

R-2615, US 421/US 321 Improvements Watauga County Project Overview

The proposed improvements involve widening two-lane US 421/US 321 in Vilas, an unincorporated community west of Boone. The roadway generally follows Brushy Fork Creek in a mountain valley. Its elevation varies, but it generally ranges from 2,740 to 3,420 feet. Figure 1 illustrates the project location. Figures 2A-2B, Environmental Features Map, illustrate the project study area.

The widening is anticipated to result in a multi-lane roadway, though typical section(s) to be considered are under development. The project extends from the US 421/US 321 split to SR 1107 (NC 105 Bypass), a distance of approximately 3.5 miles. No bridges exist along the project corridor, though two culverts and several pipe replacements or extensions are anticipated.

The project is state-funded. A combined State Environmental Assessment / Finding of No Significant Impact will be prepared.

Purpose and Need

The project is needed to address increasing peak hour congestion along the US 421/US 321 corridor. Commuter traffic into Boone from western Watauga County, Ashe County, and Mountain City, Tennessee is growing in response to employment growth in Boone. Traffic from US 421 northwest of the project accounts for approximately two-thirds of the US 421/US 321 volume within the project limits.

Traffic counts taken in 2018 indicate the current volume on the roadway ranges from 14,000 AADT to 15,100. By 2045, the project design year, traffic volumes along the project corridor are expected to increase to between 18,200 to 19,600 AADT. (Figures 3A-3B provide the existing and design year traffic estimates.) Additional capacity along the corridor is needed to accommodate this increased traffic volume and achieve a Level of Service (LOS) D or better in the project design year.

Crash data obtained and analyzed for the project provide additional evidence of the congestion currently experienced along the corridor. Figure 4 illustrates the locations and type of crashes along US 421/US 321 during the five-year analysis period. Rear-end and lane departure crashes are by far the most common crash types, at 45 percent and 24 percent, respectively. This is indicative of congestion exacerbated by left-turning vehicles. A summary of the corridor's crash rate compared to the statewide average for similar roadways is provided in Table 1, below. The crash rate for the corridor is higher than the statewide average for comparable roadways.

Table 1. Crash Rate Comparison: US 421/US 321 from US 321 to SR 1107 (NC 105 Bypass)

<i>Category</i>	<i>Crashes</i>	<i>Crash Rate</i>	<i>Statewide Average Crash Rate</i>	<i>Critical Crash Rate</i>
Total	267	229.72	183.55	206.64
Fatal	2	0.00	1.48	4.02
Non-Fatal Injury	98	77.94	56.35	69.37

Note: Compared to Statewide Average Crash Rates for US Routes with 2 lanes (2015 - 2017). The cross section does vary, but two lanes is the prevailing cross section.

Another desirable outcome of the project is to meet the need for bicycle accommodations along US 421/US 321, as identified in the High County RPO *Comprehensive Transportation Plan*.

Therefore, the primary purpose of the project is to upgrade the existing roadway with improvements that will provide additional capacity to alleviate congestion and accommodate growth in traffic along the corridor.

Natural Environment

Surface Waters

Figures 5A-5H provided more detailed information on streams preliminarily identified within the project area. Approximately 25,660 linear feet of streams have been identified, including 3 named streams and numerous unnamed tributaries. The named streams are listed in the table below. No streams in the project area are classified as DWR Trout Streams or Designated Public Mountain Trout Streams. (Please note that many unnamed tributaries shown on the environmental features map are identified as wetlands, based on National Wetlands Inventory mapping.)

Table 2. Project Study Area Streams

<i>Named Streams</i>	<i>Stream Index Number</i>	<i>Water Quality Classification</i>
George Branch	8-15-10-2	C
Brushy Fork	8-15-10	C
Linville Creek	8-15-10-1	C

In addition, at least 28 unnamed tributaries, 1 ephemeral stream to Brushy Fork Creek, and 2 unnamed tributaries to George Branch occur in the project study area.

Approximately 2 acres of wetlands have been preliminarily identified in the study area. Their locations are also provided on Figures 2A - 2H.

Protected Species

The table below lists the threatened and endangered species for Watauga County. Preliminary field survey results indicate that no habitat for the listed species exists within the project study area.

Table 3. Federal Threatened and Endangered Species (Watauga County), as of June 27, 2018

<i>Common Name</i>	<i>Scientific Name</i>	<i>Federal Status</i>	<i>Record Status</i>
Carolina northern flying squirrel	<i>Glaucomys sabrinus coloratus</i>	Endangered	Current
Gray bat	<i>Myotis grisescens</i>	Endangered	Probably/potential
Virginia big-eared bat	<i>Corynorhinus townsendii virginianus</i>	Endangered	Current
Rusty-patched bumble bee	<i>Bombus affinis</i>	Endangered	Historic
Spruce-fir moss spider	<i>Microhexura montivaga</i>	Endangered	Current
Road mountain bluet	<i>Hedyotis purpurea var. montana</i>	Endangered	Current
Spreading avens	<i>Geum radiatum</i>	Endangered	Current
Northern long-eared bat	<i>Myotis septentrionalis</i>	Threatened	Current
Blue Ridge goldenrod	<i>Solidago spithamea</i>	Threatened	Current
Bog Turtle	<i>Glyptemys muhlenbergii</i>	Threatened (S/A)	Current
Heller's blazing star	<i>Liatris helleri</i>	Threatened	Current

Human Environment

Cultural Resources

A survey for historic architecture will be conducted in the project study area. A review of HPOweb, indicates that two potentially historic properties (shown on the environmental features map) occur in the project area:

- McBride-Bingham House - WT0374, surveyed only
- Wilson House - WT0371, surveyed only

A survey for archaeological resources may be required within the project study area.

Community Characteristics

The US 421/US 321 improvement project is located in the unincorporated community of Vilas, west of Boone, in Watauga County. According to a Watauga County planner, the community is comprised largely of families with deep roots in the community. The majority of community resources in Vilas are churches, with at least three fronting US 421/US 321. A U.S. Post Office is located at the roadway's intersection with Sunshine Cove Road. A variety of businesses front the roadway, including numerous automotive repair and sales, gas stations, restaurants, and small shops. No access control currently exists and driveways are numerous.

The initial demographic analysis of the project area shows that the 92 percent of its residents are white, although pockets of Hispanic residents exist in the general area. This population meets the NCDOT threshold for Language Assistance. Poverty is pronounced in the area compared to Watauga County as a whole. Nearly 43 percent of area residents are living below the poverty threshold, with the majority of those classified as "very poor." Additional analysis will determine whether Environmental Justice will be a consideration.

PROJECT DATA SHEET

Date: 10/23/18
Rev.:

TIP No.: R-2615	County: Watauga
Federal-aid No.: N/A	WBS No.: 44385.1.3
NCDOT Division: 11	Scoping Meeting Date: November 29, 2018

Project Description:

- Length: 3.5 miles
- Termini (US Hwy / SR): US 321/US 421 junction to SR 1107 (105 Bypass)
- MPO / RPO: High Country Council of Governments (HCCOG)
- NEPA / 404 Merger Candidate? Yes No Unknown
- General Description of Project:

US 321/US 421 junction near Vilas to SR 1107 (105 Bypass) – Termini of proposed Boone Bypass (U-2703). Widen to multi-lanes.

Design Data (Existing Conditions):

- Functional Classification: Other Principal Arterial
- Strategic Highway Corridor: Yes, Corridor D
- CTP Designation (Facility Type): Expressway, Needs Improvement
- Type of Access Control: No Control
- Typical Section: 2 lanes
- Right of Way: generally 60'
- Posted Speed: varies, 45 mph to 60 mph

- Structure Inventory (bridges, RCBC, Walls, etc):

- RCBC # 15: double 10'x5' R.C. box culvert; 52'-6 along centerline culvert, carrying Brushy Fork Creek. Sufficiency rating: 71.35, structurally deficient.
- RCBC # 28: triple 8'x9' R.C. box culvert; 77'-3 along centerline culvert, carrying Brushy Fork Creek. Sufficiency rating: 96.1.

- Other TIP Projects in the Area

R-2566B – SR 1136 (Clarks Creek Road) to SR 1107 (NC 105 Bypass) in Boone
U-5715 – College Street intersection, construct improvements
U-5603 – US 321 (Blowing Rock Road) to NC 105 Bypass. Upgrade Roadway
R-5872 – SR 1180 (Poplar Grove Connector), construct roundabout

- Railroad Involvement:

None

Long Range Plan History:

2013 Watauga County Comprehensive Transportation Plan

https://connect.ncdot.gov/projects/planning/TPBCTP/Watauga%20County/Watauga_Final_Report.pdf

Proposes improving US 321-421 from the NC 105 BYP to US 321 at Vilas to a four-lane divided, partially controlled access facility

Traffic Data (AADT):

Current Year	2018	14,000 to 15,100
Design Year	2045	18,200 to 19,600
Source of Traffic Data:	Traffic counts conducted in May, 2018. Traffic Volume Estimate, July 2018.	

Cost Estimates:

	Construction	Right-of-Way	Utilities	Total
TIP Estimate*	\$28,700,000	\$26,500,000	\$3,200,000	\$59,150,000
Current Estimate				TBD

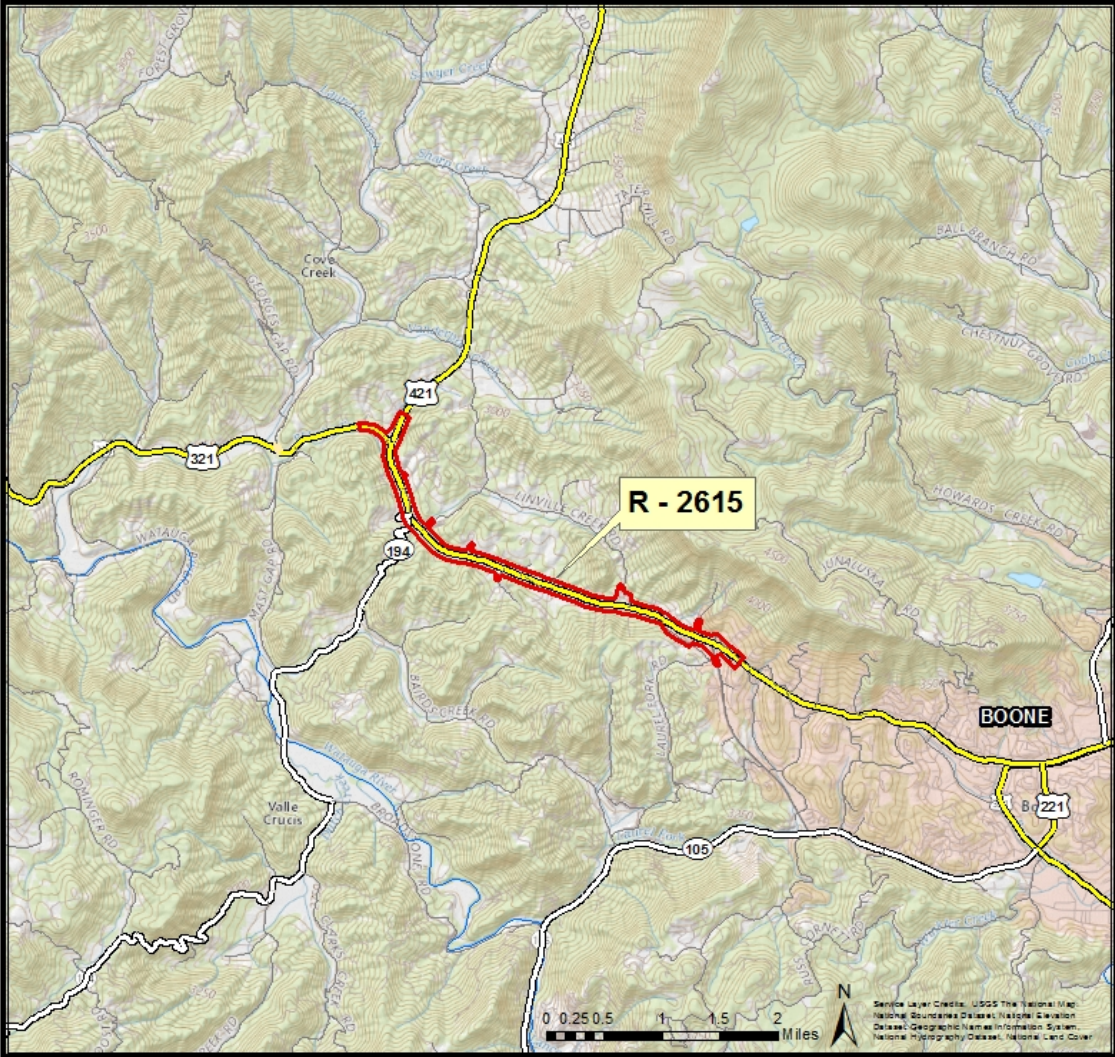
*2018-2027 Draft STIP

Project Schedule*:

Environmental Document	Combined State EA/FONSI	Spring 2020
Right-of-Way	FY 2022	
Let	FY 2024	

*2018-2027 Draft STIP

Figure 1: Vicinity Map



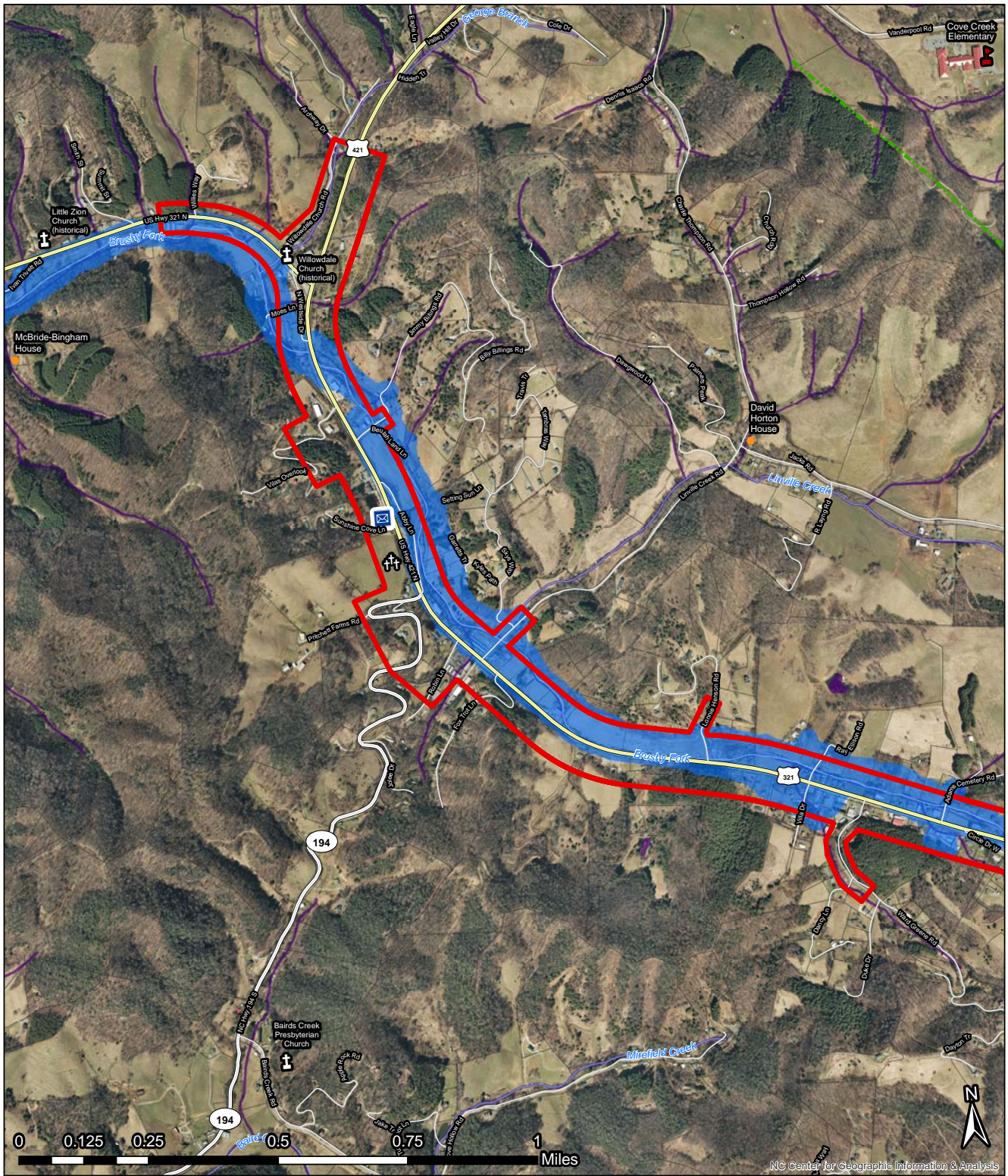
WATAUGA COUNTY
US 321/421 IMPROVEMENTS
R - 2615
















Preliminary Study Area Resources Inventory Table

Resource/Measure	Study Area Corridor
General Project Information	
Length of project	3.5 miles
Potential for Interchanges or RR crossings	N/A
Crossing or intersecting roadways	7 – US 321, NC 194, SR 1311 (Charlie Thompson Road), SR 1313 (Linville Creek Road), SR 1110 (Greer Lane), SR 1107 (NC 105 Bypass), SR 1104 (Old Bristol Road)
Cultural Resources	
National Register or eligible sites or districts	None previously identified
Human Environment	
Hospitals	N/A
Nursing homes	N/A
Churches	3 – Willowdale Baptist Church, Apostolic Church of Jesus Christ, Brushy Fork Baptist Church
Cemeteries	2 – Howell Cemetery, unnamed cemetery
Public schools	N/A
Private schools/day care	1 – Mary’s Montessori School
Public parks / Section 4(f) properties	N/A
Greenways	N/A
Game Lands or Land and Water Conservation Fund Properties	N/A
Potentially Affected Residential Properties	110 (within study area)
Potentially Affected Business Properties	46 (within study area)
Low-income or minority communities	Low-income threshold met for 3 block groups – CT 9202/BG 3, CT 9204/BG 3, CT 9203/BG 2 and the Demographic Study Area
Natural Environment	
Streams (# of crossings)	30
Wetlands (est. acres rounded to whole acre)	2
Critical Water Supply Watersheds	No
Riparian Buffer rules apply (yes/no/part)	No
Identified Critical habitat/species under ESA	No
Physical Environment	
Natural gas transmission pipeline	N/A
Power transmission line	N/A
Suspected/known Hazardous Material sites	11 sites, including 8 UST sites
FEMA Buyout Properties	0
Area in active agriculture (nearest acre)	450

NOTE: This table is to be used in conjunction with the Environmental Features Map for the purposes of evaluating potential impacts. Use of the table without the aid of mapping may lead to misinformed decisions.

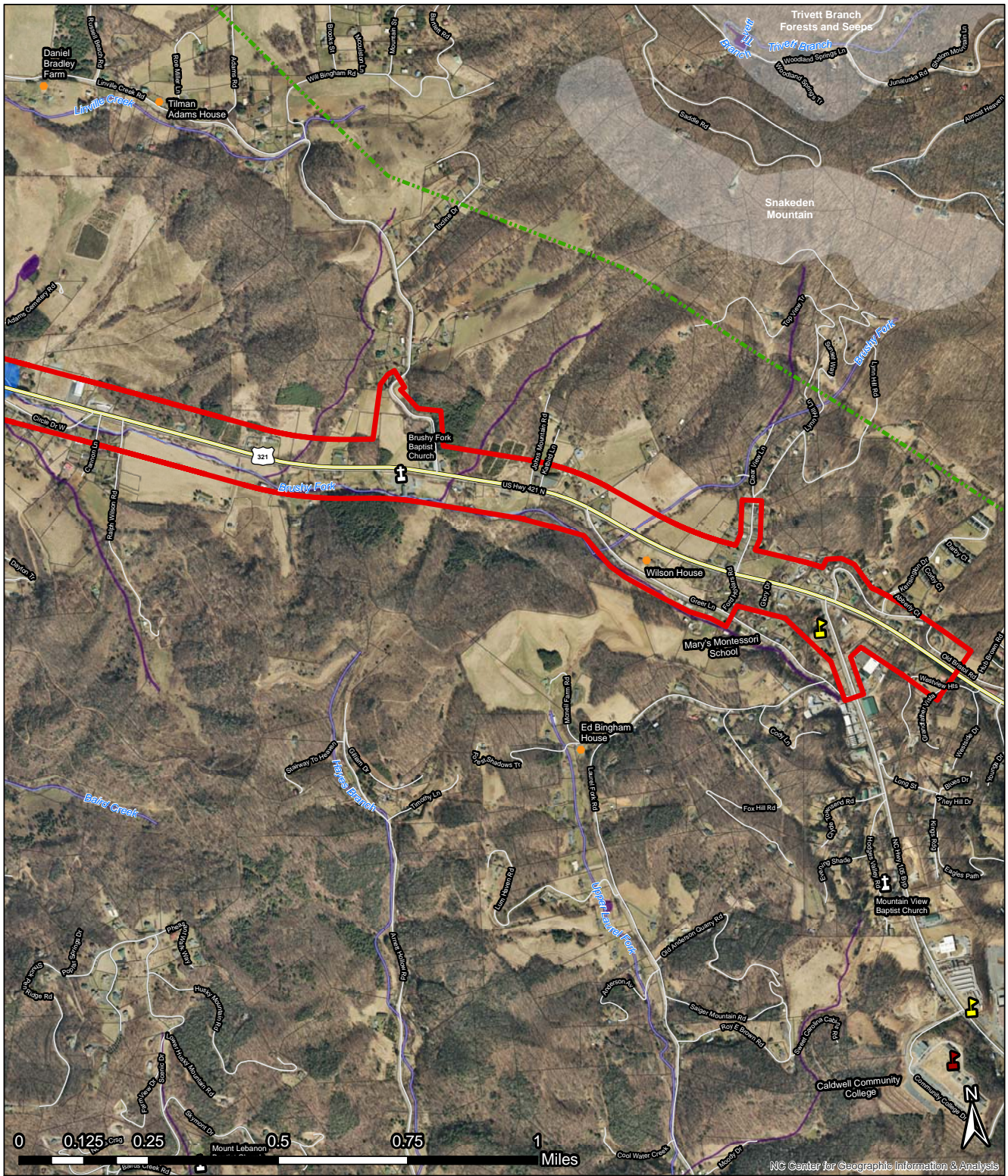


NC Center for Geographic Information & Analysis














	Study Area		Historic Property		Cemetery
	Watauga Parcels 2013		Water Resources		Post Office
	Transmission Lines		Flood Zones		Public School
	Natural Heritage Areas		Wetlands		Non-Public School
					Church

<h2>Environmental Features</h2> <p>STIP Project No. R-2615 US 421/321 Improvements Watauga County</p>	<h2>Figure 2A</h2>
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Source: NCDOT GIS Unit, NC OneMap, USFWS, USGS, USDA, FEMA



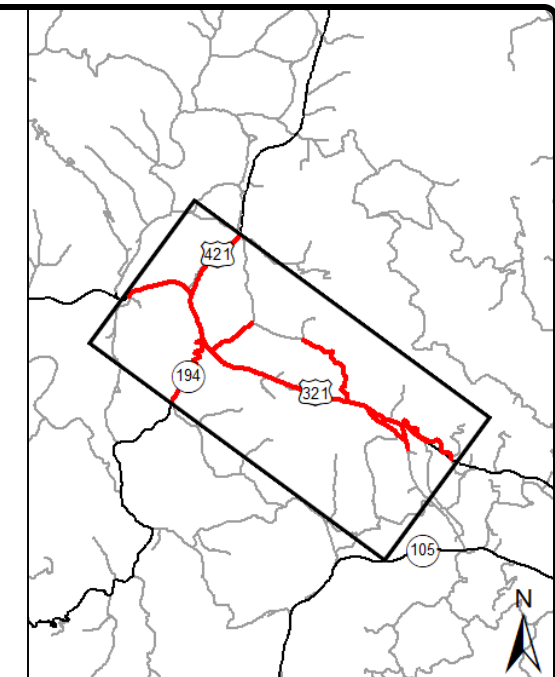
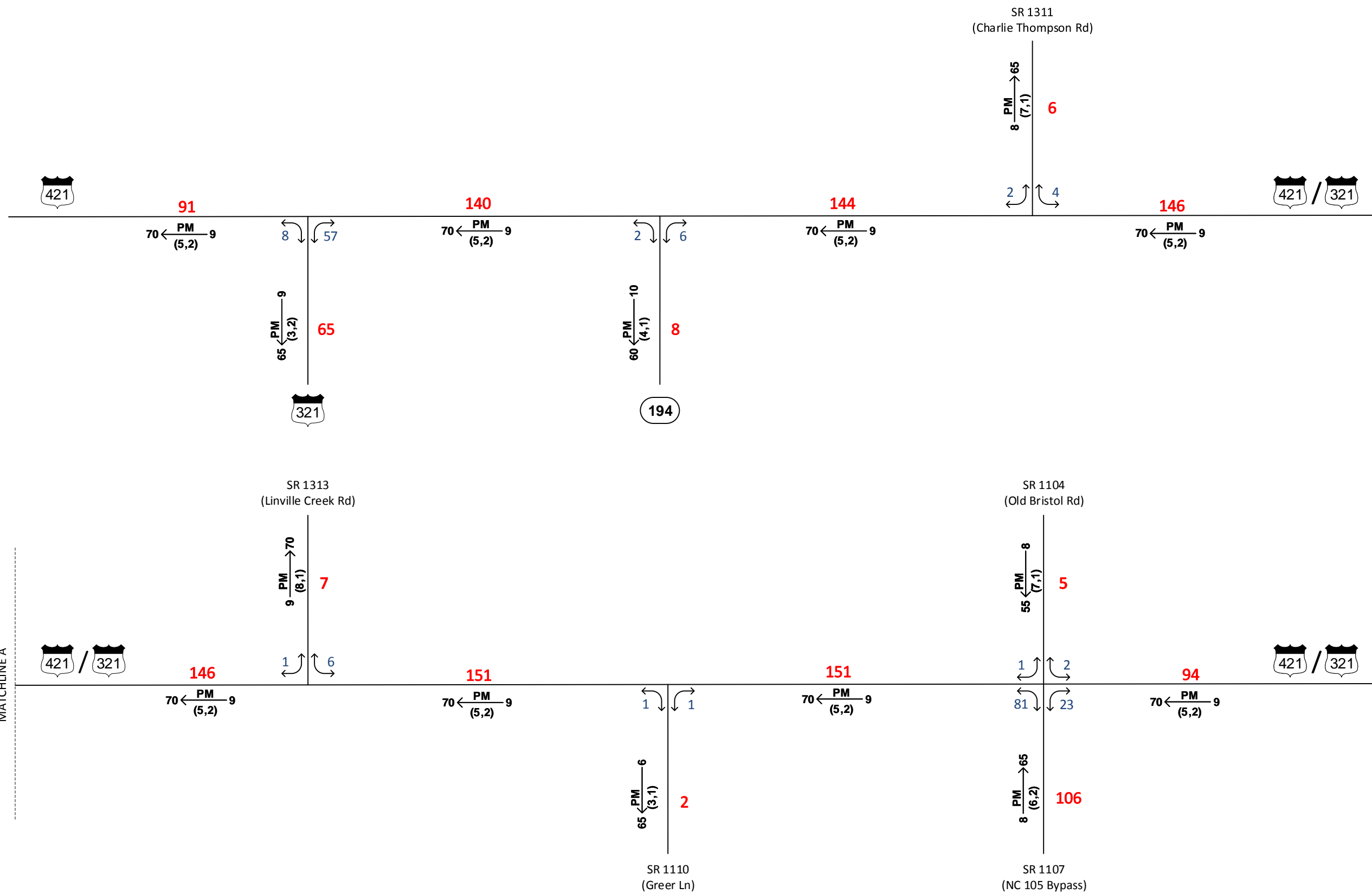
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Environmental Features
STIP Project No. R-2615
US 421/321 Improvements
Watauga County

Figure 2B

Source: NCDOT GIS Unit, NC OneMap, USFWS, USGS, USDA, FEMA



2018

AVERAGE ANNUAL
DAILY TRAFFIC

VOLUME ESTIMATE

Figure 3A

LEGEND

- $\frac{PM}{(d, t)} \rightarrow D$
- ### No. of Vehicles Per Day (VPD) in 100s
- 1- Less than 50 VPD
- X Movement Prohibited
- Roadway
- K Design Hour Factor (%)
- PM PM Peak Period
- D Peak Hour Directional Split
- \rightarrow Indicates Direction of D
- (d,t) Duals, TT-STs (%)

TIP: R-2615 WBS:

COUNTIES: Watauga DIVISION: 6

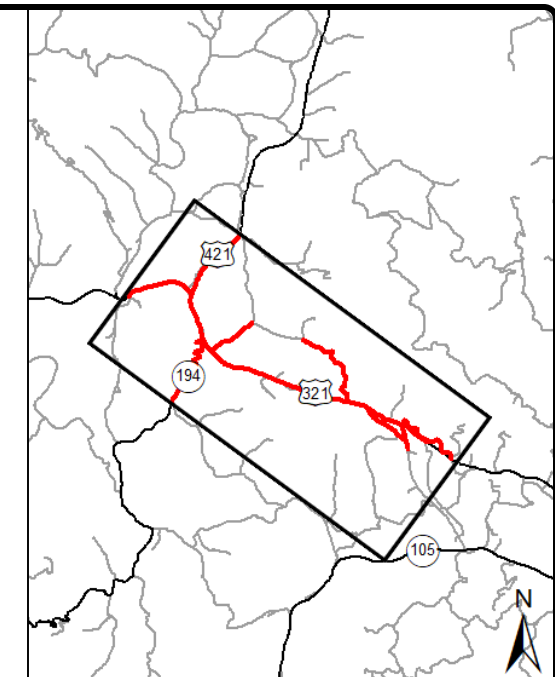
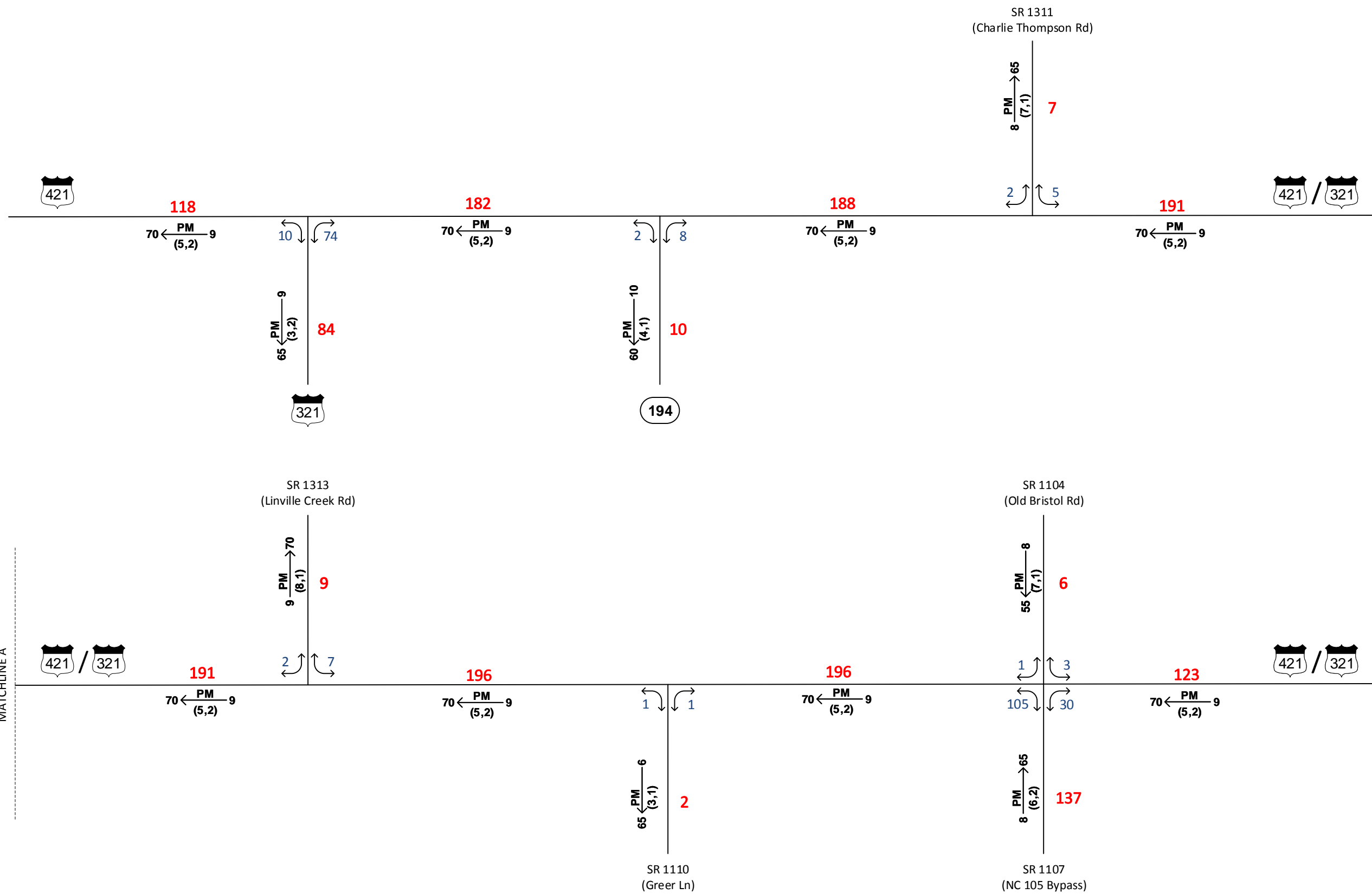
DATE: July 2018

PREPARED BY: Kimberly Levine

LOCATION: US 321/US 421 from US 321 to SR 1107 (NC 105 Bypass)

PROJECT: Improvements to US 421/US 321





2045

AVERAGE ANNUAL DAILY TRAFFIC

VOLUME ESTIMATE

Figure 3B

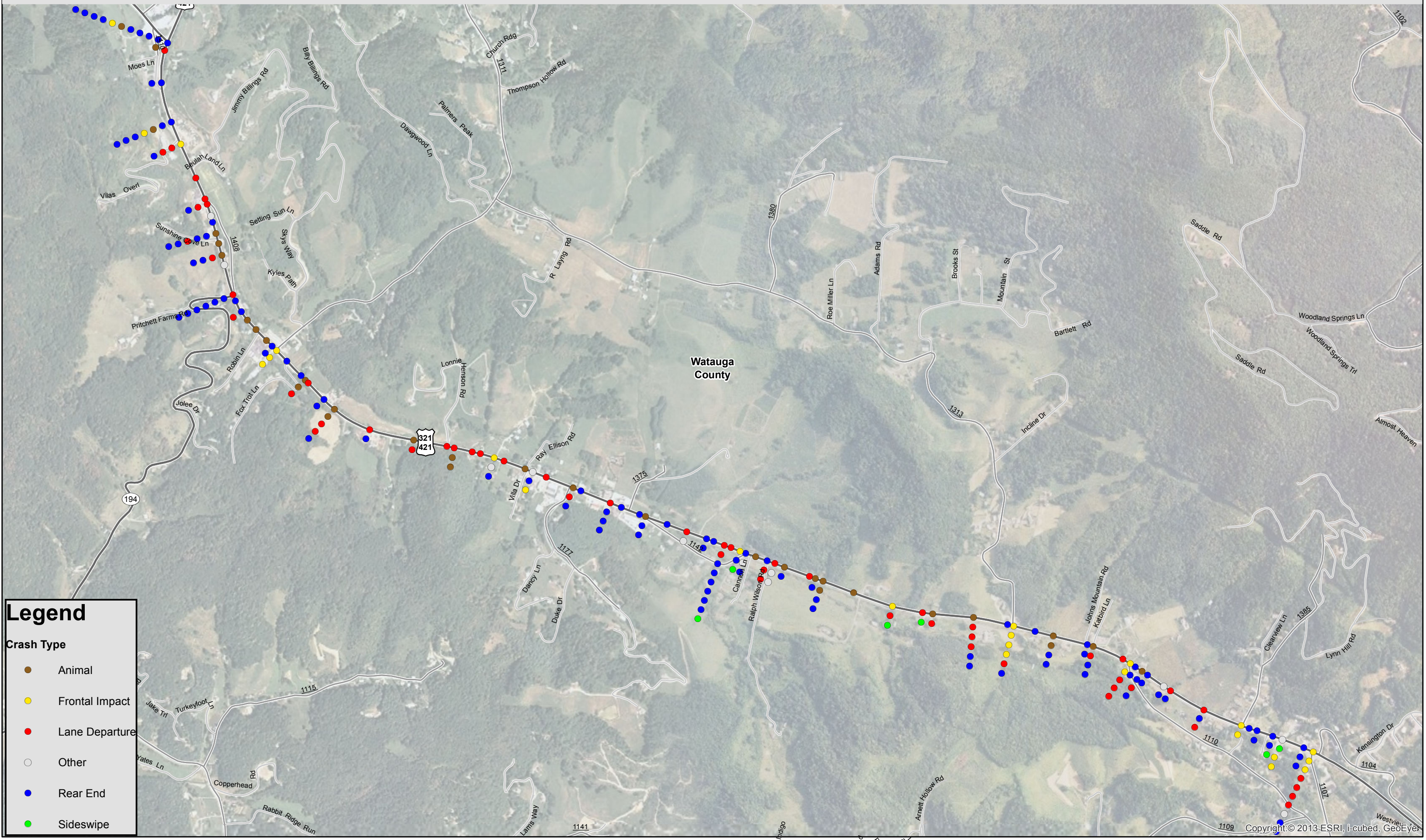
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TIP: R-2615	WBS:
COUNTIES: Watauga	DIVISION: 6
DATE: July 2018	
PREPARED BY: Kimberly Levine	
LOCATION: US 321/US 421 from US 321 to SR 1107 (NC 105 Bypass)	
PROJECT: Improvements to US 421/US 321	



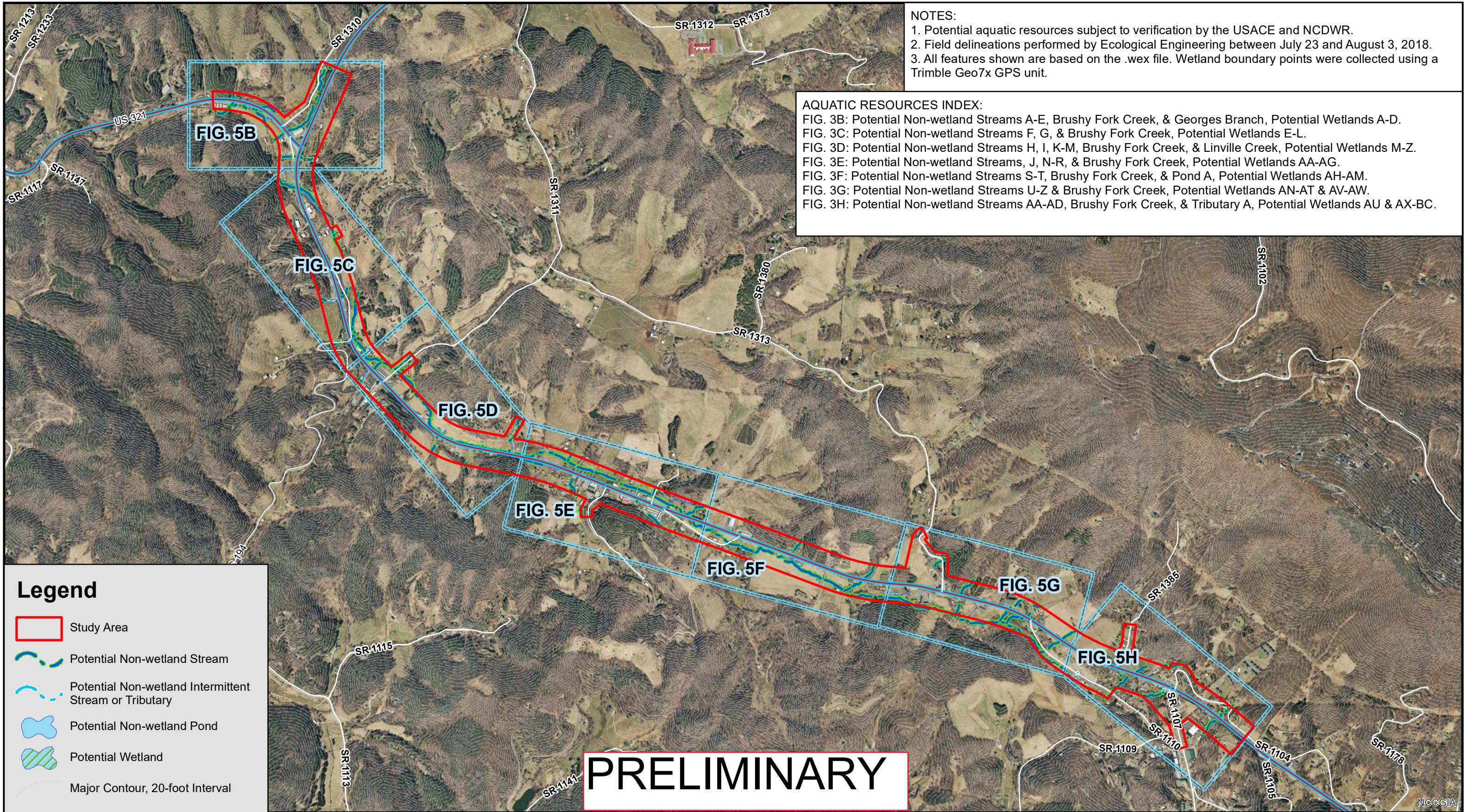
Figure 4. US 321 / US 421 from SR 1107 (NC 105 Bypass) to US 421 (8/1/2013 - 7/ 31/201 8)



Legend

Crash Type

- Animal
- Frontal Impact
- Lane Departure
- Other
- Rear End
- Sideswipe



NOTES:
 1. Potential aquatic resources subject to verification by the USACE and NCDWR.
 2. Field delineations performed by Ecological Engineering between July 23 and August 3, 2018.
 3. All features shown are based on the .wex file. Wetland boundary points were collected using a Trimble Geo7x GPS unit.

AQUATIC RESOURCES INDEX:
 FIG. 3B: Potential Non-wetland Streams A-E, Brushy Fork Creek, & Georges Branch, Potential Wetlands A-D.
 FIG. 3C: Potential Non-wetland Streams F, G, & Brushy Fork Creek, Potential Wetlands E-L.
 FIG. 3D: Potential Non-wetland Streams H, I, K-M, Brushy Fork Creek, & Linville Creek, Potential Wetlands M-Z.
 FIG. 3E: Potential Non-wetland Streams, J, N-R, & Brushy Fork Creek, Potential Wetlands AA-AG.
 FIG. 3F: Potential Non-wetland Streams S-T, Brushy Fork Creek, & Pond A, Potential Wetlands AH-AM.
 FIG. 3G: Potential Non-wetland Streams U-Z & Brushy Fork Creek, Potential Wetlands AN-AT & AV-AW.
 FIG. 3H: Potential Non-wetland Streams AA-AD, Brushy Fork Creek, & Tributary A, Potential Wetlands AU & AX-BC.

Legend

- Study Area
- Potential Non-wetland Stream
- Potential Non-wetland Intermittent Stream or Tributary
- Potential Non-wetland Pond
- Potential Wetland
- Major Contour, 20-foot Interval

PRELIMINARY



**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 DIVISION 11**

**JURISDICTIONAL FEATURES
 OVERVIEW
 US 321/421 WIDENING**
 2014 Aerial from NC Onemap
 20-ft NCDOT Contours

County:	Watagua
Division:	11
TIP:	R-2615
Date:	August 2018

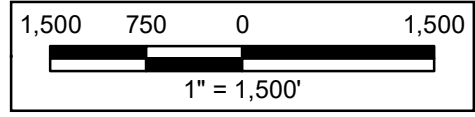
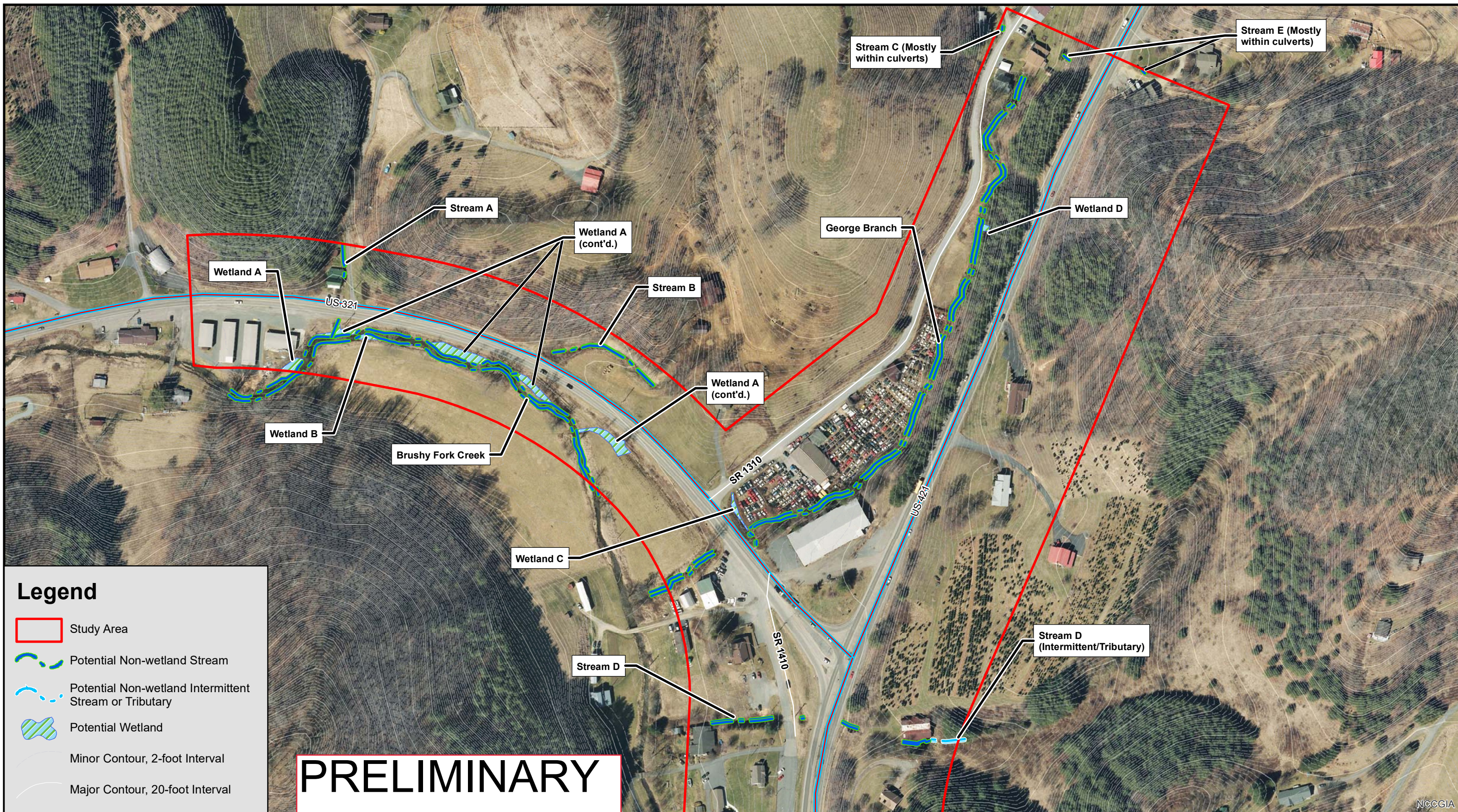


Figure 5A



Legend

- Study Area
- ~ Potential Non-wetland Stream
- - - Potential Non-wetland Intermittent Stream or Tributary
- / / / Potential Wetland
- ~ Minor Contour, 2-foot Interval
- ~ Major Contour, 20-foot Interval

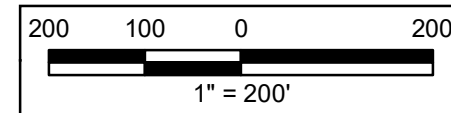
PRELIMINARY



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DIVISION 11**

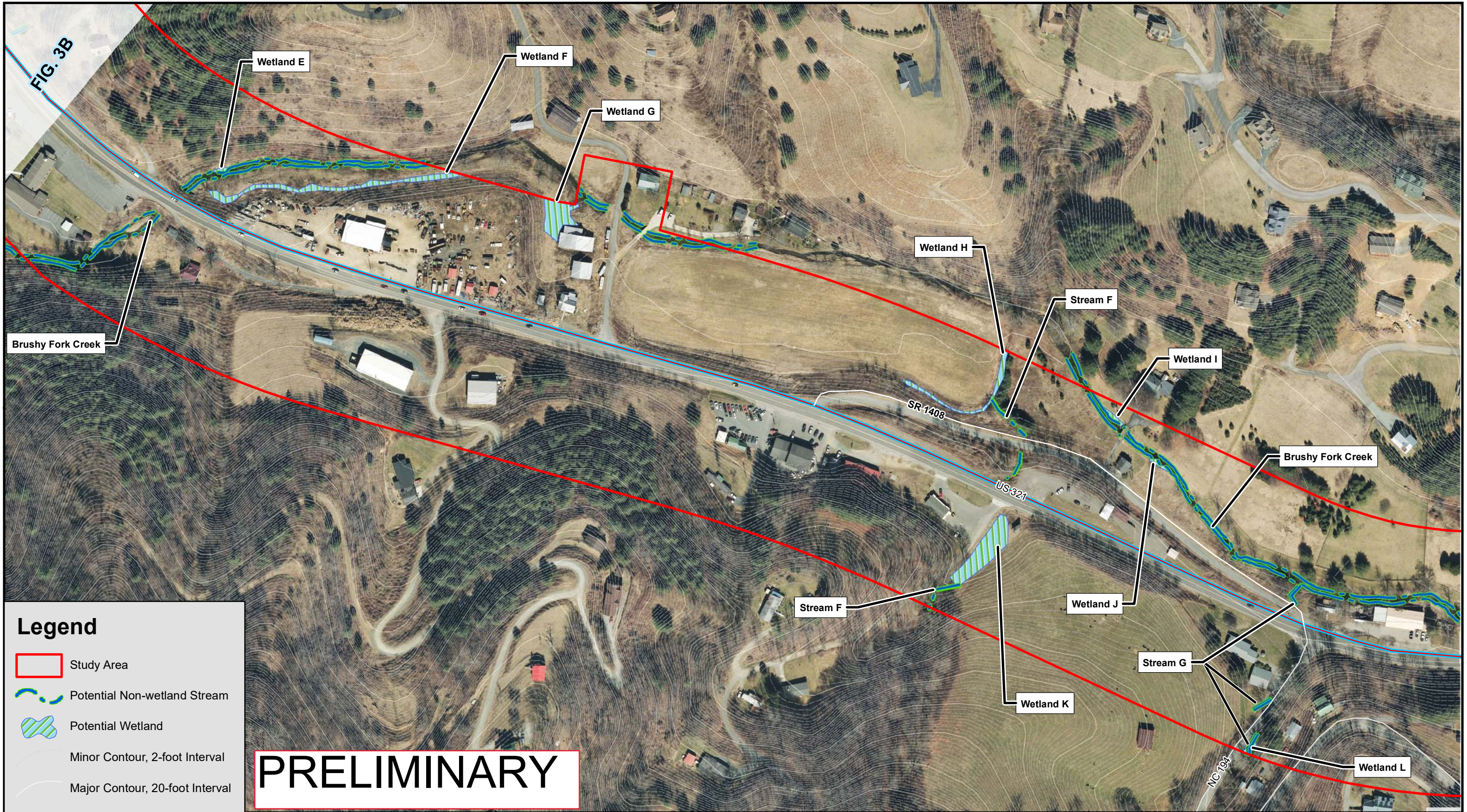
**JURISDICTIONAL FEATURES
DETAIL
US 321/421 WIDENING**
2014 Aerial from NC Onemap

County:	Watagua
Division:	11
TIP:	R-2615
Date:	August 2018



**Figure
5B**

NCCGIA



Legend

- Study Area
- ~ Potential Non-wetland Stream
- ~ Potential Wetland
- ~ Minor Contour, 2-foot Interval
- ~ Major Contour, 20-foot Interval

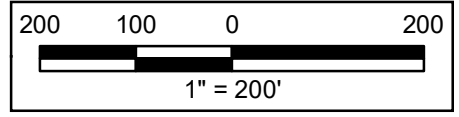
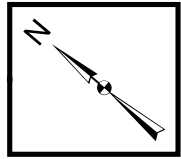
PRELIMINARY



**NORTH CAROLINA DEPARTMENT
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DIVISION 11**

**JURISDICTIONAL FEATURES
DETAIL
US 321/421 WIDENING**
2014 Aerial from NC Onemap

County:	Watagua
Division:	11
TIP:	R-2615
Date:	August 2018



**Figure
5C**

Legend

- Study Area
- Potential Non-wetland Stream
- Potential Wetland
- Minor Contour, 2-foot Interval
- Major Contour, 20-foot Interval

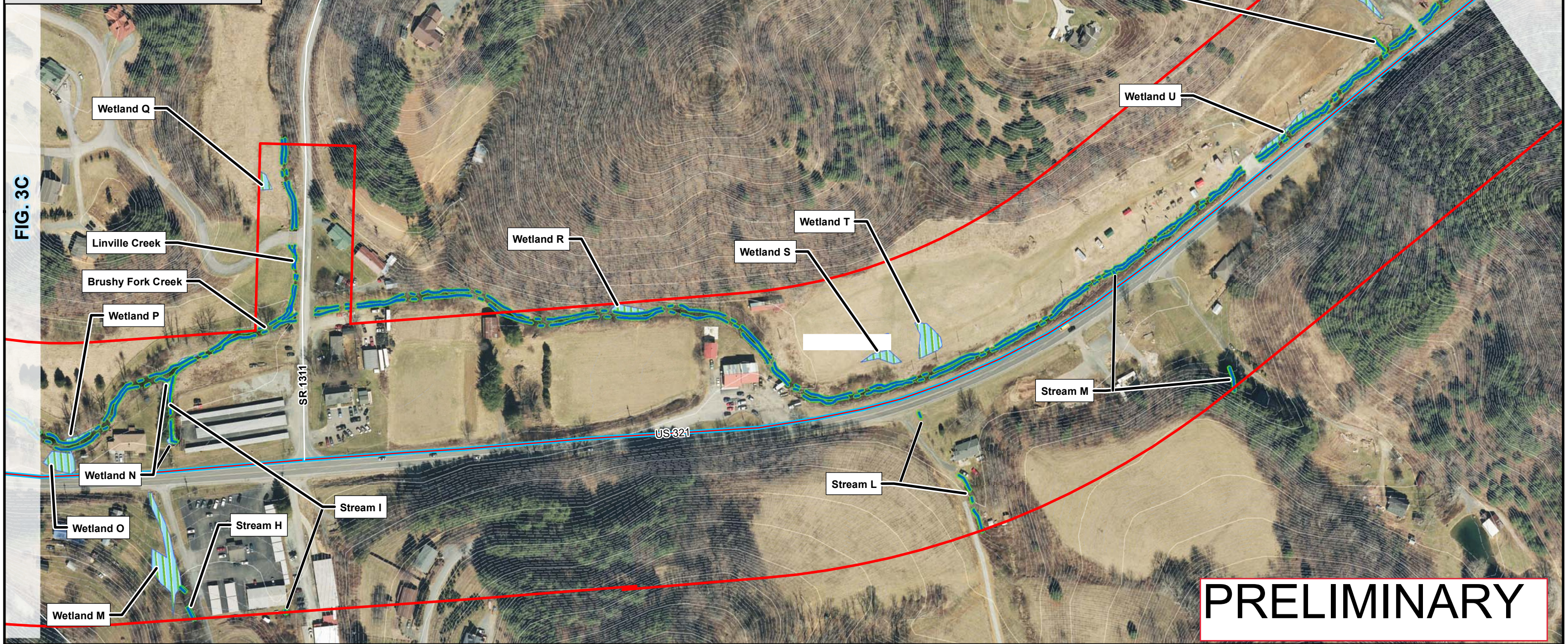


FIG. 3C

FIG. 3E

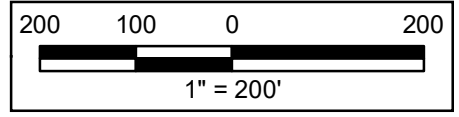
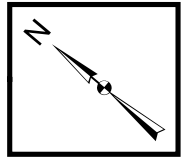
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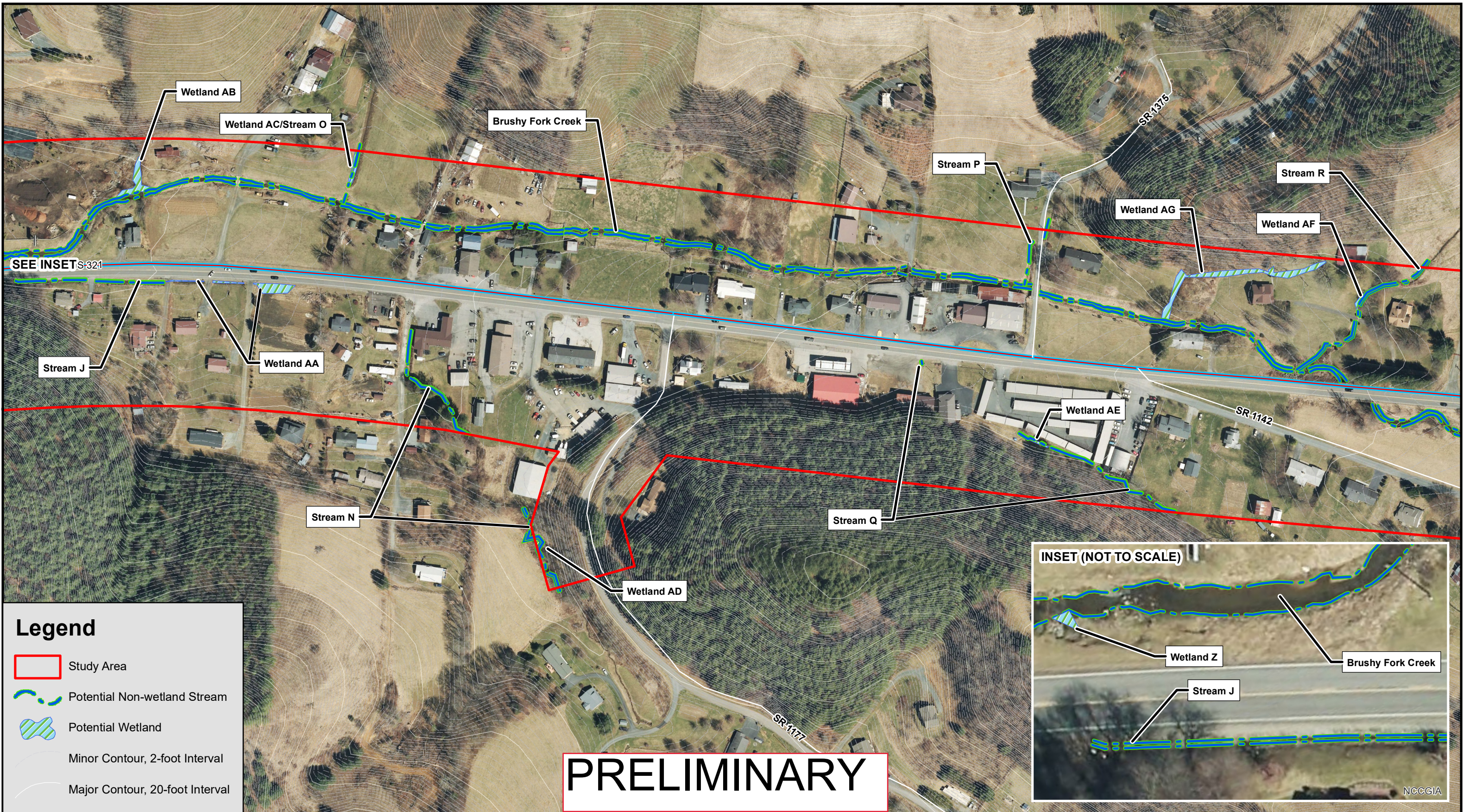
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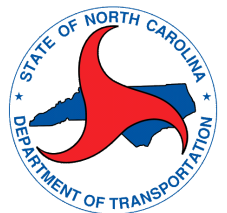
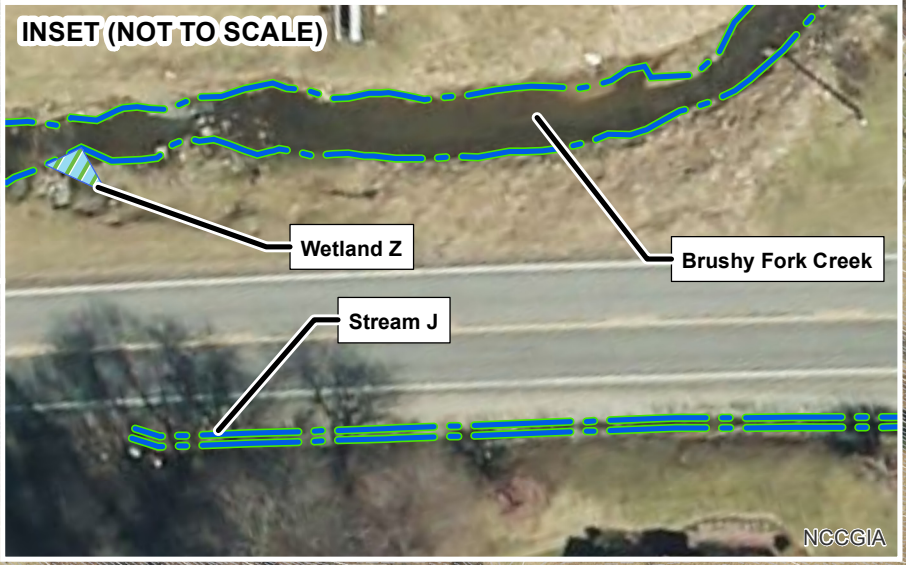
**Figure
5D**



Legend

- Study Area
- Potential Non-wetland Stream
- Potential Wetland
- Minor Contour, 2-foot Interval
- Major Contour, 20-foot Interval

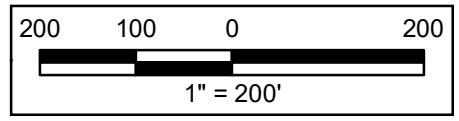
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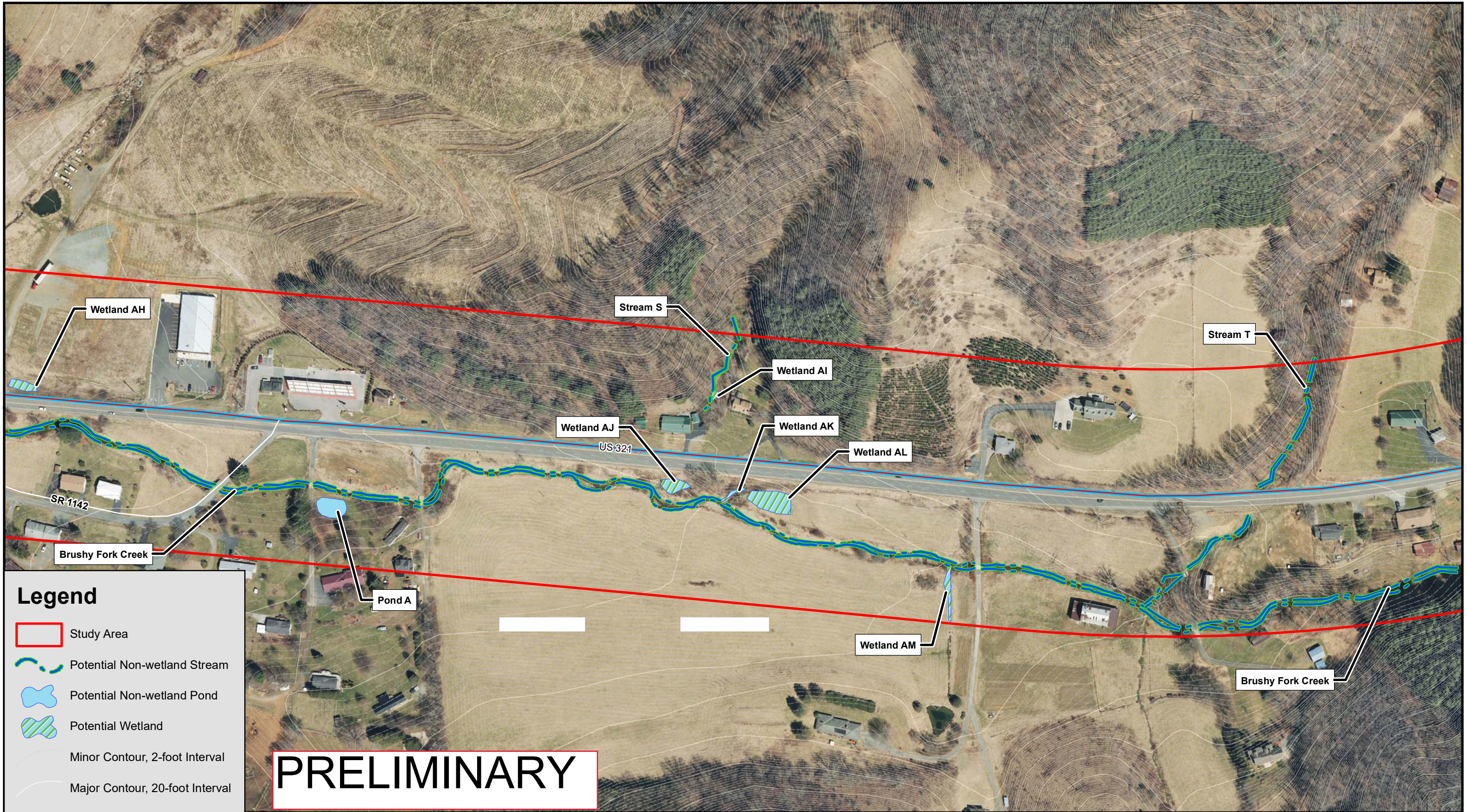
**NORTH CAROLINA DEPARTMENT
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US 321/421 WIDENING**
2014 Aerial from NC Onemap

County:	Watagua
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TIP:	R-2615
Date:	August 2018



**Figure
5E**



Legend

- Study Area
- ~ Potential Non-wetland Stream
- ◊ Potential Non-wetland Pond
- ▨ Potential Wetland
- ~ Minor Contour, 2-foot Interval
- ~ Major Contour, 20-foot Interval

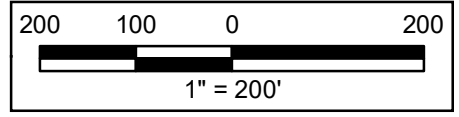
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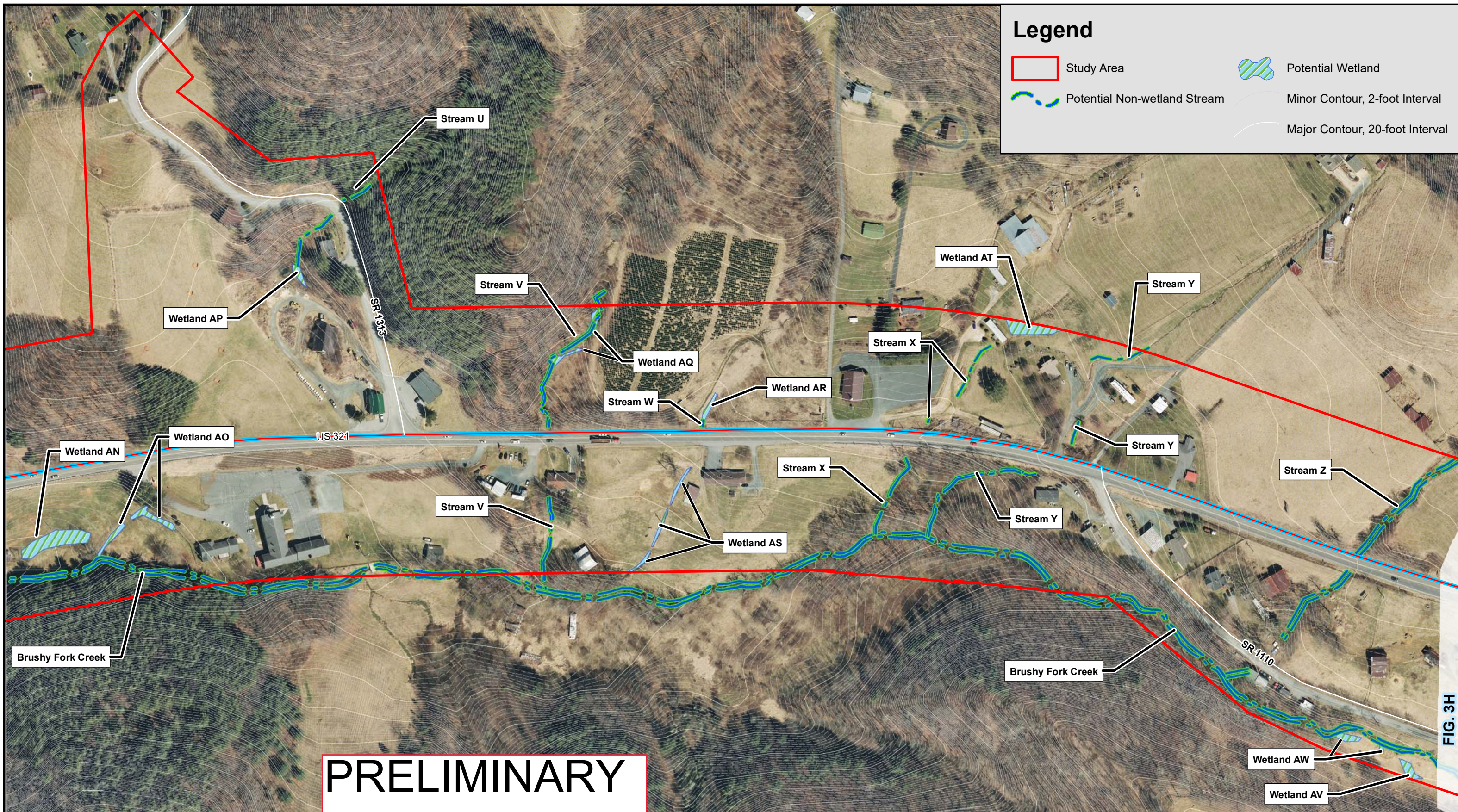
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DETAIL
US 321/421 WIDENING**
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County:	Watagua
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TIP:	R-2615
Date:	August 2018



**Figure
5F**



Legend

- Study Area
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- ~ Potential Wetland
- ~ Minor Contour, 2-foot Interval
- ~ Major Contour, 20-foot Interval

PRELIMINARY

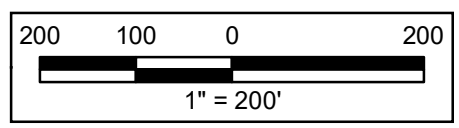
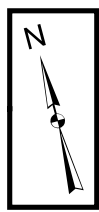
FIG. 3H



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**JURISDICTIONAL FEATURES
DETAIL
US 321/421 WIDENING**
2014 Aerial from NC Onemap

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**Figure
5G**

Legend

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- ~ Potential Non-wetland Stream
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- Minor Contour, 2-foot Interval
- Major Contour, 20-foot Interval

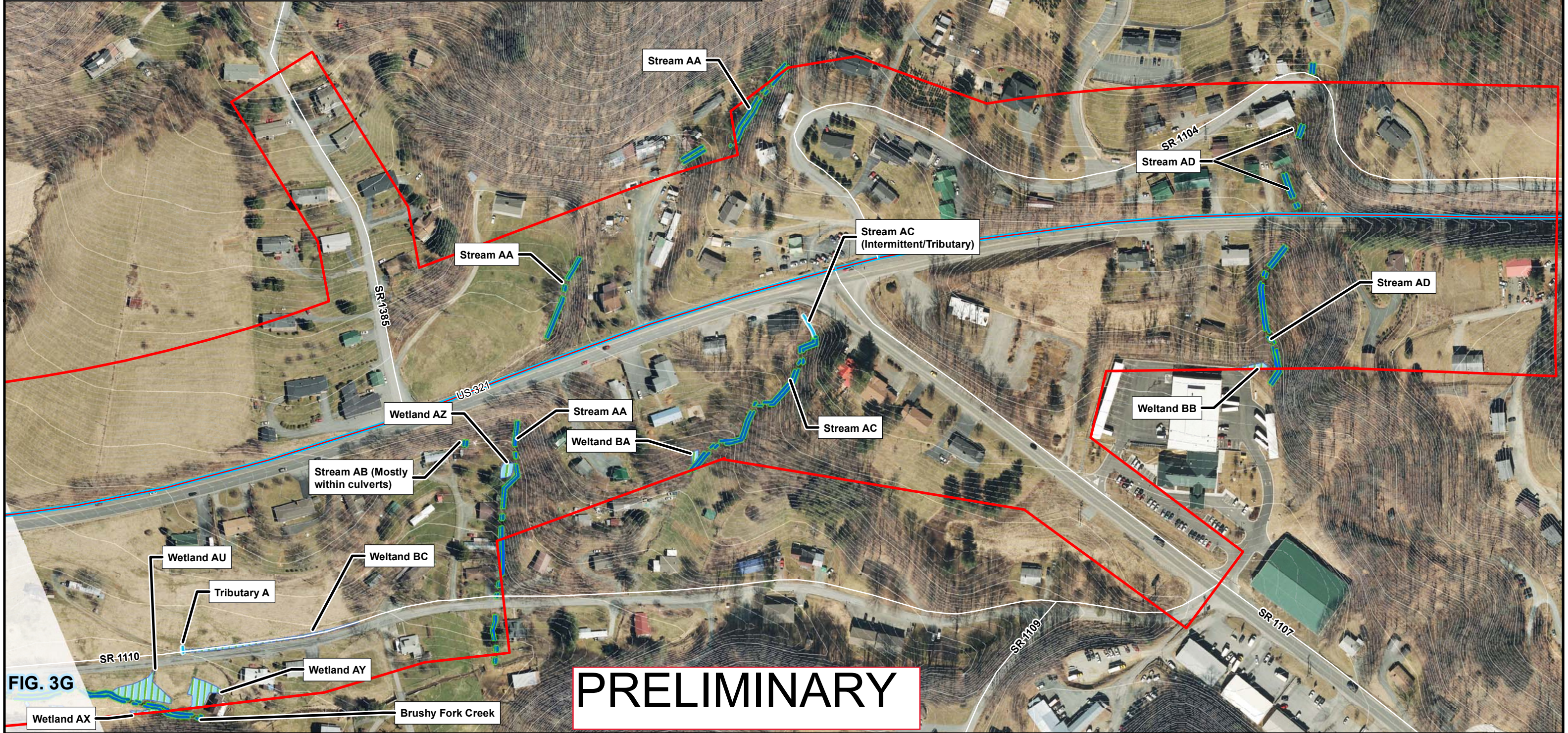


FIG. 3G

PRELIMINARY



**NORTH CAROLINA DEPARTMENT
OF TRANSPORTATION
DIVISION OF HIGHWAYS
DIVISION 11**

**JURISDICTIONAL FEATURES
DETAIL
US 321/421 WIDENING**
2014 Aerial from NC Onemap

County:	Watagua
Division:	11
TIP:	R-2615
Date:	August 2018

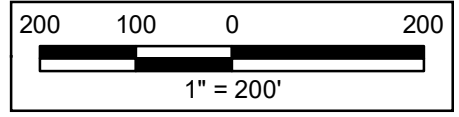
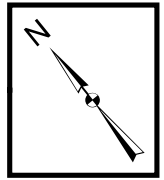


Figure
5H