



**Section 404/NEPA Merger Project Team Meeting
External Scoping / Concurrence Point No. 1:
Purpose and Need and Study Area Defined**
April 10, 2019

NC 191 Improvements

Widen to multi-lanes from South of Avery Creek Road (SR 3486)/Glenn Bridge Road SE (SR 3486)/Southwicke Drive (SR 3573)
to North of the Blue Ridge Parkway
Buncombe County, North Carolina – Division 13
STIP Project No. U-3403B
WBS No. 34936.1.4



Prepared by RK&K
for the North Carolina Department of Transportation



Purpose of the Meeting

The primary purpose of today's meeting is to discuss the Purpose and Need and Study Area for STIP Project No. U-3403B (Concurrence Point 1) with the resource agencies. The desired outcome of this meeting is to gain approval on the overall scope of the project and concurrence on the purpose and need and study area.

Project Description

The NCDOT proposes to widen NC 191 (Brevard Road), a two-lane roadway, to multi-lanes from south of Avery Creek Road (SR 3486)/Glenn Bridge Road SE (SR 3486)/Southwicke Drive (SR 3573) to north of the Blue Ridge Parkway in Buncombe County, a distance of approximately 3.6 miles. The project vicinity is shown on Figure 1.

Project Status and Schedule

The project is included in the 2018-2027 STIP as Project No. U-3403:

- A: NC 280 (Boyston Hwy) to SR 3498 (Ledbetter Road) - unfunded
- **B: SR 3498 (Ledbetter Road) to north of the Blue Ridge Parkway, 3.6 miles**
- C: North of the Blue Ridge Parkway to NC 112 (Sardis Road) - complete

The STIP has allocated \$5,100,000 for right-of-way acquisition, \$600,000 for utilities, and \$16,400,000 for construction. Right of way acquisition is planned to begin in fiscal year (FY) 2021 and construction is currently scheduled to begin in FY 2023. (The draft 2020-2028 STIP proposes to delay construction until FY 2024.) The project is state funded and a State Environmental Assessment is being prepared in compliance with North Carolina's State Environmental Policy Act (SEPA).

Project Setting

NC 191 is a north-south roadway connecting Hendersonville in Henderson County to Asheville in Buncombe County (Figure 1). Through the project limits, NC 191 is generally parallel to I-26 south of Asheville. The character of the corridor varies with most development south of Clayton Road. Land use is mixed and includes several large manufacturing or distribution facilities, single- and multi-family residential, and an elementary school. North of Clayton Road, the NC 191 corridor is characterized by proximity to the French Broad River, as well as the Pisgah National Forest. The Blue Ridge Parkway crosses over NC 191 near the northern project terminus. Development is primarily limited to low-density single-family homes west of the roadway and deed restrictions on properties along the roadway prohibit development.

The project data sheets and a summary of agency scoping comments are included in Appendix A.

Concurrence Point 1: Purpose and Need and Study Area Defined

Project Study Area

The proposed study area boundary will accommodate widening NC 191 along the existing alignment and a new location alignment east of the French Broad River. The study area generally includes a 300-foot wide corridor (150 feet from the centerline) along NC 191 with extensions along intersecting roadways up to 1,000 feet (Figure 2). South of Clayton Road, the western boundary widens to 300 feet to accommodate potential intersection improvements at Clayton Road and NC 191 widening in proximity to the French Broad River. The eastern boundary extends across the river to explore a potential new location alignment.

Need for Project

The following conditions demonstrate the need for the project.

Existing traffic congestion along NC 191 is expected to worsen in the future.

- Most two-lane segments of NC 191 within the project limits currently operate at level of service (LOS) D or E in the peak hours. The Percent Time Spent Following¹ currently exceeds 70 percent for all the two-lane NC 191 segments during both peak hours. Currently, a trip along the corridor takes 7 to 10 minutes and has an average travel speed of 24 to 34 miles per hour (mph) compared to a posted speed limit of 45 mph.
- The signalized NC 191 intersection with Avery Creek Road/Glenn Bridge Road SE/Southwicke Drive currently operates at LOS F overall in both the AM and PM peak hours. The unsignalized intersection of NC 191 and Clayton Road is currently operating at LOS F (based on the worst performing movement) in both peak hours, with delays exceeding 5 minutes per vehicle.
- Most of the two-lane segments of NC 191 within the project limits are expected to degrade to LOS E by 2040. The Percent Time Spent Following will exceed 78 percent with conditions that indicate increased platooning², higher demand, and little to no passing opportunities. Increased traffic volumes will add to the delays experienced by stop and yielding movements at the unsignalized intersections, private streets and driveways within the project limits. Travel time is expected to increase to 16 to 27 minutes and the average travel speed is expected to decrease to 9 to 15 mph.
- By 2040, the intersections currently operating at LOS F are expected to further degrade in both peak hours with increasing delay. The signalized NC 191 intersection with NC 146/Vista Blvd is expected to degrade to LOS F in both the AM and PM peak hours. Queues are expected to lengthen, exceeding 4,000 feet along several segments of NC 191 and exceeding 2,000 feet along Clayton Road.

Roadway deficiencies contribute to congestion and safety issues.

- Within the project limits, NC 191 does not meet current design standards. Roadway deficiencies include narrow travel lanes and shoulders, inadequate clear zones, and substandard horizontal and vertical alignment in many sections of the roadway.
- The two-lane roadway's horizontal and vertical alignment affects sight distance, resulting in limited passing opportunities. Percent Time Spent Following will approach or exceed 80 percent by 2040 for most two-lane NC 191 segments during both peak hours, with several segments approaching or exceeding 90 percent.
- Along NC 191, the total crash rate and the non-fatal crash rate exceeded the critical crash rate, as well as the three-year statewide crash rate for similar facilities (October 2013 to September 2018). The fatal crash rate was higher than the statewide crash rate during this period. Rear-end crashes, which are typically associated with congested conditions, were the most common

¹ Percent Time Spent Following refers to time spent by vehicles following one another due to the inability to pass. The 2016 Highway Capacity Manual uses Percent Time Spent Following as a primary LOS measure for two-lane highways.

² In this context, platooning refers to vehicles bunching up when there is little to no opportunity to go around slower moving vehicles.

crash type. Limited sight distance, steep grades and substandard vertical alignment along NC 191 may also contribute to this type of crash.

Project Purpose

The primary purpose of the proposed project is to improve traffic operations along NC 191 within the project limits.

Alternatives considered for the project must achieve an arterial travel time savings of at least 50 percent in 2040 compared to no build conditions.

Secondary Benefit

Another desirable outcome of the project is improved traffic safety due to reduced congestion, improved sight distance, improved horizontal and vertical alignment, and increased opportunities for motorists to pass slower-moving or stopped vehicles.

Logical Termini and Independent Utility

The project limits are of sufficient length to address traffic congestion and roadway deficiencies along this section of NC 191 and consider a range of alternatives without restricting other reasonably foreseeable transportation improvements. The project can serve its intended use without requiring additional transportation improvements.

- **South:** The logical southern project terminus was established to be south of the NC 191 intersection with Avery Creek Road/Glenn Bridge Road SE/Southwicke Drive, based on higher traffic volumes, poor traffic operations, and identified roadway deficiencies. This end point was chosen south of the 5-leg intersection in order to address intersection improvements and adjacent roadway deficiencies, with a transition to the existing two-lane section.
- **North:** The logical northern project terminus was established to be north of the Blue Ridge Parkway. In this area, NC 191 transitions from a two-lane shoulder section to a four-lane, median divided section (U-3403C).

Description of Existing Facility

NC 191 is currently a two-lane roadway with a pavement width of 20 to 24 feet and unpaved shoulders of various widths. Just north of the Blue Ridge Parkway, NC 191 transitions to a four-lane divided section with a grass median (U-3403C) north of the access road to the Blue Ridge Parkway. In this transition area, Bridge No. 127 carries NC 191 over Bent Creek. There is minimal clear zone along much of the roadway and several existing culverts are too short and in poor condition, ending at the edge of pavement.

Although the posted speed limit is 45 mph, most of the roadway meets standards for a 25 mph design speed due to substandard horizontal and/or vertical alignment. South of Clayton Road, most sections of the roadway have steep grades. The unsignalized NC 191 intersection with Ledbetter Road and with Clayton Road are in horizontal and/or vertical curves, resulting in limited sight distance and an unsafe condition. Horizontal and vertical curves at the Blue Ridge Parkway bridge are also substandard and limit sight distance at the bridge.

There is an approximately 5-foot retaining wall along the west side of NC 191 as the roadway passes under the Blue Ridge Parkway bridge. Approximately 600 feet to the south of the Blue Ridge Parkway bridge, an approximately 20- to 30-foot stone retaining wall is along the west side of the roadway.

NC 191 serves local traffic in addition to regional traffic, including commuters. Within the project limits, NC 191 provides access to manufacturing/distribution centers and other businesses along the roadway,

as well as adjacent residential communities and other uses. There are 5 signalized and 11 unsignalized intersections and approximately 56 driveways and private streets within the project limits.

Performance of the Existing Roadway System

Traffic Volumes

Current (2017) traffic volumes within the study area range from 8,600 vehicles per day (vpd) south of Avery Creek Road/Glenn Bridge Road SE/Southwicke Drive to 16,300 vpd north of Clayton Road. In 2040, traffic volumes are projected to increase approximately 34 to 41 percent, ranging from 11,600 vpd to 21,800 vpd.

Table 1. NC 191 Traffic Volumes

NC 191 Section	Current Year (2017)	Future Year (2040)
South of Avery Creek Road/Glenn Bridge Road SE/Southwicke Drive	8,600	11,600
Avery Creek Road/Glenn Bridge Road SE/Southwicke Drive to Long Shoals Road/Vista Blvd	12,500	17,600
Long Shoals Road/Vista Blvd to Clayton Road	11,700	16,300
Clayton Road to Blue Ridge Parkway ramp	16,300	21,800

Source: Project Level Traffic Forecast, STIP Project No. U-3403A/B, Widening NC 191 from NC 280 to North of the Blue Ridge Parkway, August 2017 (RK&K).

Traffic Operational Analysis

Base Year No-Build Scenario

The Base year No-Build condition analysis results indicate that the two-lane NC 191 segment north of Clayton Road operates at LOS E in the AM peak in the southbound direction and the PM peak in the northbound direction; and that most of the other two-lane NC 191 segments along the study corridor operate at LOS D during both peak hours. Overall traffic operations for this two-lane roadway are affected by following time. The Percent Time Spent Following exceeds 70 percent for all the two-lane NC 191 segments during both peak hours, which indicates that “platooning increases significantly. Passing demand is high... but passing capacity approaches zero.”³

The 5-leg signalized intersection of NC 191 with Avery Creek Road/Glenn Bridge Road/Southwicke Drive and the unsignalized intersection of NC 191 with Clayton Road are currently operating at LOS F. The intersection of NC 191 with NC 146/Vista Blvd is currently operating at acceptable LOS C overall in the peak hours; however, most movements operate at LOS D in one or both peak hours. There is queueing at these intersections during both peak hours, which blocks turning movements in some cases.

As shown in Table 2, it is estimated that there is currently a travel time of about 7 to 10 minutes, 2 to 5 minutes of delay per vehicle, and an average speed of about 24-34 mph along the 45-mph, 4-mile NC 191 study corridor.

³ As defined by the Highway Capacity Manual, Chapter 15, p. 15-9.

Table 2. Comparison of Average Travel Speed, Delay and Travel Time¹

Direction	AM Peak			AM Peak		
	Travel Time (min)	Delay (min/veh)	Average Travel Speed (mph)	Travel Time (min)	Delay (min/veh)	Average Travel Speed (mph)
2017 Base Year (No Build)						
Northbound NC 191	7.1	1.74	34	7.0	1.69	35
Southbound NC 191	9.8	4.76	24	9.4	4.25	25
2040 Future Year (No Build)						
Northbound NC 191	26.8	20.68	9	23.1	17.91	11
Southbound NC 191	16.2	10.30	15	16.3	10.56	15

¹ Based on the Synchro-SimTraffic analysis results

The Base Year No-Build condition analysis results for the segments and intersections within the study area are presented in Appendix B, Tables 1 and 2.

Future Year No-Build Scenario

The Future Year No-Build condition analysis results of the two-lane NC 191 segments indicate that the segments south of Avery Creek Road/Glenn Bridge Road/Southwicke Drive degrades to LOS D in both peak hours of the Future Year No-Build condition; and that all the other two-lane NC 191 segments degrade to LOS E in one or both peak hours. The Percent Time Spent Following exceeds 78 percent for all the two-lane NC 191 segments during both peak hours, with the segment north of Clayton Road exceeding 90 percent. Similar to the Base Year No Build, degrading conditions indicate increased platooning, higher demand, and passing opportunities approaching zero.

By 2040, the 5-leg signalized intersection of NC 191 with Avery Creek Road/Glenn Bridge Road SE/Southwicke Drive and the unsignalized intersection of NC 191 and Clayton Road are expected to continue operating at LOS F with further degradation noted in the delays in both peak hours. The increasing delays at the unsignalized Clayton Road intersection indicate a potential impact on the overall safety of the corridor as the delays are anticipated to increase to a level which will encourage driver behaviors which may accept less than desirable gaps for entry. The signalized intersection of NC 191 with NC 146 / Vista Blvd is expected to degrade to LOS F in both the AM and PM peak hours. All other intersections within the study area are expected to continue operating at acceptable levels of service into the future year, although with increased volumes some delay increases are anticipated. Increased queuing is projected along NC 191 at the Avery Creek Road/Glenn Bridge Road SE/Southwicke Drive 5-leg intersection during both AM and PM peak hours; especially along the northbound approach which extends over a half-mile. The queuing also extends along the Avery Creek Road and Glenn Bridge Road approaches. Increased queuing is also expected along NC 191 at the NC 146 / Vista Blvd intersection during both AM and PM peak hours, especially along the southbound approach which extends back over a half mile. The results also indicate extensive queuing along NC 146, with the queuing on the westbound NC 146 and eastbound Vista Blvd approaches blocking right-turn movements during both AM and PM peak hours.

It is anticipated that the future year No Build condition will experience increased travel times (about 16 to 27 minutes), increased delays (about 11 to 21 minutes per vehicle), and lower average speeds (of about 9 to 15 mph) along NC 191. (See Table 1.)

The Future Year No-Build condition analysis results for the segments and intersections within the study area are presented in Appendix B, Tables 3 and 4.

Crash Data

The NCDOT Traffic Safety Unit provided crash data for a five-year period (October 2013 to September 2018) for NC 191 within the project limits. Crash rates are based on average daily traffic, the length of the roadway segment, and the number of recorded crashes that occurred there. Accident rates are stated in the number of crashes per 100 million vehicle miles of travel. The critical crash rate is a statistically derived number that can be used to identify or screen for high accident locations.

Along NC 191, the total crash rate of 297.06 crashes per 100 million vehicle miles of travel (VMT) is higher than both the statewide crash rate reported by NCDOT of 252.59 crashes per 100 million VMT for urban two-lane undivided NC routes and the critical crash rate reported by NCDOT of 279.91 crashes per 100 million VMT. During the study period, the two (2) recorded fatal crashes yields a crash rate of 2.1 which is higher than the statewide rate of 1.17, but lower than the critical rate of 3.52 (see Table 1). The non-fatal injury crash rate during the period is higher than the statewide rate, but slightly lower than the critical crash rate. Most crashes (69%) were property damage only crashes. The most predominant crash type along the route is rear-end crashes, which accounted for 50% of all the crashes. (There were also a number of “left-turn” and “run off road/fixed object” crashes reported; 18% and 11%, respectively, of the total.) Most of the reported crashes occurred during the daytime (84%) and during dry pavement conditions (83%).

Table 2. Strip Analysis Report Data and Comparison of Crash Rates

Category	Crashes	Crash Rate	Statewide Average Crash Rate ¹	Critical Crash Rate ²
Total	283	297.06	252.59	279.91
Fatal	2	2.10	1.17	3.52
Non-Fatal Injury	84	88.17	77.00	92.32

¹ Compared to Statewide Average Crash Rates for urban North Carolina routes with 2 lane undivided cross sections (2013-2018).

² Based on the statewide crash rate (95% level of confidence)

Strip Analysis Report Data and Statewide Crash Rates based on Information provided by NCDOT

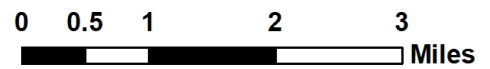
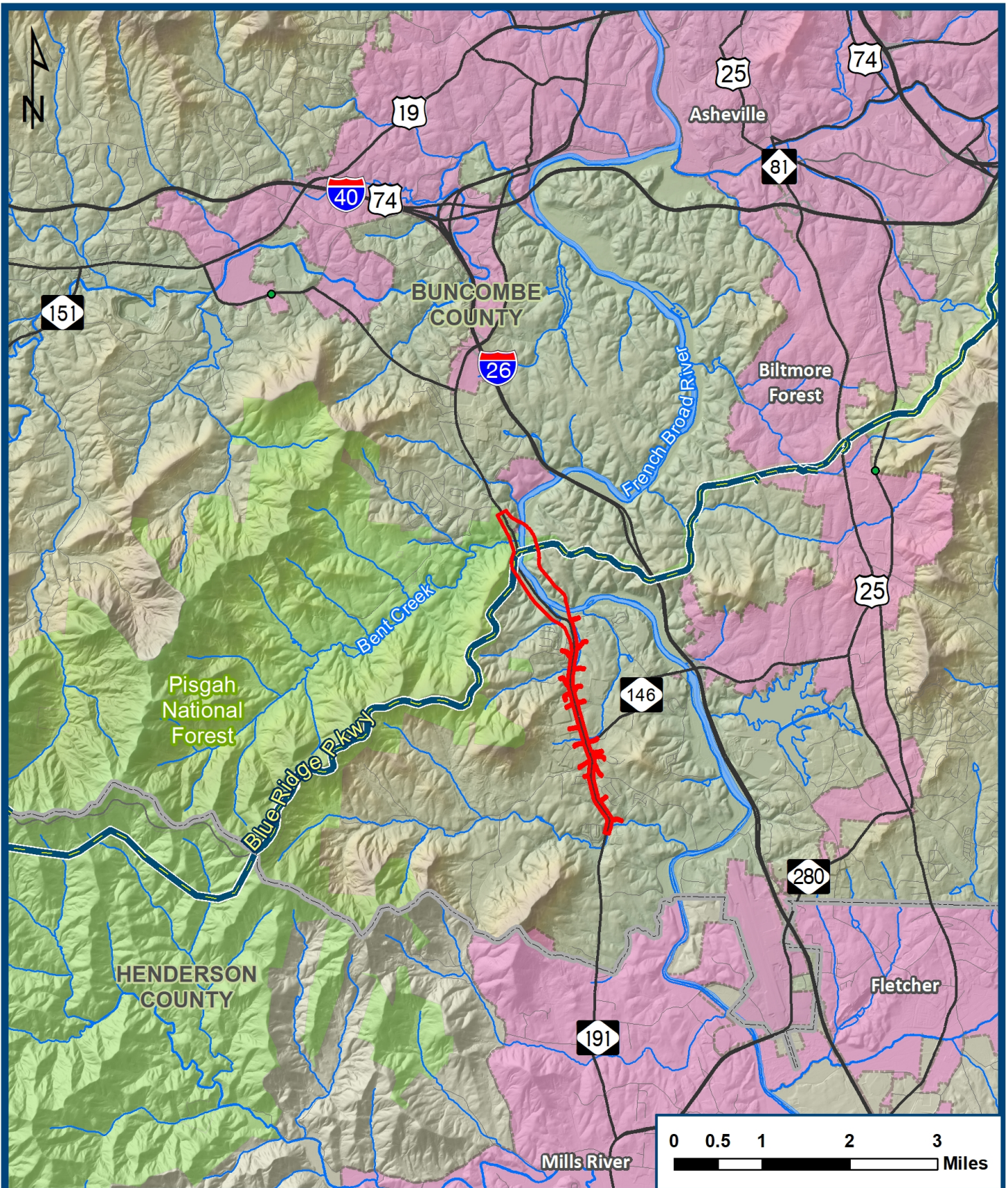
Figures




- 1 Vicinity Map
- 2 Study Area Map
- 3 Environmental Features Map

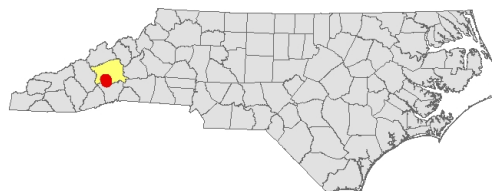
Appendix A – External Scoping

Appendix B - Traffic

Appendix C – Concurrence Point 1 Form



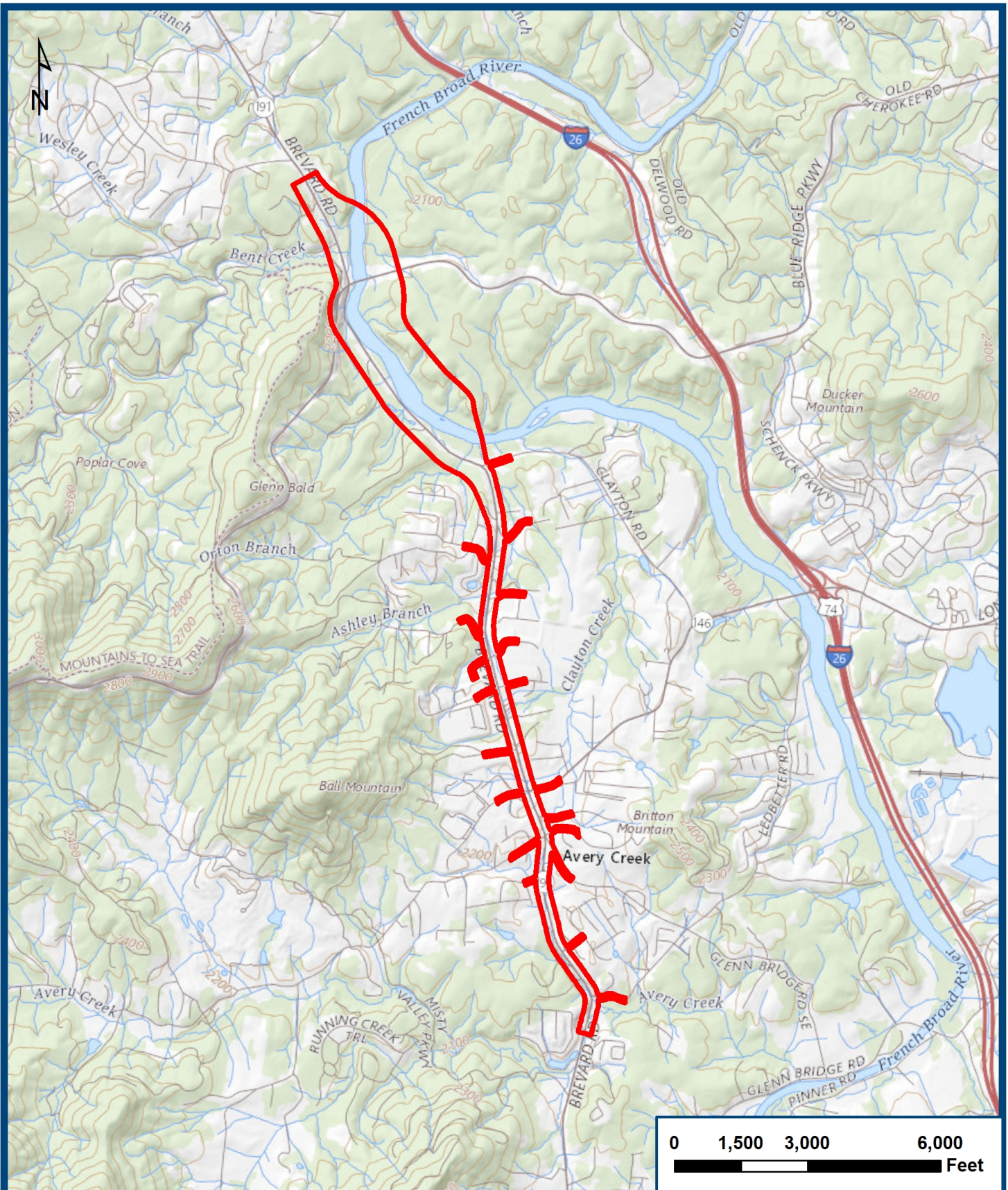
-  Draft Study Area
-  County Boundary
-  Municipal Boundary




U-3403B
Buncombe County

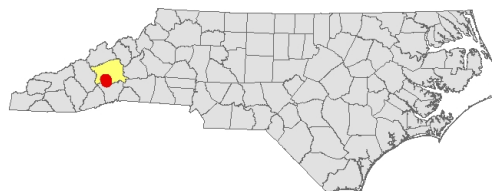
NC 191 from south of Avery Creek Rd/Glenn Bridge Rd SE/Southwicke Dr to north of the Blue Ridge Parkway

Vicinity Map - Figure 1



0 1,500 3,000 6,000
Feet

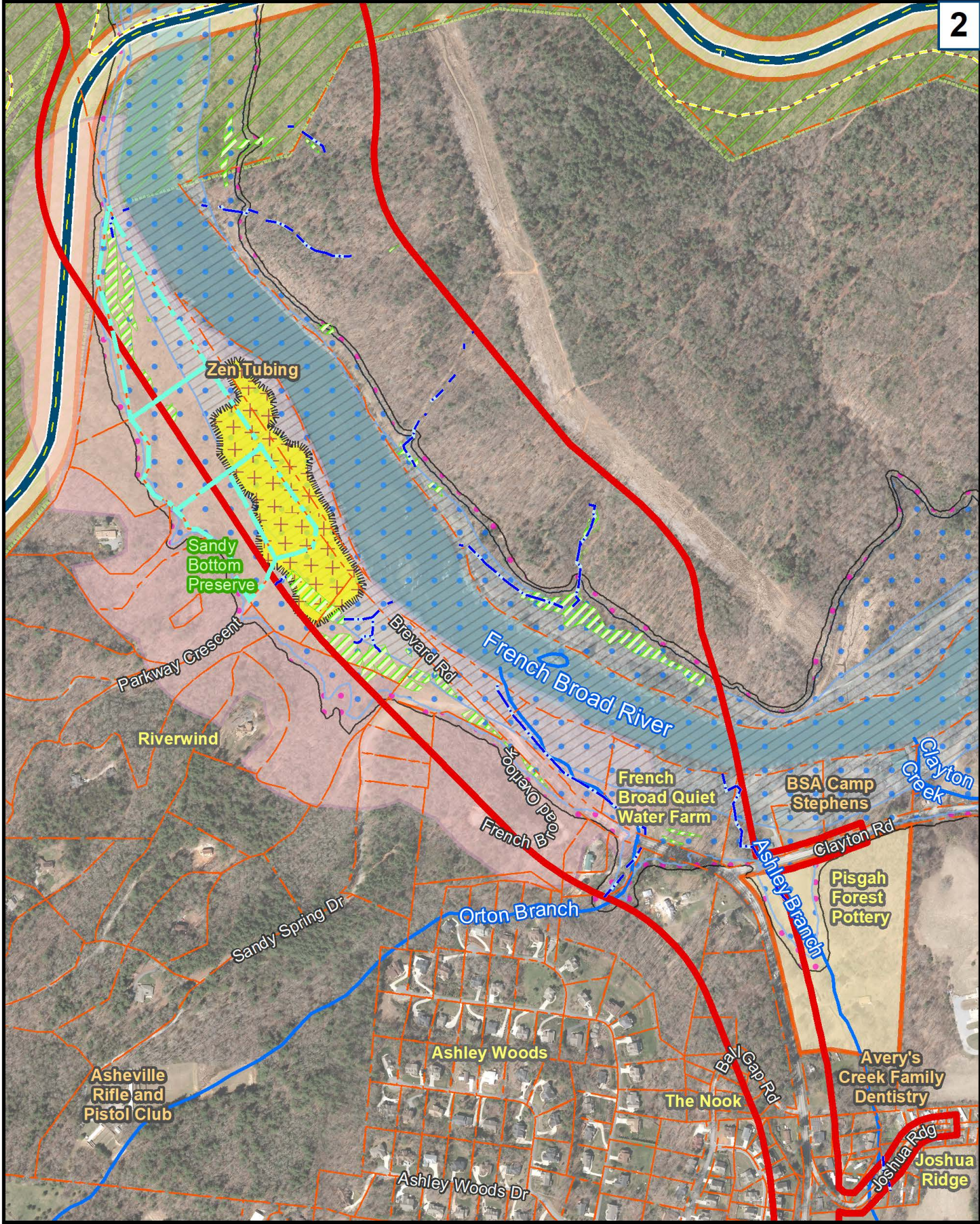
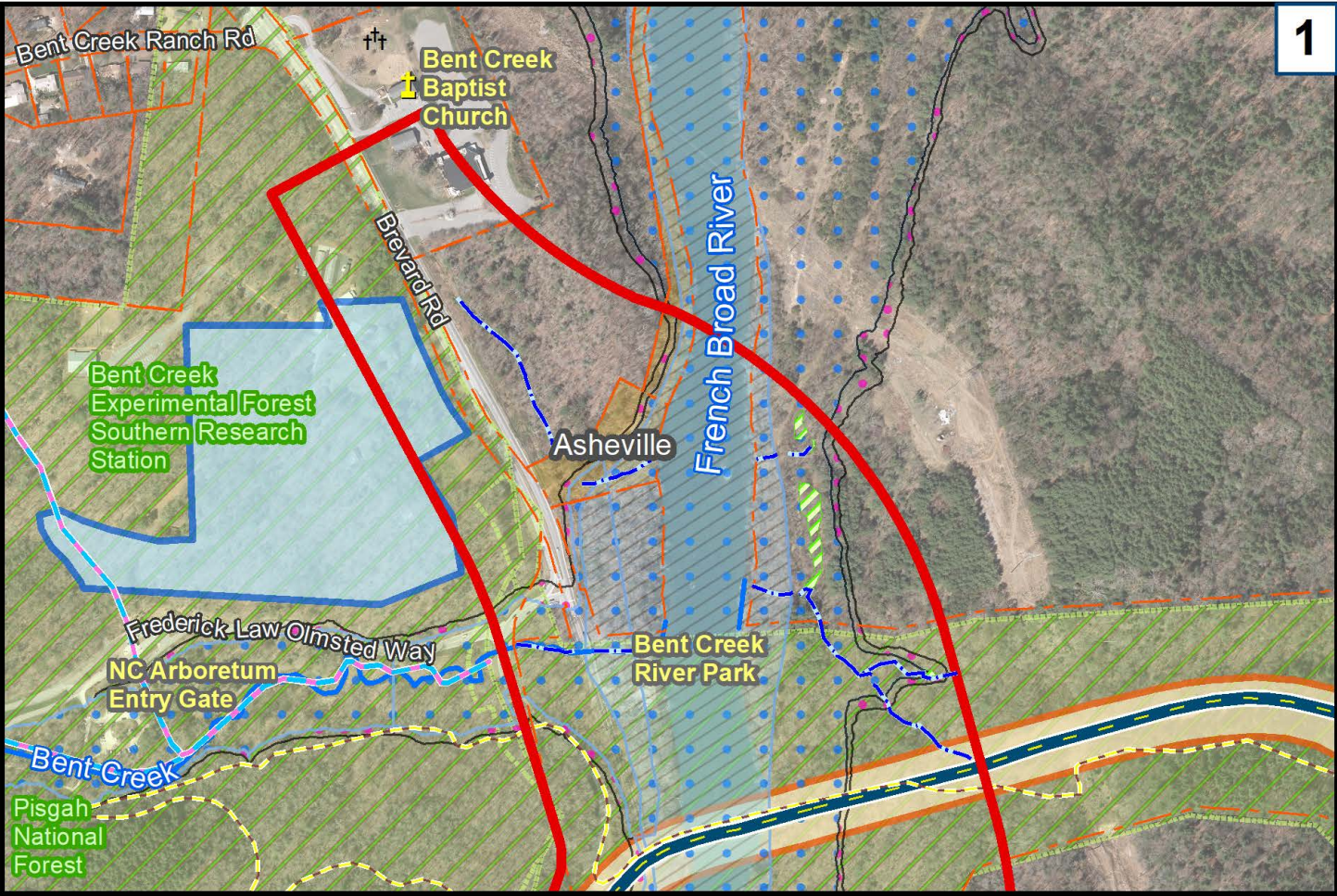
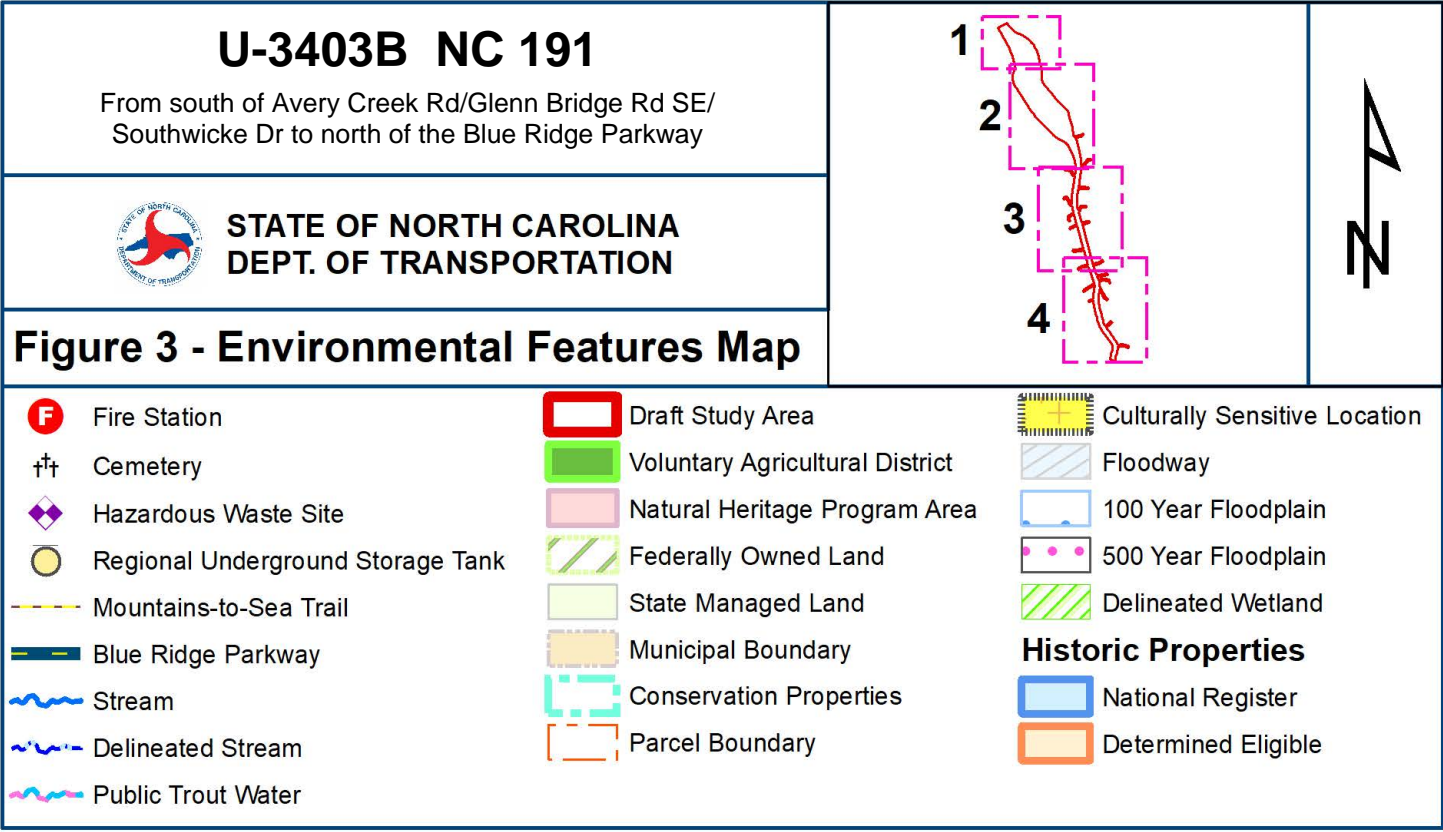
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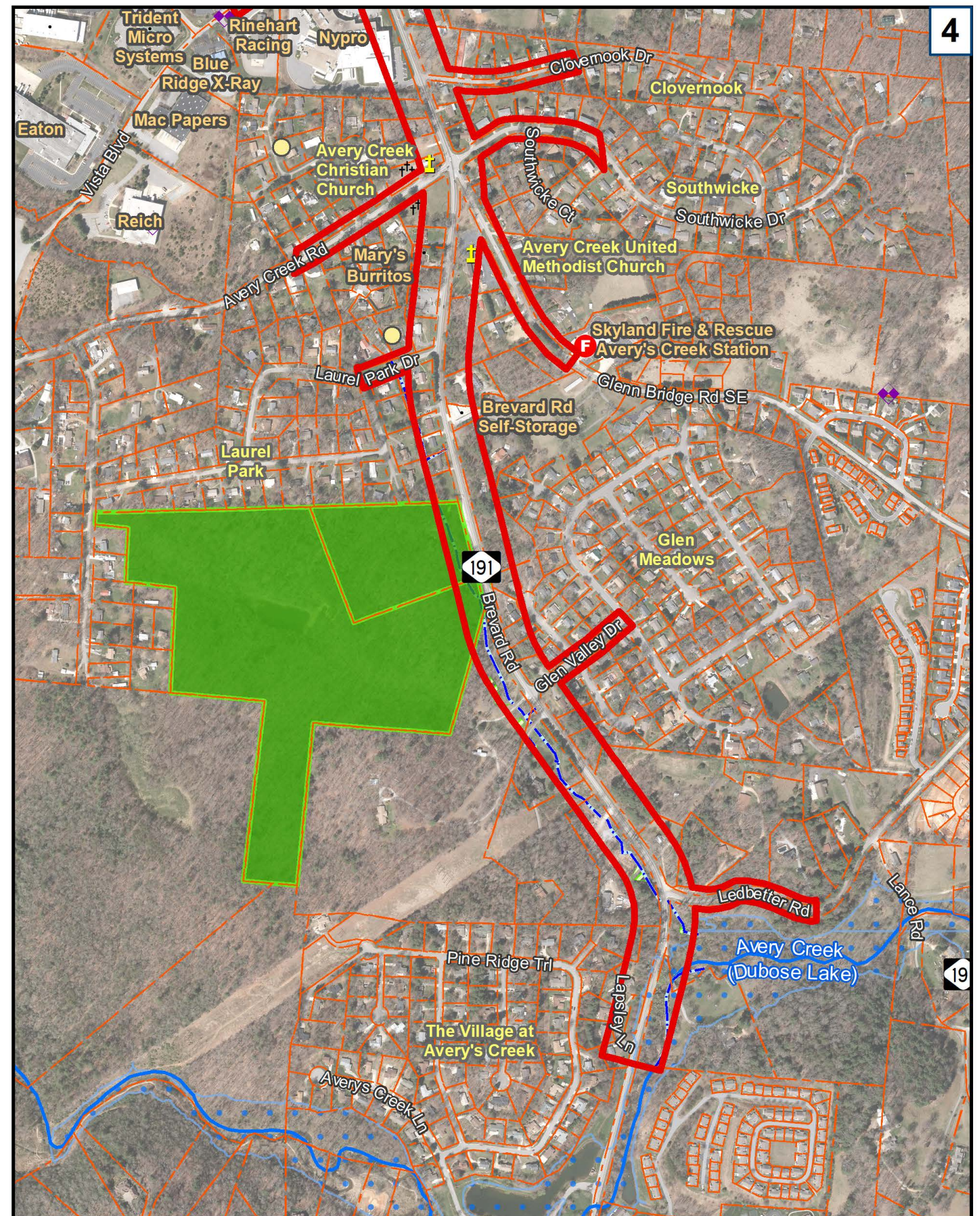
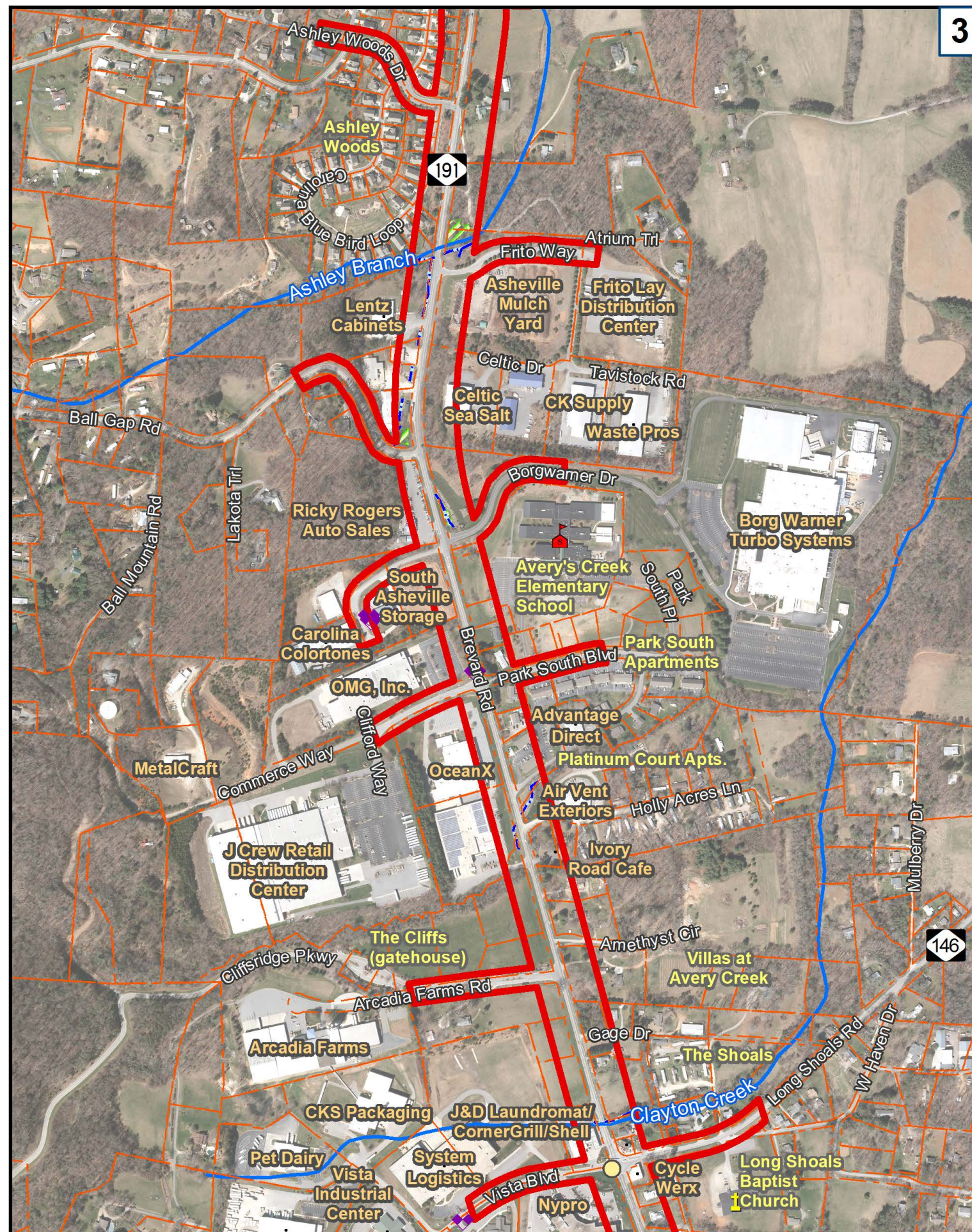


U-3403B
Buncombe County

NC 191 from south of Avery Creek Rd/Glenn Bridge Rd SE/Southwicke Dr to north of the Blue Ridge Parkway

Study Area - Figure 2





Appendix A

- Project Data Sheets
- Summary of Agency Comments Received

PROJECT DATA SHEET

Date: 8/30/2017
Rev.: 10/26/2017
Rev.: 3/15/2019

STIP No.: U-3403B	County: Buncombe
Federal-aid No.: N/A	WBS No.: 34936.1.4
NCDOT Division: 13	Scoping Meeting Date: TBD

Project Description:

- Length: 3.6 miles
- Termini (US Hwy / SR): South of Avery Creek Road (SR 3486)/Glenn Bridge Road SE (SR 3486)/Southwicke Drive (SR 3573) to North of the Blue Ridge Parkway
- MPO / RPO: French Broad River Metropolitan Planning Organization (MPO)
- NEPA / 404 Merger Candidate? ☒ Yes ☐ No ☐ Unknown
- General Description of Project: Widen NC 191 to multi-lanes

Design Data (Existing Conditions):

- Functional Classification: Minor Arterial
<http://ncdot.maps.arcgis.com/home/webmap/viewer.html?layers=029a9a9fe26e43d687d30cd3c08b1792>
- Strategic Transportation Corridor: No
<https://connect.ncdot.gov/projects/planning/Pages/NCTransportationNetwork.aspx>
- CTP Designation (Facility Type): Boulevard – Needs Improvement
https://connect.ncdot.gov/projects/planning/TPBCTP/Buncombe%20County/RABuncombeCoCTP_HighwayMap.pdf
- Type of Access Control: No control of access
- Typical Section: Two-lane, shoulder section
- Right of Way: Typically 60 feet
- Posted Speed: 45 mph
- Structure Inventory (bridges, RCBC, Walls, etc):
 - Bridge No. G91: Blue Ridge Parkway over NC 191, functionally obsolete [Federal bridge, Structure No. 5140-125P (National Park Service)]
 - Bridge No. 127: NC 191 over Bent Creek, constructed in 1978
<http://ncdot.maps.arcgis.com/home/webmap/viewer.html?webmap=db3b56c3228743b3811e36761393d661>
- Other TIP Projects in the Area:
 - U-3403A: NC 191. NC 280 to SR 3498 (Ledbetter Road). Widen to multi-lanes. Unfunded [Current STIP lists project limits to NC 146.]
 - I-4700: I-26. NC 280 (Exit 40) to I-40 at Asheville. 8.6 miles. Add additional lanes. ROW 2018, Construction 2018
- Railroad Involvement: None

Transit:

There are no fixed transit routes along the project section of NC 191. Two City of Asheville transit routes are within approximately two miles of the U-3403B corridor (to the north and east). <http://www.ashevilenc.gov/civicax/filebank/blobdload.aspx?blobid=25860>

Long Range Plan History:

The project is included in the **2040 French Broad River MPO Metropolitan Transportation Plan (MTP)**, identified as project BUNC16b-H with a horizon year of 2021-2025. The MTP recommends a four-lane, "urban/suburban boulevard" cross section with a speed limit of 55 mph. https://connect.ncdot.gov/projects/planning/TPBCTP/French%20Broad%20River/FBRCTP_Report.pdf

The **Comprehensive Transportation Plan for French Broad River MPO and Rural Areas of Buncombe and Haywood Counties** (CTP), adopted by NCDOT in 2008, identifies project A16, widening NC 191 from the Blue Ridge Parkway to NC 280 (widen to 4 lanes with median). The CTP also recommends the expansion of local bus service along NC 191 between Asheville and Hendersonville (project id A10/C5).

https://connect.ncdot.gov/projects/planning/TPBCTP/French%20Broad%20River/FBRCTP_Report.pdf

A **feasibility study** was completed by NCDOT in 1996 that describes the widening of NC 191 from NC 280 in Henderson County to NC 112 in Buncombe County, a distance of 9.1 miles (U-3403). The feasibility study recommended widening most of NC 191 to a five-lane curb and gutter facility. A four-lane cross-section was recommended from Clayton Road to north of the Blue Ridge Parkway.

Traffic Data (AADT):

NC 191 Section	Current Year (2017)	Future Year (2040)
Glenn Bridge Road to Avery Creek Road/Southwicke Drive ¹	8,600	11,600
Avery Creek Road/Southwicke Drive to Long Shoals Road/Vista Blvd	12,500	17,600
Long Shoals Road/Vista Blvd to Clayton Road	11,700	16,300
Clayton Road to Blue Ridge Parkway ramp	16,300	21,800

¹ This section includes the NC 191 intersection with Ledbetter Road

Source: Traffic Forecast for NCDOT STIP Project No. U-3403A/B, Widening NC 191 from NC 280 to North of the Blue Ridge Parkway, August 2017 (RK&K).

Cost Estimates¹:

Construction	Right-of-Way	Utilities	Total
\$16,400,000	\$5,100,000	\$600,000	\$22,100,000

¹ NC 146 (Long Shoals Road) to north of the Blue Ridge Parkway

Source: NCDOT 2018-2027 STIP [https://connect.ncdot.gov/projects/planning/STIPDocuments1/2018-2027%20STIP%20\(Division%208-14\).pdf](https://connect.ncdot.gov/projects/planning/STIPDocuments1/2018-2027%20STIP%20(Division%208-14).pdf)

Project Schedule:

State EA: 2020

State FONSI: 2021

Right-of-Way: 2021

Let: 2023

Draft Purpose and Need:

Existing congestion along NC 191 is expected to worsen in the future. The MTP notes that continued growth and development in the area will place increasing pressure on this corridor, which serves as an alternative to I-26. The traffic forecast indicates an increase in AADT of 34 to 41 percent from 2017 to 2040.

Roadway deficiencies include narrow travel lanes and shoulders. Horizontal curves at the NC 191 intersection with Clayton Road and at the Blue Ridge Parkway bridge result in sight distance limitations. In addition, the vertical alignment of NC 191 at the Blue Ridge Parkway is substandard and limits sight distance at the bridge.

The purpose of the project is to reduce traffic congestion.

Project-Specific Issues:

- The **French Broad River**, an important natural resource and community asset, is adjacent to a section of NC 191 within the project limits.
- A portion of NC 191 is adjacent to the **Pisgah National Forest**, which is administered by the United States Forest Service (USFS).
- The **Blue Ridge Parkway**, part of the National Park System, crosses NC 191 and the French Broad River via a two-lane bridge constructed in 1967.

Because of potential impacts to the Pisgah National Forest and/or the Blue Ridge Parkway, early and ongoing coordination with the USFS and the National Park Service (NPS) is planned.

Additional study area resources are listed in the inventory table on pages 4 – 5.

Design Data (Proposed Conditions):

- CTP Designation (Facility Type): Boulevard
- Type of Access Control: To Be Determined
- Typical Section: Four-lane, median divided facility with potential for superstreet components and bicycle accommodations (either on-road or off-road).
- Right of Way: 110 feet
- Posted Speed: 45 mph (50 mph design speed)

Initial Alternatives or Concepts Considered:

- **Feasibility Study (1996)** – The Feasibility Study for U-3403 recommended widening NC 191 to a four-lane curb and gutter section, 56-feet wide (no median) under the Blue Ridge Parkway bridge. Widening would occur asymmetrically to the west between the Blue Ridge Parkway bridge bents. It was recommended the roadway be elevated a minimum of 12 feet to avoid undermining the existing bridge footings. The grade modification would be within 1,000 feet of each direction of the bridge.

However, this concept is not feasible due to the inadequate spacing and skew of the Blue Ridge Parkway bridge bents. Maintenance of traffic during construction would also be an issue. In addition, this concept would place substantial fill in the floodway and floodplain of the French Broad River.

- **Preliminary Concepts Study (2017)** - Four preliminary concepts were developed for the portion of the project north of Clayton Road as an initial step in the project development process:
 - Widening on existing alignment,
 - New alignment to the east (crossing the French Broad River),
 - New alignment to the west (through the Pisgah National Forest), and
 - Long two-lane bridge (along existing alignment).

Based on a review of potential impacts and/or costs, the western new alignment concept and the two-lane bridge concept were eliminated from further consideration.

Preliminary Study Area Resources Inventory Table

This table is to be used in conjunction with the Environmental Features Map and USGS map.
Resources are listed from south to north where applicable.

Resource/Measure	Applicability/Resources in Study Area
General Project Information	
Length of project (to tenth of miles)	Approximately 3.6 miles
Signalized intersections	<ul style="list-style-type: none"> – Avery Creek Rd/Glenn Bridge Rd SE/ Southwicke Dr – NC 146 (Long Shoals Road)/Vista Boulevard – Commerce Way/Park South Boulevard – Industrial Drive/Borg Warner Drive – Blue Ridge Parkway access road
Cultural Resources	
National Register (NRHP) or eligible sites (DOE) and districts	<ul style="list-style-type: none"> – Pisgah Forest Pottery (DOE) – Archaeological site [recommended] – Blue Ridge Parkway (DOE) [The Blue Ridge Parkway has been nominated as a National Historic Landmark.] – Bent Creek Campus, Appalachian Forest Experiment Station (NRHP)
Human Environment	
Churches	<ul style="list-style-type: none"> – Avery's Creek United Methodist Church (874 Glenn Bridge Road SE) – Avery's Creek Christian Church (1927 Brevard Road) – Long Shoals Baptist Church (661 Long Shoals Road) – Bent Creek Baptist Church (1554 Brevard Road)
Schools	<ul style="list-style-type: none"> – Avery's Creek Elementary School
Named residential communities	<ul style="list-style-type: none"> – Glen Meadows – Southwicke – Clovernook – The Shoals (mobile home community) – Platinum Court Apartments – Park South Apartments – Ashley Woods – The Nook – Joshua Ridge (mobile home community) – Riverwind
Other Residential Properties	Approximately 30 single-family properties
Business Properties	Approximately 26 business properties
Parks, Open Space, Greenways, Game Lands, Land and Water Conservation Fund Properties, etc.) (#)	<ul style="list-style-type: none"> – Pisgah National Forest – Blue Ridge Parkway – Mountains-to-Sea Trail (follows the Blue Ridge Parkway bridge across NC 191) – Bent Creek River Park <p>The Buncombe County Greenways and Trails Master Plan indicates a "Priority Greenway Corridor" along the French Broad River and NC 191 within the study area. A 2015 feasibility study identified this route as part of the preferred alignment for the Bent Creek-Lake Julian Greenway.</p>
Special populations	Low-income populations are present

Resource/Measure	Applicability/Resources in Study Area
Natural Environment	
Rivers and Named Streams	<ul style="list-style-type: none"> – French Broad River – Avery Creek – Clayton Creek – Ashley Branch – Orton Branch – Bent Creek
NWI Wetlands	Approximately 0.8 acres
Critical Water Supply Watersheds	None
Floodplain (acres)	Approximately 74 acres
Floodway (acres)	Approximately 47 acres
Riparian Buffer rules apply	No
Natural Heritage Program (NHP) sites	Sandy Bottom Preserve (NHP Natural Area) Sandy Bottom (Long Branch) Registered Heritage Area (RHA)
Identified Critical habitat/species under Endangered Species Act (ESA)	To Be Determined; 14 – species with federal Threatened or Endangered status listed by the Natural Heritage Program (NHP) as having known occurrences in the county. A 2016 survey identified a gray bat population in proximity to NC 191.
Physical Environment	
Suspected/known Hazardous Material sites (#)	3 – Underground Storage Tank (UST) facilities 1 – Hazardous Waste Site Note: Additional Geo-environmental investigations will be conducted.
Other Infrastructure	To Be Determined
Active agricultural operations/Voluntary Agricultural Districts	2 properties – 43 acres
FEMA Buyout Properties	None identified

Sources:

Bent Creek – Lake Julian Greenway Feasibility Study. 2015. <https://www.buncombecounty.org/common/parks/Bent-Creek-Lake-Julian-Feasibility-Study.pdf>

Buncombe County GIS. <http://gis.buncombecounty.org/buncomap>.

Buncombe County Parks and Recreation. <https://www.buncombecounty.org/Governing/Depts/Parks/Default.aspx>

Caldwell, K., and Weber, J. North Carolina Wildlife Resources Commission. "Gray Bat Tracking Aug-Sept 2016."

Mountains-to-Sea Trail. <https://mountainstoseatrail.org>.

NCDEQ – Natural Heritage Program. 2017. <https://www.ncnhp.org/data/species-community-search>.

NC State Historic Preservation Office. HPOWEB GIS Service. <http://gis.ncdcr.gov/hpoweb/>.

NC 191 Improvements

Summary of External Scoping Responses

Formal coordination with various federal, state, and local agencies began in August 2017. The following project-specific comments were provided:

NC Wildlife Resources Commission
This widening has been considered for at least 20 years, as a feasibility study for the larger U-3403 project (Buncombe and Henderson Counties) was completed in 1996. NCWRC was listed as one of the concerned parties in a letter from the NC Natural Heritage Program dated June 3, 1997. We would like to be involved throughout the life of the project and plan to serve as a member of the Merger team.
A number of notable features occur in the area and must be considered in the development of the project. Context sensitive design will be important to avoid and minimize impacts to valuable area resources. (Blue Ridge Parkway, Mountains-to-Sea Trail, French Broad River and other aquatic features, Pisgah National Forest, Bent Creek Experimental Forest Southern Research Station, Bent Creek River Park, Sandy Bottom Preserve including an important wetland complex, proposed greenways)
Sandy Bottom Preserve is a rare and unique resource with extraordinary biodiversity. It has more reptile and amphibian species than any single location in the state or the southern Appalachian Mountain region, and arguably in the world, with at least 38 species in the wetland complex and surrounding uplands. The site represents increasingly rare habitat types for western NC, especially the greater Asheville area, featuring spring-fed wetland, bog, floodplain, and vernal pool natural communities. Preserving hydrologic function is key to preserving the wetland habitats, some of which receive surface flow as well as spring water. Seemingly small changes in hydrology can have devastating effects on species with very specific habitat and breeding requirements. The regional loss of wetlands and floodplain along the French Broad River in recent years due to utility, transportation, and commercial development, plus the planned and potential future development facilitated by the improved roadway and other nearby projects, make protecting Sandy Bottom Preserve vitally important.
Sandy Bottom has been researched and monitored for plants, natural communities, and wildlife since the 1970s by state and federal agencies, non-governmental organizations, and academic institutions. It currently provides a unique outdoor learning lab and long-term research site for UNC-A and other area students. Numerous peer-reviewed publications specifically about the ecology and biodiversity of this site have been produced. The Registered Heritage Area has a permanent conservation easement that is owned by Longbranch Environmental Education Center in Leicester, NC. A collaborative of researchers, biologists, and ecologists, representing NCWRC, USFWS, UNC-A, MountainTrue, Tangled Bank Conservation LLC, and NC Natural Heritage Program, is currently working on the <i>Sandy Bottom Conservation Plan</i> to guide future management of the site.
NCWRC is very concerned about the federal and state listed species and Species of Greatest Conservation Need (SGCN), as identified in the North Carolina Wildlife Action Plan (NCWRC 2015), that occur in the project area. North Carolina's only known maternity colony of the federally Endangered Gray Bat (<i>Myotis grisescens</i>) occurs in the project vicinity. Over 1,000 bats roost at this site during the summer, most of which are Gray Bats. The roost is in close proximity to NC 191. Acoustic and visual surveys have shown Gray Bats arrive in March and leave in October. NCWRC's

radio-telemetry surveys of five Gray Bats from this site indicated these bats display a variety of foraging ranges and roosting preferences.

The location of this roost leaves it vulnerable to anthropogenic disturbance and disturbance during the maternity season causes females to drop their flightless pups (USFWS 1982). Due to the proximity of the roost to NC 191 and the sensitivity of this species to disturbance, we recommend planning the timing of road construction along the stretch of NC 191 adjacent to the French Broad River so that it does not coincide with the maternity season (April through July). Since Gray Bats commute and forage in the project area and artificial light has been shown to decrease activity of *Myotis* species (Rowse et al., 2015), adjusting construction along this stretch to avoid the maternity season will allow the colony to function normally during the important reproductive season. Since Gray Bats have been documented foraging in the area, we recommend avoiding significant impacts to natural areas that may support foraging habitat for the species like Bent Creek Experimental Forest, the Sandy Bottom Preserve, and the NC Arboretum. We are also concerned about the construction impacts combined with those of the nearby I-26 widening project (I-4400/I-4700) on this and other sensitive species that use habitat common to both and the potential of both projects being under construction simultaneously. We recommend coordination of the two projects to ensure protective strategies regarding timing and extent of disturbance are used.

The Eastern Hellbender (*Cryptobranchus a. alleghaniensis*), a Federal Species of Concern and state Special Concern aquatic salamander that is under review for possible listing as federally Threatened or Endangered, occurs in Bent Creek and is expected to inhabit the French Broad River, as well. The Creeper (*Strophitus undulatus*), state Threatened; French Broad River Crayfish (*Cambarus reburus*), FSC; and Eastern Spiny Softshell (*Apalone s. spinifera*), state SC; are also found in the river near Sandy Bottom. Other listed riverine species potentially occurring in the project area include Appalachian Elktoe (*Alasmidonta raveneliana*), federal and state Endangered; Blotched Chub (*Erimystax insignis*), FSC and state Significantly Rare; Mudpuppy (*Necturus maculosus*), state SC; Striped-neck Musk Turtle (*Sternothernus minor peltifer*), state SC; and Cumberland Slider (*Trachemys scripta troostii*), state SC. The Bog Turtle (*Glyptemys muhlenbergii*), federally Threatened due to Similarity of Appearance and state Threatened, has been documented at Sandy Bottom Preserve in recent years. NCWRC is nearing completion of an important guidance document, the *Bog Turtle Conservation Plan for North Carolina*, which is expected to be available this year.

Sandy Bottom provides rare habitats for amphibian breeding, including fishless, vernal, seasonal, or semi-permanent pools and spring fed bogs with sphagnum moss essential for the Four-toed Salamander (*Hemidactylium scutatum*), FSC and state SC, and the Bog Turtle. The Mole Salamander (*Ambystoma talpoideum*), state SC, is also found in the Preserve, as well as the Southern Appalachian Salamander (*Plethodon teyahalee*) and Queen Snake (*Regina septemvittata*), which, along with the above listed species, are SGCN. The Four-toed Salamander population at Sandy Bottom Preserve is unique, disjunct, highly divergent, extremely rare, and it represents an Evolutionarily Significant Unit. This ESU is likely a separate and yet undescribed new species which would be considered imperiled and in immediate need of greater protection. Further genetic analysis to evaluate and describe species systematics will occur in 2018-2019. Sandy Bottom Preserve is one of only three extant sites for this ESU known globally (Herman and Bouzat 2015) and it represents the best remaining, functioning habitat of the three. The Four-toed Salamander is one of the species with very specific habitat requirements for reproduction. Any disturbance or alteration of the hydrology, particularly to the pool at the southern end of the site, near Sandy Spring Drive and very close to NC 191, could lead to the loss of this important population. The hydroperiod and hydrology are extremely important for this species and some of the water source for this pool originates from the remnant wetland on the south side of Sandy Spring Drive.

The wetland complex at Sandy Bottom Preserve is a forested wetland, a preferred habitat for many wildlife species, such as the rapidly declining Rusty Blackbird (*Euphagus carolinus*), a SGCN that visits area forest wetlands in winter. The IUCN, which provides the most comprehensive inventory of the global conservation status of plant and animal species, lists “loss of wooded wetlands in the southeast U.S. winter range” as a major threat to this species (IUCN 2018). We are concerned about potential impacts to bird species that use isolated mountain wetlands for foraging and roosting during the spring and fall migrations and over winter. Black-crowned (*Nycticorax nycticorax*) and yellow-crowned (*Nyctanassa violacea*) night herons, both SGCN, and other marsh birds frequent such wetlands, especially young birds dispersing from their natal site. Other bird SGCN that have the potential to breed in the project area include Acadian flycatcher (*Empidonax virescens*), Kentucky warbler (*Geothlypis formosa*), Louisiana waterthrush (*Parkesia motacilla*), and yellow-throated warbler (*Setophaga dominica*).

NCWRC is very concerned about the sensitive species that may be impacted by sediment pollution, hazardous spills, chemical runoff, and habitat and connectivity loss from project construction and subsequent development activity. The French Broad River appears to be on the 303(d) list of impaired waters upstream of the project. Context sensitive design elements that provide significant treatment of stormwater and prevent pollutant-laden runoff or spills from entering the French Broad River or the Sandy Bottom wetland complex will be very important. Hazardous spill basins and sediment and erosion control measures that adhere to the Design Standards in Sensitive Watersheds may be appropriate for the project area closest to the river. While recreational fisheries occur in the river and major tributaries, significant trout reproduction is not expected in and downstream of the project, therefore a trout moratorium is not proposed.

NCWRC strongly recommends impacts to the Sandy Bottom Preserve be avoided and the project be designed to reconnect the French Broad River to important habitats and its floodplain across the entire section adjacent to these wetlands by constructing an elevated roadway. If this entire section cannot be elevated, we recommend elevating the majority, particularly at the southern end and northern end of the Sandy Bottom complex where wetlands and pools are closest to NC 191. We have documented an increasing number of road mortalities for amphibians, including the state-listed Mole Salamander, trying to cross NC 191 and Clayton Road to migrate to and from breeding habitats or to disperse. We recommend an elevated roadway that allows wildlife passage underneath the majority of this stretch of roadway, as opposed to increasing habitat fragmentation in the widening of NC 191. A reduction of successful crossings would be expected with a wider roadway, which may have detrimental effects on sensitive wildlife populations. Strategies for safe wildlife passage will be important to this project. Wildlife crossings may be appropriate in the Bent Creek and Bear Sanctuary area, as well. The entire roadway in the project area should be investigated for elevated numbers of road kills and areas of higher vehicle accidents with wildlife to determine appropriate wildlife crossing locations. NCWRC staff would like to be included in wildlife crossing design efforts.

Secondary and cumulative effects are also a significant concern for this project. Growth rates for both Buncombe and Henderson counties are projected to continue to exceed the growth rate of the state. While there are some limitations to growth and development due to the terrain and other factors, the improved roadway is likely to attract additional development. We are very concerned about the cumulative effects of development across the region that negatively impact water quality of the French Broad River and its tributaries and the quality and quantity of wetlands and other habitat vital to our rare and vulnerable species. The environmental document should provide details on local protections and growth management efforts and address secondary and cumulative impact concerns. Measures to mitigate secondary and cumulative impacts can be found in the Guidance Memorandum

to Address and Mitigate Secondary and Cumulative Impacts to Aquatic and Terrestrial Wildlife Resources and Water Quality (NCWRC 2002). Local authorities and NCDOT should work together to develop strategies that protect rare wildlife and habitats, water quality of waterways and wetlands, and ensure proper management of secondary growth.

US Fish and Wildlife Service

We have occurrence records near the project area for the following federally protected species: Appalachian elktoe (*Alasmidonta raveneliana*) and Gray bat (*Myotis grisescens*). We recommend surveying the French Broad River throughout the reach affected by the project to determine presence and distribution of Appalachian elktoe. We recommend inspecting suitable structures for the presence of bats or evidence of bat use. We recommend conducting habitat assessments and surveying any suitable habitat in the project area for other federally listed species prior to any further planning or on-ground activities to ensure no adverse impacts occur.

Implementation of this project also has the potential to impact the Sandy Bottom Preserve, a Natural Heritage Area adjacent to the project south of the Blue Ridge Parkway. Sandy Bottom is a species rich riparian wetland that is used by UNC-Asheville for teaching and research. Sandy Bottom also provides habitat for the threatened due to similarity of appearance bog turtle (*Glyptemys muhlenbergii*).

US Forest Service

The project's northern terminus includes lands of the Pisgah National Forest. Additional maps showing project design and our property lines will be needed to determine if the proposed project will impact NFS lands.

Please continue to keep the National Forests in North Carolina involved in the planning for this project. The Forest Service would like to attend a field scoping meeting as the project progresses.

US Army Corps of Engineers

It appears the project should go into Merger.

We'll need to discuss any adjacent projects even if those projects are in the planning stage. If there are any adjacent projects, we'll need to discuss logical termini for this project.

We encourage DOT to quantify or specify the amount of reduction of traffic congestion (or improvement in vehicular mobility, reduction of travel time, etc.) in the purpose statement or provide screening criteria that does this. This is very important as it goes in compliance with the 404(b)(1) Guidelines and the LEDPA decision if this project requires an IP or goes through the Merger Process.

This project will need to be coordinated with the 3 Cherokee Tribes. Please include them on the project team and send invitation to them for all future project team meetings.

US Environmental Protection Agency

EPA does not have any comments at this time. NEPA is not applicable to this state-funded project.

French Broad River MPO

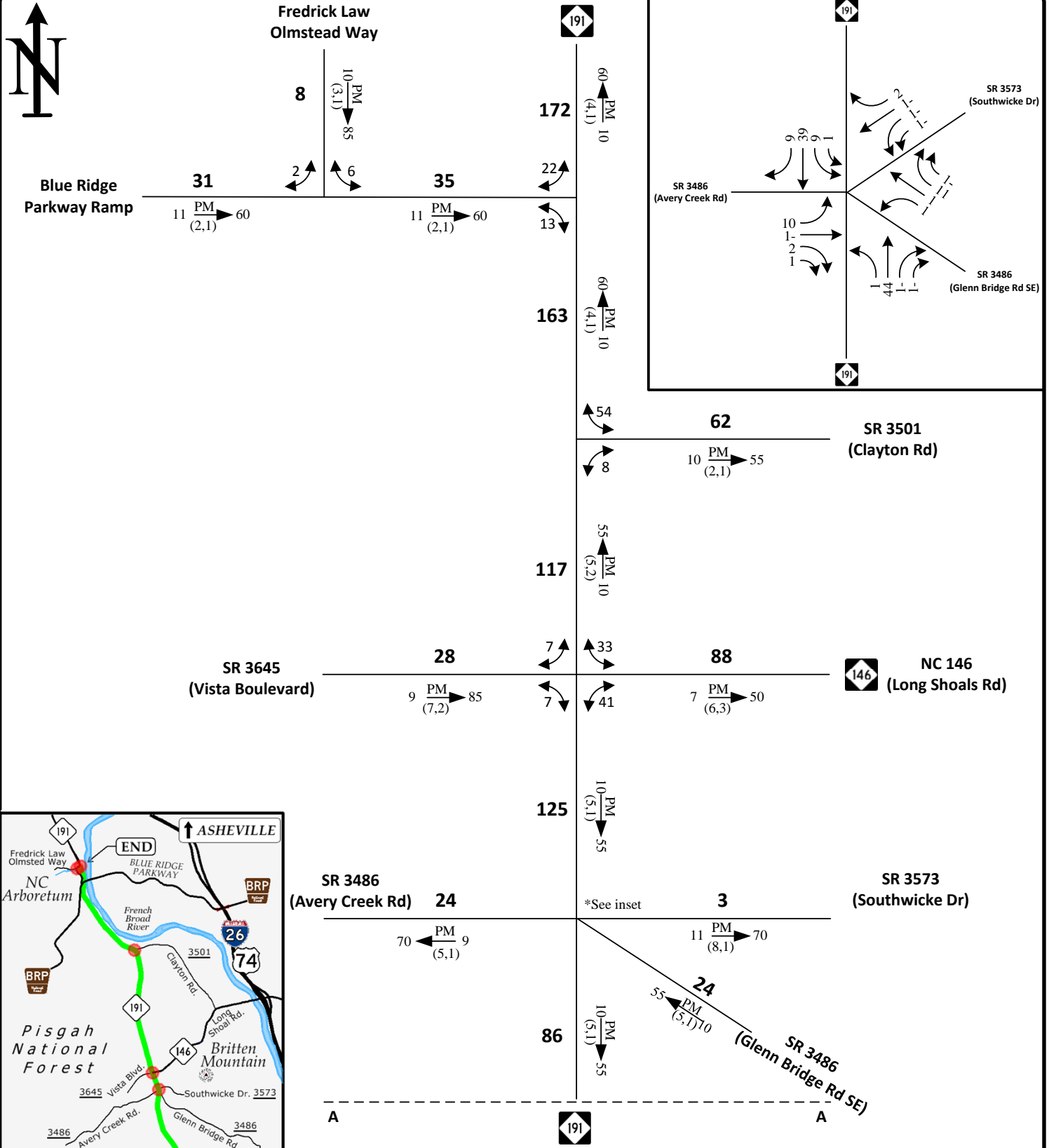
Existing local and regional planning study recommendations for NC 191 Brevard Road: French Broad River 2040 MTP includes U-3403B; widening to multi-lanes with a resulting four-lane median divided cross-section is envisioned; FBRMPO Complete Streets Recommendation for this corridor: Urban/Suburban Avenue with bike lanes and sidewalk; Blue Ridge Bike Plan recommendations: Primary Corridor (Regional Corridor #8) – bike lanes in the city, shoulder in the county; Asheville Bicycle Plan (2007) recommends bicycle lanes for NC 191 north of the Blue ridge Parkway; Buncombe County Bent Creek Feasibility Study and Buncombe County Greenways Master Plan (2012) identify this general corridor as Bent Creek-Lake Julian Greenway corridor;

<p>Additional bicycle, pedestrian and transit considerations for this corridor: MPO staff are interested in identifying a potential park-and-ride lot location along this corridor, to serve the traffic traveling north out of Henderson County to the Buncombe County job sites; if available ROW was identified as part of this project, implementation of the Park-and-Ride lot amenities could be done at a later date (i.e. paving, lights, shelter, signage)</p>
<p>Natural and Cultural Resources: The French Broad River attracts a number of people for picnics, boating and tubing; Bent Creek River Park and Zen Tubing are located along the corridor; This corridor serves as an access point to the Blue Ridge Parkway and the NC Arboretum; Bent Creek Experimental Forest and Bent Creek mountain bike trails are accessible just north of the U-3403B corridor; large numbers of local residents and visitors visit the Blue Ridge Parkway, Bent Creek and the NC Arboretum every year and it is important that safe access to those locations is preserved as part of the project; improving bicycle and pedestrian access to Bent Creek and the Arboretum would be desirable.</p>
<p>Development Pattern Observations: MPO staff have been receiving a number of comments from the general public about congestion during peak periods at the intersections of NC 191 and NC 146 (Long Shoals Road) and NC 191 and Clayton Road; both residential and industrial development is expected to grow along the NC 191 corridor; limited connectivity puts a lot of pressure on NC 191 from surrounding developments; NC 191 often serves as a reliever for I-26 Corridor; currently there are limited to no opportunities for the use of non-motorized travel</p>
<p>Tribal Historic Preservation Office – Eastern Band of the Cherokee Indians (THPO-EBCI)</p>
<p>Due to the location of this proposed undertaking, there is a possibility that human remains or cultural resources could be present. The EBCI THPO requests that a Phase I cultural resource survey be conducted in areas of new ground disturbance within the APE of this project. If human remains are inadvertently discovered during construction, the EBCI THPO requests all work cease and to be notified so that nation-to-nation consultation process may continue as stipulated under 36CFR800.</p>
<p>Tribal Historic Preservation Office –United Keetowah Band of Cherokee Indians in Oklahoma (UKB)</p>
<p>The proposed undertaking lies within the traditional territory of the UKB. [The UKB is a Federally Recognized Indian nation headquartered in Tahlequah, OK.]</p>
<p>Information on Native American use in the project vicinity show that prehistoric, ethnographic, historic, and traditional sites of value to the UKB surround the project area. We recommend that a cultural resources inventory be completed prior to project implementation.</p>
<p>NC Division of Parks and Recreation</p>
<p>STIP Project No. U-3403B will not impact any PARTF or LWCF projects. Follow up with the local government is recommended to ensure no other projects will be impacted. The closest LWCF project is Lake Julian Park. The closest PARTF projects are the Collier Property Acquisitions which are both located east of Julian Lake.</p>
<p>Tribal Historic Preservation Office - Cherokee Nation</p>
<p>The following comments were received in response to archaeological survey correspondence: Please allow this letter to serve as the Nation’s interest in acting as a consulting party to this proposed project.</p>
<p>This Office does not object to the project proceeding as long as the following recommendations are observed:</p>

- The Nation concurs that Site 31BN1045 is eligible to be listed in the National Register of Historic Places (NRHP) under Criterion D and should be avoided throughout the course of this project. If the site cannot be avoided, this Office requests additional consultation;
- The Nation requests that NCDOT recontact this Office for additional consultation if there are any changes to the scope of or activities within the Area of Potential Effects;
- The Nation requests that NCDOT halt all project activities immediately and re-contact our Offices for further consultation if items of cultural significance are discovered during the course of this project; and
- The Nation requests that NCDOT conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the Nation's databases or records.

Appendix B

- Traffic Volume Diagrams (2017 and 2040)
- Traffic Operations Figures and Tables



2017

AVERAGE ANNUAL DAILY TRAFFIC

No Build

Figure B-1b

###

No. of Vehicles Per Day in 100s

1-

Less than 50 vpd

X

Movement Prohibited

κ

AM

(d, t)

→

ρ

K

Design Hour Factor (%)

PM

PM Peak Period

D

Peak Hour Directional Split (%)

→

Indicates Direction of D

(d, t)

Duals, TT-STs (%)

TIP: U-3403A/B

WBS: 34936.1.4

COUNTY: BUNCOMBE, HENDERSON

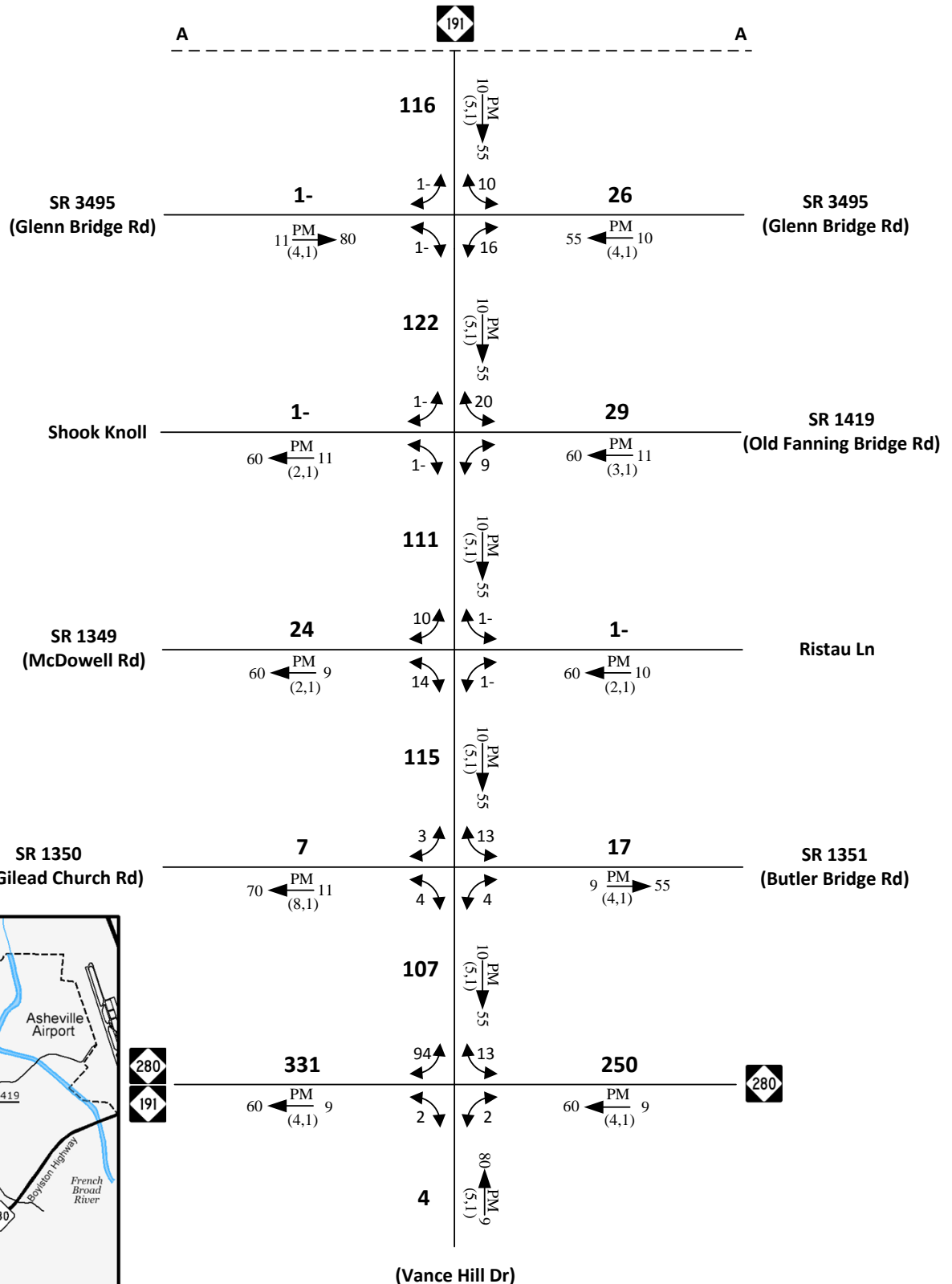
DIVISION: 13,14

DATE: August 2017

PREPARED BY: RK&K

LOCATION: BUNCOMBE/HENDERSON COUNTIES, NC

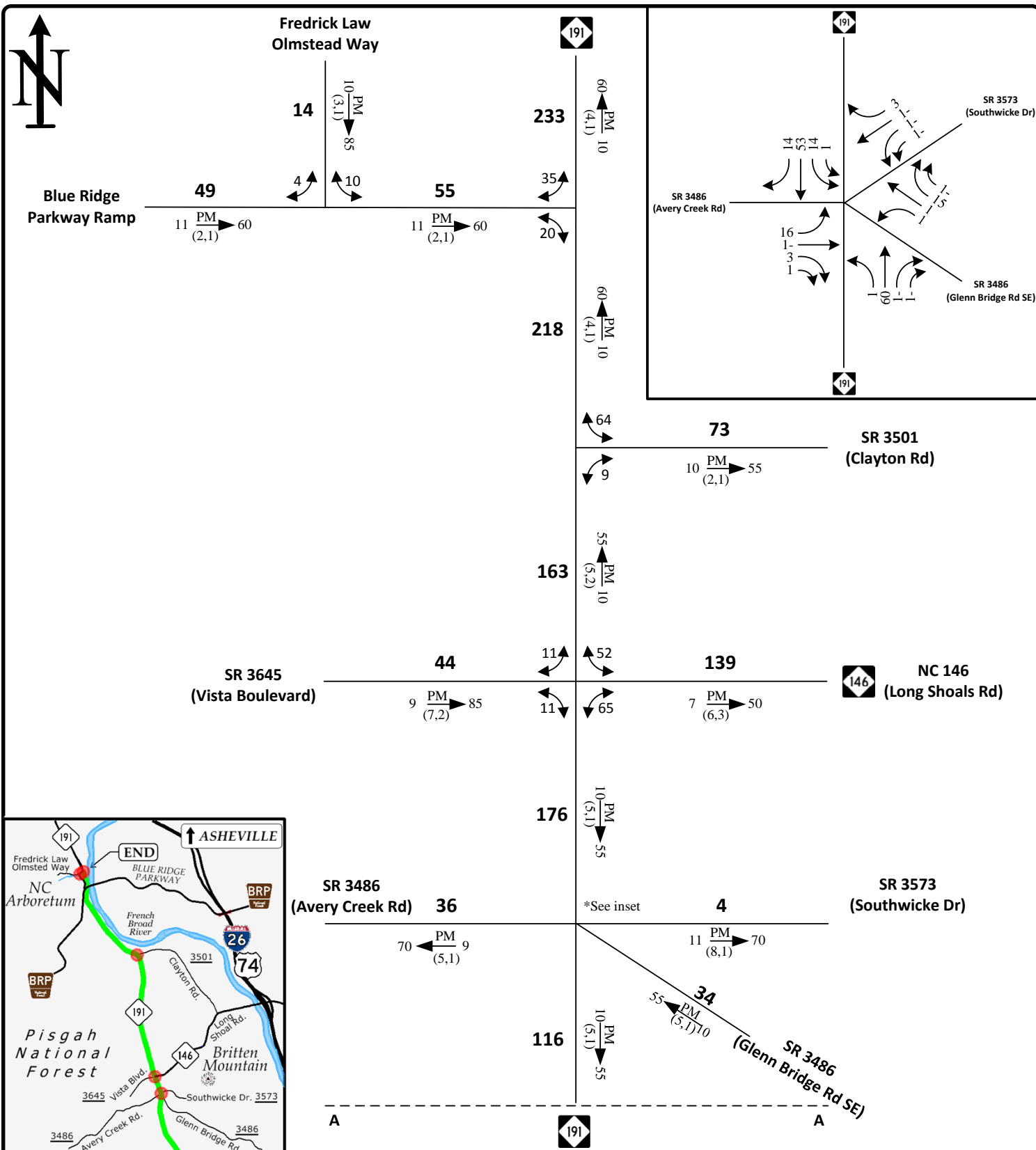
PROJECT: NC 191 WIDENING FROM NC 280 TO BLUE RIDGE PARKWAY RAMP



2040 AVERAGE ANNUAL DAILY TRAFFIC

No Build Figure B-2a

TIP: U-3403A/B	WBS: 34936.1.4
COUNTY: BUNCOMBE, HENDERSON	DIVISION: 13,14
DATE: August 2017	
PREPARED BY: RK&K	
LOCATION: BUNCOMBE/HENDERSON COUNTIES, NC	
PROJECT: NC 191 WIDENING FROM NC 280 TO BLUE RIDGE PARKWAY RAMP	



2040 AVERAGE ANNUAL DAILY TRAFFIC

No Build Figure B-2b

TIP: U-3403A/B	WBS: 34936.1.4
COUNTY: BUNCOMBE, HENDERSON	DIVISION: 13,14
DATE: August 2017	
PREPARED BY: RK&K	
LOCATION: BUNCOMBE/HENDERSON COUNTIES, NC	
PROJECT: NC 191 WIDENING FROM NC 280 TO BLUE RIDGE PARKWAY RAMP	

Table B-1. Base Year No-Build Segment Analysis Results

Two-Lane Highway Segments								
Direction	Segment	Location Description	AM Peak			PM Peak		
			ATS* (mph)	PTSF* (%)	LOS	ATS* (mph)	PTSF* (%)	LOS
Northbound NC 191	1	South of Avery Creek Rd/Glenn Br Rd SE/Southwicke Dr	34.3	76.5	C	34.5	72.4	C
	2	South of NC 146/Vista Blvd	30.7	80.1	D	31.0	75.1	D
	3	Between NC 146/Vista Blvd and Clayton Rd	34.4	75.2	D	34.1	81.1	D
	4	Between Clayton Rd & Blue Ridge Pkwy ramp	34.4	83.4	D	34.3	87.8	E
Southbound NC 191	1	South of Avery Creek Rd/Glenn Br Rd SE/Southwicke Dr	34.5	72.4	C	34.3	76.5	C
	2	South of NC 146/Vista Blvd	31.0	75.1	D	30.7	80.1	D
	3	Between NC 146/Vista Blvd and Clayton Rd	34.1	81.1	D	34.4	75.2	D
	4	Between Clayton Rd & Blue Ridge Pkwy ramp	34.3	87.8	E	34.4	83.4	D

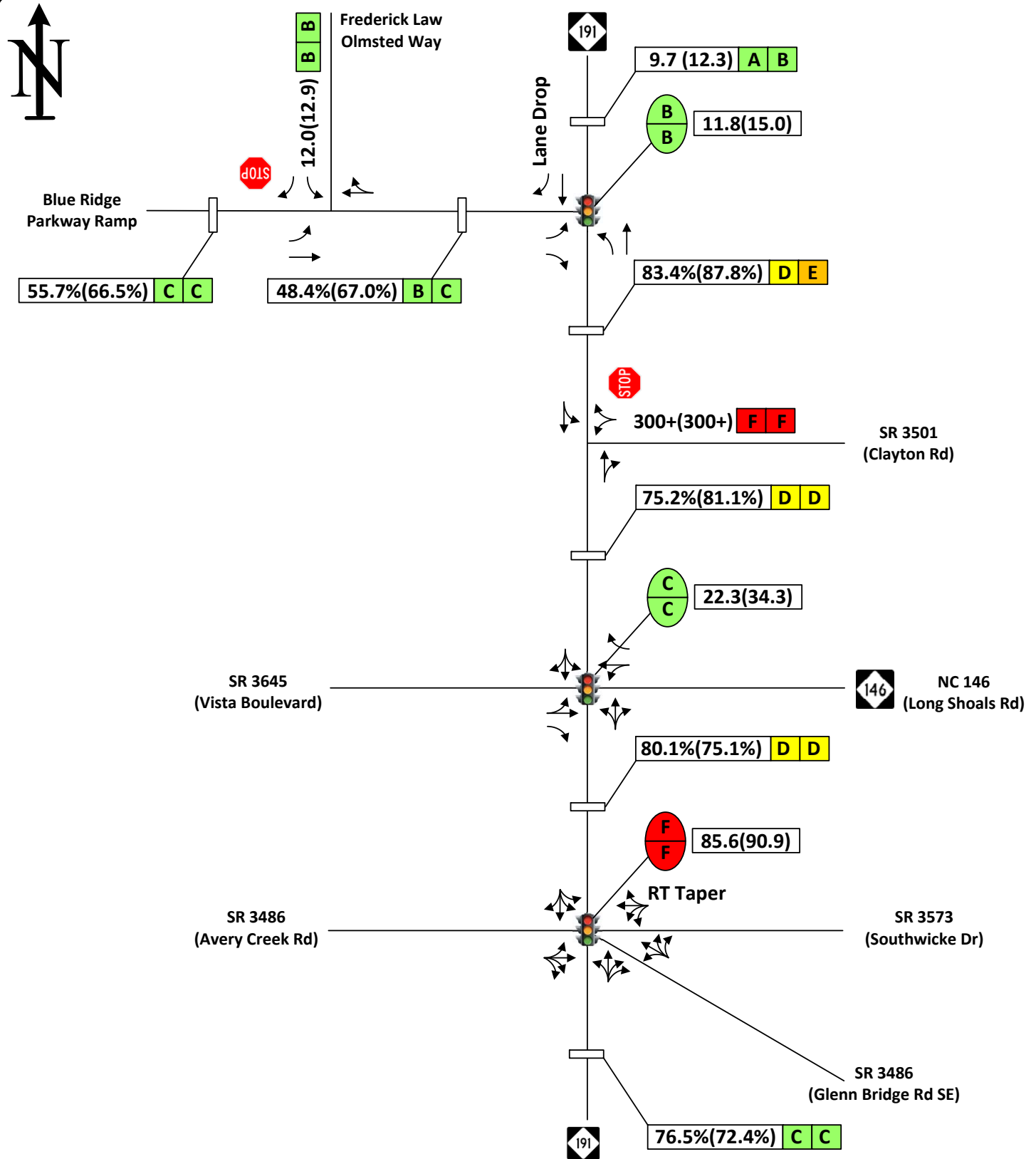
* Note: ATS- Average Travel Speed in miles per hour; PTSF- Percent Time Spent Following

Table B-2. Base Year No-Build Intersection Analysis Results

No.	Intersection	Approach	Lane Group	Delay (s/veh) ⁽¹⁾		LOS ⁽¹⁾		Synchro 95th % Queue (ft.)		SimTraffic Max. Queue (ft.)		Available Storage (ft.) ⁽²⁾
				AM	PM	AM	PM	AM	PM	AM	PM	
1	NC 191 at Avery Creek Rd/ Glenn Br Rd/ Southwicke Dr (Signalized)	Avery Creek Rd, EB	L/T/R1/R2	93.5	59.1	F	E	230	115	285	145	-
		Southwicke Dr, SWB	L1/L2/T	52.0	52.0	D	D	65	45	80	65	-
		Southwicke Dr, SWB	R	50.9	50.8	D	D	50	40	55	50	25
		Glenn Br Rd, NWB	L/T/R1/R2	132.7	138.3	F	F	175	235	203	285	-
		NC 191, NB	L/T/R1/R2	34.2	32.5	C	C	385	425	460	510	-
		NC 191, SB	L1/L2/T/R	53.1	56.4	D	E	855	1,080	860	945	-
		Overall		85.6	90.9	F	F	-	-	-	-	-
2	NC 191 at NC 146/ Vista Blvd (Signalized)	Vista Blvd, EB	L/T	39.5	44.0	D	D	60	355	80	450	-
			R	38.4	31.8	D	C	35	100	50	90	50
		NC 146, WB	L/T	52.0	49.4	D	D	275	430	320	440	-
			R	39.8	31.3	D	C	115	120	90	90	50
		NC 191, NB	L/T/R	12.2	23.1	B	C	540	395	665	470	-
		NC 191, SB	L/T/R	19.2	37.0	B	D	2,025	1,490	1,840	1,295	-
		Overall		22.3	34.3	C	C	-	-	-	-	-
3	NC 191 at Clayton Rd	Clayton Rd, WB	L/R	300+	300+	F	F	1,690	2,175	1,505	1,730	-
		NC 191, NB	T/R	-	-	A	A	15	15	25	30	-
		NC 191, SB	L/T	10.1	10.8	B	B	380	340	475	435	-
4	Note: This intersection ties to the existing 4-lane section. NC 191 at Blue Ridge Pkwy ramp (Signalized)	BRP ramp, EB	L	56.3	54.0	E	D	130	180	165	205	200
			R	46.9	43.8	D	D	60	75	65	90	-
		NC 191, NB	L	7.8	6.9	A	A	80	75	105	95	150
			T	4.0	7.5	A	A	165	220	215	285	-
		NC 191, SB	T	11.2	11.6	B	B	240	235	310	295	-
			R	-	-	A	A	30	10	65	20	Lane Drop
		Overall		11.8	15.0	B	B	-	-	-	-	-

(1)- Intersections #1 and #2 delay and LOS results reported from HCM2000 module within Synchro. All other delay and LOS results are HCM 6th edition module within Synchro.

(2)- ## - Queue exceeds Available Storage



2017 Traffic Operations

No-Build Figure B-3

##(##) - AM(PM) MOE's



- Stop Control



- Signal Control

LEGEND

AM|PM

- Segment or Mvmt LOS



- Signal LOS



- Segment Analysis



- LOS A, B, C



- LOS D



- LOS E



- LOS F

TIP: U-3403B

WBS: 34936.1.4

COUNTY: BUNCOMBE

DIVISION: 13

DATE: January 2019

PREPARED BY: **RK&K**

LOCATION: From Ledbetter Rd to Blue Ridge Pkwy

PROJECT: NC 191 Widen to Multi-lanes

Table B-3. Future Year No-Build Segment Analysis Results

Two-Lane Highway Segments								
Direction	Segment	Location Description	AM Peak			PM Peak		
			ATS* (mph)	PTSF* (%)	LOS	ATS* (mph)	PTSF* (%)	LOS
Northbound NC 191	1	South of Avery Creek Rd/Glenn Br Rd/Southwicke Dr	31.9	82.7	D	32.1	78.1	D
	2	South of NC 146/Vista Blvd	27.3	88.1	E	27.3	82.9	E
	3	Between NC 146/Vista Blvd and Clayton Rd	30.7	83.6	D	30.6	88.5	E
	4	Between Clayton Rd & Blue Ridge Pkwy ramp	29.7	90.5	E	29.6	92.7	E
Southbound NC 191	1	South of Avery Creek Rd/Glenn Br Rd/Southwicke Dr	32.1	78.1	D	31.9	82.7	D
	2	South of NC 146/Vista Blvd	27.3	82.9	E	27.3	88.1	E
	3	Between NC 146/Vista Blvd and Clayton Rd	30.6	88.5	E	30.7	83.6	D
	4	Between Clayton Rd & Blue Ridge Pkwy ramp	29.6	92.7	E	29.7	90.5	E

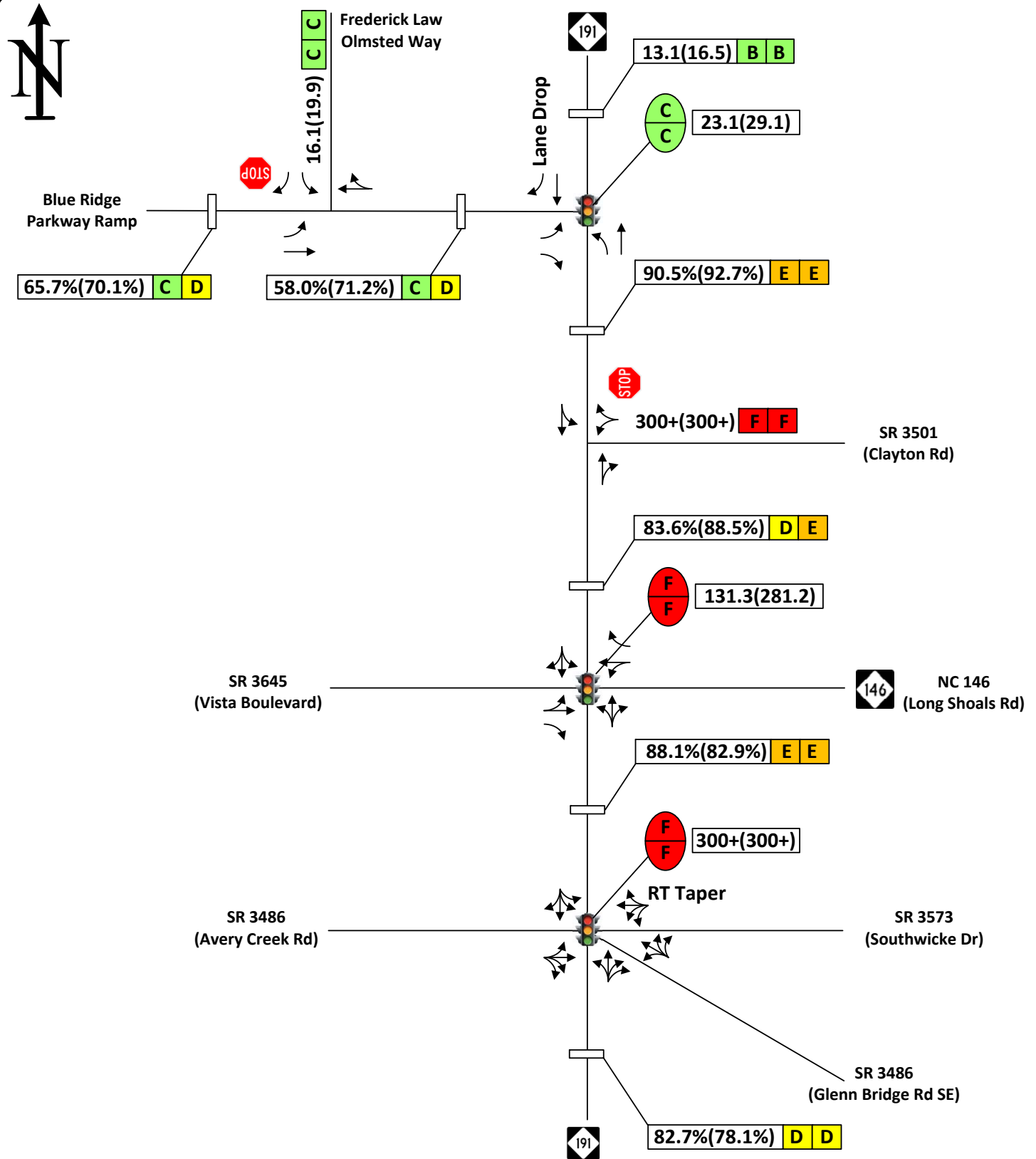
* Note: ATS- Average Travel Speed in miles per hour; PTSF- Percent Time Spent Following

Table B-4. Future Year No-Build Intersection Analysis Results

No.	Intersection	Approach	Lane Group	Delay (s/veh) ⁽¹⁾		LOS ⁽¹⁾		Synchro 95th % Queue (ft.)		SimTraffic Max. Queue (ft.)		Available Storage (ft.) ⁽²⁾
				AM	PM	AM	PM	AM	PM	AM	PM	
1	NC 191 at Avery Creek Rd/ Glenn Br Rd/ Southwicke Dr (Signalized)	Avery Creek Rd, EB	L/T/R1/R2	300+	300+	F	F	1,260	225	1,065	260	-
		Southwicke Dr, SWB	L1/L2/T	58.3	66.6	E	E	65	50	95	65	-
		Southwicke Dr, SWB	R	56.9	61.2	E	E	60	40	60	50	25
		Glenn Br Rd, NWB	L/T/R1/R2	143.3	300+	F	F	1,205	1,155	1,035	1,050	-
		NC 191, NB	L/T/R1/R2	300+	300+	F	F	4,705	4,715	3,910	3,920	-
		NC 191, SB	L1/L2/T/R	300+	300+	F	F	480	635	595	750	-
		Overall		300+	300+	F	F	-	-	-	-	-
2	NC 191 at NC 146/ Vista Blvd (Signalized)	Vista Blvd, EB	L/T	60.9	300+	E	F	115	595	175	520	-
			R	48.2	40.4	D	D	55	120	85	90	50
		NC 146, WB	L/T	203.0	300+	F	F	1,075	1,155	970	965	-
			R	52.2	39.6	D	D	125	125	90	90	50
		NC 191, NB	L/T/R	66.4	27.3	E	C	795	530	870	615	-
		NC 191, SB	L/T/R	193.1	188.5	F	F	4,530	3,695	3,790	3,610	-
		Overall		131.3	281.2	F	F	-	-	-	-	-
3	NC 191 at Clayton Rd	Clayton Rd, WB	L/R	300+	300+	F	F	2,440	2,470	2,050	2,065	-
		NC 191, NB	T/R	-	-	A	A	10	15	25	30	-
		NC 191, SB	L/T	12.4	14.3	B	B	700	705	795	795	-
4	Note: This intersection ties to the existing 4-lane section. NC 191 at Blue Ridge Pkwy ramp (Signalized)	BRP ramp, EB	L	63.1	70.8	E	E	175	240	215	225	200
			R	44.3	38.9	D	D	115	125	140	170	-
		NC 191, NB	L	31.4	19.8	C	B	120	115	165	175	150
			T	8.1	22.2	A	B	215	275	285	335	-
		NC 191, SB	T	27.1	25.1	C	C	370	365	385	370	-
			R	-	-	A	A	45	25	70	50	Lane Drop
		Overall		23.1	29.1	C	C	-	-	-	-	-

(1)- Intersections #1 and #2 delay and LOS results reported from HCM2000 module within Synchro. All other delay and LOS results are HCM 6th edition module within Synchro.

(2)- ## - Queue exceeds Available Storage



2040 MOE DIAGRAM

No-Build

Figure B-4

LEGEND		
##(##) - AM(PM) MOE's	AM PM - Segment or Mvmt LOS	- Segment Analysis
STOP - Stop Control	AM - Signal LOS	- LOS A,B,C
Signal - Signal Control	PM - Signal LOS	- LOS D
		- LOS E
		- LOS F

TIP: U-3403B	WBS: 34936.1.4
COUNTY: BUNCOMBE	DIVISION: 13
DATE: January 2019	
PREPARED BY: RK&K	
LOCATION: From Ledbetter Rd to Blue Ridge Pkwy	
PROJECT: NC 191 Widen to Multi-lanes	

Appendix C

- Concurrence Point No. 1 Form

Section 404/NEPA Merger Project Team Meeting Agreement

Concurrence Point No. 1

Project Purpose and Need and Study Area Defined

STIP Project: U-3403B

Project Name/Description: NC 191, from South of Avery Creek Road/Glenn Bridge Road SE/Southwicke Drive to North of the Blue Ridge Parkway, Buncombe County. Widen to multi-lanes.

Need for Project: The following conditions demonstrate the need for the project.

Existing traffic congestion along NC 191 is expected to worsen in the future.

Roadway deficiencies contribute to congestion and safety issues.

Project Purpose: The primary purpose of the proposed project is to improve traffic operations along NC 191 within the project limits.

Alternatives considered for the project must achieve an arterial travel time savings of at least 50 percent in 2040 compared to no build conditions.

Secondary Benefit: Another desirable outcome of the project is improved traffic safety due to reduced congestion, improved sight distance, improved horizontal and vertical alignment, and increased opportunities for motorists to pass slower-moving or stopped vehicles.

Study Area: As depicted on Merger packet figures, the study area is shown on the attached map.

The Project Team met on April 10, 2019 and concurred on the above-mentioned project purpose and need and the study area for STIP Project U-3403B.

USACE

HPO

USFWS

NCDOT

NCDWR

FBRMPO

NCWRC