS	Bottomland Hardwood Forest	Low	Riparian	0.1
			Total	4.8

¹Additional WAM conducted in wetlands with land use change.

6.2 Construction Moratoria

The USACE has not identified streams in the study area as trout streams. The North Carolina Department of Environmental Quality (NCDEQ) has not identified streams in the study area as a primary nursery area.

The study area is in Wake County. However, the NCDEQ Anadromous Fish Spawning Areas (AFSA) Neuse River Area Map 1 indicates that there are no moratoria for streams within the project study area.

6.3 N.C. River Basin Buffer Rules

Streamside riparian zones within the study area are protected under provisions of the Neuse River Buffer Rules administered by NCDWR. Table 5 indicates which streams are subject to buffer rule protection. Eight (8) of the perennial streams are not shown on either the most recent topographic or soil survey map and, therefore, may not be subject

to the Buffer Rules. However, final calls will be made by the NCDWR during a future site visit. Potential impacts to protected stream buffers will be determined once a final alignment and design have been determined.

6.4 Rivers and Harbors Act Section 10 Navigable Waters

No streams within the project area have been designated by the USACE as a Navigable Water under Section 10 of the Rivers and Harbors Act.

6.5 Coastal Area Management Act Areas of Environmental Concern

This project, located in Wake County, is not under jurisdiction of the Coastal Area Management Act (CAMA) and no Areas of Environmental Concern (AEC) are present.

6.6 Coastal Barrier Resources System

No units of the Coastal Barrier Resources System have been designated in the project area.

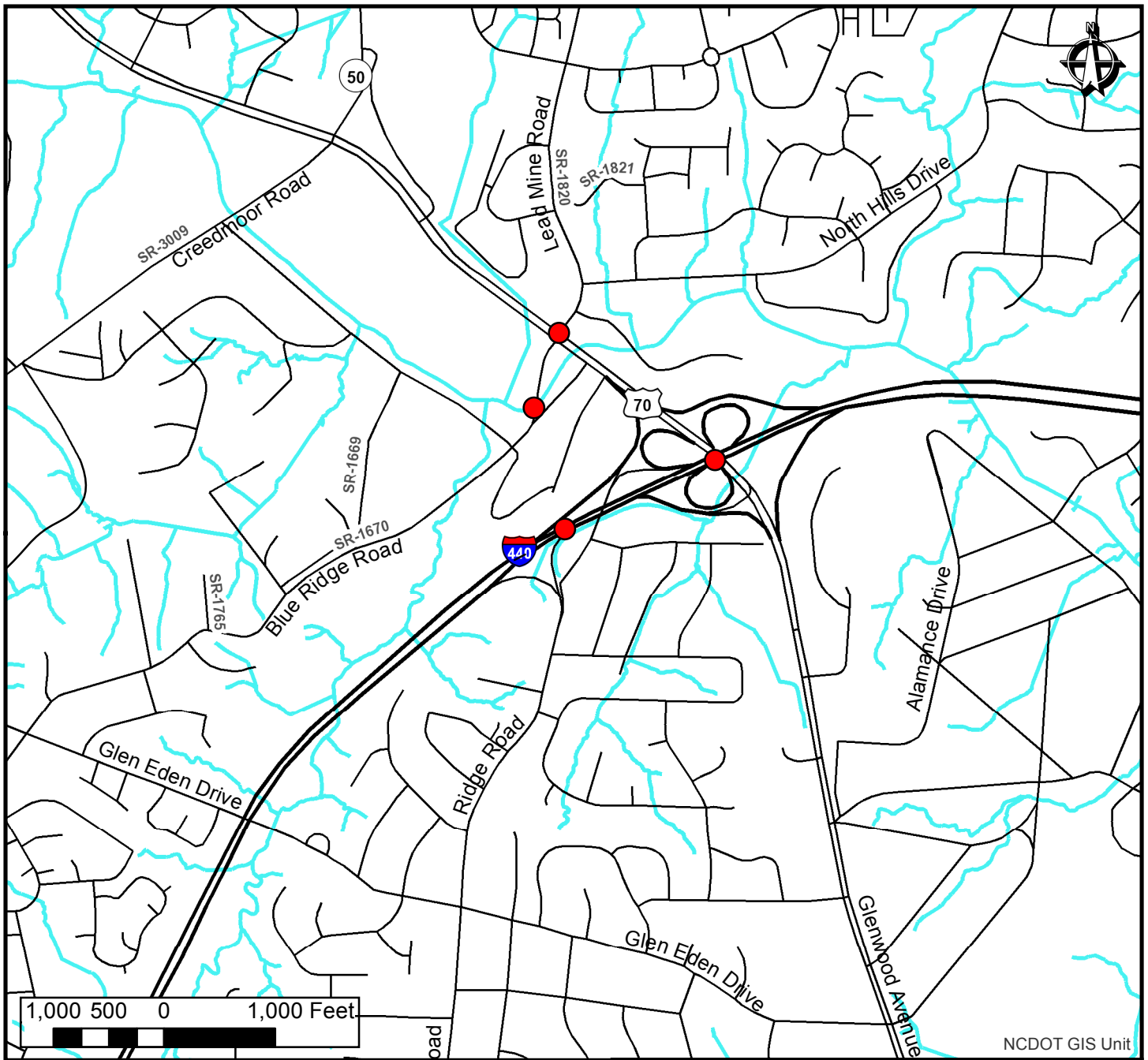
7.0 REFERENCES

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Appendix A

Figures



● I-5870 Proposed Improvement Locations



NORTH CAROLINA DEPARTMENT
OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DELIVERY UNIT

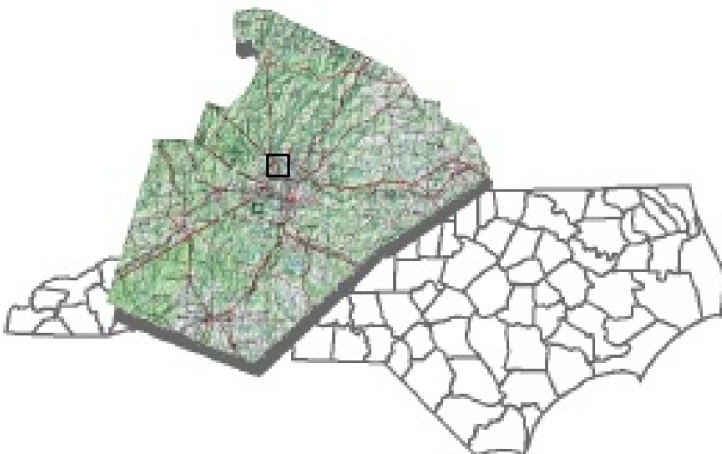
WAKE COUNTY

I-440/US 1

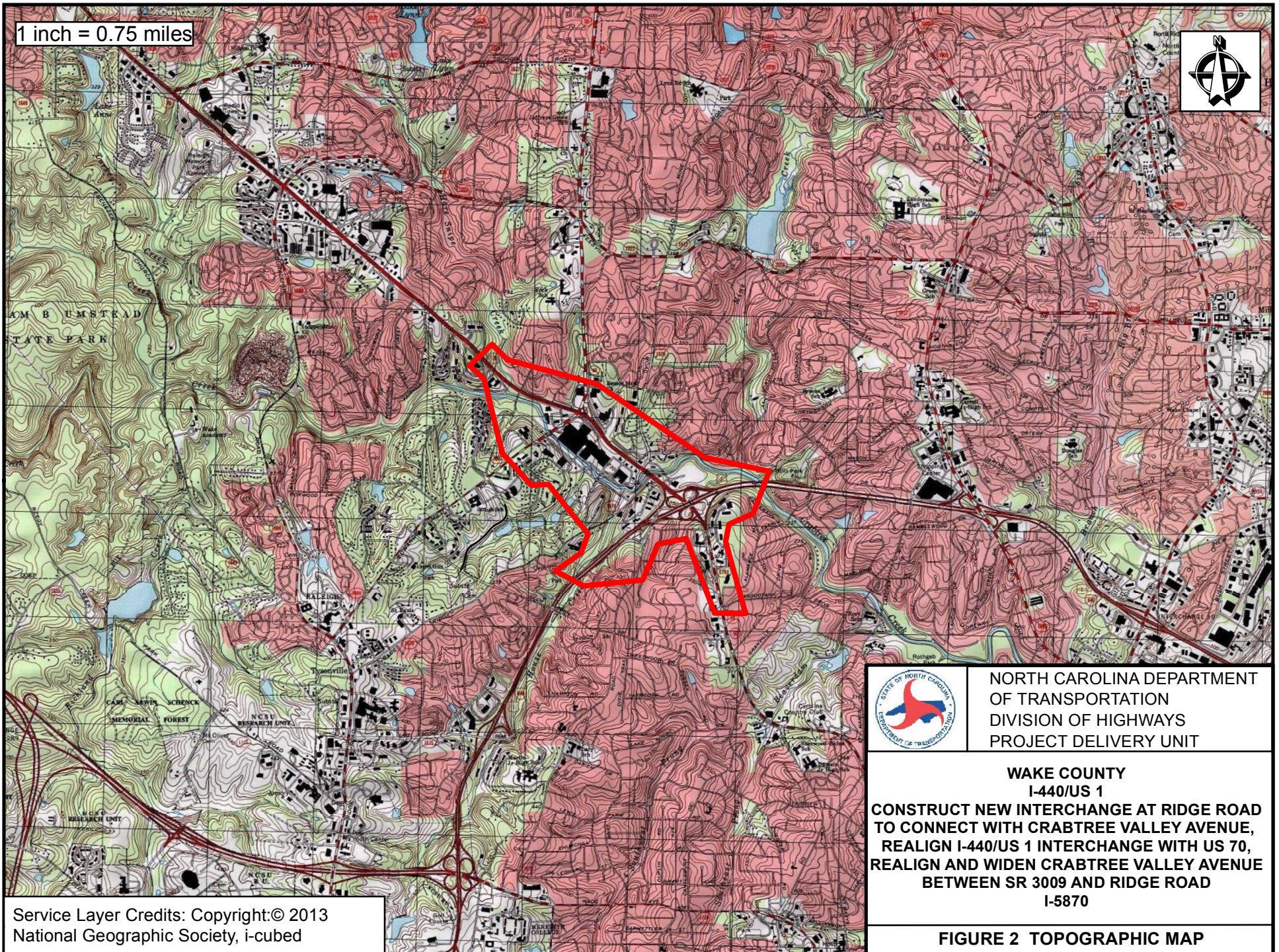
CONSTRUCT NEW INTERCHANGE AT RIDGE ROAD
TO CONNECT WITH CRABTREE VALLEY AVENUE,
REALIGN I-440/US 1 INTERCHANGE WITH US 70,
REALIGN AND WIDEN CRABTREE VALLEY AVENUE
BETWEEN SR 3009 AND RIDGE ROAD

STIP I-5870

FIGURE 1 VICINITY MAP



1 inch = 0.75 miles



NORTH CAROLINA DEPARTMENT
OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DELIVERY UNIT

**WAKE COUNTY
I-440/US 1
CONSTRUCT NEW INTERCHANGE AT RIDGE ROAD
TO CONNECT WITH CRABTREE VALLEY AVENUE,
REALIGN I-440/US 1 INTERCHANGE WITH US 70,
REALIGN AND WIDEN CRABTREE VALLEY AVENUE
BETWEEN SR 3009 AND RIDGE ROAD
I-5870**

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FIGURE 2 TOPOGRAPHIC MAP

1 in = 1,700 feet



Legend

-  Intermittent Streams
-  Streams
-  Study limits
-  Pond PA
-  Wetlands

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

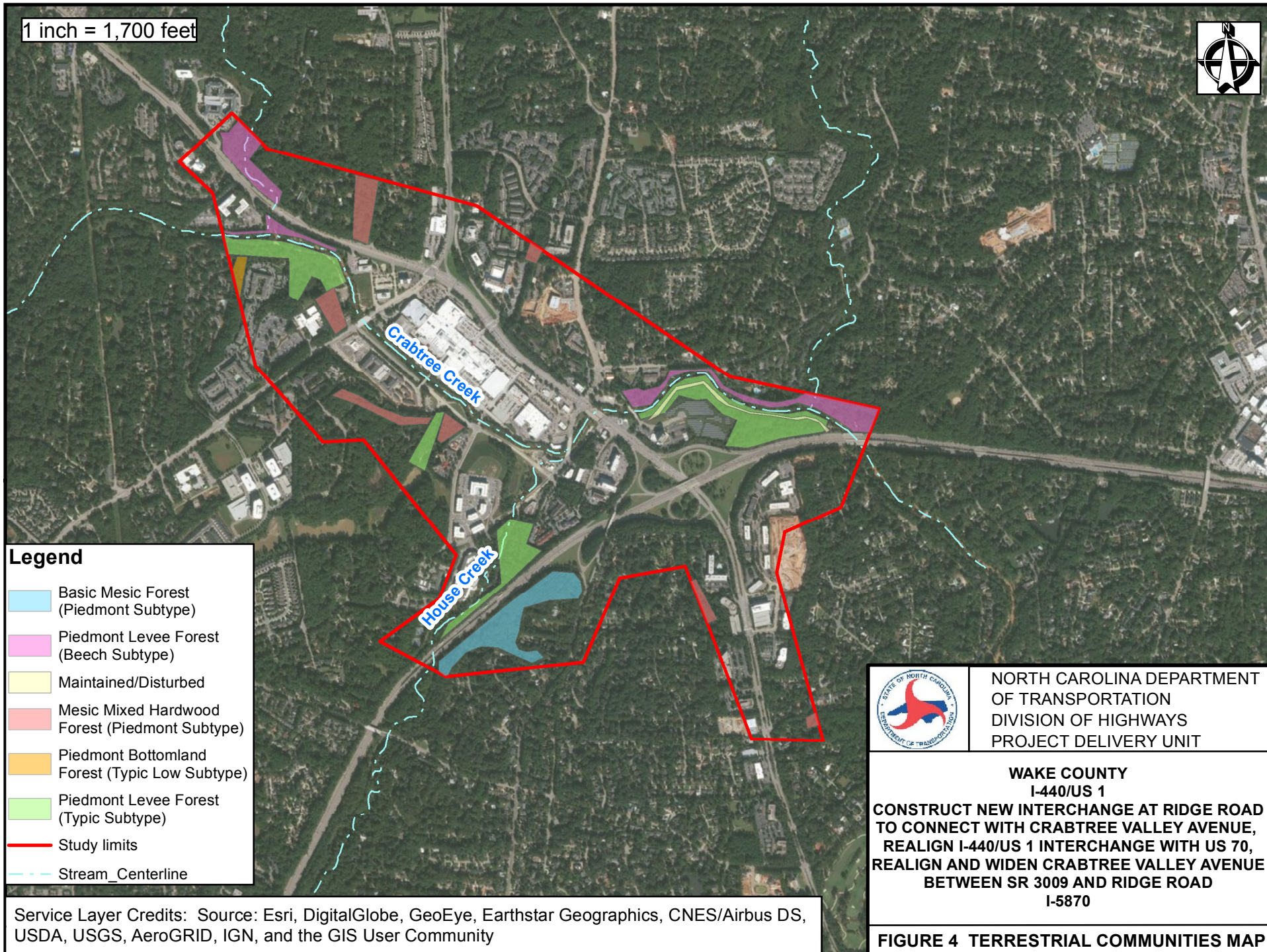


NORTH CAROLINA DEPARTMENT
OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DELIVERY UNIT

WAKE COUNTY
I-440/US 1
CONSTRUCT NEW INTERCHANGE AT RIDGE ROAD
TO CONNECT WITH CRABTREE VALLEY AVENUE,
REALIGN I-440/US 1 INTERCHANGE WITH US 70,
REALIGN AND WIDEN CRABTREE VALLEY AVENUE
BETWEEN SR 3009 AND RIDGE ROAD
I-5870

FIGURE 3 JURISDICTIONAL MAP

1 inch = 1,700 feet



Appendix B

Qualifications of Contributors

Principal

Investigator: Troy Shelton, PWD
Education: B.S. Environmental Science, 1996
Experience: Senior Environmental Scientist, Dewberry Engineers Inc. 2001-Present
United States Marine Corps, 1997-2001
Responsibilities: Wetland and stream delineations, stream assessment, T/E species
assessment, QA/QC of document

Investigator: Briana Bill, PWD
Education: B.S. Environmental Science, 2003
Experience: Senior Environmental Scientist, Dewberry Engineers Inc., 2008-Present
Environmental Health Specialist, VA Department of Health, 2004-2008
Responsibilities: Wetland and stream delineations, wetland and stream assessment, T/E
species assessment, natural communities assessment, document
preparation

Investigator: Elizabeth Lusk
Education: B.A. German, Davidson College, 1985
Masters of Forest Management, Duke University, 1989
Experience: Senior Environmental Scientist, Dewberry Engineers Inc., 2015-Present
Environmental Supervisor, NCDOT 2002-2014
Environmental Biologist, NCDOT 1999-2002
Biologist/Forester, Coastal Zone Resources 1994-1999
Service Forester, NC Forest Service 1992-1993
Service Forester, MD Forest Service 1990-1992
Responsibilities: QA/QC of document

Investigator: Anne Burroughs
Education: B.S. Biological Sciences, Minor Environmental Sciences 1992
Experience: Senior Environmental Scientist, Dewberry Engineers Inc., 2014-Present
Environmental Scientist, URS Corporation 2011-2014
Environmental Program Consultant, NCDOT 2003-2011
Responsibilities: QA/QC of document

Appendix C
Mussel Survey Report

Appendix D

Jurisdictional Determination Package