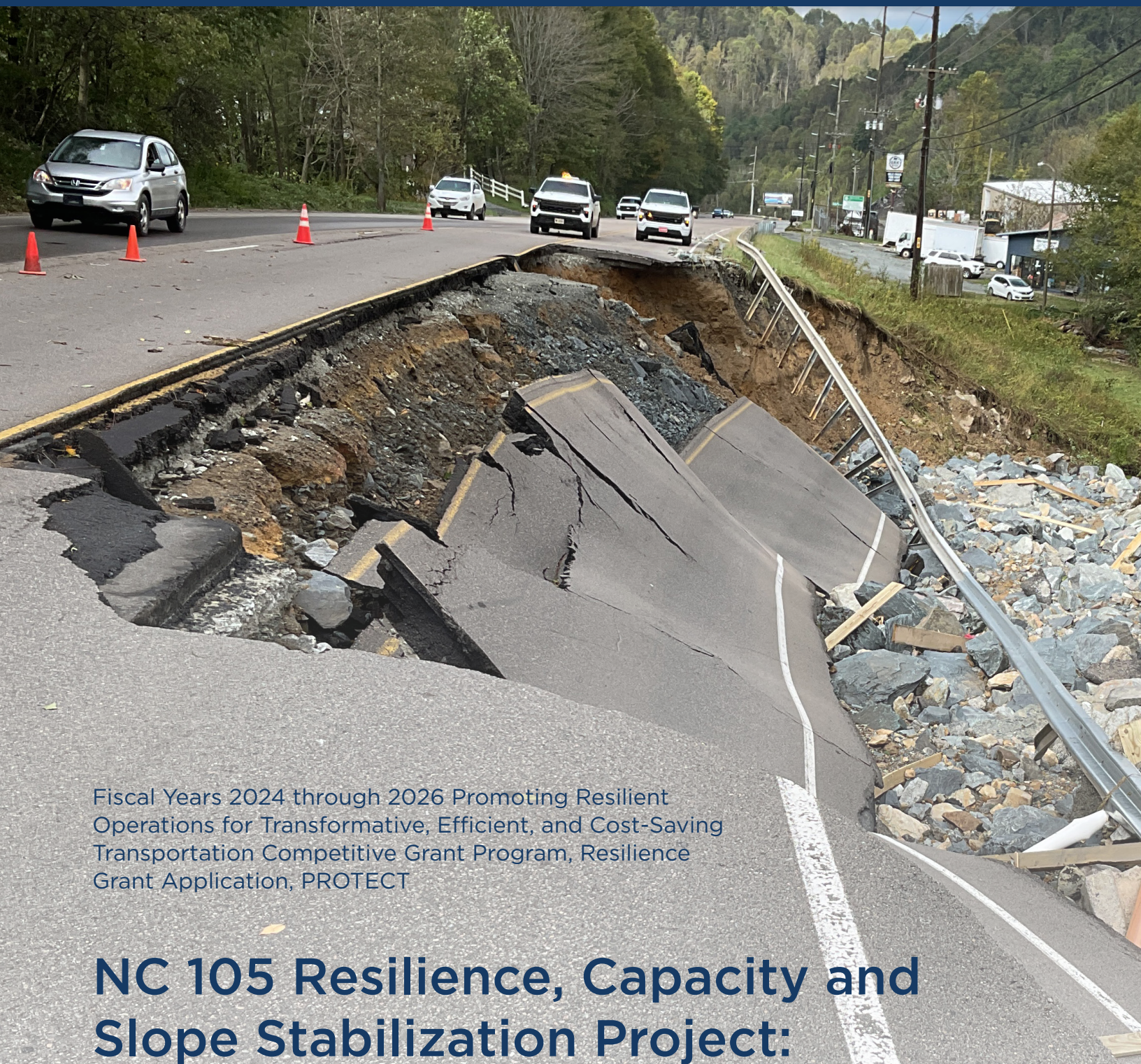


Fiscal Years 2024 through 2026 Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation Competitive Grant Program, Resilience Grant Application, PROTECT

NC 105 Resilience, Capacity and Slope Stabilization Project: Securing a Critical Mountain Corridor

NCDOT Priority #10

Applicant:
North Carolina Department of Transportation

Environmental Assessment

October 9, 2026

NC 105 Improvements
From Clark's Creek Road (SR 1136) to NC 105 Bypass (SR 1107) in Boone
Watauga County
State Project 37512.1.5
NHPP-0150(004)

TIP Project R-2566B

ADMINISTRATIVE ACTION

ENVIRONMENTAL ASSESSMENT

U.S. Department of Transportation
Federal Highway Administration
and
N.C. Department of Transportation
Division of Highways

Submitted pursuant to 42 U.S.C. 4332(2)C

APPROVED:

9/22/16 Beverly G. Robinson
Date

Beverly G. Robinson
Project Group Leader,
Project Development and Environmental Analysis Unit, NCDOT

9/23/16 for
Date

John F. Sullivan, III, P.E.
Division Administrator, FHWA

NC 105 Improvements
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NHPP-0150(004)

TIP Project R-2566B

ENVIRONMENTAL ASSESSMENT

Document Prepared by Kimley-Horn and Associates, Inc.
for the North Carolina Department of Transportation

Gene Tarascio 9/22/16

Gene Tarascio
Project Development Engineer,
Project Development and Environmental Analysis Unit, NCDOT

Teresa Gresham 9/22/16

Teresa Gresham, P.E.
Project Manager,
Kimley-Horn and Associates, Inc.

NORTH CAROLINA PROFESSIONAL SEAL 031550 ENGINEER TERESA R. GRESHAM

PROJECT COMMITMENTS

NC 105 Improvements

From Clark's Creek Road (SR 1136) to NC 105 Bypass (SR 1107) in Boone

Watauga County

WBS No. 37512.1.5
NHPP-0150(004)

TIP Project R-2566B

NCDOT Project Development Section

Habitat for the Virginia big-eared bat is within the study area. NCDOT will complete formal consultation with the US Fish and Wildlife Service (USFWS), and the results of this coordination will be included in the final environmental document for the project.

Habitat for the northern long-eared bat (NLEB) also is within the study area, and multiple occurrences of the NLEB have been recorded close to NC 105 within the study area. Formal consultation is underway with USFWS regarding NLEB.

Due to the high quality waters and trout waters throughout the project corridor, Design Standards in Sensitive Watersheds will be implemented.

Based on a recommendation from the North Carolina Wildlife Resources Commission (NCWRC), a moratorium will be placed on in-stream work and land disturbance to the 25-foot trout buffer from October 15th to April 15th for the entire corridor, to protect reproducing trout.

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Appendix B. NEPA/404 Merger Team Concurrence Forms
Appendix C. Stream and Wetland Tables
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Copies of the following documents:

Air Quality Analysis (January 2016)
Alternatives Development Report (June 2016)
Traffic Capacity Analysis Report (May 2015)
Community Characteristics Report (July 2010)
Community Impact Assessment (October 2015)
Geotechnical Report (June 2010)
Hazardous Materials Report (May 2010)
Historic Architectural Resources Survey Report (June 2013)
Hydraulic Technical Memorandum (June 2015)
Indirect Screening Report (January 2011)
Natural Resources Technical Report (September 2011)
Natural Resources Technical Report Addendum (January 2016)
Traffic Forecast (May 2012)
Traffic Noise Analysis (March 2016)
Traffic Safety Alternative Analysis (March 2016)
Traffic Safety Crash Analysis (May 2013)
Vissim Microsimulation Existing Conditions Analysis (November 2012)
Vissim Microsimulation Operations Analysis (February 2013)

may be attained by contacting: NCDOT PDEA, 1548 Mail Service Center, Raleigh, NC 27699-1548 or by calling (919) 707-6000.

SUMMARY

1. Type of Action

This Environmental Assessment (EA) has been prepared for the Federal Highway Administration (FHWA) in accordance with the Code of Federal Regulations (CFR) 23, Part 771 for the purpose of evaluating the potential impacts of a proposed transportation improvement project.

2. Description of Action

The North Carolina Department of Transportation (NCDOT) proposes to improve NC 105 from Clark's Creek Road (SR 1136) to NC 105 Bypass (SR 1107) in Boone, Watauga County. **Figure 1** shows the vicinity of the project.

This project is included in the current approved 2016-2025 NCDOT *State Transportation Improvement Program* (STIP) as Project R-2566B. The proposed improvements are anticipated to reduce congestion on NC 105, reduce rear-end and run-off road crashes, and improve bicycle facilities.

The project corridor is 5.5-miles long. No improvements are recommended on the 1-mile section between Clark's Creek Road and the southern intersection of NC 105 and Old Shull's Mill Road. The section between Old Shull's Mill Road and Broadstone Road will consist of three 12-foot lanes (one northbound, two southbound) with 6-foot wide paved shoulders on both sides. The section between Broadstone Road and NC 105 Bypass will consist of four 12-foot lanes, a 23-foot wide raised median and 6-foot wide paved shoulders.

In addition to widening, the two intersections where Old Shull's Mill Road tees into NC 105 have safety concerns. These are referenced as "Old Shull's Mill Road (north)" and "Old Shull's Mill Road (south)." To address these issues, the southern intersection (NC 105/Old Shull's Mill Road (south)) will be realigned, and the northern intersection (NC 105/Old Shull's Mill Road (north)) will be closed.

Replacement of the bridge that carries NC 105 over the Watauga River north of the Broadstone Road intersection is funded separately in the STIP as R-2566BA. Project R-2566BA is included in this environmental document.

The current funding for this project is federal National Highway Performance Program (NHPP) funds. Based on the current 2016-2025 STIP:

- Project R-2566B: Right of Way acquisition is currently scheduled to begin in Fiscal Year (FY) 2023, and construction is scheduled to begin in FY 2025.
- Project R-2566BA: Right of Way acquisition is scheduled for FY 2018, and construction is scheduled to begin in FY 2019.

3. Alternatives Considered

Preliminary alternatives considered for the proposed project included: No Build Alternative, Best-Fit Alternative, Four-Lane Median-Divided Alternative, New Location Alternative, Transportation System Management (TSM) Alternative, Transportation Demand Management (TDM) Alternative, and Mass Transit Alternative.

This project began in 2008 with consideration of improvements for a 14.6-mile section of NC 105, from Linville to Boone. After a new traffic forecast was prepared in 2012, the project limits were shortened to 5.5 miles, the purpose and need was revised, and alternatives were revisited.

Although the new 5.5-mile corridor was chosen because it had logical termini, the Merger team understood that improvements may not be needed for the entire 5.5-mile section. The congestion and safety needs vary along the corridor, and a single typical section may not address the issues appropriately. The team agreed to make the fewest improvements possible to meet the project purpose and need, which could result in a varying typical section or even making no improvements along a portion of the 5.5-mile corridor.

At an Interagency Merger Concurrence Point 1 & 2 meeting on August 13, 2014, two alternatives were selected to be carried forward for detailed study, a Best-Fit Build Alternative that would improve NC 105 from Clark's Creek Road to NC 105 Bypass using the fewest improvements that would result in meeting the purposes of the project and a No Build Alternative for comparison.

The team agreed not to make improvements in the southernmost 1-mile section where no additional congestion or safety needs were identified, to minimize potentially impacting adjacent properties twice (once as part of this project to widen shoulders, and a possible second impact if NC 105 will need to be widened as part of a future project).

4. Summary of Environmental Effects

Table S1 presents a summary of the effects of the detailed study alternatives.

Table S1. Impacts of Detailed Study Alternatives

Topic	Best-Fit Alternative	No Build Alternative
Railroad Crossings	0	0
Schools	0	0
Recreational Areas & Parks	0	0
Churches	0	0
Cemeteries	0	0
Major Utility Crossings	8*	0
Impacts to National Register Eligible Resources	0	0
Archaeological Sites	0	0
Federally-Listed Species within Study Area	6 No Effect, 2 Unresolved, 1 No Biological Conclusion Required**	No Effect
100-Year Floodplain Crossings	1	0
Prime and Unique Farmland	0	0
Residential Relocations	17	0
Business Relocations	11	0
Hazardous Material Sites	6	0
Wetland Impacts	0.2 acres	0
Stream Crossings	19	0
Stream Impacts	3,270 feet	0
Traffic Noise Impacts (# of receptors)	29	0
Water Supply Watershed Protected Areas	0	0
Wildlife Refuges & Game Lands	0	0
Section 4(f) Impacts (Historic)	0	0
Low Income Population Disproportionate and Adverse Impacts	0	0
Minority Population Disproportionate and Adverse Impacts	0	0
Total Cost Estimate (in millions)	$61,123,000	$0
Construction Cost	$42,500,000	$0
Utility Relocation Cost	$8,910,000	$0
Right of Way Cost	$9,713,000	$0

* Major power line crossings, in addition to smaller service drops.

** Formal consultation is underway for the Virginia big-eared bat and the Northern long-eared bat. A biological conclusion is not required for the bog turtle because it is threatened due to similarity of appearance.

5. Permits Required

It is anticipated that an Individual Section 404 permit will be required from the US Army Corps of Engineers (USACE). The USACE holds the final discretion as to what permit will be required to authorize project construction. If a Section 404 permit is required, a Section 401 Water Quality Certification from the NC Division of Water Resources (NCDWR) also will be needed.

6. Other Highway Actions

Adjacent to Project R-2566B, Project U-5603 proposes to upgrade NC 105 from NC 105 bypass to US 321, potentially including a superstreet design. Planning is currently underway; right of way acquisition is scheduled to begin in FY 2020, with construction beginning in FY 2022.

7. Coordination

As part of the public involvement process, two sets of public meetings were held. Two hundred forty-eight citizens signed in at the three August 2011 meetings, and 132 written comments were received. Eighty-three citizens signed in at the June 2015 meeting, and 17 written comments were received. All comments are summarized in Section VI.A.

A start of study letter was mailed to federal, state, and local agencies on December 28, 2009. At that time, the project limits were from US 221 in Linville to NC 105 Bypass in Boone (Sections A and B). When the project limits changed to only include R-2566B, a new scoping letter was not distributed because the agencies were regularly involved through the Merger process. The following state, federal, and local agencies were consulted regarding this project:

- Eastern Band of the Cherokee Indians
- High Country Council of Governments
- National Park Service
- NC Department of Administration – State Clearinghouse
- NC Department of Cultural Resources – Division of Archives and History
- NC Department of Cultural Resources – State Historic Preservation Office
- NC Department of Environment and Natural Resources
- NC Department of Public Instruction
- NC Division of Water Quality
- NC Wildlife Resources Commission
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Forest Service

8. Contact Information

Contacts for this project include:

Ms. Beverly G. Robinson
Project Group Leader
Project Development and Environmental Analysis Unit
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, NC 27699-1548
(919) 707-6041

Mr. John F. Sullivan, III, P.E.
Division Administrator
Federal Highway Administration
310 New Bern Avenue, Suite 410
Raleigh, NC 27601-1418
(919) 856-4346

I. DESCRIPTION OF PROPOSED ACTION

A. General Description

The North Carolina Department of Transportation (NCDOT) proposes to improve a 5.5-mile section of NC 105 from Clark's Creek Road (SR 1136) to NC 105 Bypass (SR 1107) in Boone, Watauga County. **Figure 1** shows the vicinity of the project.

In addition to widening, the two intersections where Old Shull's Mill Road tees into NC 105 have safety concerns due to the horizontal skew and limited sight distance at the intersections. These are referenced as "Old Shull's Mill Road (north)" and "Old Shull's Mill Road (south)." To address these issues, the southern intersection (NC 105/Old Shull's Mill Road (south)) will be realigned, and the northern intersection (NC 105/Old Shull's Mill Road (north)) will be closed. **Figures 3C** and **3D** show the proposed designs for both Old Shull's Mill Road intersections.

The Merger team agreed that Clark's Creek Road and NC 105 Bypass are the logical termini for the project. However, the agencies requested that the road only be widened where capacity improvements are needed. Based on the most recent traffic forecast, it was determined that no improvements are needed for the 1-mile section from Clark's Creek Road to Old Shull's Mill Road (south). No additional congestion or safety needs were identified in this section, and so no improvements will be made as part of this project. This will minimize potentially impacting adjacent properties twice (once as part of this project to widen shoulders, and a possible second impact if NC 105 will need to be widened as part of a future project).

Widening is only recommended for the 4.5-mile section from Old Shull's Mill Road (south) to NC 105 Bypass. The Merger agencies agreed that although the project limits will remain the 5.5-mile section from Clark's Creek Road to NC 105 Bypass, improvements are only proposed within the shorter 4.5-mile section. This is represented on the figures by "Begin Project" or "Begin Improvements."

B. Historical Resume and Project Status

This project is included in the current approved 2016-2025 NCDOT *State Transportation Improvement Program* (STIP) as Project R-2566B. Replacement of the bridge on NC 105 over the Watauga River is included separately as Project R-2566BA. The current funding for this project is federal National Highway Performance Program (NHPP) funds. Based on the 2016-2025 STIP:

- Project R-2566B: Right of Way acquisition is currently scheduled to begin in Fiscal Year (FY) 2023, and construction is scheduled to begin in FY 2025.
- Project R-2566BA: Right of Way acquisition is scheduled for FY 2018, and construction is scheduled to begin in FY 2019.

C. Cost Estimates

The 2016-2025 STIP includes $34.1 million for R-2566B and $1.5 million for R-2566BA. **Table 1** summarizes the estimated costs for the Project R-2566B Best-Fit Build Alternative.

Table 1. Cost Estimate

Best-Fit Alternative Item	Total Cost Estimate (in millions)
Construction	$42,500,000
Utility Relocation	$8,910,000
Right of Way	$9,713,000
Total	**$61,123,000**

II. PURPOSE AND NEED FOR PROJECT

At a meeting in August 2014, the Merger team agreed on the logical termini and purpose and need for Project R-2566B.

A. Purpose of Project

The Merger team agreed that this project has two primary purposes and one secondary purpose. According to AASHTO's Practitioner's Handbook (7th edition), a primary purpose is a "driver" of the project (i.e., it is a goal that reflects the fundamental reason why the project is being pursued). A secondary purpose is an additional purpose that is desirable, but not the core purpose of the project. A secondary purpose would not provide a basis for eliminating alternatives in the screening stage, but could be considered as a factor in screening and could also be considered in selecting a preferred alternative.

Congestion: A primary purpose of the project is to reduce congestion on NC 105 in order to achieve level of service (LOS) D or better in the design year (2040) during the average highest week day, and to achieve LOS E or better in the design year during the average highest weekend day.

NC 105 is used heavily by commuters during the week, but also is used by tourists and locals visiting recreational sites on the weekends. The congestion goals for this project were chosen to address the needs of commuters (LOS D during the week), but also to try to ensure that the road didn't experience failure during the busy tourist times (LOS E on the weekends).

Safety: Another primary purpose is to reduce rear-end and run-off-road crashes on NC 105. Alternatives were analyzed using Highway Safety Manual methodologies.

Bicycle Facilities: A secondary purpose is to improve bicycle facilities on NC 105 in areas where capacity or safety improvements are proposed.

B. Need for Project

Congestion: One segment on NC 105 between Foscoe and Boone currently operates at LOS E, and several segments and intersections are anticipated to operate at LOS E and F in the design year (2040).

Safety: Historically (2003 – 2014), crash types and rates on NC 105 between Foscoe and Boone have indicated a pattern of crashes related to terrain, geometry, congestion, and development. As traffic volumes have increased, crash rates have increased at a non-linear rate, with higher crash rates and frequencies associated with higher traffic volumes.

Bicycle Facilities: Existing travel lanes on NC 105 are 12 feet wide, and paved shoulders are 1 to 2 feet wide. The *High Country Bike Plan* (March 2014) recommends adding 4- to 6-foot paved shoulders on NC 105 between US 221 in Linville and NC 105 Bypass in Boone. Comments were received by local officials, members of bike clubs, and other citizens during the first public meeting held in August 2011 identifying a need for bike facilities on this corridor.

1. Description of Existing Conditions Related to Project Need

Functional Classification

NC 105 has a Federal Functional Classification of Other Principal Arterial throughout the project corridor.

Physical Description of Existing Facility

Roadway Cross-section

NC 105 is a 2-lane undivided facility from Clark's Creek Road for approximately 1.4 miles. A 0.4-mile long southbound passing lane is located between the two intersections of NC 105 with Old Shull's Mill Road. NC 105 then tapers back to 2 lanes undivided for the next 2.2 miles to Flintlock Campground. A northbound passing lane extends the final 1.5 miles from Flintlock Campground to NC 105 Bypass. Paved shoulders along the corridor are narrow (typically 1 to 2 feet wide), and clear zones do not meet current design standards in most areas.

Right of Way and Access Control

Existing right of way along NC 105 varies throughout the project corridor. Currently, there is no access control on NC 105 or within the project limits. In addition to intersecting roads and driveways, several businesses have pull-in parking areas directly on NC 105.

Speed Limit

The posted speed limit along NC 105 varies along the project corridor. At the south terminus, the speed limit is 35 mph through Foscoe. It changes to 45 mph for less than a mile to the Twin Rivers community. For the 2.7 miles between Twin Rivers and south of

Baird's Creek Road, the speed limit increases to 55 mph. It lowers again to 45 mph for the final 1.9 miles from Baird's Creek Road to NC 105 Bypass.

Intersections/Interchanges

There are two signalized intersections on NC 105 (at NC 105 Bypass and at Broadstone Road). Multiple side streets and driveways also have direct access to NC 105 throughout the entire corridor, several with turn lanes on NC 105.

Railroad Crossings

There are no railroad crossings within the project corridor.

Structures

There are six existing structures within the project corridor, summarized in **Table 2**.

Table 2. Existing Drainage Structures

Site #	Feature Name	Existing Structure	Location
1	Watauga River	Bridge No. 5: 263 linear feet Sufficiency Rating: 8 Structurally deficient	North of Broadstone Road intersection
2	UT to Laurel Fork	One 60-inch Structural Steel Pipe	North of Broadstone Road
4	UT to Laurel Fork	Two 54-inch Structural Steel Pipes	South of Baird's Creek Road
6	Laurel Fork	Culvert No. 337 Triple Reinforced Concrete Box Culvert	South of NC 105 Bypass
7a	UT to Laurel Fork	One 112-inch Structural Steel Pipe	Under Chandler Concrete Company
7b	UT to Laurel Fork	One 72-inch Structural Steel Pipe	Under New River Building Supply

Bicycle and Pedestrian Facilities/Greenways

No bicycle or pedestrian facilities are located within the project corridor.

Utilities

Aerial power lines are located throughout the project corridor. A major line is on one side of NC 105, switching between the north and south sides eight times. Smaller aerial power lines branch off to service adjacent properties.

School Bus Usage

Local school transportation officials indicated that there are seven routes (14 trips) per day that travel on NC 105 across the bridge near Broadstone Road, including two that carry special needs children.

Traffic Carrying Capacity

Projected traffic volumes are reported in the *Traffic Forecast for TIP Project R-2566* (prepared by NCDOT in May 2012). Anticipated segment and intersection levels of service LOS and delays are reported in the R-2566B *Traffic Capacity Analysis Report* (May 2015) and are summarized in **Tables 3 through 6**. A VISSIM microsimulation analysis was also conducted (R-2566B *VISSIM Microsimulation Existing Conditions Analysis*, November 2012 and R-2566B *VISSIM Microsimulation Operations Analysis*, February 2013).

Existing (2012) Traffic Volumes

The existing traffic volumes on NC 105 range between 10,800 vehicles per day (vpd) and 14,300 vpd within the project study area. Existing volumes are shown in **Figures 2A and 2B**.

Truck volume data were obtained from Vulcan Materials Company for the Vulcan Quarry driveway on NC 105. In February 2012, 732 trucks entered and exited the quarry. According to historical data, 12% of the daily volume is typically observed in the AM peak hour and 6% is typically observed in the PM peak hour, yielding 35 trucks entering and exiting daily.

Existing Levels of Service

The 2012 LOS along roadway segments for the existing geometry are summarized in **Table 3**.

Table 3. 2012 Existing Geometry Segment Levels of Service

Segment	Direction	Peak Hour LOS (Delay)			
		AM	PM	Friday PM	Weekend
Clark's Creek Road to Calloway Road	NB	D (78.1)	D (70.1)	D (73.0)	D (80.1)
	SB	D (70.1)	D (78.1)	D (80.1)	D (73.0)
Calloway Road to Twin Rivers Road	NB	D (75.4)	C (68.5)	D (71.6)	D (77.5)
	SB	D (70.1)	D (77.4)	D (79.2)	D (73.1)
Twin Rivers Road to Old Shull's Mill Road (south)	NB	D (79.0)	D (71.8)	D (75.5)	D (80.7)
	SB	D (71.0)	D (78.0)	D (79.8)	D (74.8)
Old Shull's Mill Road (south) to Old Shull's Mill Road (north)	NB	D (77.8)	D (70.9)	D (74.1)	D (80.7)
	SB	B (49.6)	B (54.4)	C (57.1)	B (51.8)
Old Shull's Mill Road (north) to Broadstone Road	NB	D (78.5)	D (71.4)	D (75.2)	D (80.2)
	SB	D (71.4)	D (78.5)	D (80.2)	D (75.2)
Broadstone Road to Baird's Creek Road	NB	***E (87.5)***	D (74.4)	D (78.8)	E (90.5)
	SB	D (74.4)	***E (87.5)***	E (90.5)	D (78.8)
Baird's Creek Road to NC 105 Bypass	NB	C (56.2)	B (47.4)	B (49.5)	C (58.6)
	SB	D (72.5)	D (84.9)	E (88.5)	D (75.7)

Note: Bold and italics denotes unacceptable levels of service: LOS E and F for AM and PM peak hours; LOS F for Friday PM and weekend peak hours.

The 2012 levels of service for intersections in the study area are summarized in **Table 4**. All of the intersections are T-intersections, and levels of service for the unsignalized intersections are for the minor street approach that has a stop condition.

Table 4. 2012 Intersection Levels of Service

Segment	Peak Hour LOS (Average Delay / Vehicle)			
	AM	PM	Friday PM	Weekend
NC 105 at Clark's Creek Road (Unsignalized)	C (21.4)	C (21.1)	D (26.9)	D (27.6)
NC 105 at Calloway Road (Unsignalized)	C (15.6)	C (15.1)	C (17.0)	C (17.8)
NC 105 at Twin Rivers Drive (Unsignalized)	C (15.2)	B (14.0)	C (15.4)	C (17.1)
NC 105 at Old Shull's Mill Road (south) (Unsignalized)	C (23.0)	C (23.7)	D (31.4)	D (29.9)
NC 105 at Old Shull's Mill Road (north) (Unsignalized)	B (14.5)	B (13.2)	B (14.5)	C (16.9)
NC 105 at Broadstone Road (Signalized)	D (39.5)	D (39.6)	E (70.9)	D (45.4)
NC 105 at Baird's Creek Road (Unsignalized)	C (19.3)	C (22.5)	D (31.2)	D (25.9)
NC 105 at Vulcan Quarry Driveway (Unsignalized)	***E (49.5)***	***E (40.0)***	***F (69.4)***	***F (74.0)***
NC 105 at NC 105 Bypass (Signalized)	B (18.1)	B (18.5)	C (24.4)	C (21.6)

Note: Bold and italics denotes unacceptable levels of service for the signalized intersections: LOS E and F for AM and PM peak hours; LOS F for Friday PM and weekend peak hours. It is typical for stop-controlled approaches intersecting major streets to experience long delays during peak hours while the majority of traffic moving through the intersection on the major street experiences little to no delay.

Future (2040) Traffic Volumes

Future traffic volumes, with the construction of Project R-2566B, are projected to range between 13,800 vpd and 18,300 vpd on NC 105 along the project corridor. Future volumes are shown in **Figures 2C and 2D**.

By 2040, annual truck volumes accessing the Vulcan Quarry are anticipated to return to levels observed in 2004 when approximately 70,000 trucks entered and exited the site. The total volume averaged over 12 months would result in a prediction of an increase to an average of 255 trucks per day. Based on input from Vulcan Materials Company, the truck volumes are expected to be split equally to the north toward Boone and to the south toward Foscoe.

Future Levels of Service

The 2040 LOS along roadway segments for the Build and No Build scenarios are summarized in **Table 5**.

Table 5. 2040 Segment Levels of Service

Condition	Direction	Peak Hour LOS (Delay)			
		Weekday AM	Weekday PM*	Friday PM	Weekend
Clark's Creek Road to Calloway Road					
2040 No Build	NB	D (82.0)	D (75.5)	D (78.8)	E (85.1)
	SB	D (75.5)	D (82.0)	E (85.1)	D (78.8)
Calloway Road to Twin Rivers Road					
2040 No Build	NB	D (81.0)	D (74.2)	D (78.2)	D (84.5)
	SB	D (75.5)	D (82.5)	E (85.7)	D (79.2)
Twin Rivers Road to Old Shull's Mill Road (south)					
2040 No Build	NB	D (84.3)	D (77.3)	D (80.5)	E (87.3)
	SB	D (76.7)	D (83.5)	E (86.6)	D (80.0)
Old Shull's Mill Road (south) to Old Shull's Mill Road (north)					
2040 No Build	NB	D (82.9)	D (75.9)	D (79.0)	E (85.9)
	SB	B (53.1)	C (58.7)	C (60.9)	C (55.9)
Old Shull's Mill Road (north) to Broadstone Road					
2040 No Build	NB	D (83.9)	D (77.0)	D (80.3)	D (87.0)
	SB	D (77.0)	D (83.9)	E (87.0)	D (80.3)
2040 Build	NB	D (83.9)	D (77.0)	D (80.3)	D (87.0)
	SB	A (7.3)	A (6.0)	A (6.9)	A (6.9)
Broadstone Road to Baird's Creek Road					
2040 No Build	NB	***E (91.5)***	D (81.6)	E (85.1)	E (94.0)
	SB	D (81.6)	***E (91.5)***	E (94.0)	E (85.1)
2040 Build	NB	A (11.0)	A (7.3)	A (8.4)	B (12.6)
	SB	A (7.3)	A (11.0)	B (12.6)	A (8.4)
Baird's Creek Road to NC 105 Bypass					
2040 No Build	NB	C (59.7)	B (52.4)	B (54.9)	C (67.5)
	SB	D (79.1)	***E (90.1)***	E (92.4)	D (82.9)
2040 Build	NB	B (12.1)	A (8.0)	A (9.2)	B (13.8)
	SB	A (8.0)	B (12.1)	B (13.8)	A (9.2)

Note: Bold and italics denotes unacceptable levels of service: LOS E and F for AM and PM peak hours; LOS F for Friday PM and weekend peak hours.

* Except Friday PM, which is reported separately.

The 2040 LOS at intersections in the study area for the Build and No Build scenarios are summarized in **Table 6**. All intersections have been designed so they meet the level of service goals (LOS D during the week and LOS E on Friday PM and weekends) except the intersections of NC 105 and Old Shull's Mill Road (south), and NC 105 and the Vulcan Quarry Driveway. Both of these intersections are unsignalized, and are expected to

operate at a LOS F in the future during every peak hour due to delays from the side streets (Old Shull's Mill Road and Vulcan Quarry driveway), even if the project is not constructed. It is typical for stop-controlled approaches intersecting major streets to experience long delays during peak hours while the majority of traffic moving through the intersection on the major street experiences little to no delay.

Table 6. 2040 Intersection Levels of Service

Condition	Peak Hour LOS (Average Delay / Vehicle)			
	Weekday AM	**Weekday PM***	**Friday PM**	**Weekend**
NC 105 at Clark's Creek Road (Unsignalized) – Eastbound Approach				
2040 No Build	D (34.1)	D (32.6)	E (49.2)	***F (53.8)***
2040 Build	D (34.1)	D (32.6)	E (49.2)	***F (53.8)***
NC 105 at Calloway Road (Unsignalized) – Westbound Approach				
2040 No Build	C (20.2)	C (19.1)	C (22.1)	D (25.2)
2040 Build	C (20.2)	C (19.1)	C (22.1)	D (25.2)
NC 105 at Twin Rivers Drive (Unsignalized) – Westbound Approach				
2040 No Build	C (19.3)	C (17.2)	C (23.9)	D (25.1)
2040 Build	C (19.3)	C (17.2)	C (23.9)	D (25.1)
NC 105 at Old Shull's Mill Road (south) (Unsignalized) – Southbound Approach				
2040 No Build	***E (38.9)***	***E (41.9)***	***F (72.1)***	***F (62.7)***
2040 Build*	D (34.6)	***E (39.7)***	E (46.5)	***F (59.2)***
NC 105 at Old Shull's Mill Road (north) (Unsignalized) – Southbound Approach				
2040 No Build	C (18.9)	C (15.9)	C (18.7)	C (23.1)
NC 105 at Broadstone Road (Signalized)				
2040 No Build	***F (109.3)***	***F (137.0)***	***F (221.0)***	***F (187.0)***
2040 Build	B (20.0)	B (14.4)	B (17.8)	C (22.2)
NC 105 at Baird's Creek Road (Unsignalized) – Northbound Approach				
2040 No Build	D (31.0)	***E (39.9)***	***F (105.0)***	***F (55.7)***
2040 Build	C (19.1)	C (20.9)	D (25.6)	D (25.2)
NC 105 at Vulcan Quarry Driveway (Unsignalized) – Southbound Approach				
2040 No Build	***F (354.8)***	***F (166.2)***	***F (736.9)***	***F (393.8)***
2040 Build*	***F (105.9)***	***E (45.8)***	***F (98.4)***	***F (115.1)***
NC 105 at NC 105 Bypass (Signalized)				
2040 No Build	C (26.5)	D (36.1)	E (56.9)	D (43.1)
2040 Build	C (28.6)	D (43.3)	E (75.1)	D (43.2)

Note: Bold and italics denotes unacceptable levels of service for the signalized intersections: LOS E and F for AM and PM peak hours; LOS F for Friday PM and weekend peak hours.

* Except Friday PM, which is reported separately.

Crash Data

Historic Crash Analysis

A crash analysis was prepared along NC 105 between Clark's Creek Road and NC 105 Bypass for the time periods of March 2003 to February 2008, and April 2009 to March 2014.

There were 43% more crashes and only 20% more vehicles during the 2003-2008 period compared to the 2009-2014 period. If traffic volumes increase in future years, as projected, it is reasonable to expect that crashes would increase by a similar rate as experienced in the past. The relationship between traffic volumes and traffic crashes is often not linear, particularly as a roadway approaches capacity.

The analysis included the time period of March 2003 to February 2008 to look at the crash experience of this roadway under those higher volumes. During that period, volumes were higher than 2012 volumes, but still less than the projected 2040 volumes. Crash rates are shown in **Tables 7 and 8**. The traffic volumes along this section of NC 105 have decreased in recent years, but are expected to increase again based on future projections.

Table 7. Crash Rate Comparison – March 2003 to February 2008

Category	Crashes	Crash Rate	Statewide Average Crash Rate*	Critical Crash Rate	Above Critical Crash Rate?	Percent Above or Below Statewide Average
Total	327	214.21	175.41	193.38	Yes	22%
Fatal	3	1.97	2.14	4.42	No	-8%
Non-Fatal Injury	125	81.88	66.16	77.32	Yes	24%
Night	60	39.30	60.38	71.06	No	-35%
Wet	59	38.65	26.41	33.58	Yes	46%

*Compared to Statewide Average Crash Rates for Rural NC Routes (2005 – 2007)

Table 8. Crash Rate Comparison – April 2009 to March 2014

Category	Crashes	Crash Rate	Statewide Average Crash Rate*	Critical Crash Rate	Above Critical Crash Rate?	Percent Above or Below Statewide Average
Total	228	179.47	194.56	215.32	No	-8%
Fatal	1	0.79	1.90	4.31	No	-58%
Non-Fatal Injury	63	49.59	60.43	72.17	No	-18%
Night	61	48.01	73.20	86.08	No	-34%
Wet	42	33.06	29.94	38.32	No	10%

*Compared to Statewide Average Crash Rates for Rural NC Routes (2005 – 2007)

Along the corridor, two locations have met the NC Highway Safety Improvement Program (HSIP) warrant criteria in the past five years:

- NC 105 in the vicinity of Old Tweetsie Road (between Broadstone Road and Baird's Creek Road) (2014)
- NC 105 in the vicinity of Flintlock Campground (between Baird's Creek Road and NC 105 Bypass) (2010, 2011, and 2013)

There are two primary types of crashes that are considered to be "correctable" since they can often be addressed through roadway improvement projects: rear end crashes and lane departure crashes. More information about each of these is shown in **Table 9**.

Table 9. Crash Type Information

Crash Type		Standard Corrective Measures
Rear end	Scattered	• Add capacity • Provide refuge for left turning vehicles out of through lanes • Provide adequate stopping sight distance
	Spot	• Add left turn lanes at specific intersections
Lane departure	Due to stopped vehicle	• Same methods used for rear end crashes
	General lane departure	• Provide adequate clear zones • Provide appropriate design elements

Several specific deficiencies on NC 105 contribute to crashes:

- The paved shoulder is narrow (1-2 feet). Improving the clear zones would give vehicles who depart the road an opportunity to recover or stop without crashing, and may reduce the number of rear end crashes by providing space to maneuver if drivers encounter a stopped vehicle unexpectedly.
- There are some horizontal and vertical curves that limit sight distance, both along NC 105 and at some intersections. This is particularly dangerous in areas with a high number of rear end crashes that involve vehicles stopped in the through lanes waiting to turn left.
- Scattered development and driveway frequency contributes to the pattern of rear end crashes. Along NC 105, many businesses have pull-in parking, multiple driveways, or open frontage that allows vehicles to enter into the parking lot along the entire property length.

<u>Predicted Crash Analysis</u>

Safety performance functions (SPFs) were used to make comparisons regarding the safety performance of the proposed alternative. SPFs are mathematical equations that relate site characteristics of a road segment or intersection to the number of predicted crashes

at that site. The following predictions are based on the year 2040 projected traffic volumes.

- No Build Alternative: The No Build Alternative was analyzed as a baseline for comparison to the build alternative. Crashes in the year 2040 are predicted to increase (as traffic volumes increase) by approximately 34% compared to the current number of crashes along this corridor (65 compared with an average of approximately 48).
- Best-Fit Build Alternative: Crashes are predicted to be 22% lower in 2040 compared with the No Build Alternative (51 crashes compared with 65 crashes).
    - The improvements planned at the NC 105/Old Shull's Mill Road intersections are expected to have substantial safety impacts at those specific locations.
    - The additional capacity, along with the access control measures, planned along the portion of the project from Broadstone Road to NC 105 Bypass also is expected to have positive safety benefits.

2. Transportation and Land Use Plans

State Transportation Improvement Program (STIP)

Adjacent to Project R-2566B, Project U-5603 proposes to upgrade 2.1 miles of NC 105 from NC 105 Bypass to US 321, potentially including a superstreet design.

Local Thoroughfare Plans

The *Watauga County Comprehensive Transportation Plan* (September 2013) notes that NCDOT plans to widen NC 105 to four lanes from Boone to the county line. The plan recommends four 12-foot lanes with a minimum 30-foot median, 2-foot inside paved shoulders, and 4- to 5-foot outside paved shoulders along this corridor.

The *High Country Bike Plan* (March 2014) recommends adding 4- to 6-foot paved shoulders on NC 105 between US 221 and NC 105 Bypass, with additional recommendations along NC 105 within Boone town limits. The justification for this recommendation is that this route connects Boone to Seven Devils, Grandfather Mountain State Park, and other communities. The route also connects residential and commercial areas within Boone.

The *Citizens' Plan for Watauga* (2009) consolidated previous plans and studies into a unifying document for Watauga County. The plan specifically identifies NC 105 as the "Grandfather Gateway" to Boone. The plan calls for an economic and aesthetic "gateway" for the entrance to Boone. Local planners have expressed a desire to further develop this "gateway" as part of a future, independent plan.

The *Watauga County Parks and Recreation Comprehensive System-wide Plan* (2010) focuses on park and recreational facility needs and recommendations for the 2010-2019

planning horizon. The plan includes the proposed Laurel Creek-Watauga River Trail, from Boone to the Tennessee state line, running parallel to NC 105 and along the Watauga River.

The Town of Boone adopted *Boone 2030* (2009), a land use plan that promotes smart growth principles and calls for two major gateways along US 421 and US 321, and secondary gateways along NC 105 and NC 194.

R-2566B ranks 2nd (total score: 79) in the *2016-2025 High Country Rural Planning Organization Priority Needs List*.

The northern portion of the proposed project is included in the limits of the *North Carolina Strategic Transportation Corridor Network* (Corridor E, US 421 W, and Corridor D, US 321/CSX).

3. System Linkage/Travel Time/Access Needs

Existing Road Network

Several major roads and driveways have direct access to NC 105 through the project corridor, as shown on **Figure 1**. These roads are used by locals, commuters living and working along the study corridor, and tourists visiting surrounding local attractions. Major roads along the study corridor are described briefly below.

- Clark's Creek Road connects to NC 194 in Valle Crucis.
- Shull's Mill Road connects to the Blue Ridge Parkway and Blowing Rock Highway (US 221).
- Broadstone Road connects to NC 194 north of Valle Crucis.
- Baird's Creek Road connects to NC 194 and US 321.
- NC 105 Bypass connects to US 321, US 421, and NC 194 while bypassing Boone and Appalachian State University's main campus.

Commuting Patterns

According to the Longitudinal Employer-Household Dynamics (LEHD) data, 70% of the 5,500 adults living in Boone commute out of town to work, and 88% of those working in Boone live outside the municipal boundaries. Approximately 30% (1,600) of people live and work in town. The average travel time to work for drivers living in Boone is approximately 16 minutes, which is less than the average travel time of North Carolina (25.4 minutes).

According to the LEHD data, approximately 9% of the people working outside of Boone are employed in Raleigh, 4% in Asheville, and 3% in Charlotte. This data does not specify the employment location of unincorporated areas, such as Avery and Caldwell Counties. Of the people commuting to Boone for work, approximately 2% each live in Foscoe, Charlotte, and Cove Creek. The majority of the people commuting to Boone for work (79%) live in unincorporated areas that could not be specified using the LEHD data.

C. Benefits of the Project

The primary benefits of the proposed project are reduced congestion as well as rear-end and run-off-road crashes on NC 105. A secondary benefit is improved bicycle facilities on NC 105.

III. ALTERNATIVES

A. Alternatives Considered

Four-Lane Median-Divided Alternative

Based on the 2005 traffic forecast, a four-lane median-divided section was initially proposed for the entire 14.6-mile corridor from Linville to Boone (R-2566, Sections A and B). The width of the proposed median would vary along the corridor depending on physical constraints, location of natural resources, speed limits, and required turn lanes. The primary typical section included a 23-foot grass median typical section, with a 4-foot concrete median typical section used to minimize impacts in some areas. Other variations that were considered included wider outside lanes for bicycles, sidewalks, and crosswalks; minimization measures such as expressway gutter and retaining walls; providing public access to the Watauga River, in particular where the river crosses under NC 105; and using wildlife crossings at various locations to avoid habitat fragmentation.

New Location

A New Location Alternative would relocate NC 105 off its current alignment to avoid areas that are constrained by geographic and natural features.

Transportation System Management (TSM)

TSM Alternative improvements typically involve low-cost, minor transportation improvements to increase the capacity of an existing facility, such as intersection improvements (turn lanes, pavement striping, signage, and lighting), signal improvements (timing optimization, equipment upgrades, and detector repair/ replacement), data collection to monitor system performance, and special events management strategies. Minor transportation improvements such as these will be considered in locations on NC 105 where widening to four lanes is not necessary to address congestion on roadway segments.

Transportation Demand Management (TDM)

TDM Alternative improvements typically involve strategies that increase the overall efficiency of the transportation system by changing traveler behavior, primarily through encouraging a shift from single occupant vehicle trips to non-single-occupant vehicle trips, or by shifting auto trips out of peak periods. This is done primarily by improving transportation options (biking, walking, transit, and ridesharing) and providing incentives

for drivers to use alternate modes, reduce driving, or shift their schedule. Ridesharing and incentives can provide a feasible option for some travelers.

Mass Transit

The AppalCART (Appalachian Campus Area Rapid Transit) system has 12 bus routes in Boone and 10 Dial-A-Ride van routes throughout Watauga County. None of the routes operate along NC 105. Passenger rail service is not available in the county. Expanded bus service and new rail alignments are anticipated to result in a small decrease in traffic volumes on NC 105 by providing additional options for commuters.

Best-Fit Build Alternative

The Best-Fit Alternative would improve NC 105 by using the fewest improvements (therefore minimizing impacts) that would result in meeting the purposes of the project. Improvements were evaluated against the goals in the primary purposes: to achieve LOS D or better in 2040 during the average highest weekday, to achieve LOS E or better in 2040 during the average highest weekend day, and to reduce rear-end and run-off-road crashes on NC 105. In addition, bicycle facilities will be improved on NC 105 in areas where capacity or safety improvements are proposed. The Best-Fit Alternative utilizes a combination of 4-lane, 3-lane, and 2-lane sections to meet the purposes of the project while using the fewest improvements.

No Build Alternative

The No Build alternative provides no substantial benefit to NC 105, with the exception of regular maintenance such as resurfacing, regrading shoulders, and maintaining ditches. The No Build alternative would not incur any right of way or construction costs, and it would not impact natural or human resources.

B. Alternatives Eliminated

Four-Lane Median-Divided Alternative

The results of the updated traffic forecast indicate that a four-lane facility is not needed for the entire length of the project. Therefore, the Four-Lane Median-Divided Alternative was eliminated from study.

New Location

Due to the geographic constraints of the mountain and the abundance of rivers and other natural resources in the area, it was determined that a new location alternative was not reasonable and feasible, nor would a new location alternative meet the purpose of the project. Therefore, the New Location Alternative was eliminated from study.

Transportation System Management (TSM)

The TSM Alternative as a stand-alone detailed study alternative would provide little, if any, noticeable improvement in congestion on NC 105 and would not meet the project purpose. Therefore, the TSM Alternative was eliminated from study.

Transportation Demand Management (TDM)

The ability of TDM programs to substantially reduce volumes on NC 105 is unlikely because it is used heavily by visitors and local residents to access ski resorts and other nearby recreational destinations. Bike and pedestrian facilities may be improved as part of this project, but those improvements alone would not provide any improvements in congestion on NC 105 and would not meet the project purpose. Therefore, the TDM Alternative was eliminated from study.

Mass Transit

Improved transit service, even if successful in attracting additional riders, would not be sufficient to reduce congestion on NC 105 and therefore would not meet the project purpose. Therefore, the Mass Transit Alternative was eliminated from study.

C. Alternatives Carried Forward

The Best-Fit Build Alternative uses the fewest improvements that would result in meeting the purpose of the project. Improvements considered included:

- Widen to four lanes with variable median where needed
- Add/extend turn lanes where needed
- Additional non-capacity safety improvements, such as:
    - Access control (median and/or consolidated driveways)
    - Left turn lanes
    - Extend passing/climbing sections
    - Improve clear zones and sight distance
- Pave wider shoulders to provide bicycle accommodations

The No Build Alternative was retained to compare the impacts and benefits of the Best-Fit Build Alternative. However, the No Build Alternative does not meet the project purpose. Without improvement, NC 105 is projected to operate at an unacceptable level of service in the design year, and the potential for crashes will continue to increase.

D. Alternative Recommended by NCDOT

The Best-Fit Build Alternative meets the purpose of the project and is recommended by NCDOT. The Best-Fit Alternative is described in the following section, and preliminary impacts are summarized in **Table 14**.

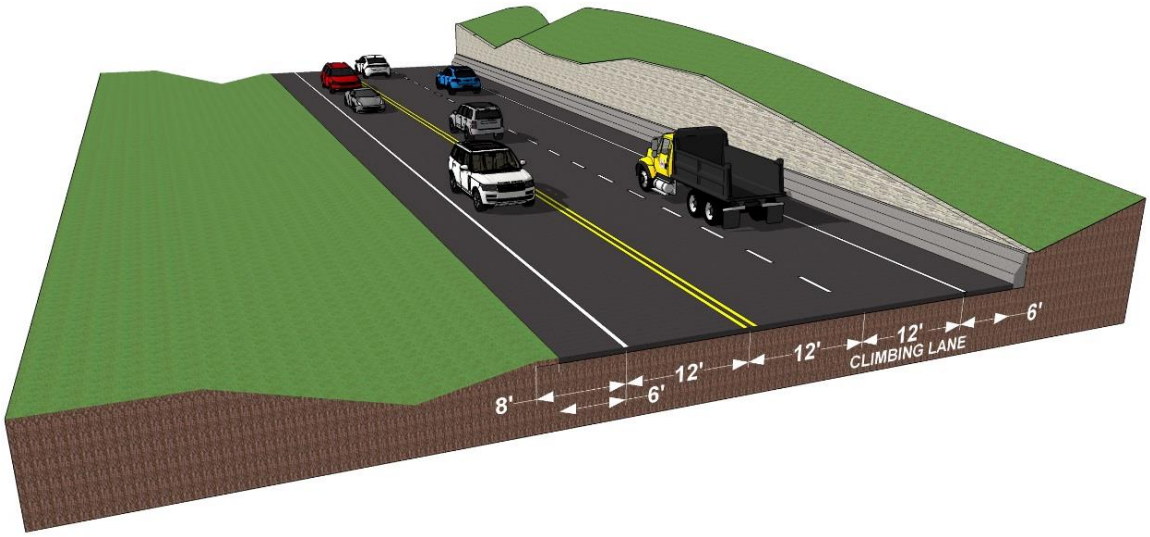
IV. PROPOSED IMPROVEMENTS

A. Roadway Cross-Section and Alignment

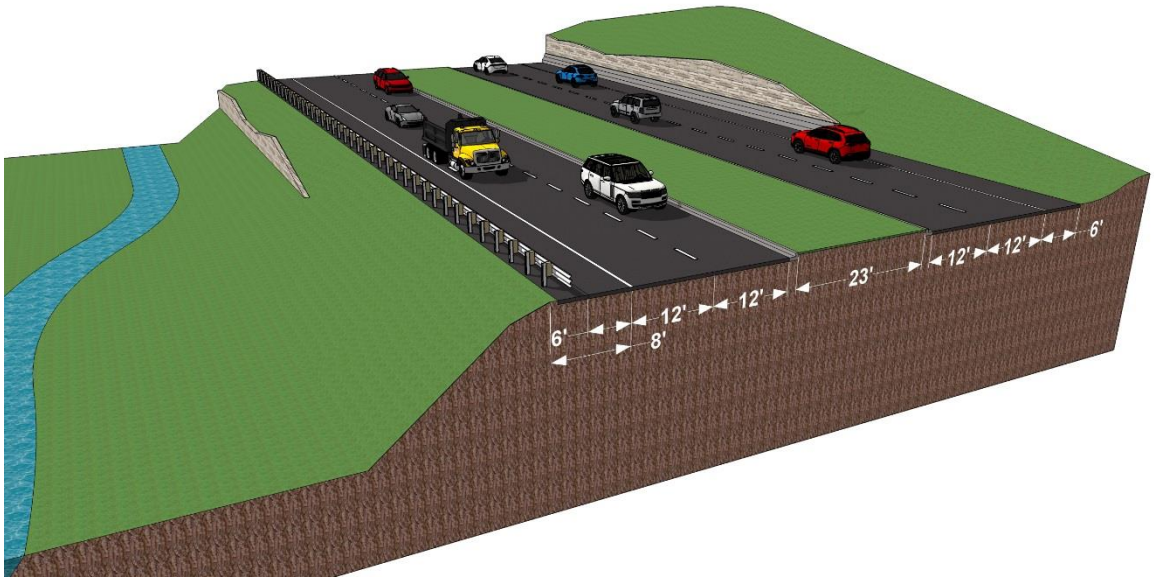
No improvements are recommended for 1 mile along the project corridor from Clark's Creek Road to Old Shull's Mill Road (south) because traffic is anticipated to operate at acceptable levels of service in the future design year (2040) on that section.

Improvements are recommended for approximately 4.5 miles from Old Shull's Mill Road (south) to NC 105 Bypass, based on future traffic operations and safety concerns.

1. The approximately 1.7-mile section between Old Shull's Mill Road (south) and Broadstone Road will consist of three 12-foot lanes (two southbound, one northbound) with 6-foot wide paved shoulders on both sides, shown below.



2. The approximately 2.8-mile section between Broadstone Road and NC 105 Bypass will consist of four 12-foot lanes, a 23-foot wide raised median, and 6-foot wide paved shoulders on both sides, shown below.



B. Right of Way and Access Control

The right of way width will vary, but generally will be wider than existing to accommodate the proposed widening. In the future, there will be partial access control along the NC 105 corridor.

Between Clark's Creek Road and Broadstone Road, all intersections and driveways will be full-movement. The NC 105 intersection with Old Shull's Mill Road (north) will be closed, and that traffic will be routed to the intersection of NC 105 with Old Shull's Mill Road (south). Some driveways may be consolidated where properties currently have more than one; these will be determined during final design.

Between Broadstone Road and NC 105 Bypass, a median will be added and full-movement intersections will be retained at Broadstone Road, Old Danner Road, Baird's Creek Road, the Flintlock Campground entrance, and NC 105 Bypass. Other driveways and intersecting roads will have right-in/right-out access.

C. Speed Limit

The posted speed limit along NC 105 will remain the same as the existing condition. At the south terminus, the speed limit is 35 mph through Foscoe. It changes to 45 mph for less than a mile to the Twin Rivers community. For the 2.7 miles between Twin Rivers and south of Baird's Creek Road, the speed limit increases to 55 mph. It lowers again to 45 mph for the final 1.9 miles from Baird's Creek Road to NC 105 Bypass.

D. Design Speed

The proposed design speeds along the project corridor are 5 mph over the posted speed limit.

E. Intersections/Interchanges

Between Broadstone Road and NC 105 Bypass, a median will be added and full-movement intersections will be retained at Broadstone Road, Old Danner Road, Baird's Creek Road, the Flintlock Campground entrance, and NC 105 Bypass. Other driveways and intersecting roads will have right-in/right-out access. **Figures 3A through 3F** show the proposed intersection improvements.

F. Railroad Crossings

There are no railroad crossings along the project corridor.

G. Structures

Four of the six existing major drainage structures within the study corridor are proposed to be replaced. These are summarized in **Table 10** and shown on **Figures 3A through 3F**. More detail is in the R-2566B *Hydraulic Technical Memorandum* (August 2015).

Table 10. Proposed Drainage Structures

Site #	Feature Name	Existing Structure	Proposed Structure
1	Watauga River	Bridge No. 5: 263 linear feet	New 260-foot long bridge 90-foot width
2	UT to Laurel Fork	One 60-inch Structural Steel Pipe	One 8-foot x 6-foot RCBC with sills and baffles
4	UT to Laurel Fork	Two 54-inch Structural Steel Pipes	One 8-foot x 6-foot RCBC with sills and baffles
6	Laurel Fork	Culvert No. 337 Triple Reinforced Concrete Box Culvert	Two 12-foot x 7-foot RCBCs with sills and baffles

The two structural steel pipes located on private property adjacent to the project corridor (Sites 7a and 7b) will be studied in more detail during the final design phase.

H. Bicycle and Pedestrian Facilities/Greenways

The proposed six-foot wide paved shoulders in the 4.5-mile section from Old Shull's Mill Road (south) to NC 105 Bypass will improve the infrastructure for bicyclists. The Merger team agreed to add these wider outside lanes, consistent with local plans, in the section where other improvements are proposed for congestion or safety purposes. The team agreed not to widen shoulders in the 1-mile section from Clark's Creek Road to Old Shull's Mill Road (south), where no additional congestion or safety improvements are proposed,

to minimize potentially impacting adjacent properties twice (once as part of this project to widen shoulders, and a possible second impact if NC 105 will need to be widened as part of a future project).

I. Utilities

The majority of the power line parallel with NC 105 will need to be relocated due to the widening. As part of this project, water and sewer lines under NC 105 will be shifted to outside of the travel lanes.

J. Landscaping

Landscaping will be designed as part of final design.

K. Noise Barriers

According to the R-2566B *Traffic Noise Analysis*, twenty-nine impacts to noise-sensitive receptors were predicted in the design year. No noise abatement is recommended along the project corridor. Noise study areas are shown on Figure 4.

L. Work Zone, Traffic Control and Construction Phasing

Traffic control and construction phasing plans will be developed during final design. It is anticipated that NC 105 will remain open to traffic during construction.

V. ENVIRONMENTAL CONDITIONS AND EFFECTS OF PROPOSED ACTION

A. Natural Resources

Natural resources were catalogued in the R-2566B *Natural Resources Technical Report* (September 2011) and the *Natural Resources Technical Report Addendum* (January 2016).

1. Biotic Resources

Terrestrial communities, terrestrial wildlife, aquatic communities, and invasive species were documented in the September 2011 NRTR. Natural communities are shown on Figure 5. Details about these communities are included by reference.

Terrestrial communities in the study area may be impacted by project construction as a result of grading and paving of portions of the study area.

2. Waters of the United States

Streams, Rivers, Ponds

Water resources in the study area are a part of the Watauga River basin [U.S. Geological Survey (USGS) Hydrologic Units 06010103]. Forty four streams and two ponds were identified in the study area. A summary of the water resources is in Table 11, and details are provided in Appendix C. Figures showing individual water resources and physical characteristics of each water resource are in the NRTR Addendum (January 2016).

Table 11. Streams in the Study Area

Stream Name	NCDWR Index Number	Best Usage Classification	Length Within the Study Area (ft)
Watauga River and 20 associated UTs	8-(1)	B; Tr; HQW	2,791
UT to Watauga River	8-6	C; Tr	293
Big Branch	8-9	C	22
Laurel Fork and 21 associated UTs	8-10	C; Tr	3,260
2 UTs to Laurel Fork	8-10-2	C	402
Total			**6,768**

The Watauga River is identified as High Quality Waters (HQW) from its source throughout the study area. In addition, the North Carolina Wildlife Resources Commission (NCWRC) has identified the Watauga River and Laurel Fork as a trout water. Boone Fork (Price Lake) is identified as an Outstanding Resource Water (ORW) located within one mile of the study area and drains from the south toward the Watauga River. There are no anadromous fish waters or Primary Nursery Areas (PNA).

All streams are perennial except one intermittent UT to the Watauga River . The perennial and intermittent streams will require compensatory mitigation. All jurisdictional streams in the study area have been designated as cold water streams for the purposes of stream mitigation.

Wetlands

Twenty seven jurisdictional wetlands were identified within the study area. A list of the wetlands located in the study area is shown in Table 12, and details are provided in Appendix C. Figures showing individual wetlands and characteristics of each are in the NRTR Addendum. All wetlands in the study area are within the Catawba River and Watauga River basins [U.S. Geological Survey (USGS) Hydrologic Units 03050101 and 06010103].

Table 12. Wetlands in the Study Area

NCWAM Classification	Hydrologic Classification	Area (ac.)
Headwater Forest	Riparian	1.095
Small-Basin Wetland	Riparian	0.02
Small-Basin Wetland	Non-Riparian	0.004
Bottomland Hardwood Forest	Riparian	0.19
Total		**1.31**

Summary of Anticipated Effects

Based on the preliminary design for the Best-Fit Alternative (with a 25-foot buffer around the proposed slope stakes), this project is anticipated to impact approximately 0.2 acres of wetlands, cross 19 streams, and impact approximately 3,270 linear feet of stream.

Avoidance, Minimization, and Mitigation

The Best-Fit Alternative was designed to avoid or minimize impacts to the Watauga River and Laurel Fork. Requirements for mitigation will be determined through coordination with USACE and NCDWR.

3. Rare and Protected Species

Endangered Species Act Protected Species

As of July 24, 2015 the United States Fish and Wildlife (USFWS) lists nine federally protected species for Watauga County (**Table 13**). Habitat requirements for each species are based on the current best available information from referenced literature and/or USFWS. A brief description of habitat for each species is below; more detail is in the NRTR Addendum.

Table 13. Federally Protected Species Listed for Watauga County

Scientific Name	Common Name	Federal Status	Habitat Present	Biological Conclusion
Glyptemys muhlenbergii	Bog turtle	T(S/A)	No	Not required
Glaucomys sabrinus coloratus	Carolina northern flying squirrel	E	No	No Effect
Myotis septenrionalis	Northern long-eared bat	T	Yes	Unresolved
Corynorhinus townsendii virginianus	Virginia big-eared bat	E	Yes	Unresolved
Microhexura montivaga	Spruce-fir moss spider	E	No	No Effect
Solidago spithamaea	Blue Ridge goldenrod	T	No	No Effect
Liatris helleri	Heller's blazing star	T	Yes	No Effect
Hedyotis purpurea var. montana	Roan mountain bluet	E	No	No Effect
Geum radiatum	Spreading avens	E	No	No Effect

E – Endangered
T – Threatened
T(S/A) – Threatened due to similarity of appearance

Bog turtle

USFWS optimal survey window: April 1 – October 1 (visual surveys); April 1-June 15 (optimal for breeding/nesting); May 1-June 30 (trapping surveys)

Habitat Description: Bog turtle habitat consists of open, groundwater supplied (springfed), graminoid dominated wetlands along riparian corridors or on seepage slopes. These habitats are designated as mountain bogs by the NCNHP, but they are technically poor, moderate, or rich fens that may be associated with wet pastures and old drainage ditches that have saturated muddy substrates with open canopies. Potential habitats may be found in western Piedmont and Mountain counties from 700 to 4500 feet elevation in North Carolina.

Biological Conclusion: Not Required

Species listed as threatened due to similarity of appearance do not require Section 7 consultation with the USFWS. Suitable habitat is not present within the study area. There are no fens within the study area. A review of NCNHP records, updated May 1, 2015, indicates no known bog turtle occurrence within 1.0 mile of the study area.

Carolina northern flying squirrel

USFWS Recommended Survey Window: May -October; coldest days in coldest winter months (nest box surveys)

Habitat Description: There are several isolated populations of the Carolina Northern flying squirrel in the mountains of North Carolina. Mature forests with a thick evergreen understory and numerous snags are most preferable. In winter, squirrels inhabit tree cavities in older hardwoods, particularly yellow birch.

Biological Conclusion: No Effect

This project will have No Effect on the Carolina northern flying squirrel. Elevations within the study area range from 3,000 to 3,400 feet mean sea level, below the known elevations for the species. A review of the NHP database, updated May 1, 2015, showed no known occurrence of the species within one mile of the study area.

Northern long-eared bat

USFWS Recommended Survey Window: June 1 – August 15

Habitat Description: In North Carolina, the Northern long-eared bat (NLEB) occurs in the mountains, with scattered records in the Piedmont and coastal plain. In western North Carolina, NLEB spend winter hibernating in caves and mines. Since this species is not known to be a long-distance migrant, and caves and subterranean mines are extremely rare in eastern North Carolina, it is uncertain whether or where NLEB hibernate in eastern North Carolina. During the summer, NLEB roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees (typically ≥3 inches dbh). Males and non-reproductive females may also roost in cooler places, like caves and mines. This bat also has been found, rarely, roosting in structures like barns and sheds, under eaves of buildings, behind window shutters, in bridges, and in bat houses. Foraging occurs on forested hillsides and ridges, and occasionally over forest clearings, over water, and along tree-lined corridors. Mature forests may be an important habitat type for foraging.

Biological Conclusion: Unresolved

Multiple occurrences of the NLEB have been recorded close to NC 105 within the study area. Formal consultation is underway with USFWS regarding NLEB.

Virginia big-eared bat

USFWS Recommended Survey Window: May 15-August 15 (summer); January 15-February 15 (winter)

Habitat Description: Virginia big-eared bat has been recorded in the Appalachian mountains of North Carolina. They occupy caves in the summer and winter. Hibernating colonies are typically located in deep cave passageways that have

stable temperatures and air movement, the temperature in these hibernacula may be lower than that tolerated by other bats. Roost sites are generally located in mines or caves in oak-hickory forests. They will use alternate roost sites but there is no record of long migrations. They are nocturnal and leave their roost to forage on moths, beetles, and other insects. This species feeds mostly over open pasture, corn, and alfalfa fields, and around the crowns of trees.

Biological Conclusion: Unresolved

Formal consultation is underway with the USFWS in regards to the Virginia big-eared bat. A research project has been conducted in the vicinity of NC 105. Findings from this report will be used for the USFWS consultation and the subsequent biological assessment.

Spruce-fir moss spider

USFWS Recommended Survey Window: May-August

Habitat Description: This species is known only from spruce-fir forests in the Appalachian mountains of North Carolina and Tennessee. The spruce-fir moss spider occurs in well-drained moss and liverwort mats growing on rocks or boulders.

Biological Conclusion: No Effect

Red spruce is not found within the study area in significant numbers to constitute a forest. Elevations within the study area do not exceed 3,400 feet, well below the elevation of 5,000 feet that known occurrence of the species have been documented. A review of the NHP database, updated May 1, 2015 shows no known occurrences of spruce-fir moss spider within one mile of the study area.

Blue Ridge goldenrod

USFWS Optimal Survey Window: July-September

Habitat Description: Blue Ridge goldenrod, endemic to the Appalachian Mountains of North Carolina and Tennessee, occurs in the High Elevation Rocky Summit natural community generally at or above elevations of 4,600 feet above mean sea level along cliffs, ledges, balds, and dry rock crevices of granite outcrops of the higher mountain peaks.

Biological Conclusion: No Effect

There are no rock outcrops, cliffs or balds occurring in full sunlight within the study area. However, elevations in the study area do not exceed 3,400 feet; well below the general elevation for Blue Ridge goldenrod. A review of the NHP database, updated May 1, 2015 indicated no known occurrences of Blue Ridge goldenrod within one mile of the study area.

Heller's blazing star

USFWS Optimal Survey Window: July-September

Habitat Description: Heller's blazing star, endemic to the Blue Ridge Mountains of North Carolina, occurs in the High Elevation Rocky Summit natural community on high elevation ledges, rock outcrops, cliffs, and balds at elevations of 3,500–5,999 feet above mean sea level.

Biological Conclusion: No Effect

Habitat for Heller's blazing star does not exist within the study area. Elevations within the study area are below the known elevations for the species. There are no rock outcrops, cliffs or balds occurring in full sunlight within the study area. A review of the NHP database, updated May 1, 2015 indicates no known occurrences of Heller's blazing star within one mile of the study area.

Roan Mountain bluet

USFWS Optimal Survey Window: June-July

Habitat Description: Roan Mountain bluet occurs on thin, gravelly talus slopes of grassy balds, cliff ledges, shallow soils in crevices of rock outcrops, and steep slopes with full sun at the summits of high elevations peaks of the southern Blue Ridge Mountains.

Biological Conclusion: No Effect

Cliff ledges, rock outcrops and steep slopes are found along the NC 105 corridor. However, elevations in the study area are generally well below the elevations preferred by Roan Mountain bluet. In the study area elevations do not exceed 3,400 feet above sea level. A review of the NHP database, updated May 1, 2015 shows no known occurrence of Roan Mountain bluet within one mile of the study area.

Spreading avens

USFWS Optimal Survey Window: June-September

Habitat Description: Spreading avens occurs in areas exposed to full sun on high-elevation cliffs, outcrops, and bases of steep talus slopes. This perennial herb also occurs in thin, gravelly soils of grassy balds near summit outcrops.

Biological Conclusion: No Effect

Cliff ledges, rock outcrops and steep slopes are found in areas throughout the study area. However, elevations in the study area are generally below the elevations preferred by spreading avens. The highest elevations on the project are approximately 4,300 feet above sea level. Rockfaces in these areas are well shaded and do not have much exposure to the sun. A review of the NHP database, updated May 1, 2015 shows no known occurrence of spreading avens within one mile of the study area.

Endangered Species Act Candidate Species

As of July 24, 2015 the USFWS lists no Candidate species for Watauga County.

4. Soils

Soil types within the study area were documented in the September 2011 NRTR. A subsurface investigation will be performed prior to construction to determine the soil and rock classification and the engineering properties pertinent to the proposed design.

B. Cultural Resources

This project is subject to compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and implemented by the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106, codified as 36 CFR Part 800. Section 106 requires Federal agencies to take into account the effect of their undertakings (federally-funded, licensed, or permitted) on properties included in or eligible for inclusion in the National Register of Historic Places (NRHP) and to afford the Advisory Council a reasonable opportunity to comment on such undertakings.

1. Historic Architectural Resources

As detailed in the *Historic Architectural Resources Survey Report* (June 2013), an initial architecture survey was performed in September 2012, which identified 31 properties within Section B with buildings that were erected prior to 1963. The North Carolina State Historic Preservation Office (SHPO) requested further information on three individual properties and two potential districts that required more detailed evaluations in order to determine eligibility. Two of the evaluated properties were recommended eligible for listing in the NHRP: the Prout-Atkins House and Ed & Falah Hollars House, shown on **Figures 3A** and **3E**, as well as on **Figure 6**.

2. Archaeological Resources

An archaeological survey is currently being completed by NCDOT.

C. Section 4(f) Resources

Section 4(f) of the US Department of Transportation (USDOT) Act of 1966, as amended, specifies that publicly owned land from a public park, recreation area, wildlife and waterfowl refuge, and all historic sites of national, state, and local significance may be used for federal projects only if there is no feasible and prudent alternative to the use of such land and the project includes all possible planning to minimize harm to 4(f) lands resulting from such use.

The Prout-Atkins House and Ed & Falah Hollars House are Section 4(f) properties, but since the Best-Fit Alternative will not require any right-of-way from these properties, no Section 4(f) impacts are anticipated for these resources. A Historic Architecture and Landscapes

Assessment of Effects meeting was held on June 7, 2016. A determination of 'No Effect' to historic properties was concluded because no proposed work is within either of the property boundaries. The Effects form is in Appendix D.

D. Section 6(f) Resources

Section 6(f) of the Land and Water Conservation Fund Act of 1965 stipulates that property acquired or developed with the assistance of the Land and Water Conservation Fund may not be converted to a use other than public recreation unless suitable replacement property is provided. No properties acquired or developed with the assistance of the Land and Water Conservation Fund exist in the project area.

E. Farmland

The Farmland Protection Policy Act (FPPA) requires all federal agencies or their representatives to consider the impact of land acquisition and construction projects on prime and important farmland soils and to minimize the impact of Federal programs, or projects completed with the assistance of a Federal agency, have on the unnecessary and irreversible conversion of farmland (directly or indirectly) to non-agricultural uses. North Carolina Executive Order Number 96 requires all state agencies to consider the impact of land acquisition and construction projects on prime farmland soils and to ensure that actions of State agencies under the jurisdiction of the Governor will minimize the loss of prime agricultural and forest lands, as designated by the US Natural Resources Conservation Service (NRCS).

A preliminary screening of farmland conversion impacts was completed as part of the R-2566B *Community Impact Assessment* (October 2015). Since the preliminary screening resulted in a total score of 55 out of 160 points for the best fit alternative, which is below the 60-point threshold established by NRCS, no additional action is needed.

F. Social Effects

The R-2566B *Community Impact Assessment* (October 2015) details the social effect of the project, which are summarized below.

1. Neighborhoods/Communities

No cohesive neighborhoods/communities are located adjacent to the study corridor. This project is not expected to affect community cohesion and stability.

2. Relocation of Residences and Businesses

The Best-Fit Alternative will require new right of way and would impact some residential and business properties along NC 105. Based on the preliminary designs, 17 residential relocations and 11 business relocations are anticipated for the Best-Fit Alternative.

The relocation report is in **Appendix A**.

3. Environmental Justice

Census data indicates a notable presence of low-income populations meeting the criteria for Environmental Justice within the vicinity of the project. Low-income communities were observed within the Direct Community Impact Area (DCIA) during the field visit.

Census data does not indicate a notable presence of minority populations meeting the criteria for Environmental Justice within the vicinity of the project.

While low-income populations are present in the vicinity of the project, no notably adverse community impacts are anticipated. Therefore, impacts to minority and low income populations do not appear to be disproportionately high and adverse. Benefits and burdens resulting from the project are anticipated to be equitably distributed throughout the community.

4. Recreational Facilities

The Flintlock Campground is located north of Baird's Creek Road and attracts visitors to the RV park, campgrounds, and cabins primarily between early April and early November. Based on data provided by the campground, there are 104 sites on the campground, including 61 sites for large recreational vehicles up to 42 feet in length. Vehicles as long as 50 feet (fifth-wheel trailers including the prime mover) utilize the driveway. Traffic generated on peak days averages 380 trips (190 entering and 190 exiting), on average split 72% to or from Boone and 28% to or from Linville.

The Hound Ears Club is a gated community with a private golf course located adjacent to the project corridor.

The Best-Fit Alternative will not affect any recreational facilities.

5. Other Public Facilities and Services

School officials expressed concern regarding the project and the impact construction would have on school bus operation. Traffic is anticipated to be maintained on NC 105 during construction; NCDOT will coordinate with the schools prior to construction to provide information about construction phasing and schedule.

G. Economic Effects

As listed in Section V.F.2, the Best-Fit Alternative would relocate 11 businesses. The addition of a median between Broadstone Road and NC 105 Bypass would change access to businesses in that section from full-movement to right-in/right-out.

This project is not anticipated to create a new transportation or land use node. Continued growth is expected along the NC 105 corridor with or without the project.

H. Land Use

1. Existing Land Use and Zoning

Current zoning codes and ordinances support commercial and residential development along NC 105. Land use policies in Watauga County are implemented through various ordinances, zoning, and permit approvals.

Watauga County has developed several additional ordinances that assist with local planning. These include: Erosion Control Ordinance, High Impact Land Uses, Mountain Ridge Protection Act, and a Watershed Protection Ordinance for Pond Creek, Winkler's Creek, Howard's Creek, Norris Branch, Flat Top Branch, and South Fork New River.

While Watauga County does not have an Ordinance to regulate steep slopes, the *Citizens' Plan for Watauga* recognizes the hazards of developing slopes greater than 25-30%, and thus generally discourages any intensive development and requires a comprehensive planning and approval process. These measures do not however, prevent non-residential development on any slopes greater than 25-30%.

Watauga's official zoning map indicates that along NC 105, a majority of fronting parcels and additional parcels within the project study area are to be zoned Rural, Highway, or are not zoned at all.

2. Future Land Use

The *Citizens' Plan for Watauga* (2009) consolidated previous plans and studies into a unifying document for Watauga County. The plan specifically identifies NC 105 as the "Grandfather Gateway" to Boone. The plan calls for an economic and aesthetic "gateway" for the entrance to Boone. Local planners have expressed a desire to further develop this "gateway" as part of a future, independent plan.

3. Project Compatibility with Local Plans

The *Watauga County Comprehensive Transportation Plan* (September 2013) states that NCDOT plans to widen NC 105 to four lanes from Boone to the Watauga/Avery county line. The project originally included a four-lane design throughout the entire corridor; however, updated traffic forecasts determined that a four-lane section would only be needed north of Broadstone Road.

The proposed project is consistent with local plans and does not require a change to the current STIP. In 2012, the project was split into two sections (A and B) because the updated traffic forecast did not project sufficient future traffic volumes between Linville and Foscoe to justify improvements at this time. The proposed design of R-2566B does not preclude future action on R-2566A.

I. Indirect and Cumulative Effects

An *Indirect Screening Report* was completed in January 2011 for the combined R-2566 Sections A and B. Indirect and cumulative effects were considered for the time period through 2030. This is based on relevant data, project information, and local planning efforts regarding land use and transportation activities. Potential impacts for Section B are summarized below.

1. Indirect Effects

Indirect effects are characterized by those changes in land use related to the proposed project but not directly caused by the project. Construction of this project is expected to have little or no indirect effect on land use decisions in the project vicinity.

The proposed project consists of the widening of existing NC 105, which currently has some segments over capacity in terms of both year-round and seasonal traffic volumes. The indirect economic impacts being experienced within the study area consists of a growing tourism sector and second home market that is expected to continue to support increased residential and commercial development. Increased residential and commercial development is expected to be accompanied with a modest growth in year-round population levels and a notable growth in seasonal population levels through 2030. Due to the topographic constraints associated with the mountainous terrain, much of the future development is anticipated to be in-fill development that will increase build-out conditions, particularly along NC 105.

2. Cumulative Effects

Cumulative effects represent the total anticipated direct and indirect effects resulting from the project, in addition to those effects by other projects in the vicinity.

The proposed project is located in western North Carolina, known for both its regional and national attractions. The project lies within the Watauga River Basin. The Watauga River is identified as High Quality Waters (HQW) from its source throughout the study area. In addition, the North Carolina Wildlife Resources Commission (NCWRC) has identified the Watauga River and Laurel Fork as trout waters. Boone Fork (Price Lake) is identified as an Outstanding Resource Water (ORW) located within one mile of the study area and drains from the south toward the Watauga River. The Watauga River from its source to Cove Creek is listed on the North Carolina 2014 Final 303(d) list of impaired waters for turbidity.

The rate of population increase within the study area between 1990 and 2000 exceeded the rate of population increase within Watauga County and the state for that same timeframe. The reason for the increases in the population stems from the areas popularity for first and second (seasonal) homebuyers. Planners estimate that the seasonal population may increase the year-round population as much as 25 to 30%.

NC 105 is important to the regional transportation network and also provides local access to services and resources for communities located nearby. Nearby roadway projects will increase access and roadway capacity.

The amount of impervious surface associated with NC 105 which parallels trout waters of the Watauga River through most of the project limits would more than double with the construction of the project. Yet, future development within the area is anticipated to remain relatively modest due to the topographic constrains of this mountainous area. Future growth is expected to mainly consist of in-fill development which is expected to add to the total amount of impervious surfaces near the Watauga River. Based on the amount of land along NC 105 with the potential for in-fill development or redevelopment near the banks of the Watauga River, the proposed project will notably contribute to cumulative impacts to water quality in the absence of stormwater management regulations requiring Best Management Practices.

Habitat fragmentation is anticipated to continue correspondingly with land use change. The proposed 4-lane improvement with a median divided typical section is likely to require much more disturbance of raw land due to the mountainous terrain and the need for extensive cut and fill sections to meet current design standards for safety. The proposed project and its associated development are anticipated to affect terrestrial communities to a greater degree than what would be expected to occur without the construction of the proposed project. Past and future actions including residential and non-residential development and infrastructure improvements have the potential to cumulatively alter or fragment natural habitats and wildlife regime. The potential for the degradation of water quality also exists through an increase in the overall amount of impervious surfaces and erosion and stream sedimentation in the absence of stormwater management regulations requiring Best Management Practices. Yet, any direct natural environmental impacts by NCDOT projects would be addressed by avoidance and minimization, consistent with programmatic agreements with the natural resource agencies during the Merger and Permitting processes.

Local and regional water quality initiatives include Watauga County's Erosion Control Ordinance that exceeds those required by the NC Sedimentation Pollution Control Act and a local Sediment and Erosion Control program administered through the Town of Boone.

State water quality initiatives include the North Carolina Ecosystem Enhancement Program (NCEEP) which is responsible for providing ecologically effective compensatory mitigation in advance of permitted impacts associated with road projects and other development activities. The Clean Water Management Trust Fund offers grants for project with the broadly focused areas of restoring and protecting state surface waters and establishing a network of riparian buffers and greenways.

J. Floodplain/Floodway Impacts

Streams in the project study area are located in Federal Emergency Management Agency (FEMA) regulated floodways. Therefore, a no-rise hydraulics study or a Conditional Letter of Map Revision (CLOMR) will be required for encroachments. This will occur during the final design process.

K. Traffic Noise Analysis

1. Introduction

The R-2566B *Traffic Noise Analysis* is consistent with Title 23 Code of Federal Regulations Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise* (Title 23 CFR 772) and the NCDOT *Traffic Noise Abatement Policy* (July 13, 2011). In accordance with these policies and procedures, Type I highway projects must be analyzed for predicted traffic noise impacts. In general, Type I projects are proposed Federal or Federal-aid highway projects for construction of a highway or interchange on new location, improvements of an existing highway that substantially changes the horizontal or vertical alignment or increases the vehicle capacity, or projects that involve new construction or substantial alteration of transportation facilities such as weigh stations, rest stops, ride-share lots or toll plazas.

In accordance with the NCDOT *Traffic Noise Analysis and Abatement Manual*, the FHWA Traffic Noise Model® (TNM v.2.5) was used to predict existing and future design year 2040 hourly equivalent traffic noise levels, $L_{eq(h)}$, for the noise-sensitive receptor locations in the vicinity of the proposed NC 105 improvements.

Details of the analysis are in the R-2566B *Traffic Noise Analysis* (February 2016). A copy of the full technical report entitled “R-2566B Traffic Noise Analysis” can be viewed at the Project Development and Environmental Analysis Unit, Century Center Building A, 1001 Birch Ridge Drive, Raleigh, NC.

2. Traffic Noise Impacts and Noise Contours

The project area was divided into Noise Study Areas (NSA) in order to group similar land uses that are exposed to similar noise sources together. NSAs are shown in **Figure 4**.

Table 14. Noise Study Area Information

NSA	Extents	Studied Receptors	Existing Noise Levels
A	700 feet southwest of Clark's Creek Road to 1500 feet northeast of Old Shull's Mill Road (south)	sixty-eight (68) residences, one (1) motel, and four (4) offices	47 dB(A) and 71 dB(A)
B	1500 feet northeast of Old Shull's Mill Road (south) to Broadstone Road	fifty-four (54) residences, sixteen (16) recreation receptors (golf course), one (1) recreational receptor (swimming pool), and one (1) restaurant	49 dB(A) and 71 dB(A)
C	Broadstone Road to 300 feet northeast of Baird's Creek Road	thirty-seven (37) residences	45 dB(A) and 71 dB(A)
D	300 feet northeast of Baird's Creek Road to the southwest edge of the Vulcan Quarry	seventy-one (71) residences, twenty-six (26) recreational receptors, one (1) recreational receptor, and two (2) offices	52 dB(A) and 69 dB(A)
E	northeast edge of the Vulcan rock quarry to 1000 feet east of NC 105 Bypass	thirty-eight (38) residences and one (1) recreational receptor	44 dB(A) and 68 dB(A)

Future build (2040) traffic is predicted to impact 29 noise-sensitive receptors. Twenty-nine noise-sensitive receptors are predicted to experience noise levels that will approach or exceed FHWA NAC for the Best-Fit Alternative. None of the impacted receptors are predicted to experience noise levels that have a substantial noise increase. The number and types of predicted traffic noise impacts in each category are shown in Table 15. Impacts are delineated as either approaching or exceeding the FHWA NAC, by a substantial increase in Design Year 2040 build-condition traffic noise levels over existing noise levels, or by meeting both criteria.

Table 15. Traffic Noise Impact Summary

Alternative	Activity Category (NAC)	Impacted Receptors Approaching or Exceeding FHWA NAC	Substantial Noise Level Increase	Impacts Due to Both Criteria	Total Impacts per 23 CFR 772
Best-Fit	B	29	0	0	29

3. Traffic Noise Abatement Measures

FHWA and NCDOT require that feasible and reasonable noise abatement measures be considered and evaluated for the benefit of all impacted build-condition traffic noise receptors. Feasibility and reasonableness are distinct and separate considerations. Feasibility is the consideration as to whether noise abatement measures can be implemented. Reasonableness is the consideration as to whether noise abatement measures should be implemented. Per NCDOT Policy, the following traffic noise abatement measures may be considered: highway alignment selection, traffic systems management, buffer zones, noise barriers (earth berms and noise walls), and noise insulation of Activity Category D land use facilities.

Noise Abatement Measures

Passive noise abatement measures are effective because they absorb sound energy, extend the source-to-receptor sound transmission path, or both. Highway sound barriers are primarily constructed as earth berms or solid-mass walls adjacent to limited-access freeways that are in proximity to noise-sensitive land use(s). On roadway facilities with direct access for driveways, sound barriers are typically not feasible because the openings render the barrier ineffective in impeding the transmission of traffic noise. Due to the requisite lengths for effectiveness, sound barriers are typically not economical for isolated or most low-density areas. However, sound barriers may be economical for the benefit of as few as one predicted traffic noise impact if the barrier can benefit enough total receptors – impacted and non-impacted combined – to meet applicable reasonableness criteria.

Consideration for noise abatement measures was given to all impacted receptors in the future build case. Noise abatement measures were determined not to be feasible due to site access constraints where the driveways of each property and other side streets were located such that a noise barrier would not be able to be constructed to adequately provide the required abatement. Additionally, the low density of receptors along the project corridor would likely cause noise abatement measures to exceed NCDOT criteria for maximum allowable square footage per benefitted receptor. Noise abatement is not recommended for this project.

L. Air Quality Analysis

1. Introduction

Air pollution originates from various sources. Emissions from industry and internal combustion engines are the most prevalent sources. The impact resulting from highway construction ranges from intensifying existing air pollution problems to improving the ambient air quality. Changing traffic patterns are a primary concern when determining the impact of a new highway facility or the improvement of an existing highway facility. Motor vehicles emit carbon monoxide (CO), nitrogen oxide (NO), hydrocarbons (HC), particulate matter, sulfur dioxide (SO_2), and lead (Pb) (listed in order of decreasing emission rate).

The Federal Clean Air Act of 1970 established the NAAQS. These were established in order to protect public health, safety, and welfare from known or anticipated effects of air pollutants. The most recent amendments to the NAAQS contain criteria for sulfur dioxide (SO_2), particulate matter (PM_{10}, 10 microns and smaller, $PM_{2.5}$, 2.5 microns and smaller), carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), and lead (Pb).

The primary pollutants from motor vehicles are unburned hydrocarbons, NOx, CO, and particulates. Hydrocarbons (HC) and Nitrogen oxides (NOx) can combine in a complex series of reactions catalyzed by sunlight to produce photochemical oxidants such as ozone and NO_2. Because these reactions take place over a period of several hours, maximum concentrations of photochemical oxidants are often found far downwind of the precursor sources. These pollutants are regional problems.

A project-level air quality analysis was prepared for this project. A copy of the unabridged version of the full technical report entitled Air Quality Analysis*, Widening NC 105* dated January 26, 2016 can be viewed at the Project Development & Environmental Analysis Unit, Century Center Building A, 1010 Birch Ridge Drive, Raleigh.

2. Mobile Source Air Toxics (MSAT)

Background

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (http://www.epa.gov/iris/). In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (http://www.epa.gov/ttn/atw/nata1999/). These are acrolein, benzene, 1,3-butidiene,

diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules. The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOVES2010b model, even if vehicle activity (vehicle-miles traveled, VMT) increases by 102 percent as assumed, from 2010 to 2050, a combined reduction of 83 percent in the total annual emissions for the priority MSAT is projected for the same time period.

MSAT analyses are intended to capture the net change in emissions within an affected environment, defined as the transportation network affected by the project. The affected environment for MSATs may be different than the affected environment defined in the NEPA document for other environmental effects, such as noise or wetlands. Analyzing MSATs only within a geographically-defined "study area" will not capture the emissions effects of changes in traffic on roadways outside of that area, which is particularly important where the project creates an alternative route or diverts traffic from one roadway class to another. At the other extreme, analyzing a metropolitan area's entire roadway network will result in emissions estimates for many roadway links not affected by the project, diluting the results of the analysis.

Incomplete or Unavailable Information for Project Specific MSAT Health Impact Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The EPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (www.epa.gov/iris/). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT

compounds at high exposures are; cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (http://pubs.healtheffects.org/view.php?id=282) or in the future as vehicle emissions decrease (http://pubs.healtheffects.org/view.php?id=306).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts - each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel particulate matter (PM). The EPA (www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine an "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld

EPA's approach to addressing risk in its two-step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

3. Conclusion

Based on the qualitative analysis completed, under the Build alternative in the design year it is expected there would not be higher MSAT emissions in the project study area relative to the No Build alternative. In considering the project study area, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause area-wide MSAT levels to be significantly lower than today.

4. Summary

Vehicles are a major contributor to decreased air quality because they emit a variety of pollutants into the air. Changing traffic patterns are a primary concern when determining the impact of a new highway facility or the improvement of an existing highway facility. New highways or the widening of existing highways increase localized levels of vehicle emissions, but these increases could be offset due to increases in speeds from reductions in congestion and because vehicle emissions will decrease in areas where traffic shifts to the new roadway. Significant progress has been made in reducing criteria pollutant emissions from motor vehicles and improving air quality, even as vehicle travel has increased rapidly.

The project is located in Avery and Watauga Counties, which has been determined to comply with the National Ambient Air Quality Standards. The proposed project is located in an attainment area for CO; therefore, 40 CFR Parts 51 and 93 are not applicable. This project is not anticipated to create any adverse effects on the air quality of this attainment area.

This evaluation completes the assessment requirements for air quality of the 1990 Clean Air Act Amendments and the NEPA process, and no additional reports are necessary.

M. Hazardous Material

A GeoEnvironmental Report was prepared in May 2010 for the combined R-2566 Sections A and B, and was updated in August 2016 for Section B. Seven potential hazardous material sites are within the project corridor from Clark's Creek Road to NC 105 Bypass.

All sites are anticipated to present low geoenvironmental impacts to the project. The potential hazardous material sites are shown in **Figure 7**.

- **Site 1:** English Antique Imports (8599 NC Hwy 105, Foscoe) – Underground Storage Tank (UST). Historically, this site operated as the Foscoe Volunteer Fire Department. Soil contamination was identified during UST removals. Several monitoring wells were observed on the property.
- **Site 2:** Blue House (4358 NC Hwy 105, Boone) – UST. This site may have operated as a gas station at one time. No known incidents are associated with the property, and no visual evidence of USTs are located on the property.
- **Site 3:** Rock Solid Quarry (NC Hwy 105, Boone) – UST. This site operates as a quarry. Two USTs were removed in 1996, and one groundwater incident has been assigned.
- **Site 4:** Vulcan Materials (NC Hwy 150, Boone) – UST. This site operates as a quarry. One groundwater incident has been assigned.
- **Site 5:** Maymead Asphalt Plant (3457 NC Hwy 105, Boone) – UST. This site operates as an asphalt plant. One groundwater incident has been assigned.
- **Site 6:** Kangaroo (2968 NC Hwy 105, Boone) – UST. This site operates as a gas station. Observation wells were observed at UST bed corners.
- **Site 7:** Leonard Building and Truck Accessories (2985 NC Hwy 105, Boone) – UST. This site operates as a building and truck accessory facility. Evidence of a former gas station exists on the property.

N. Geotechnical

This project is located within a geologic feature known as the Grandfather Mountain Window. The rocks involved in this project are metamorphosed sedimentary rocks, primarily metasiltstone with metasandstone. The rocks are labeled Zgms and Zgmw on the Geologic Map of North Carolina (1985). “Hot Rock” (i.e. sulfide-bearing rocks) is not expected to be a factor.

O. Summary of Effects

Preliminary impacts for the detailed study alternatives are summarized in **Table 16**.

Table 16. Impacts of Detailed Study Alternative

Topic	Best-Fit Alternative	No Build Alternative
Railroad Crossings	0	0
Schools	0	0
Recreational Areas & Parks	0	0
Churches	0	0
Cemeteries	0	0
Major Utility Crossings	8*	0
Impacts to National Register Eligible Resources	0	0
Archaeological Sites	0	0
Federally-Listed Species within Study Area	6 No Effect, 2 Unresolved, 1 Not Required**	No Effect
100-Year Floodplain Crossings	1	0
Prime and Unique Farmland	0	0
Residential Relocations	17	0
Business Relocations	11	0
Hazardous Material Sites	6	0
Wetland Impacts	0.2 acres	0
Stream Crossings	19	0
Stream Impacts	3,270 feet	0
Traffic Noise Impacts (# of receptors)	29	0
Water Supply Watershed Protected Areas	0	0
Wildlife Refuges & Game Lands	0	0
Section 4(f) Impacts (Historic)	0	0
Low Income Population Disproportionate and Adverse Impacts	0	0
Minority Population Disproportionate and Adverse Impacts	0	0
Total Cost Estimate (in millions)	$61,123,000	$0
Construction Cost	$42,500,000	$0
Utility Relocation Cost	$8,910,000	$0
Right of Way Cost	$9,713,000	$0

* Major power line crossings, in addition to smaller service drops.

** Formal consultation is underway for the Virginia big-eared bat and the Northern long-eared bat. A biological conclusion is not required for the bog turtle because it is threatened due to similarity of appearance.

VI. COMMENTS AND COORDINATION

A public involvement program was part of this project. From 2010 to the present the following activities were completed:

- Held two public informational meetings, which were advertised through direct mail, local newspapers, and project website updates

- Mailed two newsletters and one postcard to property owners in the project vicinity to provide information on the status of the project and notify them of upcoming meetings
- Created and updated a mailing list of community contacts to include public meeting attendees and interested citizens
- Met with local officials during the planning process
- Responded consistently to citizens' requests for information

A. Public Informational Meetings

The first round of public meetings for the combined Project R-2566 Sections A and B was held on August 22, 29, and 30, 2011 at the Foscoe Grandfather Community Center, Linville Volunteer Fire Department, and La Quinta Inn & Suites in Boone, respectively. The meetings were advertised through a direct mailing and in the local newspapers. Each meeting was an informal-style open house. Large maps showing the study corridor were on display.

A total of 123 citizens signed in at the Foscoe meeting, 75 citizens signed in at the Linville meeting, and 50 citizens signed in at the Boone meeting. Between the three meetings and in the following 30-day comment period, 132 written comments were received. **Table 17** summarizes the topics of the comments. Please note that some of the comments in the summary below were for Section A, which was removed from the current study following the August 2011 meeting.

Table 17. August 2011 Comment Summary (R-2566 Sections A and B)

Topic	Comments Received
General opposition to project	46
General support for project	5
Requested bike lanes	22
Noted importance of replacing bridge over Watauga River	6
Opposed 23-foot wide median	6
Questions about right of way, acquisition, or easements	13
Concern about reducing access to property/business	10
Traffic signal requested*	5
Other	19

* All locations were in the Project R-2566 Section A portion of the project.

A second public meeting was held on June 16, 2015 at the Watauga Campus of Caldwell Community College & Technical Institute. By that time, the project limits had been shortened to Section B only. The purpose of the meeting was to notify citizens of changes that had been made to the project including new termini, an updated traffic forecast, and a modified design. The meetings were advertised through a direct mailing and in the local

newspapers. The meeting was an informal-style open house. Large maps showing the functional design of the Best-Fit Alternative were on display.

Eighty-three citizens signed in at the June 2015 meeting. A total of 17 written comments were received, as summarized below.

Table 18. June 2015 Comment Summary (R-2566 Section B)

Topic	Comments Received
General opposition to project	3
Support revised project limits and design	6
Noted importance of replacing bridge over Watauga River	1
Requested bike lanes	2
Questions about right of way, acquisition, or easements	1
Traffic signal requested*	1
Other	3

*At Baird's Creek Road

B. Public Hearing

A public hearing will be held after the Environmental Assessment has been completed.

C. Local Official's Informational Meetings

A Local Official's Informational Meeting (LOIM) was held before each of the Public Informational Meetings to provide details on the project and to receive feedback from local officials.

A presentation was given and comments were received at each LOIM.

D. NEPA/404 Merger Process

In an effort to streamline the environmental planning and permitting process, NCDOT, FHWA, and the US Army Corps of Engineers (USACE) developed an interagency agreement integrating the environmental impact assessment requirements of NEPA and the USACE Section 404 permitting process. This process is known as the NEPA/404 Merger Process.

The NEPA/404 Merger Process was designed to apply to new location projects and other projects that would likely require an individual permit under Section 404 of the Clean Water Act (CWA). At the beginning of each project, NCDOT initiates a screening process to determine the applicability of the NEPA/404 Merger Process for that project.

Given the amount of stream and wetland impacts and the potential impact to historic resources, it was determined by NCDOT, FHWA, USACE, and NC Division of Water Resources (NCDWR) that this project would follow the NEPA/404 Merger Process.

Concurrence Points are defining points in the Section 404/NEPA Merger Process. Concurrence implies that project team members and the agencies they represent agree to decisions made at these defining points in the project development process and in doing so pledge to abide by the decision made unless there is a substantial changed condition. Concurrence is sequential and must be achieved in the proper order. The seven concurrence points (CP) in the Merger Process are as follows:

- *Concurrence Point 1: Purpose and Need and Study Area Defined*. The foundation upon which justification of the project is established.
    - At a Merger meeting on August 17, 2010, the Merger team agreed to the project purpose for Sections A and B.
    - The Merger team discussed changing the project termini at a meeting on March 14, 2012, but chose to wait to make a decision until a new traffic forecast was completed.
    - At a Merger meeting on August 13, 2014, the Merger team agreed to an updated purpose and need and project termini for Section B of Project R-2566.

- *Concurrence Point 2: Detailed Study Alternatives Carried Forward (DSA).* Alternatives which satisfy the purpose and need for the project. These alternatives will be studied and evaluated in sufficient detail to ensure good transportation and permit decision-making.
    - At the March 14, 2012 meeting, the Merger team discussed selecting a four-lane divided typical section as the detailed study alternative, but agreed to wait to make a final determination until the new traffic forecast and project termini were resolved.
    - At the Merger meeting on August 13, 2014, the Merger team agreed to carry forward one best-fit alternative for detailed study, in addition to the No Build Alternative.

- *Concurrence Point 2A: Bridging Decisions and Alignment Review.* Identification of bridge locations and approximate lengths and a review of the preliminary alignment for each alternative.
    - At a Merger meeting on October 14, 2015, the Merger team agreed to replace the existing bridge with a larger bridge, replace the three existing culverts with larger culverts, and to perform additional studies for existing structural steel pipes located on private property.

- *Concurrence Point 3: LEDPA/Preferred Alternative Selection.* The alternative selected as the "least environmentally damaging practicable alternative" or LEDPA (NEPA preferred alternative), through the project development and permitting process. This meeting will be held after the Environmental Assessment has been signed and the public hearing has been held.

- *Concurrence Point 4A: Avoidance and Minimization.* A detailed, interdisciplinary and interagency review to optimize the design and benefits of the project while reducing environmental impacts to both the human and natural environment. This meeting will take place before the final environmental document has been approved for this project.

- *Concurrence Point 4B: 30 Percent Hydraulic Review.* A review of the development of the drainage design. This meeting will take place following approval of the final environmental document.

- *Concurrence Point 4C: Permit Drawings Review.* A review of the completed permit drawings after the hydraulic design is complete and prior to the permit application. This meeting will take place following approval of the final environmental document.

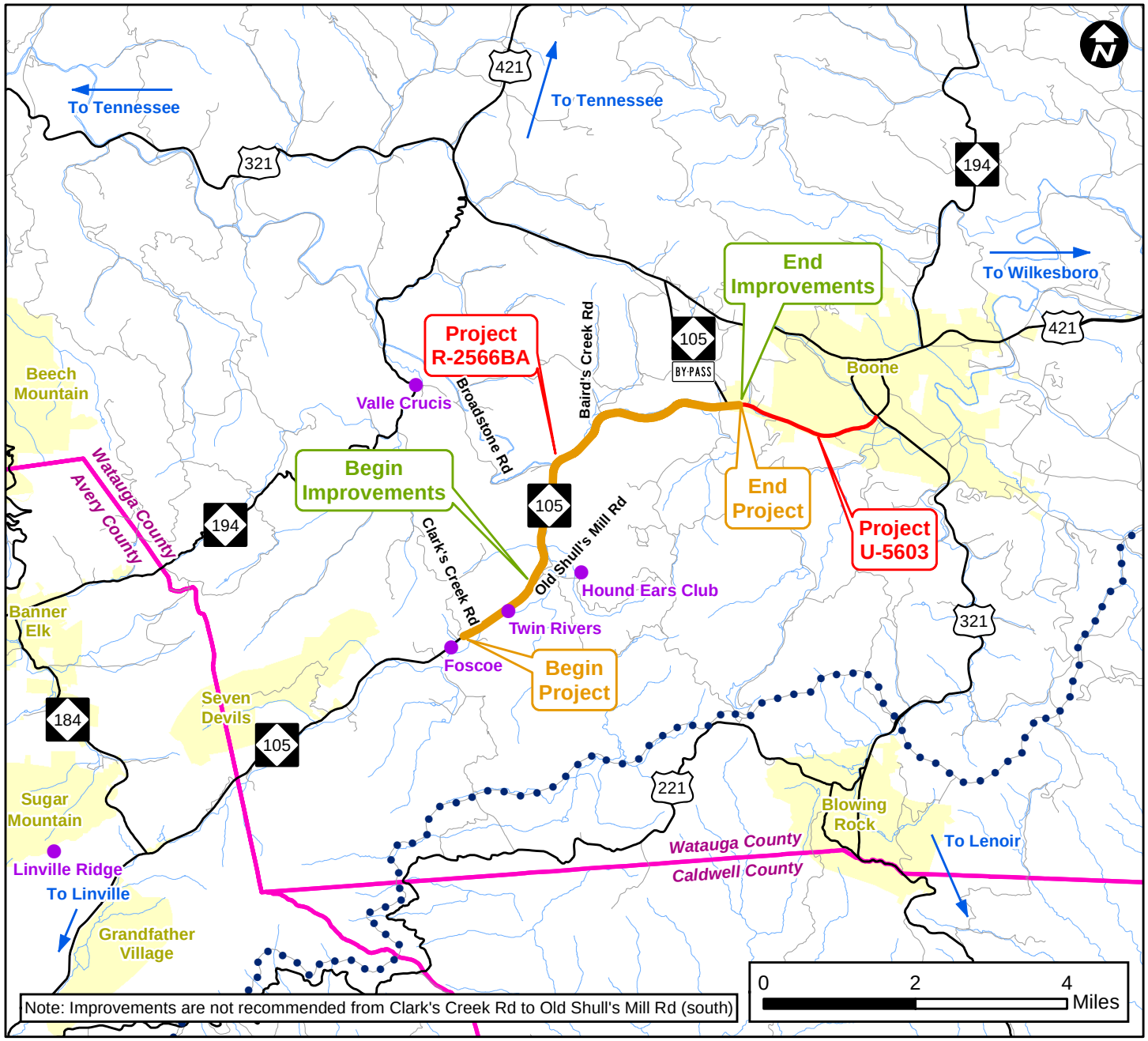
Copies of the NEPA/404 Merger Process concurrence forms approved to date for the project are included in **Appendix B**.

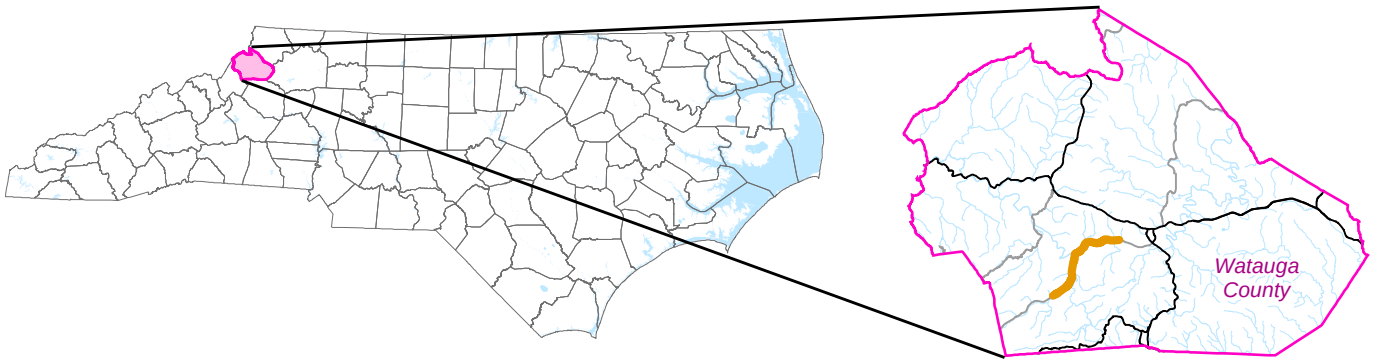
E. Other Agency Coordination

A start of study letter was mailed to federal, state, and local agencies on December 28, 2009. At that time, the project limits were from US 221 in Linville to NC 105 Bypass in Boone (Sections A and B). When the project limits changed, a new scoping letter was not distributed because the agencies were regularly involved through the Merger process. The following state, federal, and local agencies were consulted regarding this project:

Eastern Band of the Cherokee Indians
High Country Council of Governments
National Park Service
NC Department of Administration – State Clearinghouse
NC Department of Cultural Resources – Division of Archives and History
NC Department of Cultural Resources – State Historic Preservation Office
NC Department of Environment and Natural Resources
NC Department of Public Instruction
NC Division of Water Quality
NC Wildlife Resources Commission
U.S. Army Corps of Engineers
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
U.S. Forest Service

FIGURES





Project R-2566B
Blue Ridge Parkway
Nearby STIP Project
Communities
Municipal Boundary
County Boundary

Figure 1
Vicinity Map
TIP Project No. R-2566B
NC 105 Improvements
Watauga County

NOT TO SCALE

Begin Project

End Project

CLARKS CREEK RD. (SR 1136)

BROADSTONE RD. (SR 1112)

BAIRDS CREEK RD. (SR 1113)

NC 105 BYPASS (SR 1107)

0 (0)
24 (20)

20 (24)
419 (513)

429 (525)
28 (36)

453 (555)
20 (25)

450 (549)
46 (25)

439 (552)
46 (25)

20 (13)
247 (125)

125 (247)
445 (577)

41 (98)
9 (14)

14 (9)
513 (758)

525 (765)
2 (1)

82 (82)
652 (422)

422 (652)
440 (679)

NC 105

(0) 0
(419) 513

(429) 525
(9) 9

(453) 555
(0) 5

(450) 549
(24) 30

(439) 552
(0) 0

(20) 13
(445) 577

(41) 98
(510) 755

(439) 759
(1) 2

(82) 82
(440) 679

CALLOWAY RD. (SR 1580)

(9) 9
(28) 35

TWIN RIVERS DR.

(0) 5
(20) 25

OLD SHULLS MILL RD. (SOUTH) (SR 1568)

(30) 24
(0) 25

OLD SHULLS MILL RD. (NORTH) (SR 1568)

(0) 0
(46) 25

VULCAN QUARRY DRIVEWAY

(1) 2
(1) 2

Begin Improvements

End Improvements

LEGEND

XX AM PEAK HOUR
(XX) PM PEAK HOUR

FIGURE 2A

EXISTING YEAR (2012)
WEEKDAY AM & PM
PEAK HOUR TRAFFIC VOLUMES

R-2566B (NC 105 WIDENING)
WATAUGA COUNTY, NC
TRAFFIC CAPACITY ANALYSIS

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

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NOT TO SCALE

Begin Project

CLARKS CREEK RD. (SR 1136)

0 (0)
30 (25)

25 (30)
484 (591)

494 (604)
32 (41)

522 (639)
24 (30)

518 (634)
0 (0)

507 (636)
53 (30)

BROADSTONE RD. (SR 1112)

26 (17)
284 (144)

144 (284)
511 (664)

BAIRDS CREEK RD. (SR 1113)

47 (113)
11 (18)

18 (11)
590 (872)

606 (882)
2 (1)

NC 105 BYPASS (SR 1107)

95 (95)
751 (486)

486 (751)
504 (778)

End Project

(0) 0
(484) 591

(494) 604
(9) 9

(522) 639
(0) 5

(518) 634
(28) 35

(507) 636
(0) 0

(25) 17
(512) 664

NC 105

(47) 113
(587) 869

(598) 871
(1) 2

(95) 95
(504) 778

CALLOWAY RD. (SR 1580)

(9) 9
(32) 40

TWIN RIVERS DR.

(0) 5
(24) 30

OLD SHULLS MILL RD. (SOUTH) (SR 1568)

(35) 28
(0) 0

OLD SHULLS MILL RD. (NORTH) (SR 1568)

(0) 0
(53) 30

VULCAN QUARRY DRIVEWAY

(1) 2
(1) 2

End Improvements

Begin Improvements

LEGEND

XX WEEKEND PEAK HOUR
(XX) FRIDAY PM PEAK HOUR

FIGURE 2B

EXISTING YEAR (2012)
FRIDAY PM & WEEKEND
PEAK HOUR TRAFFIC VOLUMES

R-2566B (NC 105 WIDENING)
WATAUGA COUNTY, NC
TRAFFIC CAPACITY ANALYSIS

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NOT TO SCALE

Begin Project

End Project

NC 105

CLARKS CREEK RD. (SR 1136)

7 (6)
35 (28)
28 (36)
532 (650)

CALLOWAY RD. (SR 1580)

550 (674)
36 (46)
(551) 674
(9) 9
(9) 9
(36) 45

TWIN RIVERS DR.

583 (713)
24 (30)
(583) 713
(0) 5
(0) 5
(24) 30

OLD SHULLS MILL RD. (SOUTH) (SR 1568)

575 (703)
61 (0)
(575) 703
(32) 40
(40) 32
(0) 34

Begin Improvements

OLD SHULLS MILL RD. (NORTH) (SR 1568)

562 (706)
0 (0)
(562) 706
(0) 0
(0) 0
(0) 0

BROADSTONE RD. (SR 1112)

54 (36)
355 (180)
180 (355)
547 (714)
(54) 36
(547) 714

BAIRDS CREEK RD. (SR 1113)

48 (115)
10 (16)
16 (10)
659 (974)
(48) 115
(655) 970

VULCAN QUARRY DRIVEWAY

669 (974)
16 (8)
(671) 980
(8) 16
(8) 16
(8) 16

NC 105 BYPASS (SR 1107)

108 (108)
834 (539)
539 (834)
561 (866)
(108) 108
(561) 866

End Improvements

LEGEND

XX AM PEAK HOUR
(XX) PM PEAK HOUR

FIGURE 2C

FUTURE YEAR (2040)
WEEKDAY AM & PM
PEAK HOUR TRAFFIC VOLUMES

R-2566B (NC 105 WIDENING)
WATAUGA COUNTY, NC
TRAFFIC CAPACITY ANALYSIS

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NOT TO SCALE

Begin Project

CLARKS CREEK RD. (SR 1136)

7 (6)
41 (33)

33 (42)
612 (749)

631 (773)
44 (56)

632 (781)
48 (42)

664 (812)
69 (38)

649 (815)
0 (0)

61 (40)
409 (208)

208 (409)
629 (820)

BROADSTONE RD. (SR 1112)

55 (131)
11 (19)

19 (12)
759 (1123)

BAIRDS CREEK RD. (SR 1113)

770 (1119)
8 (16)

125 (125)
960 (620)

620 (960)
646 (997)

NC 105 BYPASS (SR 1107)

End Project

NC 105

(7) 7
(611) 748

(632) 773
(9) 9

(8) 9
(44) 55

CALLOWAY RD. (SR 1580)

(632) 781
(7) 11

(11) 8
(48) 41

TWIN RIVERS DR.

(664) 812
(36) 45

(45) 36
(69) 38

OLD SHULLS MILL RD. (SOUTH) (SR 1568)

Begin Improvements

(649) 815
(0) 0

(0) 0
(0) 0

OLD SHULLS MILL RD. (NORTH) (SR 1568)

(61) 40
(629) 820

(54) 131
(754) 1117

(755) 1114
(16) 8

(16) 8
(16) 8

VULCAN QUARRY DRIVEWAY

(125) 125
(646) 997

End Improvements

LEGEND

XX WEEKEND PEAK HOUR
(XX) FRIDAY PM PEAK HOUR

FIGURE 2D

FUTURE YEAR (2040)
FRIDAY PM & WEEKEND
PEAK HOUR TRAFFIC VOLUMES

R-2566B (NC 105 WIDENING)
WATAUGA COUNTY, NC
TRAFFIC CAPACITY ANALYSIS

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0 250 500 Feet

- Stream
- Proposed Bridge
- Proposed Edge of Travel
- Proposed Striping
- Proposed Paved Shoulder
- Proposed Retaining Wall
- Proposed Drainage Structure to be Replaced
- Proposed Removal of Asphalt Pavement
- Proposed Median
- Historic Property

Figure 3A
Best-Fit Alternative Design
TIP Project No. R-2566B
NC 105 Improvements
Watauga County



0 250 500 Feet

- Stream
- Proposed Bridge
- Proposed Edge of Travel
- Proposed Striping
- Proposed Paved Shoulder
- Proposed Retaining Wall
- Proposed Drainage Structure to be Replaced
- Proposed Removal of Asphalt Pavement
- Proposed Median
- Historic Property

Figure 3B
Best-Fit Alternative Design
TIP Project No. R-2566B
NC 105 Improvements
Watauga County



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

0 250 500 Feet

- Stream
- Proposed Bridge
- Proposed Edge of Travel
- Proposed Striping
- Proposed Paved Shoulder
- Proposed Retaining Wall
- Proposed Drainage Structure to be Replaced
- Proposed Removal of Asphalt Pavement
- Proposed Median
- Historic Property

Figure 3C
Best-Fit Alternative Design
TIP Project No. R-2566B
NC 105 Improvements
Watauga County



0 250 500 Feet

- Stream
- Proposed Bridge
- Proposed Edge of Travel
- Proposed Striping
- Proposed Paved Shoulder
- Proposed Retaining Wall
- Proposed Drainage Structure to be Replaced
- Proposed Removal of Asphalt Pavement
- Proposed Median
- Historic Property

Figure 3D
Best-Fit Alternative Design
TIP Project No. R-2566B
NC 105 Improvements
Watauga County



0 250 500 Feet

- Stream
- Proposed Bridge
- Proposed Edge of Travel
- Proposed Striping
- Proposed Paved Shoulder
- Proposed Retaining Wall
- Proposed Drainage Structure to be Replaced
- Proposed Removal of Asphalt Pavement
- Proposed Median
- Historic Property

Figure 3E
Best-Fit Alternative Design
TIP Project No. R-2566B
NC 105 Improvements
Watauga County

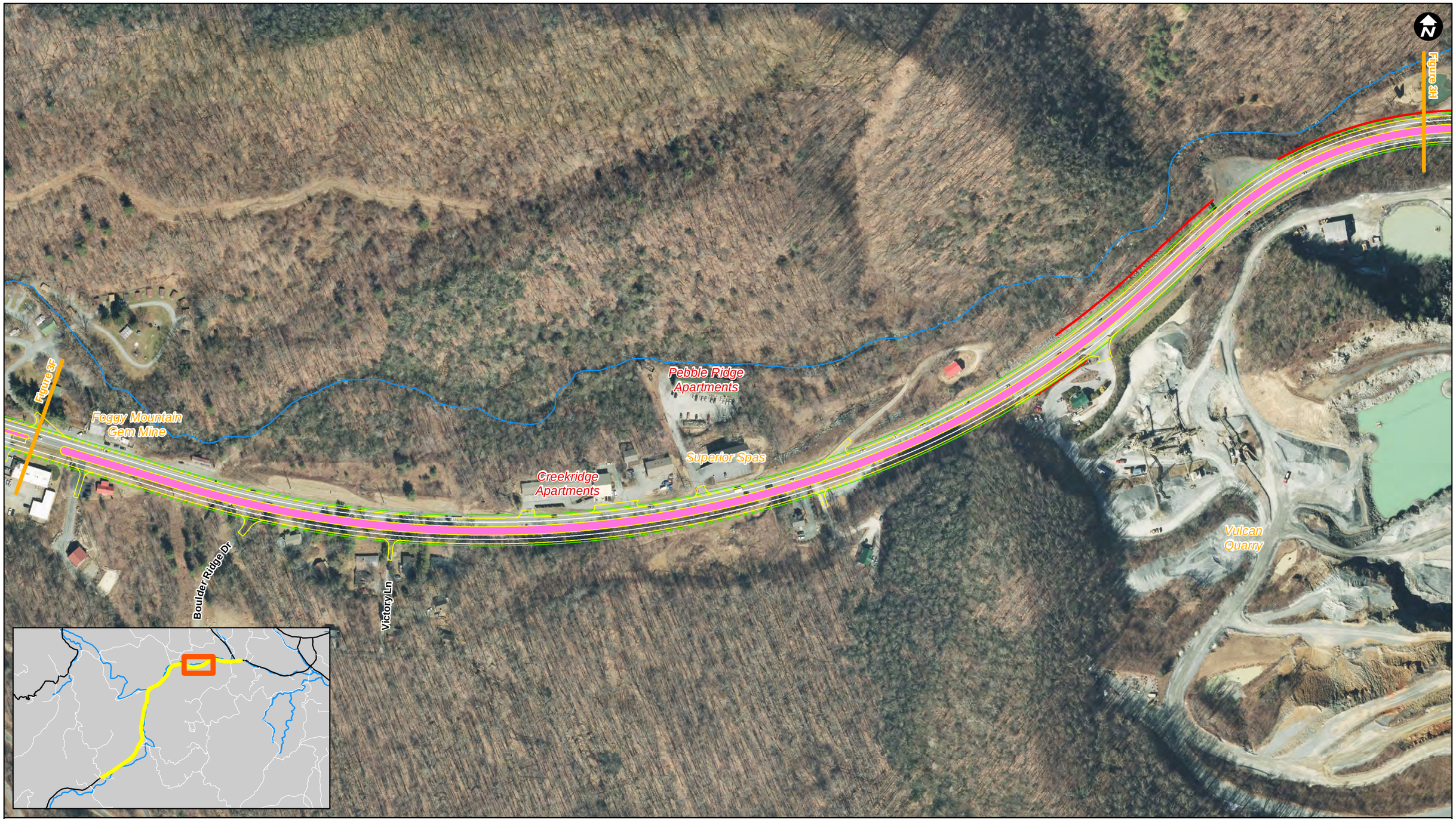




0 250 500 Feet

- Stream
- Proposed Bridge
- Proposed Edge of Travel
- Proposed Striping
- Proposed Paved Shoulder
- Proposed Retaining Wall
- Proposed Drainage Structure to be Replaced
- Proposed Removal of Asphalt Pavement
- Proposed Median
- Historic Property

Figure 3F
Best-Fit Alternative Design
TIP Project No. R-2566B
NC 105 Improvements
Watauga County



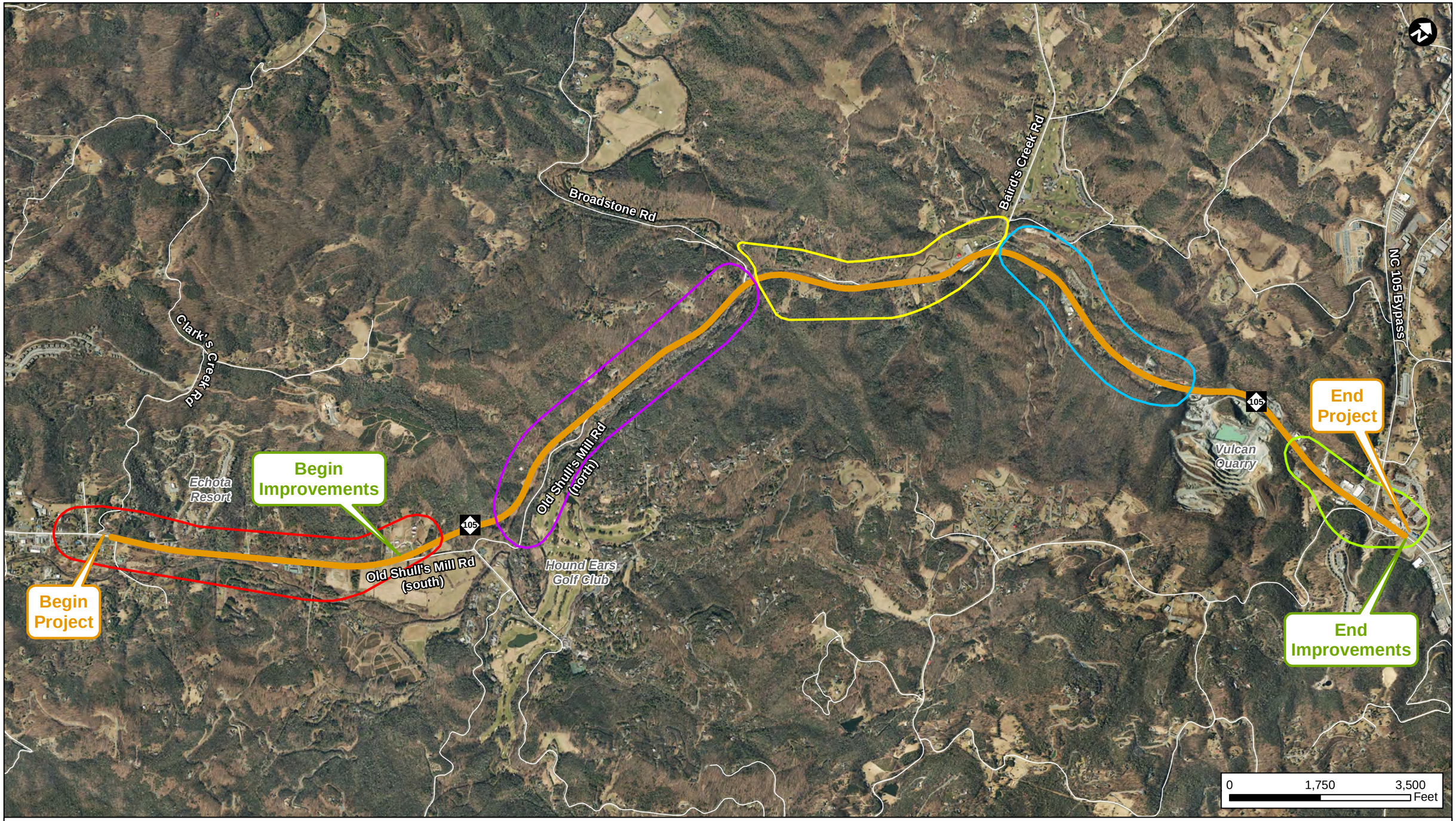
0 250 500 Feet

- Stream
- Proposed Bridge
- Proposed Edge of Travel
- Proposed Striping
- Proposed Paved Shoulder
- Proposed Retaining Wall
- Proposed Drainage Structure to be Replaced
- Proposed Removal of Asphalt Pavement
- Proposed Median
- Historic Property

Figure 3G
Best-Fit Alternative Design
TIP Project No. R-2566B
NC 105 Improvements
Watauga County



Figure 3H
Best-Fit Alternative Design
TIP Project No. R-2566B
NC 105 Improvements
Watauga County



Project R-2566B
NSA A
NSA B
NSA C
NSA D
NSA E

Figure 4
Noise Study Areas
TIP Project No. R-2566B
NC 105 Improvements
Watauga County



NORTH CAROLINA DEPARTMENT
OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND
ENVIRONMENTAL ANALYSIS BRANCH

JURISDICTIONAL FEATURES MAP

WATAUGA COUNTY
TIP PROJECT R-2566B

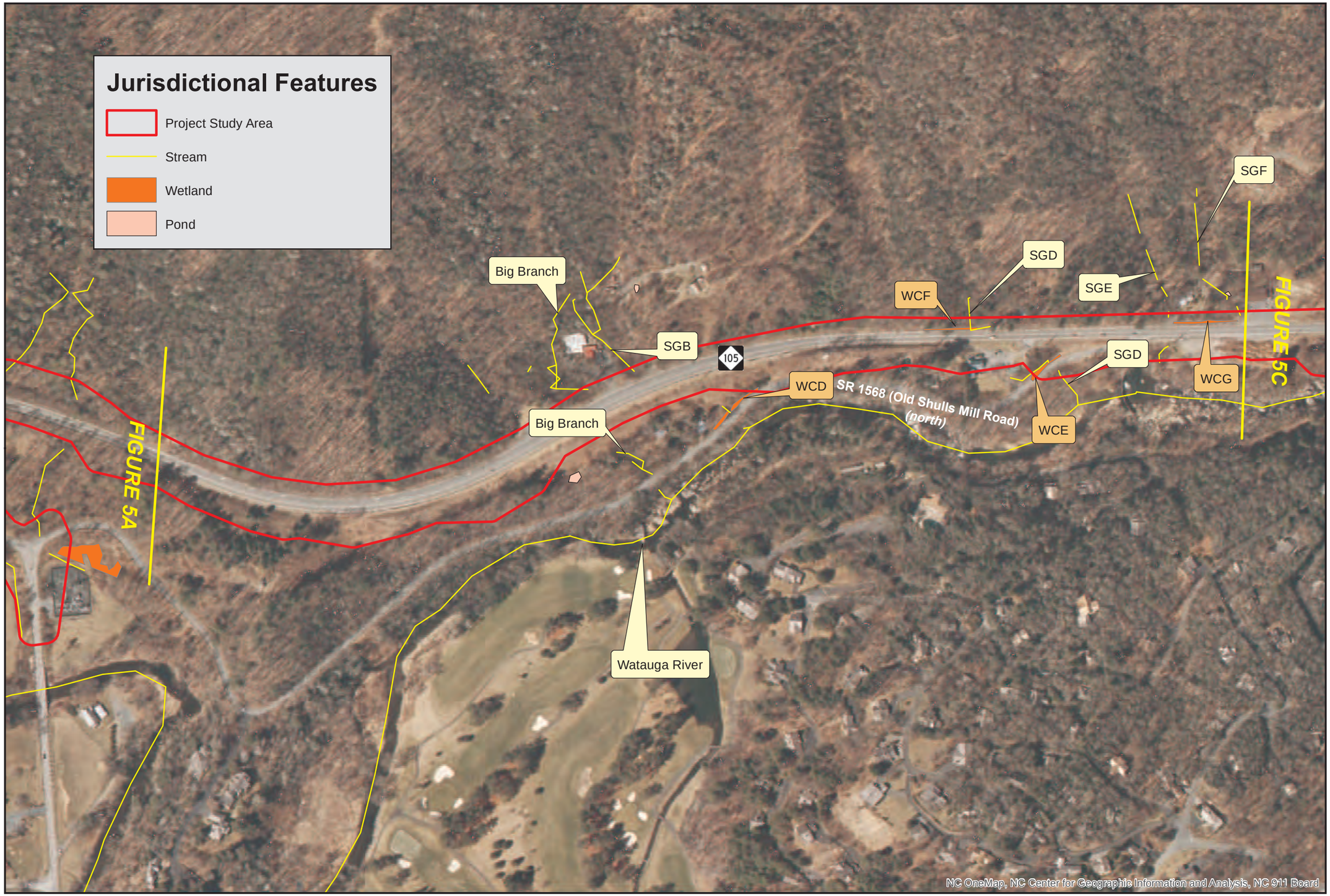
Div:	TIP#
11	R-2566B

WBS: 37512.1.1

Date: JANUARY 2016

Figure

5A



0 375 750 1,500 Feet

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH

JURISDICTIONAL FEATURES MAP

WATAUGA COUNTY
TIP PROJECT R-2566B

N

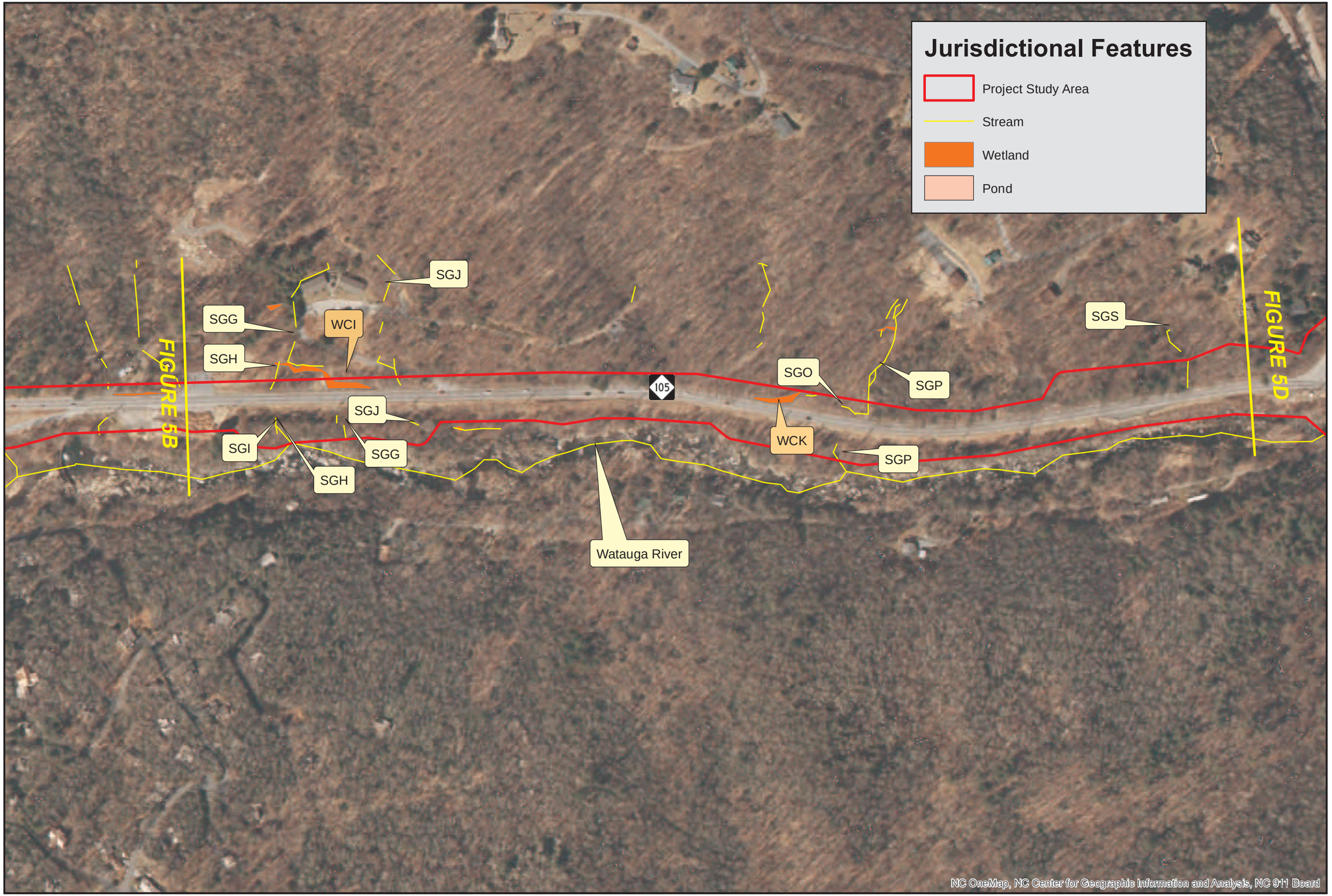
Div:	TIP#
11	R-2566B

WBS: 37512.1.1

Date: JANUARY 2016

Figure

5B



0 375 750 1,500 Feet

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH

JURISDICTIONAL FEATURES MAP

WATAUGA COUNTY
TIP PROJECT R-2566B

N

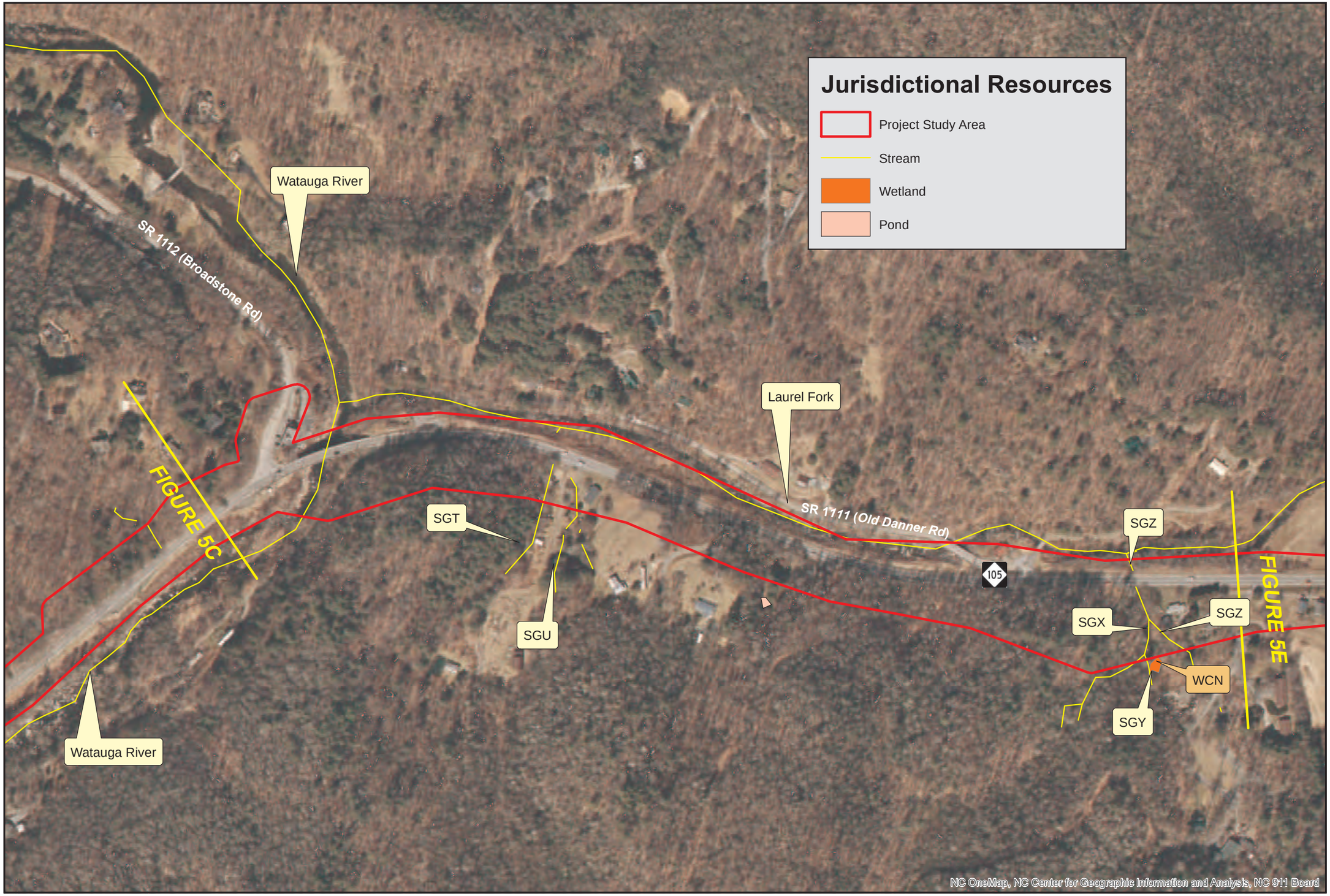
Div:	TIP#
11	R-2566B

WBS: 37512.1.1

Date: JANUARY 2016

Figure

5C



0 375 750 1,500 Feet

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH

JURISDICTIONAL FEATURES MAP

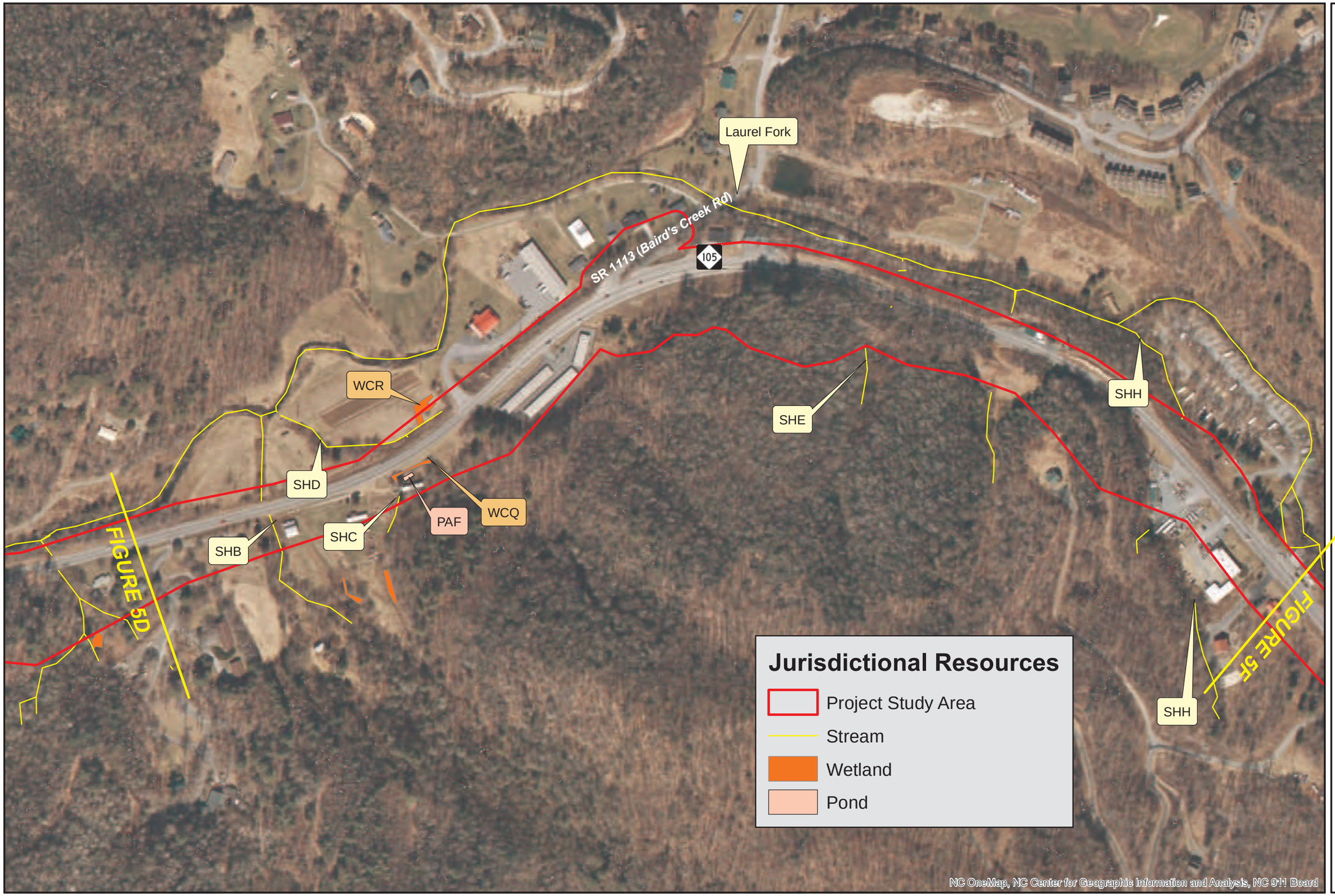
WATAUGA COUNTY
TIP PROJECT R-2566B

Div: 11	TIP# R-2566B

WBS: 37512.1.1

Date: JANUARY 2016

Figure 5D



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH

JURISDICTIONAL FEATURES MAP

WATAUGA COUNTY
TIP PROJECT R-2566B

N

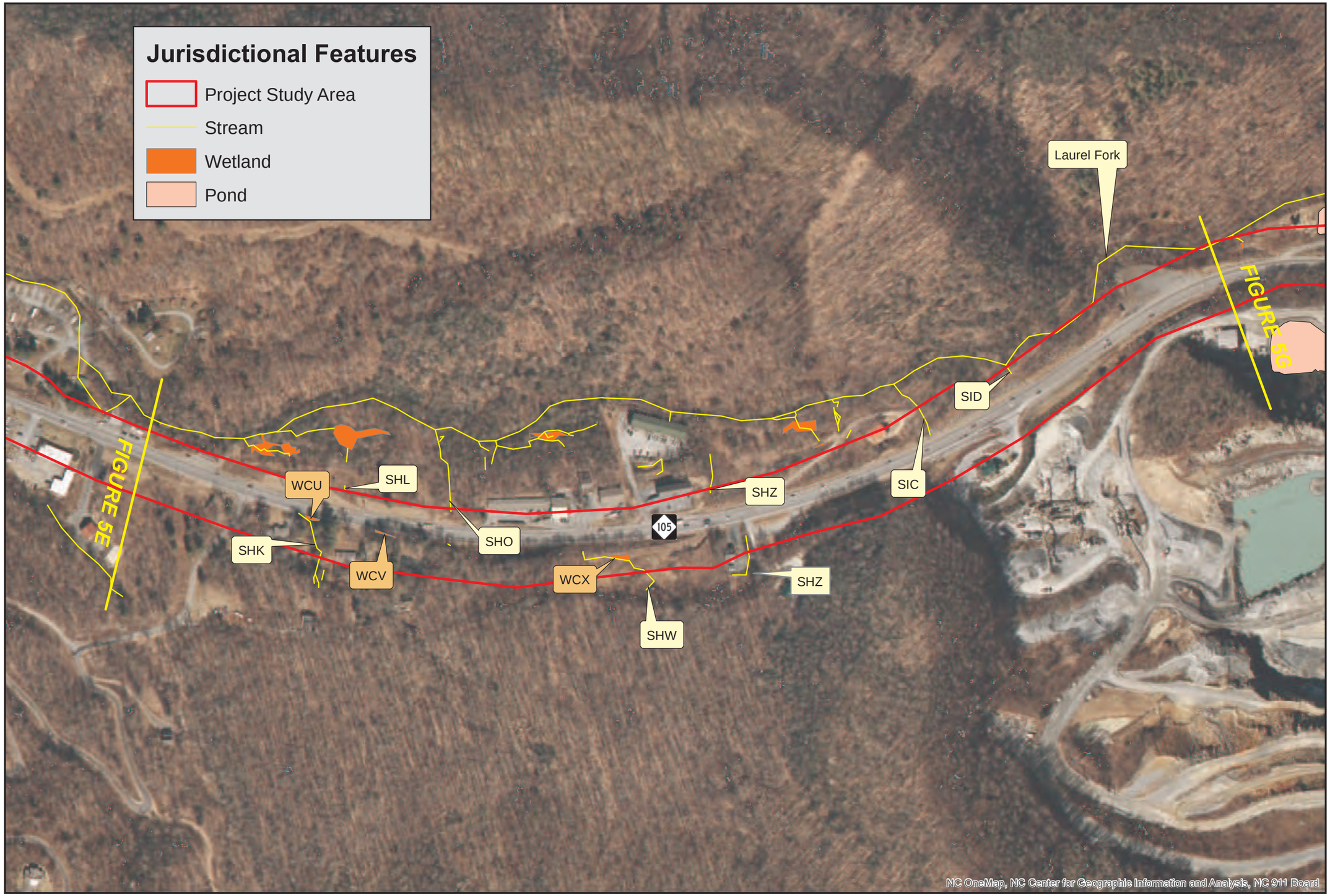
Div:	TIP#
11	R-2566B

WBS: 37512.1.1

Date: JANUARY 2016

Figure

5E



0 375 750 1,500 Feet

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH

JURISDICTIONAL FEATURES MAP

WATAUGA COUNTY
TIP PROJECT R-2566B

N

Div:	TIP#
11	R-2566B

WBS: 37512.1.1

Date: JANUARY 2016

Figure

5F

Jurisdictional Features

- Project Study Area
- Stream
- Wetland
- Pond

Laurel Fork

PAI

SIF

WDA

FIGURE 5F

SIG

SIG

105

Laurel Fork

SR 1107 (NC 105 Bypass)

WDB

SIJ

WDC

End Project

SIJ

End Improvements

NC OneMap, NC Center for Geographic Information and Analysis, NC 911 Board

0 375 750 1,500 Feet

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH

JURISDICTIONAL FEATURES MAP

WATAUGA COUNTY
TIP PROJECT R-2566B

N

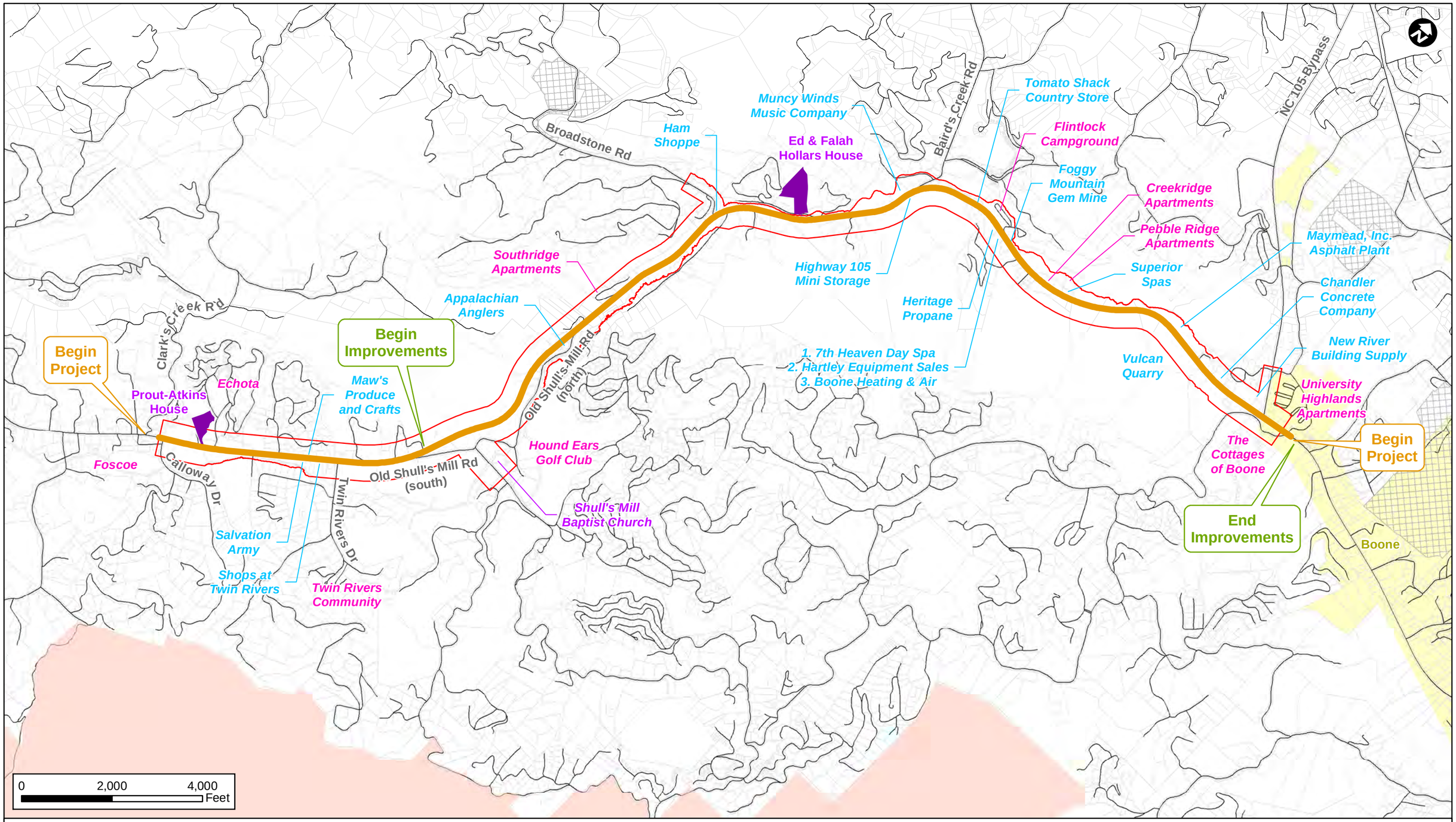
Div:	TIP#
11	R-2566B

WBS: 37512.1.1

Date: JANUARY 2016

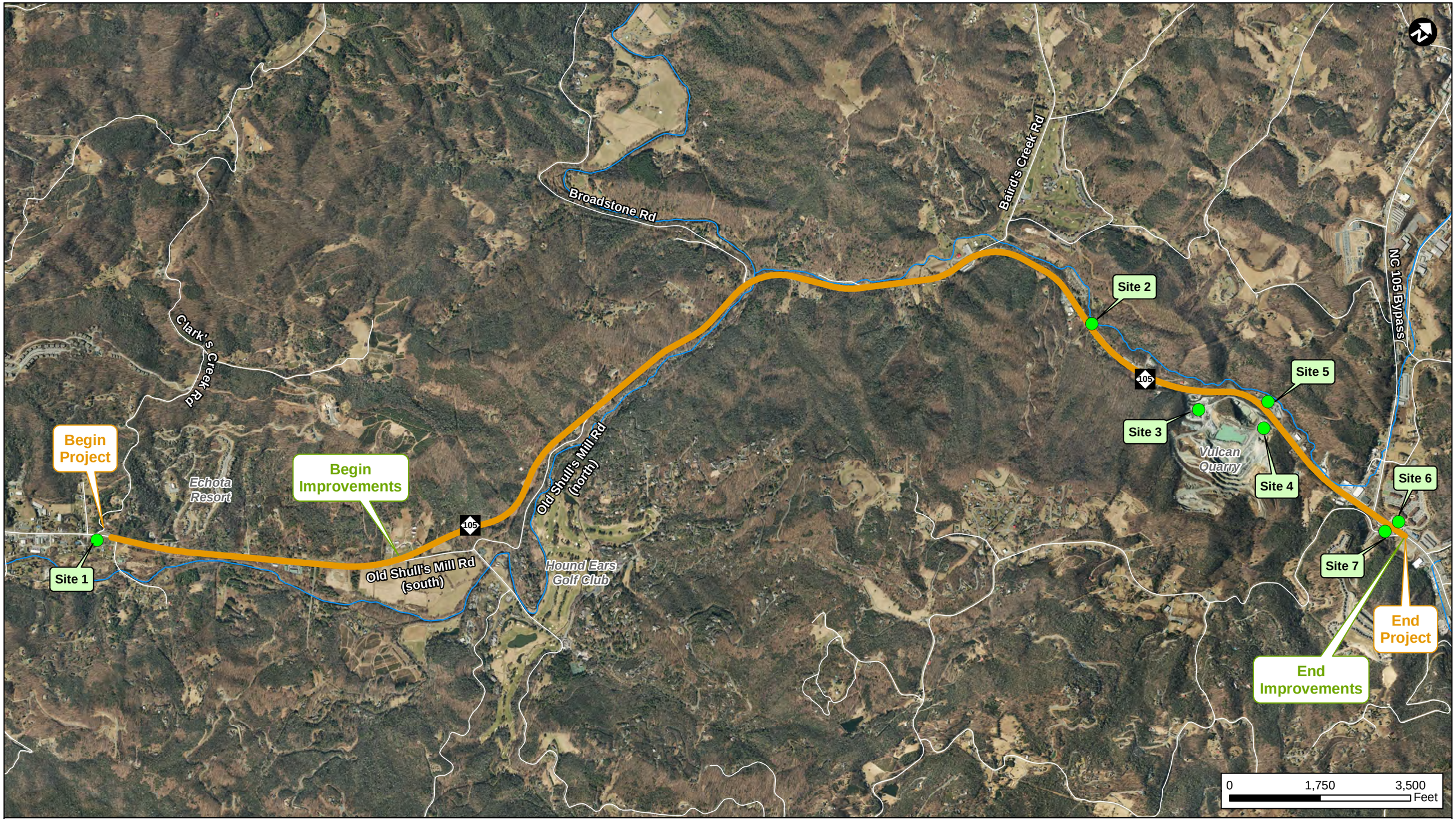
Figure

5G



Project R-2566B
Study Area
Historic Properties
State Owned Land
Federal Land
Municipal Boundary

Figure 6
Community Features
TIP Project No. R-2566B
NC 105 Improvements
Watauga County



Project R-2566B

Environmental Sites

Figure 7
GeoEnvironmental Sites of Concern
TIP Project No. R-2566B
NC 105 Improvements
Watauga County

APPENDICES

Appendix A – Relocation Report

Appendix B – NEPA/404 Merger Team Concurrence Forms

Appendix C – Stream and Wetland Tables

Appendix D – Agency Responses

APPENDIX A
RELOCATION REPORT

EIS RELOCATION REPORT

North Carolina Department of Transportation
RELOCATION ASSISTANCE PROGRAM

☒ E.I.S. ☐ CORRIDOR ☐ DESIGN

WBS ELEMENT:	37512.1.1	COUNTY	Watauga	Alternate 1 of 1 Alternate
T.I.P. NO.:	R-2566B			
DESCRIPTION OF PROJECT:	NC 105 from SR 1136 (Clarks Creek Rd.) to NC 105 Bypass (SR 1107) in Boone, Watauga County			

ESTIMATED DISPLACEES

Type of Displacees	Owners	Tenants	Total	Minorities
Residential	5	12	17	6
Businesses	6	5	11	3
Farms	0	0	0	0
Non-Profit	0	0	0	0

INCOME LEVEL

0-15M	15-25M	25-35M	35-50M	50 UP
0	0	12	3	2

VALUE OF DWELLING / DSS DWELLING AVAILABLE

Owners		Tenants		For Sale		For Rent	
0-20M	1	$ 0-150	0	0-20M	0	$ 0-150	0
20-40M	0	150-250	0	20-40M	0	150-250	0
40-70M	0	250-400	0	40-70M	6	250-400	0
70-100M	2	400-600	2	70-100M	11	400-600	19
100 UP	2	600 UP	10	100 UP	40	600 UP	30
TOTAL	5		12		57		49

ANSWER ALL QUESTIONS

Yes	No	Explain all "YES" answers.
	X	1. Will special relocation services be necessary?
	X	2. Will schools or churches be affected by displacement?
X		3. Will business services still be available after project?
X		4. Will any business be displaced? If so, indicate size, type, estimated number of employees, minorities, etc.
	X	5. Will relocation cause a housing shortage?
		6. Source for available housing (list).
	X	7. Will additional housing programs be needed?
X		8. Should Last Resort Housing be considered?
	X	9. Are there large, disabled, elderly, etc. families?
	X	10. Will public housing be needed for project?
X		11. Is public housing available?
X		12. Is it felt there will be adequate DSS housing housing available during relocation period?
	X	13. Will there be a problem of housing within financial means?
X		14. Are suitable business sites available (list source).
		15. Number months estimated to complete RELOCATION? 24

REMARKS (Respond by number)

4. See attached Sheet listing all affected business relocations

6. MLS, Newspaper, Realtor, Real Estate publications, Internet

8. As required by law.

12. Based on current market, housing locations should be available.

14. MLS, Newspaper, Realtor, Real Estate publications, Internet

NOTE TO FILE:
Tax Parcels 1889950999, 18899961195, & 2900141891 were counted in displacee's numbers above due to not knowing location of private septic systems or wells on these parcels.

Three (3) Billboards are located in project corridor and will be relocated via NC DOT Billboard relocation guidelines.

No Permanent Easement Areas are shown on these plans for Drainage and Utilities thus displacee count could rise once these areas are added in the future.

Neil Burleson	4-18-16		5/19/16
Neil Burleson Right of Way Agent	Date	Relocation Coordinator	Date

FRM15-E
Revised 7/7/14

R-2566B Displaced Business List: Name, Type, Tax ID#, Ownership, Bldg. Size, Employee #

1) Appalachian Angler (Fly Shop and Guide Service) Tax ID# 1889962302000
   Owner Operated
   Bldg. Size: 1,232 Sq. Ft.
   5-8 employees (0 Minorities)

2) Watauga River Anglers (Fly Shop and Guide Service) Tax ID# 1980909966000
   Owner Operated
   Bldg. Size: 1,240 Sq. Ft.
   5-8 employees (0 Minorities)

3) HWY 105 Mini Storage (Mini Storage Units) Tax ID# 199033882000
   Tenant Operated
   Bldg. Size: 12,000 Sq. Ft. (100 Units)
   1-4 employees (0 Minorities)

4) Heritage Propane (Propane Gas Distributor) Tax ID# 1990445279000
   Owner Operated
   Bldg. Size: 1,154 Sq. Ft.
   8-10 employees (1 Minority)

5) Firmm Corporation (Office Bldg. w/ 2 Tenants) Tax ID# 1990449145000
   Tenant Operated Business 1: 7th Heaven Day Spa
   Bldg. Size: 1,000 Sq. Ft.
   4 employees (3 Minorities)

   Tenant Operated Business 2: Boone HVAC
   Bldg. Size: 3,000 Sq. Ft.
   8-10 employees (2 Minorities)

6) Willow Brook Log Homes (Home Builder) Tax ID# 1990542268000
   Owner Operated
   Bldg. Size: 846 Sq. Ft.
   1-4 employees (0 Minorities)

7) GTM Management, LLC (Real Estate Firm) Tax ID# 1990741142000
   Tenant Operated
   Bldg. Size: 2,320 Sq. Ft.
   2 employees (1 Minority)

Continued next page

8) Kenneth & Betty Hayes (Real Estate Firm) Tax ID# 1990741142000
   Owner Operated
   Bldg. Size: 2,570 Sq. Ft.
   1 employee (1 Minority)

9) WWW Holdings, LLC (Consignment Shop) Tax ID# 2900157120000
   Tenant Operated
   Bldg. Size: 12,000 Sq. Ft.
   8-10 employees (4 Minorities)

10) Lee & Thomas Realty Co. (Real Estate Firm) Tax ID# 2900146807000
    Owner Operated
    Bldg. Size: 2,760 Sq. Ft.
    4 employees (0 Minorities)

NOTES:

Business Displacee # 7, 8, 9 are minority owned businesses.

Tax Parcel 2900146807000 has 2 structures in the proposed R/W but one bldg. is currently vacant (per market research for 1 year vacant) and thus was not counted as a displacee.

There are 2 tax parcels listed above/below where parking spaces are to be acquired due to the proposed project alternate alignment and it is felt these properties will become business displacees.

PARKING PARCELS LIST

Tax Parcel ID #, Parking Spaces Acquired During Acquisition, Damage % Applied:

1) Tax Parcel ID #1889962302000, All parking spaces acquired, 100% damages applied
2) Tax Parcel ID #1980909966000, All parking spaces acquired, 100% damages applied

APPENDIX B

NEPA/404 MERGER TEAM CONCURRENCE FORMS

Section 404/NEPA Interagency Agreement

Concurrence Point 1
Project Purpose and Need

Project Title:	NC 105 Improvement from Clarks Creek Road to NC 105 Bypass
TIP Project No.:	R-2566B
WBS No.:	37512.1.1

Purpose and Need of the Proposed Action:

Congestion: A primary purpose of the project is to reduce congestion on NC 105 in order to achieve LOS D or better in the design year (2040) during the average highest week day, and to achieve LOS E or better in the design year during the average highest weekend day.

Safety: Another primary purpose is to reduce rear-end and run-off-road crashes on NC 105. Alternatives will be analyzed using Highway Safety Manual methodologies.

Bicycle Facilities: A secondary purpose is to improve bicycle facilities on NC 105 in areas where capacity or safety improvements are proposed.

The Project Team has concurred on the above mentioned purpose and need and the attached study corridor map for the proposed project.

Name	Agency	Date
Mubarak Tabsh	FHWA	8-13-14
Cynthia J. VanDerWiele	USEPA	13 Aug. 2014
Andrew Williams	USACE	13 August 2014
Marla Chamberlain	USFWS	13 August 14
[illegible]	NCDOT	13 August 14
Mark Chambers	NCWRC	8/13/2014
David Wainwright	NCDWR	Aug 13, 2014
Renee Gledhill-Earley	NCSHPO	8-19-14
David Graham	~~EVA~~ RPO	8/21/14

Section 404/NEPA Interagency Agreement

Concurrence Point 2
Detailed Study Alternative Carried Forward

Project Title:	NC 105 Improvement from Clarks Creek Road to NC 105 Bypass
TIP Project No.:	R-2566B
WBS No.:	37512.1.1

Alternative(s) to Study in Detail:

- Best-Fit Build Alternative
- No Build

The Project Team has concurred with the above alternative to be carried forward for the proposed project.

Name	Agency	Date
[signature]	FHWA	8-18-14
[signature]	USEPA	13 Aug. 2014
[signature]	USACE	13 August 2014
[signature]	NCWRC ~~USFWS~~	8/13/2014
[signature]	NCDOT	8/18/2014
[signature]	USFWS ~~NCWRC~~	13 august 14
[signature]	NCDWQR	Aug 18, 2014
[signature]	NCSHPO	8-19-14
[signature]	~~TVA~~ RPO	8/21/14

Section 404/NEPA Interagency Agreement

Concurrence Point 2A
Bridging Decisions and Alignment Review

Project Title:	NC 105 Improvement from Clarks Creek Road to NC 105 Bypass
TIP Project No.:	R-2566B
WBS No.:	37512.1.1

The Project Team has concurred on this date to include the following major hydraulic structures as part of the detailed study alternatives:

- Site 1 – Remove and replace existing bridge over the Watauga River to 260' L x 90' W
- Site 2 – Remove and replace existing culvert carrying a UT to Laurel Fork to 1 @ 8'x6' RCBC
- Site 4 – Remove and replace existing culvert carrying a UT to Laurel Fork to 1 @ 8'x6' RCBC
- Site 6 – Remove and replace existing culvert carrying a UT to Laurel Fork to 2 @ 12'x7' RCBC
- Site 7a – ~~Retain existing structural steel pipe~~ (on private property; more study recommended)
- Site 7b – ~~Retain existing structural steel pipe~~ (on private property; more study recommended)

Name	Agency	Date
Michael J. Estes	FHWA	
Cynthia J. VanDerWiele	USEPA	10.14.2015
John Krolfifer	USACE	10/14/2015
Mark C. Bailey	USFWS	11/16/15
Beverly Robertson	NCDOT	10/14/15
Marla Chambers	NCWRC	10/14/2015
David L. Wainwright	~~NCDWR~~ DEQ	10-14-15
Renee Gledhill-Earley	NCSHPO	11/9/15
David Graham	RPO	11/9/15

APPENDIX C

STREAM AND WETLAND TABLES

Table 1. Streams in the study area

Stream Name	Map ID	Map #	NCDWQ Index Number	Best Usage Classification
Watauga River	Watauga River	3.1-3.5	8-(1)	B;Tr,HQW
UT to Watauga River	SFB	3.1	8-6	C;Tr
UT to Watauga River	SFE	3.1	8-(1)	B;Tr,HQW
UT to Watauga River	SFF	3.1	8-(1)	B;Tr,HQW
UT to Watauga River	SFH	3.1	8-(1)	B;Tr,HQW
UT to Watauga River	SFK	3.1	8-(1)	B;Tr,HQW
UT to Watauga River	SFQ	3.2	8-(1)	B;Tr,HQW
UT to Watauga River	SFS	3.2	8-(1)	B;Tr,HQW
UT to Watauga River	SFU	3.2	8-(1)	B;Tr,HQW
UT to Watauga River	SFV	3.2	8-(1)	B;Tr,HQW
UT to Watauga River	SFW	3.2	8-(1)	B;Tr,HQW
Big Branch	Big Branch	3.3	8-9	C
UT to Watauga River	SGB	3.3	8-(1)	B;Tr,HQW
UT to Watauga River	SGD	3.3	8-(1)	B;Tr,HQW
UT to Watauga River	SGE	3.3	8-(1)	B;Tr,HQW
UT to Watauga River	SGF	3.3	8-(1)	B;Tr,HQW
UT to Watauga River	SGG	3.4	8-(1)	B;Tr,HQW
UT to Watauga River	SGH	3.4	8-(1)	B;Tr,HQW
UT to Watauga River	SGI	3.4	8-(1)	B;Tr,HQW
UT to Watauga River	SGJ	3.4	8-(1)	B;Tr,HQW
UT to Watauga River	SGO	3.4	8-(1)	B;Tr,HQW
UT to Watauga River	SGP	3.4	8-(1)	B;Tr,HQW
UT to Watauga River	SGS	3.4	8-(1)	B;Tr,HQW
Laurel Fork	Laurel Fork	3.5-3.8	8-10	C;Tr
UT to Laurel Fork	SGT	3.5	8-10	C;Tr
UT to Laurel Fork	SGU	3.5	8-10	C;Tr
UT to Laurel Fork	SGX	3.5	8-10	C;Tr
UT to Laurel Fork	SGY	3.5	8-10	C;Tr
UT to Laurel Fork	SGZ	3.5	8-10	C;Tr

Stream Name	Map ID	Map #	NCDWQ Index Number	Best Usage Classification
UT to Laurel Fork	SHB	3.6	8-10	C;Tr
UT to Laurel Fork	SHC	3.6	8-10	C;Tr
UT to Laurel Fork	SHD	3.6	8-10	C;Tr
UT to Laurel Fork	SHE	3.6	8-10	C;Tr
UT to Laurel Fork	SHH	3.6	8-10	C;Tr
UT to Laurel Fork	SHK	3.7	8-10	C;Tr
UT to Laurel Fork	SHL	3.7	8-10	C;Tr
UT to Laurel Fork	SHO	3.7	8-10	C;Tr
UT to Laurel Fork	SHW	3.7	8-10	C;Tr
UT to Laurel Fork	SHZ	3.7	8-10	C;Tr
UT to Laurel Fork	SIC	3.7	8-10	C;Tr
UT to Laurel Fork	SID	3.7	8-10	C;Tr
UT to Laurel Fork	SIF	3.8	8-10	C;Tr
UT to Laurel Fork	SIG	3.8	8-10-2	C
UT to Laurel Fork	SIJ	3.8	8-10-2	C

Table 2. Physical Characteristics of streams in the study area

Map ID	Bank Height (ft)	Bankful Width (ft)	Water Depth (in)	Channel Substrate*	Velocity	Clarity
Watauga River	2-8	6-180	6-72+	sl,sa,gr,co,bo,bd	fast	clear
SFB	3-4	3-12	4-24	sl,sa,gr,co,bo,bd	moderate	clear
SFE	1	1-2	1-4	sl,sa,gr,co	slow	clear
SFF	2	8	1	co,bo	slow	clear
SFH	2-4	2-6	3-24	sl,sa,gr,co,bo,bd	fast	clear
SFK	2-4	2-8	1-8	sl,sa,gr,co	moderate	clear
SFQ	1	1-2	2-4	sl,sa,gr,co	moderate	clear
SFS	.5,4	1-6	2-10	sl,sa,gr,co	moderate	clear
SFU	2	1-2	2-4	sl,gr,co	moderate	clear
SFV	0.5-1.5	1-4	1-2	sl,sa,gr,co	moderate	clear
SFW	0.5-1	2.5-5	2-4	sl,sa,gr,co	moderate	clear

Map ID	Bank Height (ft)	Bankful Width (ft)	Water Depth (in)	Channel Substrate*	Velocity	Clarity
Big Branch	2-3	4-10	2-24	sl,sa,gr,co,bo	fast	clear
SGB	2-4	4	2-10	sl,sa,gr,co,bo	fast	clear
SGD	1-2	1-2	2-8	sl,sa,gr,co	moderate	clear
SGE	2	3	3	co,bo	moderate	clear
SGF	2	5	6	co,bo	moderate	clear
SGG	1	4	3	co,bo	moderate	clear
SGH	0.5-1	1-2	0-2	sl,sa,gr	moderate	clear
SGI	0.5-1	1-2	1-2	sl,sa,gr	slow	clear
SGJ	2	2	2	co	slow	clear
SGO	0.5-1	1-2	0-2	sl,sa,gr,co	slow	clear
SGP	2	6	2	bo,bd	moderate	clear
SGS	0.5-2	1-6	0-2	sl,sa,co,bo	slow	clear
Laurel Fork	2-8	8-50	6-72+	sl,sa,gr,co,bo,bd	fast	clear
SGT	1-3	6-8	3-8	sa,gr,co,bo	fast	clear
SGU	3-5	6	2-8	sa,gr,co	moderate	clear
SGX	1-4	6-8	1-2	sa,gr,co	slow	clear
SGY	2-5	2-6	1-4	sa,gr,co	slow	clear
SGZ	1-8	1-6	1-8	sa,gr,co,bo	moderate	clear
SHB	1-4	3-10	2-12	sa,gr,co,bo	fast	clear
SHC	0.5-1	0.5-2	1-4	sl,sa,gr	slow	clear
SHD	1-2	2-4	2-8	sl,sa,gr,co	moderate	clear
SHE	2-6	2-3	1	sa,gr,co	slow	clear
SHH	2-4	2-8	2-8	sl,sa,gr,co,bo,bd	fast	clear
SHK	1-2	1-3	1-4	sl,sa,gr,co	moderate	clear
SHL	0.5-1.5	1-2	1-6	sl,sa,gr,co	slow	clear
SHO	1-5	2-6	2-6	sl,sa,gr,co,bo	moderate	clear
SHW	0.5-2	1-2	1-4	sa,gr,co	slow	clear
SHZ	0.5-4	1-6	0-1	sl,sa,gr,co,bo	slow	clear
SIC	1	3	3	gr,co	fast	clear
SID	4	10	6	gr,bo	fast	clear

Map ID	Bank Height (ft)	Bankful Width (ft)	Water Depth (in)	Channel Substrate*	Velocity	Clarity
SIF	1	1	5	gr,co	moderate	clear
SIG	4	8	1	gr,co	moderate	clear
SIJ	3-6	2-3	2-5	sa,gr,co	moderate	clear

Table 3. Ponds in the study area

Pond Name	Map ID	Map #	Stream Connection/Isolated	Stream Compensatory Mitigation Required
PAF	PAF	3.6	SHC	Yes
PAI	PAI	3.8	Isolated	NA

Table 4. Jurisdictional characteristics of water resources in the study area

Map ID	Length (ft.)	Classification	Compensatory Mitigation Required
Watauga River	280	Perennial	Yes
SFB	293	Perennial	Yes
SFE	20	Perennial	Yes
SFF	38	Perennial	Yes
SFH	371	Perennial	Yes
SFK	191	Perennial	Yes
SFQ	110	Perennial	Yes
SFS	126	Perennial	Yes
SFU	47	Perennial	Yes
SFV	546	Perennial	Yes
SFW	192	Perennial	Yes
Big Branch	22	Perennial	Yes
SGB	18	Perennial	Yes
SGD	190	Perennial	Yes
SGE	71	Perennial	Yes
SGF	22	Perennial	Yes
SGG	63	Perennial	Yes
SGH	127	Perennial	Yes

Map ID	Length (ft.)	Classification	Compensatory Mitigation Required
SGI	24	Perennial	Yes
SGJ	58	Perennial	Yes
SGO	121	Ephemeral	No
SGP	88	Perennial	Yes
SGS	88	Perennial	Yes
Laurel Fork	1,585	Perennial	Yes
SGT	140	Perennial	Yes
SGU	110	Perennial	Yes
SGX	133	Perennial	Yes
SGY	17	Perennial	Yes
SGZ	292	Perennial	Yes
SHB	155	Perennial	Yes
SHC	27	Perennial	Yes
SHD	220	Perennial	Yes
SHE	31	Perennial	Yes
SHH	10	Perennial	Yes
SHK	165	Perennial	Yes
SHL	10	Perennial	Yes
SHO	20	Perennial	Yes
SHW	135	Perennial	Yes
SHZ	62	Ephemeral	No
SIC	92	Perennial	Yes
SID	25	Perennial	Yes
SIF	31	Perennial	Yes
SIG	379	Perennial	Yes
SIJ	23	Perennial	Yes
Total	**6,768**		

Table 5. Jurisdictional characteristics of wetlands in the study area

Map ID	Map #	NCWAM Classification	Hydrologic Classification	NCDWQ Wetland Rating	Area (ac.)	Terrestrial Community Type
WBG	3.1	Headwater Forest	Riparian	22	0.002	Maintained/Disturbed
WBK	3.1	Small-Basin Wetland	Non-Riparian	13	0.004	Maintained/Disturbed
WBL	3.1	Headwater Forest	Riparian	26	0.03	Maintained/Disturbed
WBM	3.1	Bottomland Hardwood Forest	Riparian	39	0.1	Acid Cove Forest
WBN	3.1	Bottomland Hardwood Forest	Riparian	39	0.09	Acid Cove Forest
WBT	3.2	Headwater Forest	Riparian	17	0.006	Maintained/Disturbed
WBV	3.2	Headwater Forest	Riparian	13	0.04	Maintained/Disturbed
WBW	3.2	Headwater Forest	Riparian	35	0.08	Maintained/Disturbed
WBX	3.2	Headwater Forest	Riparian	17	0.006	Maintained/Disturbed
WBZ	3.2	Headwater Forest	Riparian	26	0.11	Maintained/Disturbed
WCA	3.2	Headwater Forest	Riparian	41	0.16	Acid Cove Forest
WCC	3.2	Headwater Forest	Riparian	44	0.19	Acid Cove Forest
WCD	3.3	Headwater Forest	Riparian	17	0.04	Maintained/Disturbed
WCE	3.3	Headwater Forest	Riparian	17	0.03	Maintained/Disturbed
WCF	3.3	Headwater Forest	Riparian	9	0.02	Maintained/Disturbed
WCG	3.3	Headwater Forest	Riparian	9	0.03	Maintained/Disturbed
WCI	3.4	Headwater Forest	Riparian	33	0.13	Maintained/Disturbed
WCK	3.4	Headwater Forest	Riparian	28	0.06	Rich Cove Forest
WCN	3.5	Headwater Forest	Riparian	40	0.03	Maintained/Disturbed
WCQ	3.6	Headwater Forest	Riparian	26	0.03	Maintained/Disturbed
WCR	3.6	Headwater Forest	Riparian	17	0.07	Maintained/Disturbed
WCU	3.7	Headwater Forest	Riparian	17	0.009	Maintained/Disturbed
WCV	3.7	Headwater Forest	Riparian	9	0.007	Maintained/Disturbed
WCX	3.7	Small-Basin Wetland	Riparian	22	0.02	Maintained/Disturbed
WDA	3.8	Headwater Forest	Riparian	21	0.004	Maintained/Disturbed
WDB	3.8	Headwater Forest	Riparian	9	0.01	Maintained/Disturbed
WDC	3.8	Headwater Forest	Riparian	9	0.001	Maintained/Disturbed
				Total	**1.31**	

APPENDIX D
AGENCY RESPONSES

North Carolina Department of Cultural Resources

State Historic Preservation Office

Peter B. Sandbeck, Administrator

Michael F. Easley, Governor
Lisbeth C. Evans, Secretary
Jeffrey J. Crow, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

February 23, 2005

MEMORANDUM

TO: Gregory Thorpe, Ph.D., Director
Project Development and Environmental Analysis Branch
NCDOT Division of Highways

FROM: Peter B. Sandbeck for Peter Sandbeck

SUBJECT: NC 105 from US 221 to SR 1107, R-2566, Watauga and Avery Counties, ER 04-2452

Thank you for your letter of September 7, 2004 regarding the above project. We apologize for our delayed response.

We have conducted a search of our maps and files and located the following structure of historical or architectural importance within the general area of this project:

- AV 1 Linville Historic District (NR)
- WT 304 Prout Log House (SL), Foscoe vicinity
- WT 251 Porch-Townsend House, Foscoe vicinity, SR 1594, 0.2 mile south of junction with NC State Hwy 105
- WT 252 Ira Cox House, Foscoe vicinity, S side SR 1560, 0.9 mile south and west of junction with NC State Highway 105
- WT 300 Marjon's Antiques, Foscoe vicinity
- WT 301 Bark House, Foscoe vicinity, north side NC 105, behind Marjon's antiques
- WT 302 James A. Aldridge House, Foscoe vicinity, north side NC 105, .8 miles east of junction with SR 1594
- WT 303 Harrison Aldridge House, Foscoe vicinity, 363 Sleepy Hollow Lane, 0.3 mile southwest of junction with NC 105
- WT 375 Holy Communion Lutheran Church, Foscoe
- WT 376 Ed and Falah Hollars House, Foscoe vicinity, northeast side SR 1111, 0.1 mile west of junction with NC 105

We recommend that a Department of Transportation architectural historian identify and evaluate any structures over fifty years of age within the project area, and report the findings to us.

Three previously recorded prehistoric archaeological sites, 31WT62, 41WT64, and 31WT61, are in close proximity to the existing road. Numerous additional archaeological sites are located in the region. Furthermore, the project area has never been systematically surveyed to determine the location or significance of archaeological resources. Based on the topographic and hydrological situation, there is a high probability for the presence of prehistoric or historic archaeological sites.

We recommend that a comprehensive survey be conducted by an experienced archaeologist to identify and evaluate the significance of archaeological remains that may be damaged or destroyed by the proposed project. Potential effects on unknown resources must be assessed prior to the initiation of construction activities

As plans are available for the proposed improvements to NC 105, please forward them to us so that we may continue our review.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Seciton 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919/733-4763. In all future communication concerning this project, please cite the above referenced tracking number.

cc: Mary Pope Furr, NCDOT
Matt Wilkerson, NCDOT

North Carolina
Department of Administration

Beverly Eaves Perdue, Governor

Britt Cobb, Secretary

February 23, 2010

Mr. Gregory Thorpe
NC Department of Transportation
Project Dev. & Env. Analysis
1548 Mail Service Center
Raleigh, NC 27699-1548

Re: SCH File # 10-E-4220-0259; SCOPING; Widen NC 105 to a multi-lane facility from US 221 in Linville to SR 1107 in Boone; TIP No. R-2566

Dear Mr. Thorpe:

The above referenced environmental impact information has been reviewed through the State Clearinghouse under the provisions of the North Carolina Environmental Policy Act.

Attached to this letter are reviewer comments which identify issues to be addressed in the environmental review document. The appropriate document should be forwarded to the State Clearinghouse for compliance with State Environmental Policy Act. Should you have any questions, please do not hesitate to call me at 807-2425.

Sincerely,

Chrys Baggett (SJC)

Ms. Chrys Baggett
State Environmental Review Clearinghouse

Attachments

cc: Region D

Mailing Address:
1301 Mail Service Center
Raleigh, NC 27699-1301

Telephone: (919)807-2425
Fax (919)733-9571
State Courier #51-01-00
e-mail state.clearinghouse@doa.nc.gov

Location Address:
116 West Jones Street
Raleigh, North Carolina

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North Carolina Department of Environment and Natural Resources

Beverly Eaves Perdue
Governor

Dee Freeman
Secretary

MEMORANDUM

TO: Valerie McMillan
State Clearinghouse

FROM: Melba McGee
Environmental Review Coordinator

RE: 10-0259 Scoping Proposed Improvements to NC 105 in Avery Watauga County

DATE: February 22, 2010

The Department of Environment and Natural Resources has reviewed the proposed project. The attached comments are for the applicant's consideration. More specific comments will be provided during the environmental review process.

Thank you for the opportunity to respond. If during the preparation of the environmental document, additional information is needed, the applicant is encouraged to notify our respective divisions.

Attachments

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NCDENR
North Carolina Department of Environment and Natural Resources
Division of Water Quality
Coleen H. Sullins
Director

Beverly Eaves Perdue
Governor

Dee Freeman
Secretary

January 25, 2010

MEMORANDUM

To: Greg Thorpe, NCDOT

From: Amy Euliss, NC Division of Water Quality, Office

Subject: Scoping comments on proposed improvements to NC 105 in Avery-Watauga County, State Project No. WBS#37512.1.1, TIP R-2566.

Reference your correspondence dated December 28, 2009 in which you requested comments for the referenced project. Preliminary analysis of the project reveals the potential for multiple impacts to streams and jurisdictional wetlands in the project area. More specifically, impacts to:

Stream Name	River Basin	Stream Classification(s)	Stream Index Number
Linville River	Caldwell	C;Tr	11-24-(1)
Little Grassy Creek	Caldwell	C;Tr;ORW	11-29-2
Watauga River and Unnamed Tributaries	Watauga	B;Tr;HQW	8-(1)
Valley Creek	Watauga	C;Tr*	8-4
Big Branch	Watauga	C*	8-14
Laurel Fork and Unnamed Tributaries	Watauga	C*	8-10

*Waters or portions of waters within one mile and draining to HQW shall carry HQW classifications

Further investigations at a higher resolution should be undertaken to verify the presence of other streams and/or jurisdictional wetlands in the area. In the event that any jurisdictional areas are identified, the Division of Water Quality requests that NCDOT consider the following environmental issues for the proposed project:

Project Specific Comments:

1. In the Purpose and Need for this project, please define the need for a 4-lane divide facility beyond the project being part of the Strategic Highway Corridor. The need should include traffic analyses, and discuss why facilities with a smaller footprint will not meet the proposed need for the project. The need should also clearly discuss the reasons for the high variation in the traffic analyses presented in the scoping document.

2. A robust post construction stormwater management plan shall be prepared for the entire length of this project.

Transportation Permitting Unit
1650 Mail Service Center, Raleigh, North Carolina 27699-1650
Location: 2321 Crabtree Blvd., Raleigh, North Carolina 27604
Phone: 919-733-1786 \ FAX: 919-733-6893
Internet: http://h2o.enr.state.nc.us/ncwetlands/

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3. Linville River, Little Grassy Creek, Watauga River, Valley Creek, and all of their Unnamed Tributaries Creek are Trout waters of the State. NCDWQ recommends that the most protective sediment and erosion control BMPs be implemented to reduce the risk of turbidity violations in trout waters. In addition, all disturbances within trout buffers shall be conducted in accordance with NC Division of Land Resources and NC Wildlife Resources Commission requirements.

4. Review of the project reveals the presence of surface waters classified as C; High Quality Waters of the State in the project study area including the Watauga River, its Unnamed Tributaries. Also all or portions of Valley Creek, Big Branch, and Laurel Fork are within one mile and draining to waters classified HQW. This is one of the highest classifications for water quality. Pursuant to 15A NCAC 2H .1006 and 15A NCAC 2B .0224, NCDOT will be required to obtain a State Stormwater Permit prior to construction except in North Carolina's twenty coastal counties.

5. Review of the project reveals the presence of surface waters classified as C;Tr; Outstanding Resource Waters of the State in the project study area, including Little Grassy Creek. The water quality classification of C; ORW is one of the highest classifications in the State. NCDWQ is extremely concerned with any impacts that may occur to streams with this classification. It is preferred that these resources be avoided if at all possible. If it is not possible to avoid these resources, the impacts shall be minimized to the greatest extent possible. Given the potential for impacts to these resources during the project implementation, NCDWQ requests that NCDOT strictly adhere to North Carolina regulations entitled "Design Standards in Sensitive Watersheds" (15A NCAC 04B .0124) throughout design and construction of the project. Pursuant to 15A NCAC 2H .1006 and 15A NCAC 2B .0224, NCDOT will be required to obtain a State Stormwater Permit prior to construction except in North Carolina's twenty coastal counties.

General Project Comments:

1. The environmental document shall provide a detailed and itemized presentation of the proposed impacts to wetlands and streams with corresponding mapping. If mitigation is necessary as required by 15A NCAC 2H.0506(h), it is preferable to present a conceptual (if not finalized) mitigation plan with the environmental documentation. Appropriate mitigation plans will be required prior to issuance of a 401 Water Quality Certification.

2. Environmental assessment alternatives shall consider design criteria that reduce the impacts to streams and wetlands from storm water runoff. These alternatives shall include road designs that allow for treatment of the storm water runoff through best management practices as detailed in the most recent version of NCDWQ *Stormwater Best Management Practices*, such as grassed swales, buffer areas, preformed scour holes, retention basins, etc.

3. After the selection of the preferred alternative and prior to an issuance of the 401 Water Quality Certification, NCDOT is respectfully reminded that they will need to demonstrate the avoidance and minimization of impacts to wetlands (and streams) to the maximum extent practical. In accordance with the Environmental Management Commission's Rules {15A NCAC 2H.0506(h)}, mitigation will be required for impacts of greater than 1 acre to wetlands. In the event that mitigation is required, the mitigation plan shall be designed to replace appropriate lost functions and values. The NC Ecosystem Enhancement Program may be available for use as wetland mitigation.

4. In accordance with the Environmental Management Commission's Rules {15A NCAC 2H.0506(h)}, mitigation will be required for impacts of greater than 150 linear feet to any single stream. In the event that mitigation is required, the mitigation plan shall be designed to replace appropriate lost functions and values. The NC Ecosystem Enhancement Program may be available for use as stream mitigation.

5. NCDWQ is very concerned with sediment and erosion impacts that could result from this project. NCDOT shall address these concerns by describing the potential impacts that may occur to the aquatic environments and any mitigating factors that would reduce the impacts.

6. If a bridge is being replaced with a hydraulic conveyance other than another bridge, NCDWQ believes the use of a Nationwide Permit may be required. Please contact the US Army Corp of Engineers to determine the required permit(s).

7. If the old bridge is removed, no discharge of bridge material into surface waters is allowed unless otherwise authorized by the US ACOE. Strict adherence to the Corps of Engineers guidelines for bridge demolition will be a condition of the 401 Water Quality Certification.

8. Whenever possible, NCDWQ prefers spanning structures. Spanning structures usually do not require work within the stream or grubbing of the streambanks and do not require stream channel realignment. The horizontal and vertical clearances provided by bridges shall allow for human and wildlife passage beneath the structure. Fish passage and navigation by canoeists and boaters shall not be blocked. Bridge supports (bents) shall not be placed in the stream when possible.

9. Bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means (grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. Please refer to the most current version of NCDWQ's *Stormwater Best Management Practices.*

10. If concrete is used during construction, a dry work area shall be maintained to prevent direct contact between curing concrete and stream water. Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills.

11. If temporary access roads or detours are constructed, the site shall be graded to its preconstruction contours and elevations. Disturbed areas shall be seeded or mulched to stabilize the soil and appropriate native woody species should be planted. When using temporary structures the area shall be cleared but not grubbed. Clearing the area with chain saws, mowers, bush-hogs, or other mechanized equipment and leaving the stumps and root mat intact allows the area to re-vegetate naturally and minimizes soil disturbance.

12. Placement of culverts and other structures in waters, streams, and wetlands shall be below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and down stream of the above structures. The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by NCDWQ. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact NCDWQ for guidance on how to proceed and to determine whether or not a permit modification will be required.

13. If multiple pipes or barrels are required, they shall be designed to mimic natural stream cross section as closely as possible including pipes or barrels at flood plain elevation, floodplain benches, and/or sills may be required where appropriate. Widening the stream channel shall be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage.

14. If foundation test borings are necessary; it should be noted in the document. Geotechnical work is approved under General 401 Certification Number 3624/Nationwide Permit No. 6 for Survey Activities.

15. Sediment and erosion control measures sufficient to protect water resources must be implemented and maintained in accordance with the most recent version of North Carolina Sediment and Erosion Control Planning and Design Manual and the most recent version of NCS000250.

16. All work in or adjacent to stream waters shall be conducted in a dry work area unless otherwise approved by NCDWQ. Approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual such as sandbags, rock berms, cofferdams and other diversion structures should be used to prevent excavation in flowing water.

17. Sediment and erosion control measures shall not be placed in wetlands and streams.

18. Borrow/waste areas shall avoid wetlands to the maximum extent practical. Impacts to wetlands in borrow/waste areas could precipitate compensatory mitigation.

19. While the use of National Wetland Inventory (NWI) maps, NC Coastal Region Evaluation of Wetland Significance (NC-CREWS) maps and soil survey maps are useful tools, their inherent inaccuracies require that qualified personnel perform onsite wetland delineations prior to permit approval.

20. Heavy equipment shall be operated from the bank rather than in stream channels in order to minimize sedimentation and reduce the likelihood of introducing other pollutants into streams. This equipment shall be inspected daily and maintained to prevent contamination of surface waters from leaking fuels, lubricants, hydraulic fluids, or other toxic materials.

21. In most cases, NCDWQ prefers the replacement of the existing structure at the same location with road closure. If road closure is not feasible, a temporary detour should be designed and located to avoid wetland impacts, minimize the need for clearing and to avoid destabilizing stream banks. If the structure will be on a new alignment, the old structure shall be removed and the approach fills removed from the 100-year floodplain. Approach fills should be removed and restored to the natural ground elevation. The area shall be stabilized with grass and planted with native tree species. Tall fescue shall not be used in riparian areas.

22. Riprap shall not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be properly designed, sized and installed.

Thank you for requesting our input at this time. NCDOT is reminded that issuance of a 401 Water Quality Certification requires that appropriate measures be instituted to ensure that water quality standards are met and designated uses are not degraded or lost. If you have any questions or require additional information, please contact Amy Euliss at (336) 771-4959.

cc: Monte Matthews, US Army Corps of Engineers, Raleigh Field Office
Federal Highway Administration
Chris Militscher, Environmental Protection Agency (electronic copy only)
Marla Chambers, NC Wildlife Resources Commission (electronic copy only)
Wetlands/401 Transportation Permitting Unit
File Copy
~~Melba McGee~~ - Env. Coordinator, NCDENR.

NCDENR
North Carolina Department of Environment and Natural Resources

Beverly Eaves Perdue
Governor

Dee Freeman
Secretary

February 16, 2010

MEMORANDUM

TO: Melba McGee, DENR Environmental Coordinator

FROM: Harry LeGrand, Natural Heritage Program

SUBJECT: Scoping – Widen NC 105 to a Multi-lane Facility from US 221 in Linville to SR 1107 in Boone; Avery and Watauga counties; TIP No. R-2566

REFERENCE: Project No. 10-0259

The Natural Heritage Program has numerous records of rare species, significant natural communities, significant natural heritage areas, and conservation/managed areas within the project area. The comments below are arranged from south (Linville end) to north (Boone end).

There is a location of a State Significantly Rare plant – bog featherbells (*Stenanthium gramineum var. robustum*) located in the vicinity of the intersection of NC 105 and US 221, on the northeastern corner (see enclosed). We encourage that a survey for this plant be conducted (preferably in late summer, when blooming) to determine if there will be impacts to the population.

Roughly a mile north of Linville, there is a location of a County significant natural area, known as Brier Knob (see enclosed). This is a privately-owned, unprotected site, and it lies along the western side of NC 105. If the road is widened to the west, a very slight impact might occur, though the significance of the site lies higher up the slopes.

Just west of the intersection of NC 105 and NC 184 is the State significant Linville Gap Bog (see enclosed reports). This is an unprotected site, though it contains a very important Southern Appalachian bog and seven rare plants – five of which are believed to still be present (see enclosed). If NC 105 is widened to the west, there may be impacts to the edge of the bog. Thus, we recommend that NC 105 be widened to the east of the existing road here, if at all possible/feasible. If not feasible on the east, then it is imperative that there be proper sedimentation controls in place on the west side, to prevent mud and other sediments from reaching this important site.

At several places along the east side of the existing NC 105, portions of the large and Nationally significant Grandfather Mountain, owned in part by The Nature Conservancy (Grandfather Mountain Preserve) and by the N.C. Division of Parks and Recreation (Grandfather Mountain State Park), abut or lie very close to the existing road. The TNC property is also a Dedicated State Nature Preserve, which may preclude impacts such as highway expansion. The TNC property lies directly across from the Linville Gap Bog (east of NC 105), though not quite reaching NC 105, and also literally abutting the existing NC 105 farther northeastward, in Watauga County (see the color map enclosed). State Parks owns the portion of the mountain between the two TNC portions, and State Parks land also reaches NC 105, about 0.5 - 0.9 road-mile northeast of the NC 184 intersection. This State Parks land is not yet Dedicated. However, the NC Department of Transportation needs to consult with each of these entities

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(TNC and State Parks) regarding any expansion of NC 105 on the east side, as their lands might well be taken. Between the Parks property and the northern tip of TNC land is a record of a State Significantly Rare mayfly (*Drunella lata*), recorded in 1988, from the Watauga River. Our Program certainly recommends that any widening of NC 105 in this area (adjacent to Grandfather Mountain) take place on the west side of the existing road, also because of the presence of the Watauga River on the east side of the road.

North of Grandfather Mountain, there is a High Country Conservancy easement of 21.02 acres, located on the southeastern side of NC 105 (see enclosed map). As this easement abuts NC 105, we recommend that NC 105 not be widened to the east because of the easement and because of the location of the Watauga River, which runs along the east side near NC 105. In any case, NC DOT should contact the High Country Conservancy about this project.

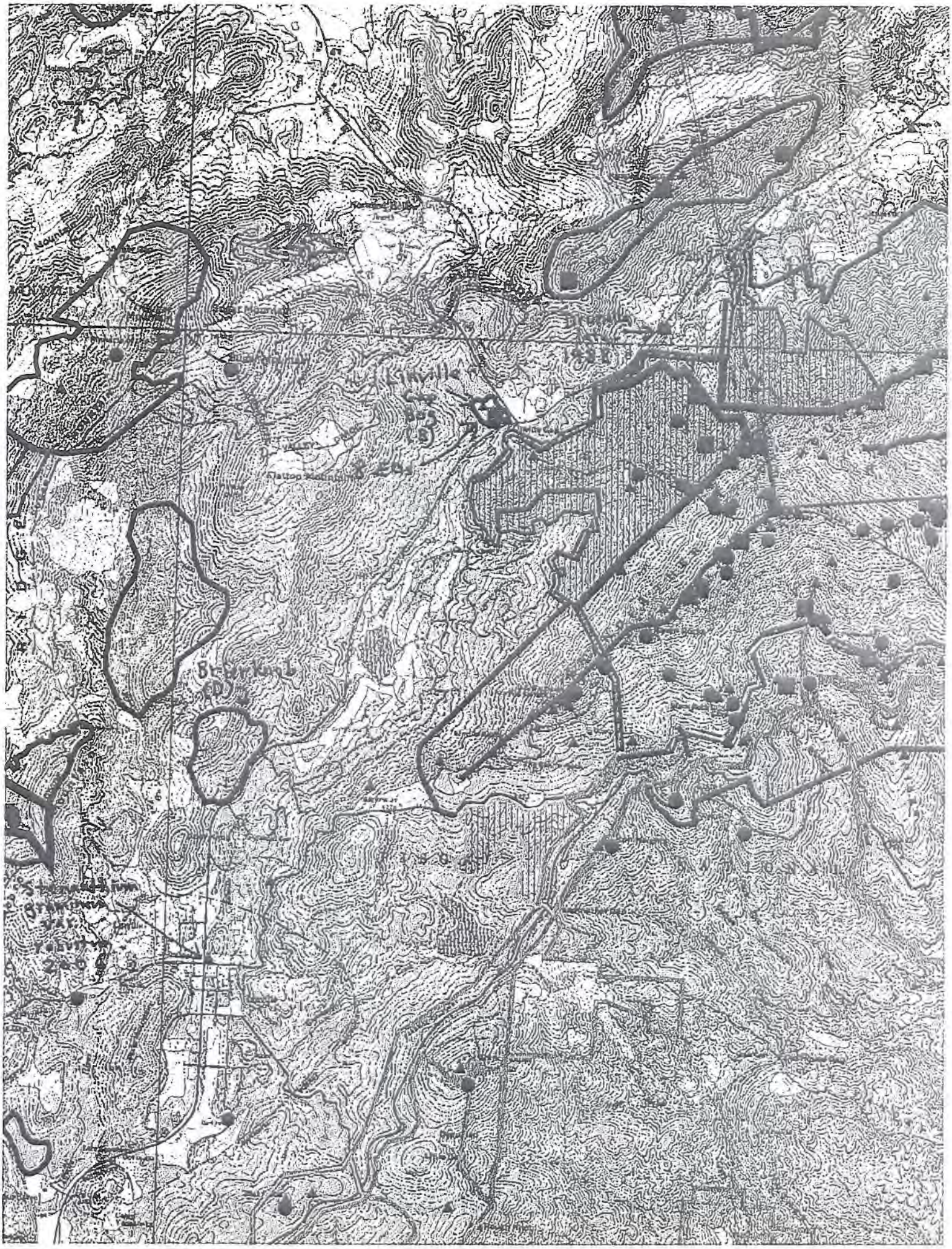
There are several rare aquatic species in the Watauga River from the Shulls Mill vicinity northward (downstream) for about 1.5 air miles (at the Laurel Fork confluence, where the river bends westward away from NC 105) (see red dots on enclosed maps). This stretch of river is a Natural Heritage site of Regional significance named the Watauga River Aquatic Habitat. It contains an existing and important population of the State Special Concern and Federal Species of Concern hellbender (*Cryptobranchus alleganiensis*), as well as an existing population of the State Special Concern longtail salamander (*Eurycea longicauda*) (see locations on enclosed maps). Because NC 105 runs very close to the river for this 1.5-mile stretch, we recommend that widening of the highway take place on the west side, opposite the river. If not feasible to the west, then it is imperative that proper sedimentation controls be in place to prevent sediment from reaching this important stretch of river.

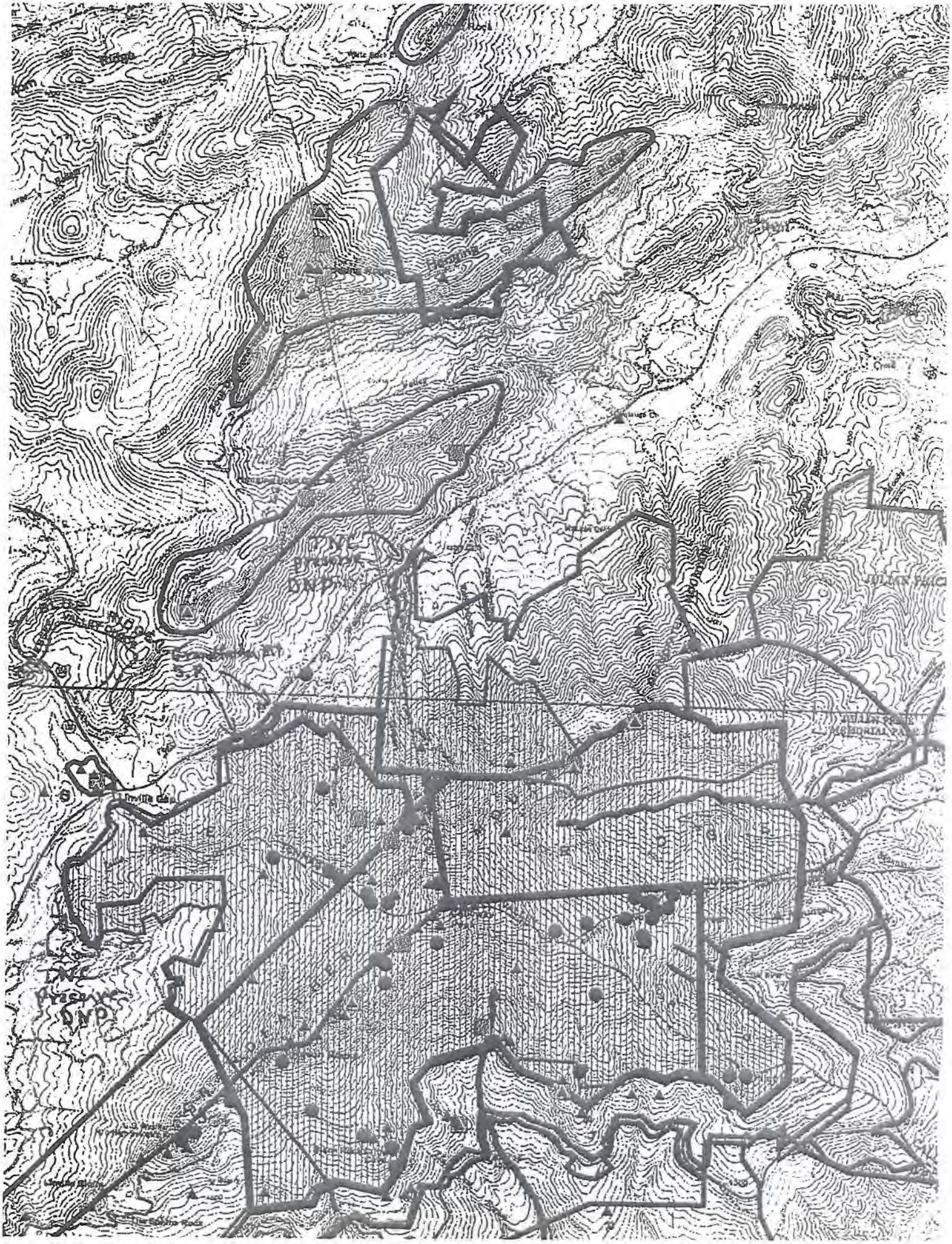
Farther to the northeast, away from the river, our Program has locations for two rare plants (see enclosed maps), though each appears to be located on forested slopes well away from the existing NC 105 and would not likely be impacted by widening.

In summary, our Program has concerns about the following important locations along the proposed project route: Grandfather Mountain, Linville Gap Bog, and the section of the Watauga River from Shulls Mill to the Laurel Fork junction. We hope that no impact at all will be made to these three sites. Other concerns involve potential impacts to a bog featherbells population, to an unprotected natural area (Brier Knob), to a mayfly location in the river, and to a conservation easement (High Country Conservancy).

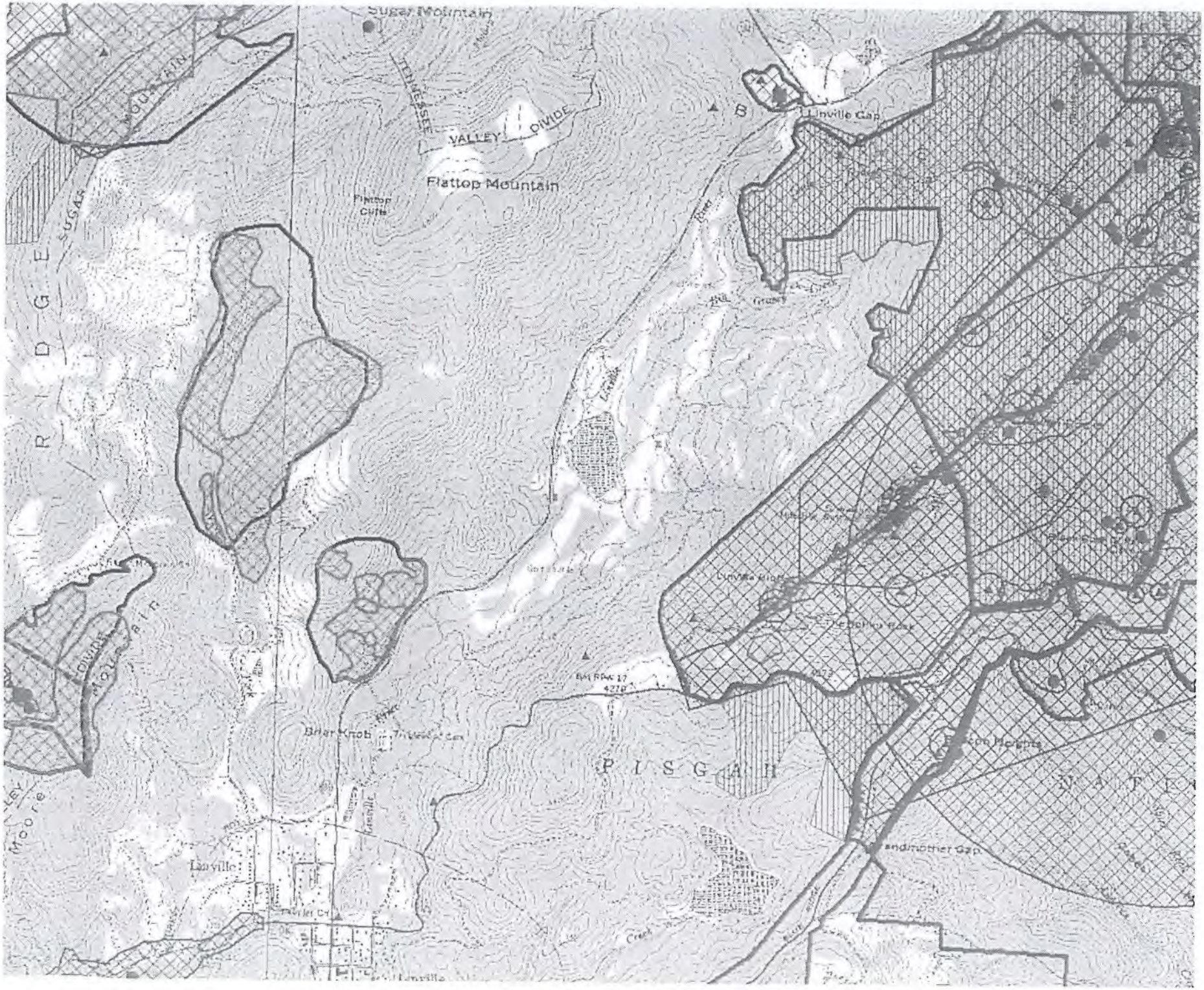
Please do not hesitate to contact me at 919-715-8697 if you have questions or need further information.

Enclosures



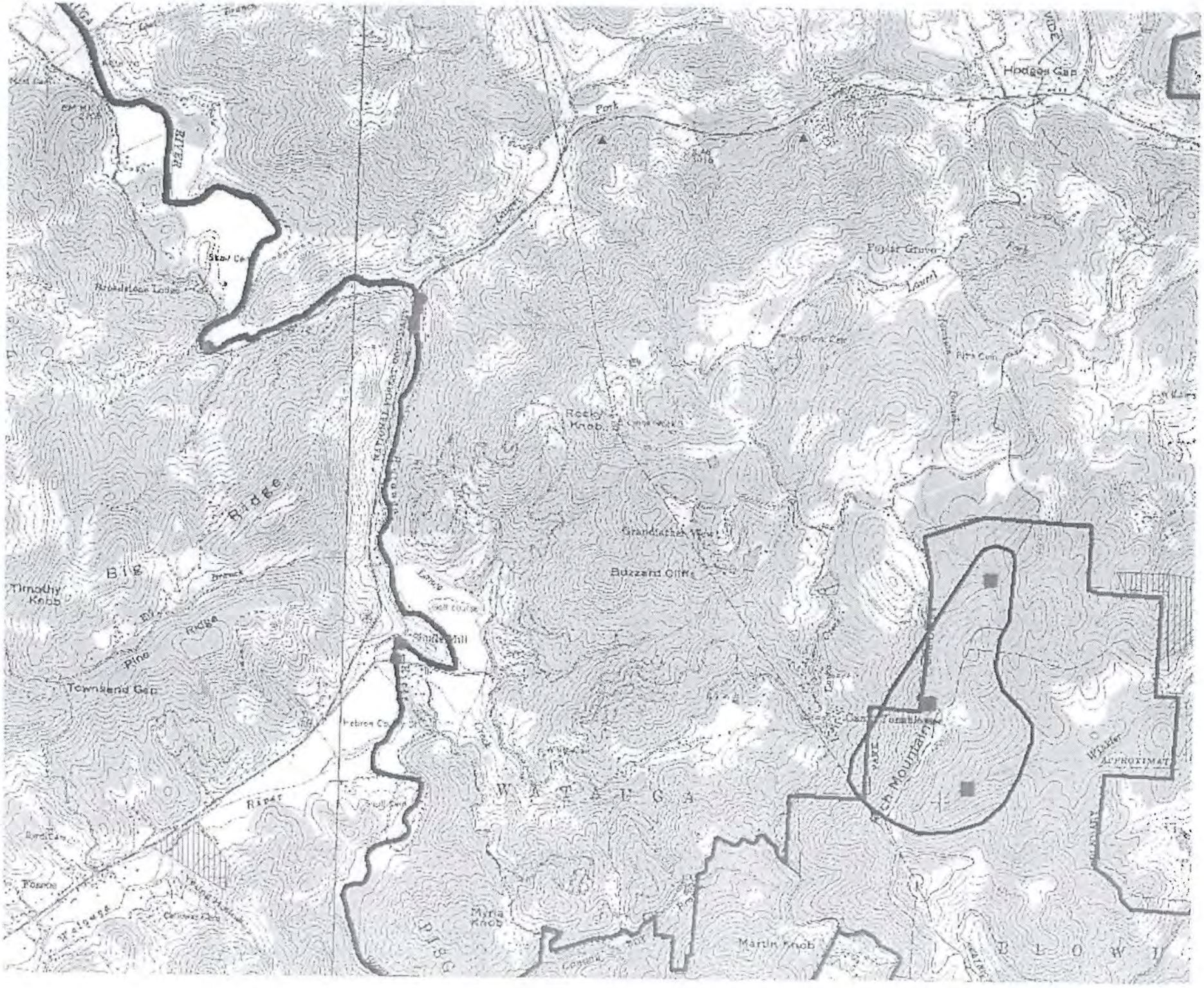


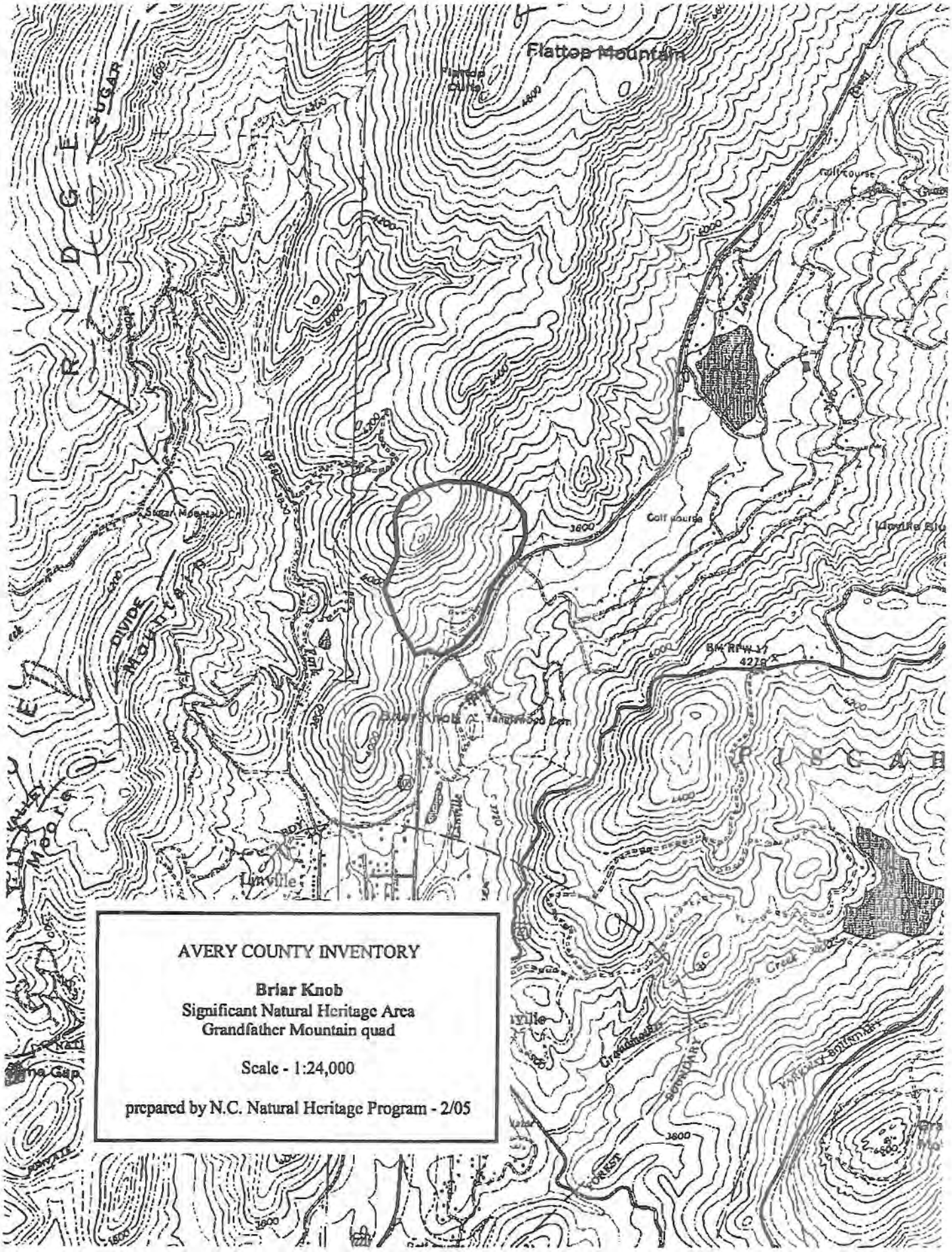

Oak Grove
FORK
Hodges Gap
Walla Walla
RIVER
Mill Creek
Mt Logan
Summit
Green Knob


Sugar Mountain
TENNESSEE
VALLEY
DIVIDE
Flattop Mountain
Flattop Cliffs
Unville Gap
B
R I D G E
SUGAR
MOUNTAIN
Briar Knob
Linville
Moore
P I S G A H
N A T I
and another Gap



JULIAN PRICE
JULIAN PRICE MEMORIAL PARK
GRANDFATHER MOUNTAIN
WATAUGA CO
AVERY CO
Hanging Rock
Dark Hollow
Falls Hollow
Valley
BLUE RIDGE
VALLEY DIVIDE
Linville Gap


Hedges Gap
Poplar Grove
Rocky Knob
Grandfather View
Buzzard Cliffs
Big
Timothy Knob
Pine Ridge
Townsend Gap
Ridge
Rocky Mountain
Martin Knob
Myra Knob
Walnut
Cabin
Trail
Creek
Branch
Fork
Laurel
Spring
Hebron Cem.
Poplar Grove Cem.
Pitts Cem.
Grandfather Mountain
APPROXIMAT
W A T A U G A
B E L O W



AVERY COUNTY INVENTORY

Briar Knob
Significant Natural Heritage Area
Grandfather Mountain quad

Scale - 1:24,000

prepared by N.C. Natural Heritage Program - 2/05

Avery County Natural Areas Inventory

BRIER KNOB

Site Significance: County
Quadrangle: Grandfather Mountain
Size: 113 acres
Ownership: Private

SIGNIFICANT FEATURES: Brier Knob contains good examples of a mature Rich Cove Forest, as well as fairly good examples of Acidic Cove Forest and Chestnut Oak Forest.

LANDSCAPE RELATIONS: The land to the west of Brier Knob is extensively cleared. To the north, east, and south, the site is bordered by residential developments and NC Hwy 105. Brier Knob is contiguous with some large undeveloped parcels to the northwest, near West Fork Forest and Swamp Forest-Bog. Grandfather Mountain lies one mile to the east and the Sugar Mountain Natural Area is less than one air mile to the west.

SITE DESCRIPTION: Brier Knob consists of a southeastern-facing slope bordered to the west by pastureland and to the southeast by highway 105. To the north lies the resort community of Linville Ridge. The bulk of the site is northeast of the actual Brier Knob. A good variety of fairly mature plant and animal habitats are present. The topographic high point at the northwest corner and adjoining north slopes support a fair quality Chestnut Oak Forest. The closed canopy is dominated by chestnut oak (*Quercus montana*), red oak (*Quercus rubra*), and sweet birch (*Betula lenta*). A diverse subcanopy is characterized by Fraser's magnolia (*Magnolia fraseri*), Canada hemlock (*Tsuga canadensis*), striped maple (*Acer pensylvanicum*), American chestnut (*Castanea dentata*) sprouts, and American beech (*Fagus grandifolia*). A patchy but dense shrub layer is primarily dominated by great laurel (*Rhododendron maximum*), with the occasional witch hobble (*Viburnum lantanoides*) and flame azalea (*Rhododendron calendulaceum*). Spotted wintergreen (*Chimaphila maculata*), closed gentian (*Gentiana clausa*), pink lady's-slipper (*Cypripedium acaule*), and Christmas fern (*Polystichum acrostichoides*) grow in the sparse herb layer.

A large rock outcrop system under a semi-closed canopy at the mountaintop and trending southwest supports a very diverse herb layer, including Indian cucumber-root (*Medeola virginiana*), speckled wood lily (*Clintonia umbellulata*), yellow mandarin (*Disporum lanuginosum*), rock polypody (*Polypodium virginianum*), rock tripe lichen (*Umbillicaria mammulata*), reindeer moss lichen (*Cladina* spp.), and marginal wood fern (*Dryopteris marginalis*). A fairly well-developed shrub layer is supported on the outcrop system, with blueberries (*Vaccinium* spp.), minnie-bush (*Menziesia pilosa*), and mountain laurel (*Kalmia latifolia*).

South and southeast from the summit, the chestnut oak-dominated canopy gives way to a mature Rich Cove Forest. The closed canopy is dominated by a mix of mesophytic trees such as tulip poplar (*Liriodendron tulipifera*), white ash (*Fraxinus americana*), red oak, basswood (*Tilia heterophylla*), sugar maple (*Acer saccharum*), and sweet birch. A well-developed subcanopy features witch hazel (*Hamamelis virginiana*), Canada hemlock, cucumber tree (*Magnolia acuminata*), Fraser's magnolia, American beech, and serviceberry (*Amelanchier laevis*). An

occasional great laurel and mountain laurel grow in the sparse shrub layer. The dense and diverse herb layer is characterized by wood nettle (*Laportea canadensis*), intermediate wood fern (*Dryopteris intermedia*), Indian cucumber-root, wild lily-of-the-valley (*Convallaria montana*), yellow mandarin, black cohosh (*Actaea racemosa*), blue cohosh (*Caulophyllum thalictroides*), jack-in-the-pulpit (*Arisaema triphyllum*), wild yam (*Dioscorea villosa*), and wild sarsaparilla (*Aralia nudicaulis*). An area within this forest has boulders comprising the majority of the ground cover, with the only soil being accumulations of organic matter on and between the rocks. Skunk currant (*Ribes glandulosum*) is common on the boulders.

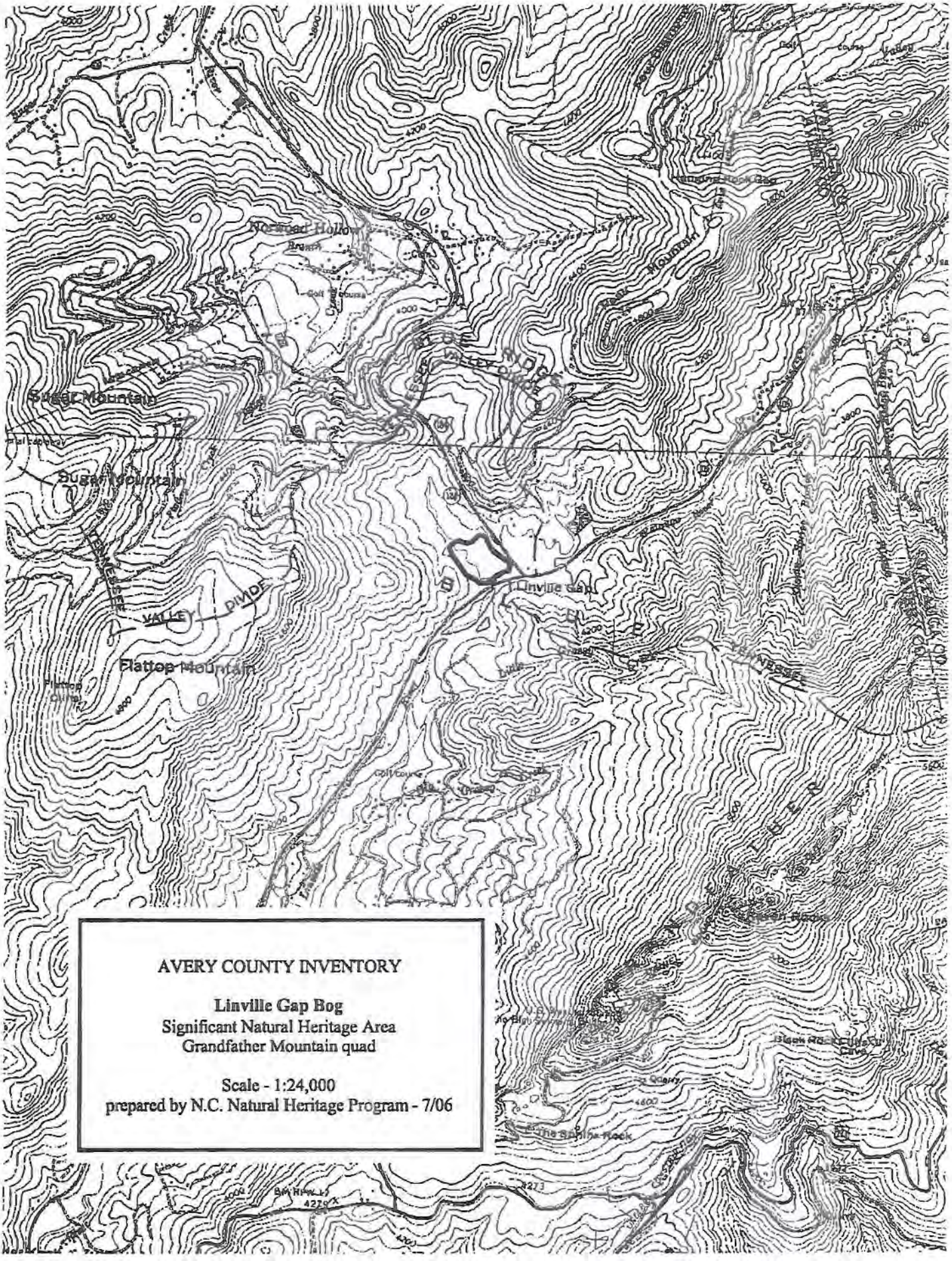
The southern and northeastern portions of the site contain small but mature examples of Acidic Cove Forest natural communities. The closed canopy is dominated by a mix of tulip poplar, sweet birch, red oak, and yellow birch (*Betula alleghaniensis*). Canada hemlock is common in both the understory and canopy. The shrub layer is completely dominated by dense thickets of great laurel. A very sparse herb layer has the occasional patch of galax (*Galax urceolata*) and Christmas fern.

MANAGEMENT AND PROTECTION: Allowing forests to continue to mature will increase their ecological significance. This site is privately-owned and is a good candidate for conservation.

NATURAL COMMUNITIES: Chestnut Oak Forest, Rich Cove Forest, Acidic Cove Forest.

REFERENCES:

Smith, P. 2004. Site Survey Report: Brier Knob. Natural Heritage Program, OCCA, DENR, Raleigh.


Sugar Mountain
Sugar Mountain
Flattop Mountain
Linville Gap
Linville Gap
Linville Gap Bog
Significant Natural Heritage Area
Grandfather Mountain quad
Scale - 1:24,000
prepared by N.C. Natural Heritage Program - 7/06

LINVILLE GAP BOG

(Permission to survey this site during the inventory was not granted. The following is a summary of data available from other sources, some of which may no longer be current.)

Site Significance: State
Quadrangle: Grandfather Mountain
Size: 15 acres
Ownership: Private

SIGNIFICANT FEATURES: This site contains an example of the very rare Southern Appalachian Bog natural community. The Linville Gap Bog supports the Federal Species of Concern plants Gray's lily (*Lilium grayi,* State Threatened) and bog bluegrass (*Poa paludigena*, State Endangered). In addition to these species, the bog supports populations of the Significantly Rare cranberry (*Vaccinium macrocarpon*), blunt-lobed grape fern (*Botrychium oneidense*), necklace sedge (*Carex projecta*), and Bailey's sedge (*Carex baileyi*). The Watch List species narrowleaf willowherb (*Epilobium leptophyllum*) and crested woodfern (*Dryopteris cristata*) also grow in the bog.

LANDSCAPE RELATIONS: The Linville Gap Bog, also known as Invershiel Bog, occupies a broad low-lying area northwest of the intersection of Highways 105 and 184. Areas surrounding the bog are largely developed for commercial and residential use. Southeast and directly across Highway 105 is the nationally significant Grandfather Mountain. Dun Vegan Mountain lies approximately one-half air mile to the northeast.

SITE DESCRIPTION: Located directly across Highway 105 from Grandfather Mountain at an elevation of 4,050 feet, the Linville Gap Bog is a classic example of the rare Southern Appalachian Bog (Northern Subtype) natural community. A semi-open to open canopy features red spruce (*Picea rubens*), Canada hemlock (*Tsuga canadensis*), white pine (*Pinus strobus*), and red maple (*Acer rubrum*). Shrubs within the bog include silky willow (*Salix sericea*), maleberry (*Lyonia ligustrina*), dog hobble (*Leucothoe fontanesiana*), hawthorn (*Crateagus* sp.), great laurel (*Rhododendron maximum*), blueberry (*Vaccinium corymbosum*), swamp rose (*Rosa palustris*), and the Significantly Rare cranberry (*Vaccinium macrocarpon*). A diverse herb layer includes bulrush (*Juncus effusus*); manna grass (*Glyceria striata*); the Federal Species of Concern/State Endangered bog bluegrass (*Poa paludigena*); and sedges (*Carex* spp.), including the Significantly Rare Bailey's sedge (*Carex baileyi*) and necklace sedge (*Carex projecta*). Other herbs include the Federal Species of Concern/State Threatened Gray's lily (*Lilium grayi*), the Significantly Rare blunt-lobed grape fern (*Botrychium oneidense*), goldenrods (*Solidago* spp.), crested wood fern (*Dryopteris cristata*), Small's ragwort (*Packera anonyma*), narrowleaf willowherb (*Epilobium leptophyllum*), and peatmosses (*Sphagnum* spp.).

Areas surrounding the bog to the west and northwest are largely a mesophytic mix of trees, including tulip poplar (*Liriodendron tulipifera*), red oak (*Quercus rubra*), sugar maple (*Acer saccharum*), and red maple. Red spruce, Canada hemlock, and white pine are more prevalent to the northwest.

MANAGEMENT AND PROTECTION: Continued protection of the Linville Gap Bog by the owners is highly recommended. This site would be a good candidate for a conservation agreement. Continued development within the watershed has increased siltation into the headwaters of the Elk River, which subsequently will impact the bog. To reduce this impact, proper anti-siltation practices are necessary during construction.

NATURAL COMMUNITIES: Southern Appalachian Bog.

RARE PLANTS: bog bluegrass (*Poa paludigena*), Gray's lily (*Lilium grayi*), necklace sedge (*Carex projecta*), cranberry (*Vaccinium macrocarpon*), blunt-lobed grape fern (*Botrychium oneidense*), Bailey's sedge (*Carex baileyi*); Watch List – narrowleaf willowherb (*Epilobium leptophyllum*), crested wood fern (*Dryopteris cristata*).

REFERENCES:

Reece, J. 2002. Memo to High Country Conservancy Regarding Updated Status of Invershiel Bog. Boone, NC.

Scott, S. 1971. The Cranberry Bog Project-Invershiel Bog. Report to Department of Natural and Economic Resources, Raleigh NC 27611.

Significant Natural Heritage Area Report

16 February 2010

Name Linville Gap Bog

IDENTIFIERS

Site ID 908

Site Alias Inversbiel Bog
Cranberry Bog

Macro Site Name

Mega Site Name

Site Relations Grandfather Mountain is adjacent.

Owner Abbr.	Owner	Owner Comments
PRV	LINVILLE RIDGE RESORT	

LOCATORS

County Avery (NC)

Latitude 360709N **Longitude** 0815032W

Quad Grandfather Mountain **Watershed** Upper Catawba

Directions Southwest of the junction of NC 105 and NC 184.

SITE DESCRIPTION

Minimum Elevation:	4,040.00 **Feet**	1,231.39 **Meters**	**Survey** R
Maximum Elevation:	4,040.00 **Feet**	1,231.39 **Meters**	

Site Description This site is a Southern Appalachian Bog community is a flat, small valley. The bog is well-developed, with wet and drier zones. A number of rare plant species are present, including narrowleaf willow-herb (Epilobium leptophyllum) and cranberry (Vaccinium macrocarpon). Invasion by trees have occurred in recent years, and the bog seems to be getting drier despite lack of drainage. A beaver pond has affected the lower end. Slopes on western edge of site support a population of watch list Fraser's sedge (Cymophyllus fraserianus).

Key Enviro Factors

Climate Description

Land Use History

Cultural Features

Additional Topics W# BOG

SITE DESIGN

Site Mapped Y - Yes **Mapped Date**

Designer

Boundary Justification

Primary and Secondary Area 14.74 Acres **Primary Area** 14.74 Acres

Site Comments

Ground Survey Date 2002 **Aerial Survey Date**

SITE SIGNIFICANCE

Significance State

Site Significance Comments Southern Appalachian Bog (Northern Subtype) is considered one of the best in the state, but recent deterioration may have reduced its significance. State significant population of Vaccinium macrocarpon.

Biodivsig rating B2 - Very high

Biodivsig Comments B ranked Southern Appalachian Bog

Other Values

Significant Natural Heritage Area Report

16 February 2010

Name Linville Gap Bog

Other Values Comments

Protection Urgency P2 - Threat/opportunity within 5 years

Protection Urgency Comments

Management Urgency

Management Urgency Comments

REAL ESTATE/PROTECTION

Conservation Intentions Registry

Number of Tracts 1.00

Designation

Protection Comments No protection status

MANAGEMENT

Land Use Comments

Natural Hazard Comments

Exotics Comments

Offsite The bog is surrounded by commercial development.

Information Needs Need to thoroughly assess the current condition and determine management needs.

Management Needs May need clearing of invading trees and shrubs.

Managed Area Relations

ELEMENT OCCURRENCES

Scientific Name	Common Name	G Rank	S Rank	EO Rank	EO ID
Carex baileyi	Bailey's Sedge	G4	S2	H	23573
Carex projecta	Necklace Sedge	G5	S1	E	1622
Epilobium ciliatum	Purpleleaf Willowherb	G5	S2	E	22623
Lilium grayi	Gray's Lily	G3	S3	D?	19428
Poa paludigena	Bog Bluegrass	G3	S1	E	4225
Sceptridium oneidense	Blunt-lobed Grape-fern	G4Q	S2	H	3513
Vaccinium macrocarpon	Cranberry	G4	S2	A	10897
Southern appalachian bog (northern subtype)		G1G2T1T:	S1S2	B	19474

REFERENCES

Reference Code	Full Citation
F02CON01NCUS	Contributed. Field forms or similar data contributed to the NC NHP by persons or organizations outside the program.
G06SMI01NCUS	Smith, Peter, Ann Kelly and Kristen Sinclair. 2006. Avery County Natural Areas Inventory. (Field work by P. Smith).
F07CON01NCUS	Contributed. Field forms or similar data contributed to the NC NHP by persons or organizations outside the program.

VERSION

Version Date 2006-05-24

Version Author Amoroso

EO ID 24131 **Scientific Name** *Stenanthium gramineum var. robustum* **EO Number** 6

Summary

Nation US **State** NC
Common Name Bog Featherbells **ELCODE** PMLIL1W013
Federal Protection Status **State Protection Status** SR-P **Global Rank** G3G5Q **State Rank** S1

Locators/Directions

USGS Quad Name
Grandfather Mountain

County Name
Avery (NC)

Watershed
03050101 - Upper Catawba
Latitude 360417N **Longitude** 0815212W

Site Name

Survey Site
Linville

Directions Linville - at intersection of NC 221 and NC 105, "on the left side [east] when turning onto 221 from 105" (Reese pers. comm. 2006).

Survey Information

Basic EO Rank B? - Possibly good estimated viability **EO Rank Date** 2006-08-28
EO Rank Comment
EO Data Approximately 25 flowering stems observed 28 August 2006 by Reese, Zawadzki, and Evans (Reese pers. comm 2006).

Survey Type

Surveyor Jerry Reese
Surveyor Alice Zawadzki, NC Native Plant Society
Surveyor Rob Evans, NCPCP

Survey Date 2006-08-28 **First Observation Date** 2006-08-28 **Last Observation Date** 2006-08-28
Data Sensitive Element N **Comments**
Monitoring Needs Comments
Research Needs Comments
Additional Inventory Needed N **Comments**

Description

General Description Occurring in a powerline, which had recently been sprayed with herbicide, along with Celastrus orbiculata and Clematis paniculata -- possibly planted (Reese pers. comm. 2006).
Min. Elevation 3,640 **feet** **Max. Elevation** 3,640 **feet**
EO Observed Area **acres**
Rep Accuracy Medium **Separation Comments**
General Comments:

Ownership/Protection

Managed Area **Contained**
Owner Name Linville Resort **Owner Note**
Owner Comments
Management Comments Apparantly not affected by herbicide used for spraying powerline (Reese pers. comm 2006).
Protection Comments
Additional Topics

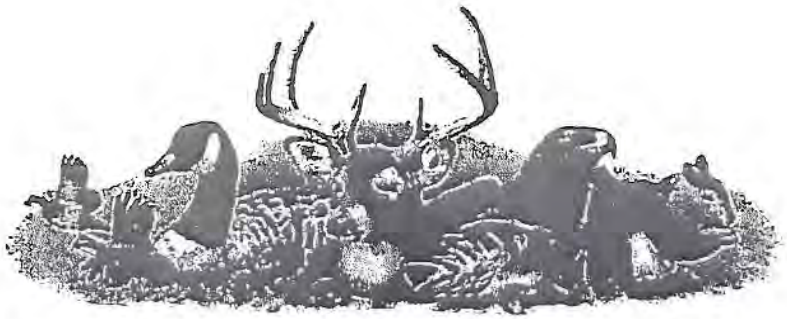
Documentation/Version

Reference Code	Citation
F06CON01NCUS	Contributed. Field forms or similar data contributed to the NC NHP by persons or organizations outside the program.

Specimen

Old Best Source

Lead Responsibility USNCHP **Version Date** 2006-09-19 **Transcription Date** 2006-09-19
Version Author M. Franklin **Transcribed By** M. Franklin



North Carolina Wildlife Resources Commission

TO: Melba McGee, Environmental Coordinator
Office of Legislative and Intergovernmental Affairs, DENR

FROM: Marla Chambers, Western NCDOT Permit Coordinator Marla Chambers
Habitat Conservation Program, NCWRC

DATE: February 18, 2010

SUBJECT: Review of NCDOT scoping sheets for the widening NC 105 to a multi-lane facility from US 221 in Linville to SR 1107 in Boone, Avery and Watauga Counties. TIP No. R-2566. OLIA Project No. 10-0259, due 2/19/2010.

North Carolina Department of Transportation (NCDOT) is requesting comments from the North Carolina Wildlife Resources Commission (NCWRC) regarding impacts to fish and wildlife resources resulting from the subject project. Staff biologists have reviewed the information provided on the scoping sheets and have the following preliminary comments. These comments are provided in accordance with the provisions of the National Environmental Policy Act (42 U.S.C. 4332(2)(c)) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667d).

The NCDOT proposes to widen NC 105 to a multi-lane facility from US 221 in Linville to SR 1107 in Boone. A four-lane divided roadway is proposed for the 14.6 mile long project. NC 105 is paralleled by the Linville River, Watauga River and Laurel Fork for most of the project length. All three support wild trout populations and carry the NC Division of Water Quality (NCDWQ) Trout (Tr) classification. The Watauga River is also classified as High Quality Waters (HQW). Reproducing trout are expected in the tributaries to these waters in the project area and a moratorium prohibiting in-stream work and land disturbance within the 25-foot trout buffer is recommended from October 15 to April 15 for the entire project.

The brook floater (*Alasmidonta varicosa*), Federal Species of Concern (FSC) and state Endangered (E), eastern creekshell (*Villosa delumbis*), state Significantly Rare (SR), and Grandfather Mountain Crayfish (*Cambarus eeseeohensis*), SR, occur downstream in the Linville River. The green floater (*Lasmigona subviridus*), FSC and state E, may occur downstream in the Watauga River. The hellbender (*Cryptobranchus alleganiensis*), FSC and state SC, has been

Mailing Address: Division of Inland Fisheries • 1721 Mail Service Center • Raleigh, NC 27699-1721
Telephone: (919) 707-0220 • **Fax:** (919) 707-0028

observed in the project area. We believe there are at least two large wetland complexes along the project, one at Foscoe, which may be monitored by an educational or conservation group, and the other at the head of the Linville River, near the junction of NC 105 and NC 184 at Linville Gap. These resources should be protected as much as possible.

The potential for significant direct impacts to important natural resources appears high due to the mountainous terrain and adjacent waterways. Stream and wetland losses and sedimentation impacts to adjacent waters are major concerns for this project. The most protective sediment and erosion control measures, which adhere to the design standards for sensitive watersheds, should be employed. We recommend the use of the NCDOT's measures that include coir fiber logs or straw wattles, if practicable, to meet the Design Standards in Sensitive Watersheds. Context sensitive designs should be used to minimize the project footprint and reduce impacts to waterways and wildlife habitat.

Widening from a two-lane roadway to a four-lane divided facility will increase habitat fragmentation and the potential for vehicle collisions with wildlife. Wildlife crossings should be provided along the project in the form of bridges, overpasses, or underpasses to reduce habitat fragmentation and improve safety. Tourism and outdoor recreation are important in this area. Opportunities along the project to provide public access to the waterways for fishing or canoeing should be investigated and coordinated with our agency. The NC 105 crossing of the Watauga River, in particular, should be considered.

Secondary and cumulative impacts are very important concerns for this area and should be sufficiently addressed in the environmental document. We recommend that NCDOT work with local officials to minimize the negative effects of secondary development induced by the project on the valuable natural resources of the area. 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).

In addition, to help facilitate document preparation and the review process, our general information needs are outlined below:

1. Description of fishery and wildlife resources within the project area, including a listing of federally or state designated threatened, endangered, or special concern species. Potential borrow areas to be used for project construction should be included in the inventories. A listing of designated plant species can be developed through consultation with the following programs:

   The Natural Heritage Program
   http://www.ncnhp.org
   1601 Mail Service Center
   Raleigh, N. C. 27699-1601

   and,

   NCDA Plant Conservation Program
   P. O. Box 27647

Raleigh, N. C. 27611
(919) 733-3610

2. Description of any streams or wetlands affected by the project. If applicable, include the linear feet of stream that will be channelized or relocated.

3. Cover type maps showing wetland acreage impacted by the project. Wetland acreage should include all project-related areas that may undergo hydrologic change as a result of ditching, other drainage, or filling for project construction. Wetland identification may be accomplished through coordination with the U. S. Army Corps of Engineers (USACE). If the USACE is not consulted, the person delineating wetlands should be identified and criteria listed.

4. Cover type maps showing acreage of upland wildlife habitat impacted by the proposed project. Potential borrow sites and waste areas should be included.

5. Show the extent to which the project will result in loss, degradation, or fragmentation of wildlife habitat (wetlands or uplands).

6. Include the mitigation plan for avoiding, minimizing or compensating for direct and indirect degradation in habitat quality as well as quantitative losses.

7. Address the overall environmental effects of the project construction and quantify the contribution of this individual project to environmental degradation.

8. Provide a discussion of the probable impacts on natural resources, which will result from secondary development, facilitated by the improved road access.

9. If construction of this facility is to be coordinated with other state, municipal, or private development projects, a description of these projects should be included in the environmental document, and all project sponsors should be identified.

Thank you for the opportunity to provide input in the early planning stages of this project. If you have any questions regarding these comments, please contact me at (704) 485-8291.

cc: Amy Euliss, NCDWQ
Marella Buncick, USFWS
Christopher Militscher, USEPA

Literature Cited:

NCWRC (North Carolina Wildlife Resources Commission). 2002. Guidance Memorandum to Address and Mitigate Secondary and Cumulative Impacts to Aquatic and Terrestrial Wildlife Resources and Water Quality. NCWRC, Raleigh. Available: http://www.ncwildlife.org/Wildlife_Species_Con/documents/pg7c3_impacts.pdf (February 2010).

NCDENR
North Carolina Department of Environment and Natural Resources
Division of Parks and Recreation

Beverly Eaves Perdue, Governor | Dee Freeman, Secretary | Lewis Ledford, Director

February 19, 2009

MEMORANDUM

TO: Melba McGee, Environmental Coordinator
Office of Legislative and Intergovernmental Affairs

FROM: Amin Davis, Environmental Review Coordinator AKD
Division of Parks and Recreation

SUBJECT: NCDOT TIP# R-2566: NC 105 Widening in Avery and Watauga Counties

REFERENCE: Project No. 10-0259

Dear Melba,

The North Carolina Division of Parks and Recreation (DPR) has reviewed the project location for the proposed widening of NC 105from US 221 in Linville, Avery County, to George Wilson Road (SR 1107) in Boone, Watauga County. DPR understands that the North Carolina Department of Transportation (NCDOT) is requesting a review and determination of potential environmental impacts to DPR properties and interests associated with this proposed project per the NCDOT Cover Letter and scoping information you provided to us dated December 28, 2009.

DPR acquired 2,500 acres along the crest of Grandfather Mountain in 2008 which is now referred to as Grandfather Mountain State Park (GRMO). DPR also manages the following State Natural Areas in the vicinity of the proposed NC 105 widening project: Beech Creek, Bear Paw, Mountain Bog, and Pineola Bog. Our preliminary review of the proposed project area revealed the following primary concerns:

1) **Watauga River Headwaters**: Nearly 2,000 feet of the headwaters of the Watauga River adjacent to the Profile Trail section of GRMO flow parallel to, and within 300 feet of NC 105 to the south and east. The River is classified as Class B Trout, High Quality Waters (HQW) by the NC Division of Water Quality (DWQ) and is listed as a Significant Natural Heritage Area of national significance by the NC Natural Heritage Program (NHP). DPR recommends the following to minimize potential impacts to this environmentally-sensitive aquatic area:

    - widening of the existing roadway alignment of NC 105 occur to the north instead of to the south,
    - sediment and control measures in accordance with the NC Division of Land Resources' guidelines for HQW are implemented and enforced, and
    - pre and post-construction stormwater best management measures approved by DWQ are implemented and enforced.

1615 Mail Service Center, Raleigh, North Carolina 27699-1615
Phone: 919-733-4181 \ FAX: 919-715-3085 \ Internet: www.ncparks.gov
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2) **Profile Trail Trailhead and Parking:** Widening of NC 105 could involve loss of the minimal road shoulder, resulting in the access road being very steep as motor vehicles exit or enter NC 105. DPR would be very interested in working with NCDOT to determine if our efforts to improve or relocate the trailhead parking area access road off of NC 105 could be incorporated into this proposed widening project.

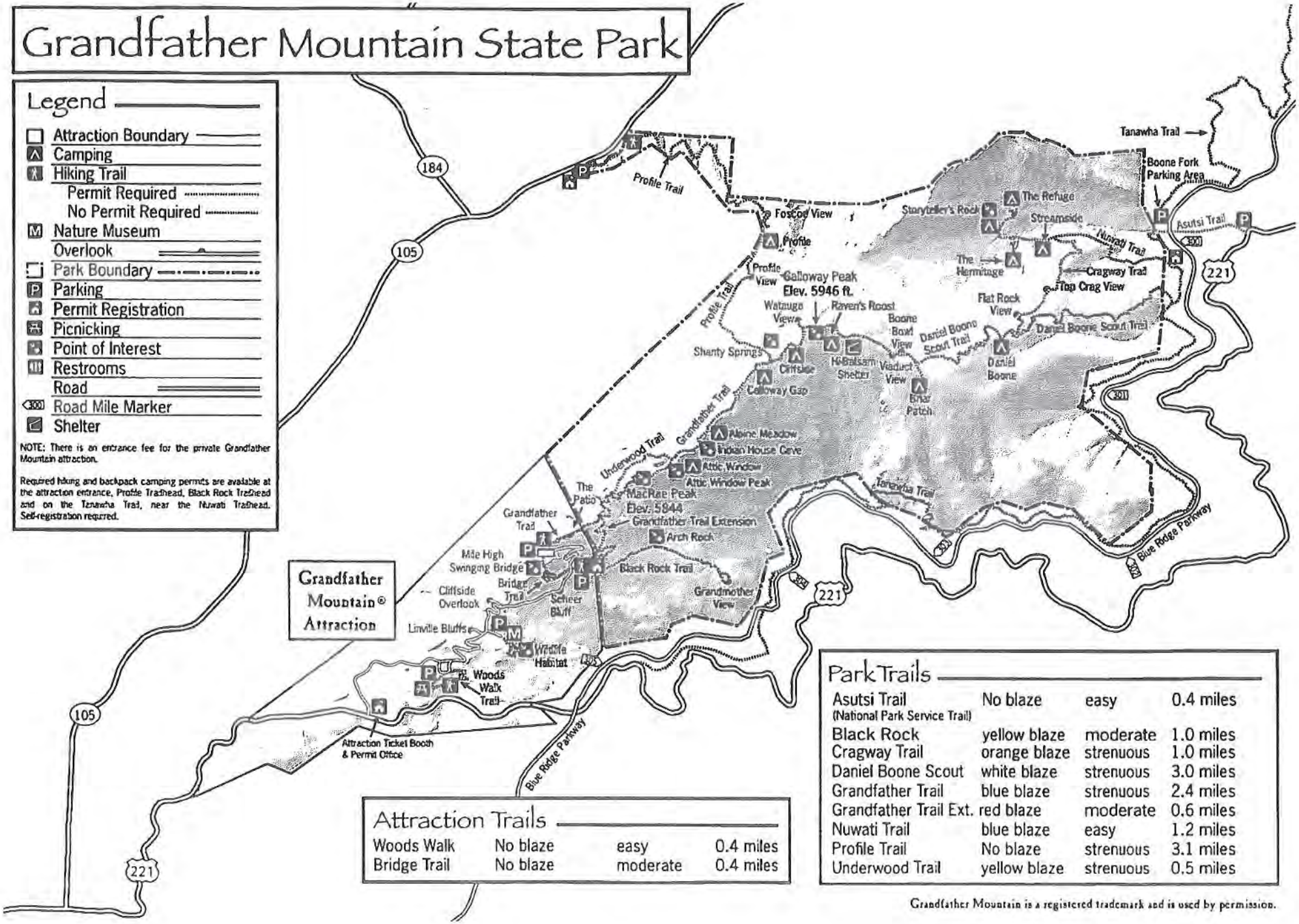
3) **Secondary and Cumulative Impacts:** DPR currently manages several environmentally-sensitive and high-quality lands within the proposed project area, and may seek additional parcels for future park land and facilities. Therefore, we recommend that a thorough assessment of potential secondary and cumulative environmental impacts be conducted according to DENR's "*Guidance for Preparing SEPA Documents and Addressing Secondary and Cumulative Impacts*", and that the results of this assessment are made available to DPR and the general public.

In addition to the comments above, DPR respectfully requests that NCDOT conduct consultations with GRMO Staff, NHP, and other relevant stakeholders regarding potential adverse impacts to rare species and significant natural heritage areas as project development moves forward. We appreciate the opportunity to provide comments for this roadway widening project. If you need further information concerning these comments, please feel free to contact me.

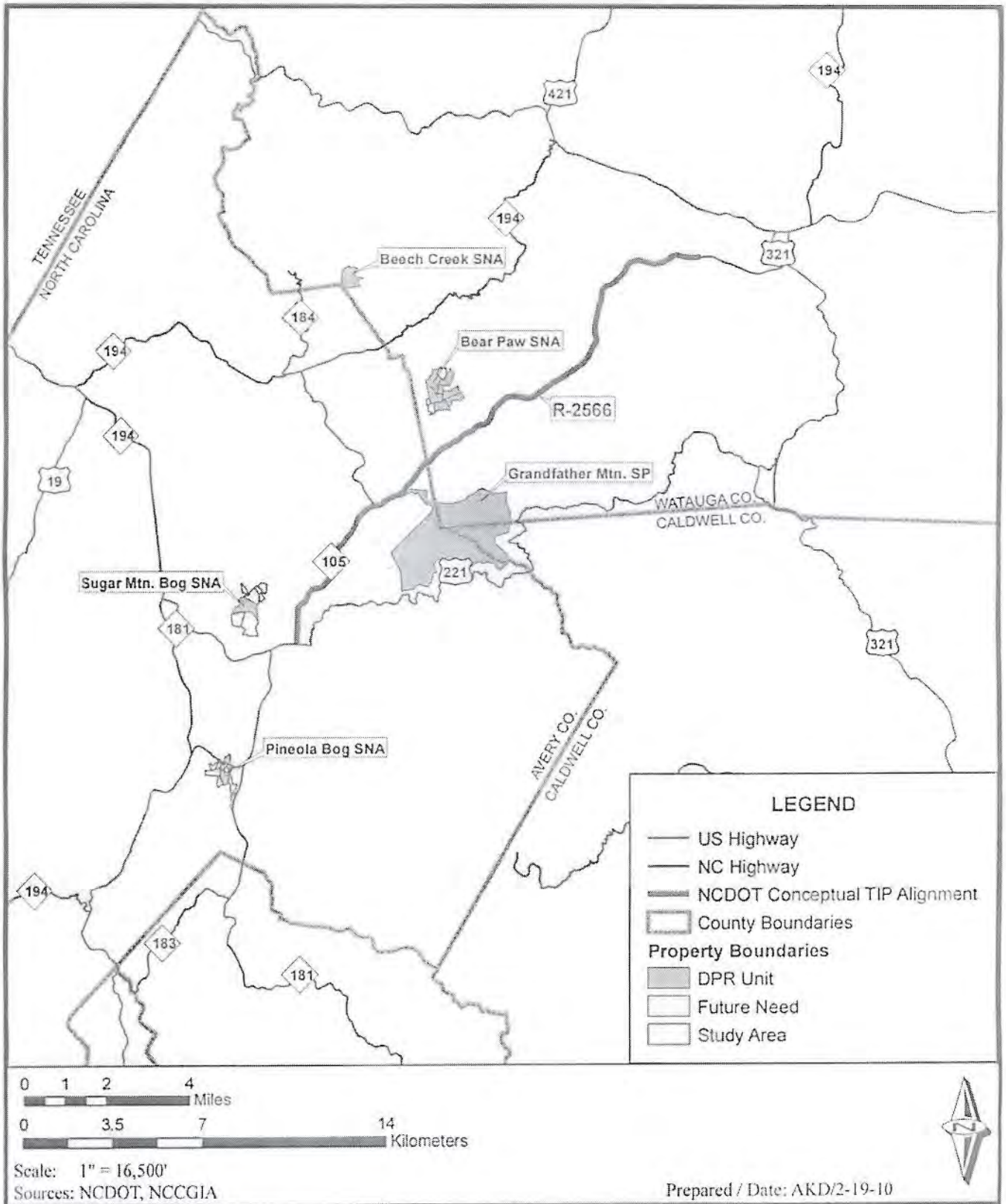
Attachments: GRMO Map
Vicinity Map

CC via email: Brian Strong, DPR Natural Resources Head
Harry LeGrand, NHP Vertebrate Zoologist
Marshall Ellis, DPR Mountain Region Biologist
Pete Colwell, DPR Land Protection
Sue McBean, GRMO Park Superintendent
Tom Jackson, DPR West District Superintendent

Grandfather Mountain State Park



Grandfather Mountain is a registered trademark and is used by permission.



Scale: 1" = 16,500'
Sources: NCDOT, NCCGIA

Prepared / Date: AKD/2-19-10

NCDOT NC-105 Widening (R-2566)
Grandfather Mountain State Park
Avery & Watauga Counties, North Carolina

North Carolina Division of Parks and Recreation

Vicinity Map

Figure 2

State of North Carolina
Department of Environment and Natural Resources

Reviewing Office: Ash + W-S Reg Office

INTERGOVERNMENTAL REVIEW - PROJECT COMMENTS

Project Number: 10-0259 Due Date: _____

After review of this project it has been determined that the ENR permit(s) and/or approvals indicated may need to be obtained in order for this project to comply with North Carolina Law. Questions regarding these permits should be addressed to the Regional Office indicated on the reverse of the form. All applications, information and guidelines relative to these plans and permits are available from the same Regional Office.

	PERMITS	SPECIAL APPLICATION PROCEDURES or REQUIREMENTS	Normal Process Time (statutory time limit)
☐	Permit to construct & operate wastewater treatment facilities, sewer system extensions & sewer systems not discharging into state surface waters.	Application 90 days before begin construction or award of construction contracts. On-site inspection. Post-application technical conference usual.	30 days (90 days)
☐	NPDES - permit to discharge into surface water and/or permit to operate and construct wastewater facilities discharging into state surface waters.	Application 180 days before begin activity. On-site inspection. Pre-application conference usual. Additionally, obtain permit to construct wastewater treatment facility-granted after NPDES. Reply time, 30 days after receipt of plans or issue of NPDES permit-whichever is later.	90-120 days (N/A)
☐	Water Use Permit	Pre-application technical conference usually necessary	30 days (N/A)
☐	Well Construction Permit	Complete application must be received and permit issued prior to the installation of a well.	7 days (15 days)
☐	Dredge and Fill Permit	Application copy must be served on each adjacent riparian property owner. On-site inspection. Pre-application conference usual. Filling may require Easement to Fill from N.C. Department of Administration and Federal Dredge and Fill Permit.	55 days (90 days)
☐	Permit to construct & operate Air Pollution Abatement facilities and/or Emission Sources as per 15 A NCAC (2Q.0100 thru 2Q.0300)	Application must be submitted and permit received prior to construction and operation of the source. If a permit is required in an area without local zoning, then there are additional requirements and timelines (2Q.0113).	90 days
☐	Permit to construct & operate Transportation Facility as per 15 A NCAC (2D.0800, 2Q.0601)	Application must be submitted at least 90 days prior to construction or modification of the source.	90 days
☒	Any open burning associated with subject proposal must be in compliance with 15 A NCAC 2D.1900	N/A	60 days (90 days)
☐	Demolition or renovations of structures containing asbestos material must be in compliance with 15 A NCAC 20.1110 (a) (1) which requires notification and removal prior to demolition. Contact Asbestos Control Group 919-707-5950.		
☐	Complex Source Permit required under 15 A NCAC 2D.0800		
☐	The Sedimentation Pollution Control Act of 1973 must be properly addressed for any land disturbing activity. An erosion & sedimentation control plan will be required if one or more acres to be disturbed. Plan filed with proper Regional Office (Land Quality Section) At least 30 days before beginning activity. A fee of $65 for the first acre or any part of an acre. An express review option is available with additional fees.		20 days (30 days)
☒	Sedimentation and erosion control must be addressed in accordance with NCDOT's approved program. Particular attention should be given to design and installation of appropriate perimeter sediment trapping devices as well as stable stormwater conveyances and outlets.		(30 days)
☐	Mining Permit	On-site inspection usual. Surety bond filed with ENR Bond amount varies with type mine and number of acres of affected land. Any are mined greater than one acre must be permitted. The appropriate bond must be received before the permit can be issued.	30 days (60 days)
☐	North Carolina Burning permit	On-site inspection by N.C. Division Forest Resources if permit exceeds 4 days	1 day (N/A)
☐	Special Ground Clearance Burning Permit - 22 counties in coastal N.C. with organic soils	On-site inspection by N.C. Division Forest Resources required "if more than five acres of ground clearing activities are involved. Inspections should be requested at least ten days before actual burn is planned."	1 day (N/A)
☐	Oil Refining Facilities	N/A	90-120 days (N/A)
☐	Dam Safety Permit	If permit required, application 60 days before begin construction. Applicant must hire N.C. qualified engineer to: prepare plans, inspect construction. certify construction is according to ENR approved plans. May also require permit under mosquito control program. And a 404 permit from Corps of Engineers. An inspection of site is necessary to verify Hazard Classification. A minimum fee of $200.00 must accompany the application. An additional processing fee based on a percentage or the total project cost will be required upon completion.	30 days (60 days)

	PERMITS	SPECIAL APPLICATION PROCEDURES or REQUIREMENTS	Normal Process Time (statutory time limit)
☐	Permit to drill exploratory oil or gas well	File surety bond of $5,000 with ENR running to State of NC conditional that any well opened by drill operator shall, upon abandonment, be plugged according to ENR rules and regulations.	10 days N/A
☐	Geophysical Exploration Permit	Application filed with ENR at least 10 days prior to issue of permit. Application by letter. No standard application form.	10 days N/A
☐	State Lakes Construction Permit	Application fees based on structure size is charged. Must include descriptions & drawings of structure & proof of ownership of riparian property.	15-20 days N/A
☒	401 Water Quality Certification	N/A	60 days (130 days)
☐	CAMA Permit for MAJOR development	$250.00 fee must accompany application	55 days (150 days)
☐	CAMA Permit for MINOR development	$50.00 fee must accompany application	22 days (25 days)
☐	Several geodetic monuments are located in or near the project area. If any monument needs to be moved or destroyed, please notify: N.C. Geodetic Survey, Box 27687 Raleigh, NC 27611		
☒	Abandonment of any wells, if required must be in accordance with Title 15A. Subchapter 2C.0100.		
☒	Notification of the proper regional office is requested if "orphan" underground storage tanks (USTS) are discovered during any excavation operation.		
☐	Compliance with 15A NCAC 2H 1000 (Coastal Stormwater Rules) is required.		45 days (N/A)
☐	Tar Pamlico or Neuse Riparian Buffer Rules required.		

* Other comments (attach additional pages as necessary, being certain to cite comment authority)

REGIONAL OFFICES

Questions regarding these permits should be addressed to the Regional Office marked below.

☒ **Asheville Regional Office**
2090 US Highway 70
Swannanoa, NC 28778
(828) 296-4500

☐ **Fayetteville Regional Office**
225 North Green Street, Suite 714
Fayetteville, NC 28301-5043
(910) 433-3300

☐ **Mooresville Regional Office**
610 East Center Avenue, Suite 301
Mooresville, NC 28115
(704) 663-1699

☐ **Raleigh Regional Office**
3800 Barrett Drive, Suite 101
Raleigh, NC 27609
(919) 791-4200

☐ **Washington Regional Office**
943 Washington Square Mall
Washington, NC 27889
(252) 946-6481

☐ **Wilmington Regional Office**
127 Cardinal Drive Extension
Wilmington, NC 28405
(910) 796-7215

☒ **Winston-Salem Regional Office**
585 Waughtown Street
Winston-Salem, NC 27107
(336) 771-5000

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL HEALTH

Inter-Agency Project Review Response

JAN 26 2010

Project Number
10-0259

County
Avery,
Watauga

Project Name NC-DOT Type of Project Scoping - Widen NC 105 to multi-lane facility from US 221 in Linville to SR 1107 in Boone; TIP No. R-2566.

Comments provided by:

☐ Regional Program Person

☒ Regional Supervisor for Public Water Supply Section

☐ Central Office program person

Name Jim Adams-Asheville RO Date 01/26/2010

Telephone number: _____

Program within Division of Environmental Health:

☒ Public Water Supply

☐ Other, Name of Program: _____

Response (check all applicable):

☐ No objection to project as proposed

☐ No comment

☐ Insufficient information to complete review

☑ Comments attached

☑ See comments below

- Plans should include water main replacement + new sources
- New R/W may invalidate wellsite restrictions on several PWS systems

Return to:
Public Water Supply Section Environmental Review Coordinator for the
Division of Environmental Health

JAN 28 2010

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL HEALTH

Project Number
10-0259
County
Avery, Watauga

Inter-Agency Project Review Response

Project Name NC-DOT Type of Project Scoping - Widen NC 105 to multi-lane facility from US 221 in Linville to SR 1107 in Boone; TIP No. R-2566.

☐ The applicant should be advised that plans and specifications for all water system improvements must be approved by the Division of Environmental Health prior to the award of a contract or the initiation of construction (as required by 15A NCAC 18C .0300et. seq.). For information, contact the Public Water Supply Section, (919) 733-2321.

☐ This project will be classified as a non-community public water supply and must comply with state and federal drinking water monitoring requirements. For more information the applicant should contact the Public Water Supply Section, (919) 733-2321.

☐ If this project is constructed as proposed, we will recommend closure of _____ feet of adjacent waters to the harvest of shellfish. For information regarding the shellfish sanitation program, the applicant should contact the Shellfish Sanitation Section at (252) 726-6827.

☐ The soil disposal area(s) proposed for this project may produce a mosquito breeding problem. For information concerning appropriate mosquito control measures, the applicant should contact the Public Health Pest Management Section at (919) 733-6407.

☐ The applicant should be advised that prior to the removal or demolition of dilapidated structures, a extensive rodent control program may be necessary in order to prevent the migration of the rodents to adjacent areas. For information concerning rodent control, contact the local health department or the Public Health Pest Management Section at (919) 733-6407.

☐ The applicant should be advised to contact the local health department regarding their requirements for septic tank installations (as required under 15A NCAC 18A. 1900 et. sep.). For information concerning septic tank and other on-site waste disposal methods, contact the On-Site Wastewater Section at (919) 733-2895.

☐ The applicant should be advised to contact the local health department regarding the sanitary facilities required for this project. + wells (sources)

☒ If existing water lines will be relocated during the construction, plans for the water line relocation must be submitted to the Division of Environmental Health, Public Water Supply Section, Technical Services Branch, 1634 Mail Service Center, Raleigh, North Carolina 27699-1634, (919) 733-2321.

☒ For Regional and Central Office comments, see the reverse side of this form.

Jim McRight	PWSS	01/26/2010
Reviewer	Section/Branch	Date

North Carolina Department of Environment and Natural Resources
Division of Environmental Health

Beverly Eaves Perdue
Governor

Terry L. Pierce
Director

Dee Freeman
Secretary

TO: Gregory J. Thorpe
Project Development and Environment Analysis Branch
NC Department of Transportation

FROM: James P. Adams, PE, Regional Engineer
NC Public Water Supply Section
Asheville Regional Office

SUBJECT: Clearinghouse Project 10-0259
Proposed Improvement to NC 105 from Linville to Boone
Avery/Watauga County

DATE: February 16, 2010

We have reviewed the referenced NCDOT/Clearinghouse project (CH 10-0259) proposing to widen NC 105 from Linville to Boone. We offer the following comments for further consideration:

1. It is unclear if additional R/W will be required for the project that could impact existing public water system (PWS) wells. PWSs owners are required to own or control a protective area around each well. The project may infringe on existing well sites and render the wells unacceptable as PWS sources. Additional approved water source(s) may need to be developed for these systems to replace existing capacity.

   Historically, the sources along NC 105 were drilled adjacent to NC 105 because of the availabiltiy of water near the river bottom. Our records have limited details on the production of these and other wells developed by the original developers. If NCDOT need specific information on water system infrastucture, they will need to contact the water system owners/managers.

2. Water mains serving public water systems may need to be relocated along the route. Relocation of water mains requires prior approval from our agency.

3. Special precautions may need to be taken during construction to assure that the operation, quality and quantity of these sources are not impaired.

I talked with Ryan White, PE (planning engineer) with NCDOT concerning some questions that I had and shared my thoughts with him. He appreciated the heads up and said he would advise others of these possible concerns. We would be willing to work with NCDOT as they develop more details on the project and possible impact the project may have on PWSs.

If you have any questions, please call on me.

C: Jessica Miles, Cheif
Wayne Munden
Lee Spencer (WSRO)

Public Water Supply Section – Jessica G. Miles, Chief
Asheville Regional Office
2090 U.S. Highway 70, Swannanoa, North Carolina 28778
Phone: 828-296-4500 \ FAX: 828-299-7043 \ Internet: ncdrinkingwater.state.nc.us
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NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

Pam Cook

COUNTY: AVERY
WATAUGA

F02: HIGHWAYS AND ROADS

STATE NUMBER: 10-E-4220-0259
DATE RECEIVED: 01/22/2010
AGENCY RESPONSE: 02/19/1010
REVIEW CLOSED: 02/22/1010

MS SHIRLEY FOYE
CLEARINGHOUSE COORDINATOR
DEPT OF TRANSPORTATION
STATEWIDE PLANNING - MSC #1554
RALEIGH NC

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DEPT OF CULTURAL RESOURCES
DEPT OF TRANSPORTATION
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PROJECT INFORMATION

APPLICANT: NC Department of Transportation
TYPE: State Environmental Policy Act
Scoping

DESC: Widen NC 105 to a multi-lane facility from US 221 in Linville to SR 1107 in Boone; TIP No. R-2566

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: ☐ NO COMMENT ☑ COMMENTS ATTACHED

SIGNED BY: Pam Cook DATE: 1.29.2010

FEB 2010

JAN 2010 RECEIVED NCDOT TRANSPORTATION PLANNING

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

January 29, 2010

MEMORANDUM TO: North Carolina State Clearinghouse
Department of Administration
Intergovernmental Review

Subject: Clearinghouse Number 10-E-4220-0259
Widen NC 105 to a multi-lane facility from US 221 in Linville to SR 1107 in Boone; TIP No. R-2566

From: Pam R. Cook, P.E. PRC
NCDOT Transportation Planning Branch

Thank you for allowing the Transportation Planning Branch to review this document. The scoping information sheet incorrectly lists the RPO as "Land of Sky RPO". This project is in the High Country RPO.

If you have any questions please feel free to contact me at 919-715-5737 ext. 74.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
TRANSPORTATION PLANNING BRANCH
1554 MAIL SERVICE CENTER
RALEIGH NC 27699-1554

NCDOT TPB
TRANSPORTATION PLANNING BRANCH
http://ncdot.org/doh/preconstruct/tpb/

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH, NC 27601
Phone: 919-733-4705
Fax: 919-733-2417

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: AVERY
WATAUGA

F02: HIGHWAYS AND ROADS

STATE NUMBER: 10-E-4220-0259
DATE RECEIVED: 01/22/2010
AGENCY RESPONSE: 02/19/1010
REVIEW CLOSED: 02/22/1010

RECEIVED
JAN 26 2010
HISTORIC PRESERVATION OFFICE

MS RENEE GLEDHILL-EARLEY
CLEARINGHOUSE COORDINATOR
DEPT OF CULTURAL RESOURCES
STATE HISTORIC PRESERVATION OFFICE
MSC 4617 - ARCHIVES BUILDING
RALEIGH NC

ER 04-2452
A - Draft letter — LGH/BJS 1-28-10

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S - LAE

PROJECT INFORMATION

APPLICANT: NC Department of Transportation
TYPE: State Environmental Policy Act
Scoping

Due 1/26/10

DESC: Widen NC 105 to a multi-lane facility from US 221 in Linville to SR 1107 in Boone; TIP No. R-2566

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: ☐ NO COMMENT ☒ COMMENTS ATTACHED

SIGNED BY: Renee Gledhill-Earley DATE: 2.3.10

FEB 2010

JAN 27 2010

North Carolina Department of Cultural Resources

State Historic Preservation Office

Peter B. Sandbeck, Administrator

Beverly Eaves Perdue, Governor
Linda A. Carlisle, Secretary
Jeffrey J. Crow, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

February 5, 2010

MEMORANDUM

TO: Greg Thorpe, Ph.D., Director
Project Development and Environmental Analysis Branch
NCDOT Division of Highways

FROM: Peter Sandbeck PBS for Peter Sandbeck

SUBJECT: NC 105 from US 221 to SR 1107, R-2566, Watauga and Avery Counties, ER 04-2452

Thank you for your letter of December 28, 2009, regarding the above project.

Three previously recorded prehistoric archaeological sites, 31WT62, 41WT64, and 31WT61, are within or in close proximity to the project area. Numerous additional archaeological sites are located in the region. Furthermore, the project area has never been systematically surveyed to determine the location or significance of archaeological resources. Based on the topographic and hydrological situation, there is a high probability for the presence of additional prehistoric or historic archaeological sites within the project area.

We recommend that a comprehensive survey be conducted by an experienced archaeologist to identify and evaluate the significance of archaeological remains that may be damaged or destroyed by the proposed project. Potential effects on unknown resources must be assessed prior to the initiation of construction activities.

There has been no countywide architectural survey for Avery County. However, the Linville National Register Historic District may lie within the Area of Potential Effects (APE). The countywide survey for Watauga County was completed in 2003. The Prout Log House (WT 304/SL) and eight other buildings along NC 105 were identified during that survey. We recommend that an architectural historian for NCDOT undertake a survey of the APE in Avery County and update the information for that portion of Watauga County within the APE.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919/807-6579. In all future communication concerning this project, please cite the above referenced tracking number.

North Carolina
Department of Administration

Beverly Eaves Perdue, Governor

Moses Carey, Jr., Secretary

March 2, 2010

Mr. Gregory Thorpe
NC Department of Transportation
Project Dev. & Env. Analysis
1548 Mail Service Center
Raleigh, NC 27699-1548

Re: SCH File # 10-E-4220-0259; SCOPING; Widen NC 105 to a multi-lane facility from US 221 in Linville to SR 1107 in Boone; TIP No. R-2566

Dear Mr. Thorpe:

The above referenced environmental impact information has been reviewed through the State Clearinghouse under the provisions of the North Carolina Environmental Policy Act.

Attached to this letter are **additional** comments which identify issues to be addressed in the environmental review document. The appropriate document should be forwarded to the State Clearinghouse for compliance with State Environmental Policy Act. Should you have any questions, please do not hesitate to call me at 807-2425.

Sincerely,

Chrys Baggett (STG)

Ms. Chrys Baggett
State Environmental Review Clearinghouse

Attachments

cc: Region D

Mailing Address:
1301 Mail Service Center
Raleigh, NC 27699-1301

Telephone: (919)807-2425
Fax (919)733-9571
State Courier #51-01-00
e-mail state.clearinghouse@doa.nc.gov

Location Address:
116 West Jones Street
Raleigh, North Carolina

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NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: AVERY
WATAUGA

F02: HIGHWAYS AND ROADS

STATE NUMBER: 10-E-4220-0259
DATE RECEIVED: 01/22/2010
AGENCY RESPONSE: 02/19/1010
REVIEW CLOSED: 02/22/1010

CLEARINGHOUSE COORD REGION D
HIGH COUNTRY COG
P.O. BOX 1820
BOONE NC



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DEPT OF CULTURAL RESOURCES
DEPT OF TRANSPORTATION
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PROJECT INFORMATION

APPLICANT: NC Department of Transportation
TYPE: State Environmental Policy Act
Scoping

DESC: Widen NC 105 to a multi-lane facility from US 221 in Linville to SR 1107 in Boone; TIP No. R-2566

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: ☐ NO COMMENT ☑ COMMENTS ATTACHED

SIGNED BY: _____ DATE: 2-24-10

REQUEST FOR REVIEW

Please review the attached notification and indicate your response. If your agency requires additional information, contact the applicant directly or call High Country Council of Governments' Clearinghouse. Please submit your response to the address below by the due date indicated.
Phone: (828) 265-5434

SCH Number 10-E-4220-0259 Date 02-08-10 Response Date 02-16-10

Please Sign and Return
This Page Only To:

High Country Council of Governments
Clearinghouse Coordinator
P.O. Box 1820
Boone, NC 28607

Reviewers:

Rocky Nelson, Watauga County Manager
Robert Wiseman, Avery County Manager



Response: This agency has reviewed the notification and offers the following recommendation: (Check appropriate response/more than one can be checked)

_____ No Comment

__X__ Favorable. The project is in agreement with the goals and objectives of this agency's programs.

_____ Unfavorable. The project is not in agreement with the goals and objectives of this agency's programs.

_____ Potential Problem (s). Identify:

Comments: Protection of Watauga River and keeping travel lanes open during construction are essential.

Reviewed by

Name: Joseph A Furman **Agency:** Watauga County Planning + Inspections Dept. **Date:** 2-24-10

Joseph A Furman

NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

COUNTY: AVERY
WATAUGA

F02: HIGHWAYS AND ROADS

STATE NUMBER: 10-E-4220-0259
DATE RECEIVED: 01/22/2010
AGENCY RESPONSE: 02/19/1010
REVIEW CLOSED: 02/22/1010

CLEARINGHOUSE COORDINATOR
CC&PS - DIV OF EMERGENCY MANAGEMENT
FLOODPLAIN MANAGEMENT PROGRAM
MSC # 4719
RALEIGH NC



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DEPT OF CULTURAL RESOURCES
DEPT OF TRANSPORTATION
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PROJECT INFORMATION

APPLICANT: NC Department of Transportation
TYPE: State Environmental Policy Act
Scoping

DESC: Widen NC 105 to a multi-lane facility from US 221 in Linville to SR 1107 in Boone; TIP No. R-2566

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED: ☐ NO COMMENT ☒ COMMENTS ATTACHED

SIGNED BY: Jeanne Lee DATE: 2/22/2010

The project involves widening of multiple streamcrossings and road alignments within FEMA regulated floodways. Any development / construction within a flood way or non-encroachment area requires one of the following prior to construction:

(1) submittal and approval of no-rise hydraulics study for each encroachment; or

(2) submittal and approval of Conditional Letter of Map Revisions for any encroachments that cause an increase in base flood elevations.

Project Tracking No.:
16-04-0010

ARCHAEOLOGICAL SURVEY REQUIRED FORM

This form only pertains to ARCHAEOLOGICAL RESOURCES for this project. It is not valid for Historic Architecture and Landscapes. You must consult separately with the Historic Architecture and Landscapes Group.

PROJECT INFORMATION

Project No:	R-2566B	*County:*	Watauga
WBS No:	37512.1.1	*Document:*	Environmental Assessment/FONSI
Federal Aid No:		*Funding:*	☒ State ☐ Federal
Federal Permit Required?	☒ Yes ☐ No	*Permit Type:*	Individual

Project Description:

Improve NC 105 from Clark's Creek Rd. in Foscoe to the NC 105 Bypass in Boone in Watauga County. Improvements will include widening of the section between Old Shull's Mill Rd. and the NC 105 Bypass. Also, the project includes the replacement of Bridge 5 on NC 105 over the Watauga River (R-2566BA). Area of Potential Effects (A.P.E.) is approximately 9 kilometers (5.6 miles) long and 27 meters (90 ft.) wide at its widest. Design plans provided.
NOTE: This project was first assigned for Cultural Resources Review in March 2012 (TIP R-2556) as NC 105 Improvements from Linville to Boone in Avery and Watauga Counties. The scope of the project was later reduced to include only the segment from Foscoe to Boone in Watauga County.

SUMMARY OF ARCHAEOLOGICAL RESOURCES REVIEW: *SURVEY REQUIRED*

Brief description of review activities, results of review, and conclusions:

The review included an examination of a topographic map, an aerial photograph, and listings of previously recorded sites, previous archaeological surveys, and previous environmental reviews at the Office of State Archaeology (O.S.A.). Also, a visual reconnaissance of the project was conducted in June 2012. The road is oriented approximately southwest-northeast (from Clark's Creek Rd. to NC 105 Bypass), but will be considered west-east for this review.

The topographic maps (Valle Crucis, N.C. and Boone, N.C.) show the A.P.E. is located in the Watauga River valley (west half) and the Laurel Fork valley (east half). The Watauga River valley is a moderately wide river valley surrounded by steep valley walls. The road is located along the ridge toe that overlooks the river on the west side. In a few places the A.P.E. appears to include some of the floodplain, a landform with a moderate to high potential for archaeological sites. The Laurel Fork valley is a narrow creek valley. The road is located along either side of the creek. The A.P.E. mostly includes steeply-sloped hillsides overlooking the stream, but also includes a few sections of floodplain, a landform with a moderate to high potential for archaeological sites. The 1978 editions of the topographic maps show many structures located along NC 105.

The aerial photograph shows the landuse in the A.P.E. is a mix of wooded, cleared, and developed land.

A review of information at the O.S.A. shows only two previously recorded sites near the A.P.E. Both sites (31WT312 and 31WT313) are located at the west end of the A.P.E. in the Watauga River floodplain. There is only minimal amount of information about the sites. Site 31WT312 is a prehistoric site recorded on the north side of NC 105 in 1977 by Stan Vance. Site 31WT313 is a site of unknown cultural affiliation recorded on the south side of NC 105 (and the south side of the Watauga River) by Sherry Blakely in 1978.

There are several projects within and adjacent to the A.P.E. that have been previously reviewed by the State Historic Preservation Office (HPO). Several of them appear to be minor utility line projects and HPO has not recommended a survey for them. HPO has reviewed previous improvements to NC 105, when climbing lanes and left and right turn lanes were added to the two-lane highway (TIP R-2017A). On 8/9/1989 HPO recommended an evaluation of previously recorded site 31WT64 (located on the north side of NC 105 in Foscoe west of the A.P.E.), and an archaeological survey of the proposed improvements to NC 105 (CH 90-E-4220-0041). Padgett (1989) conducted a survey of the project and identified no archaeological sites. HPO concurred with the results on 11/14/1989 (ER 90-7393). The current phase of the NC 105 improvements was first reviewed on 2/23/2005 (ER 04-2452), when HPO recommended that a comprehensive archaeological survey be conducted.

A visual reconnaissance of the A.P.E. was conducted on 6/20/2012 by NCDOT archaeologists Scott Halvorsen and Caleb Smith. The reconnaissance included the examination of 11 high potential areas that had been chosen based on their topographic situations. Visual examination confirmed that two of the areas were disturbed by development. Several other areas were too steep to access but may have some archaeological potential. Several of the areas have the potential for archaeological sites. Examination of one of the areas identified the remains of an historic complex, probably the former location of at least part of the early 20th century Shull's Mill complex (assigned site number 31WT371**).

Recommend an archaeological survey of all level, well-drained, undeveloped landforms within the A.P.E. Identify the age, origin and function of the structural remains at 31WT371**, and evaluate the site for potential inclusion on the National Register of Historic Places (NRHP).

References Cited

Padgett, Thomas J.
1989 Archaeological Survey for the NC 105 Improvements from Linville to Boon, Avery and Watauga Counties (TIP R-2017A). North Carolina Department of Transportation, Planning and Research Branch, Raleigh, North Carolina.

SUPPORT DOCUMENTATION

See attached: ☒ Map(s) ☒ Previous Survey Info ☐ Photos ☐ Correspondence ☐ Photocopy of County Survey Notes Other:

Project Tracking No.:
16-04-0010

FINDING BY NCDOT ARCHAEOLOGIST – *SURVEY REQUIRED*

Caleb Smith 5/9/2016

NCDOT ARCHAEOLOGIST **Date**

8/3/2016

Proposed fieldwork completion date



HISTORIC ARCHICTECTURE AND LANDSCAPES
EFFECTS REQUIRED FORM

This form only pertains to Historic Architecture and Landscapes for this project. It is not valid for Archaeological Resources. You must consult separately with the Archaeology Group.

PROJECT INFORMATION

Project No:	R-2566B	***County***:	Watauga
WBS No.:	37512.1.1	***Document Type***:	EA/FONSI
Fed. Aid No:	N/A	***Funding***:	☒ State ☐ Federal
Federal Permit(s):	☒ Yes ☐ No	***Permit Type(s)***:	
Project Description: Widen NC 105 to a multi-lane facility from Old Shull's Mill Road to NC 105 Bypass.			

SUMMARY OF HISTORIC ARCHICTECTURE AND LANDSCAPES REVIEW

Description of review activities, results, and conclusions:
Review of HPO quad maps, HPO GIS information, historic designations roster, and indexes was undertaken on April 21, 2016. Based on this review, R-2566B was surveyed in June 2013 and two resources were determined eligible, the Prout-Atkins House (WT304) and the Ed and Falah Hollars House (WT 376). The State Historic Preservation Office concurred with these findings on September 3, 2013. An effects meeting with SHPO will be required.

SUPPORT DOCUMENTATION

☒ Map(s) ☐ Previous Survey Info. ☐ Photos ☐ Correspondence ☐ Design Plans

FINDING BY NCDOT ARCHITECTURAL HISTORIAN

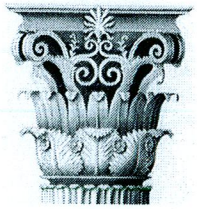
Historic Architecture and Landscapes -- **EFFECTS REQUIRED**

Kate Husted 4/21/2016

NCDOT Architectural Historian Date

Project Tracking No. (Internal Use)

16-04-0010



HISTORIC ARCHICTECTURE AND LANDSCAPES ASSESSMENT OF EFFECTS FORM

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ASSESSMENT OF EFFECTS

Property Name:	Prout-Atkins House	***Status***:	Determined Eligible/Study Listed
Survey Site No.:	WT304	***PIN***:	1888491759000

Effects
☒ No Effect ☐ No Adverse Effect ☐ Adverse Effect

Explanation of Effects Determination:
No proposed work within boundary, project starts north of property

List of Environmental Commitments:

Property Name:	Ed & Falah Hollars House	***Status***:	Determined Eligible
Survey Site No.:	WT376	***PIN***:	1990121053000

Effects

☒ No Effect ☐ No Adverse Effect ☐ Adverse Effect

Explanation of Effects Determination:

No proposed work within the property boundary.

List of Environmental Commitments:

FHWA Intends to use the State Historic Preservation Office's concurrence as a basis for a "de minimis" finding for the following properties, pursuant to Section 4(f):

SUPPORT DOCUMENTATION

☒ Map(s) ☐ Previous Survey Info. ☒ Photos ☐ Correspondence ☐ Design Plans

FINDING BY NCDOT AND STATE HISTORIC PRESERVATION OFFICE

Historic Architecture and Landscapes – ASSESSMENT OF EFFECTS

Kate Husband — 6/7/2016

NCDOT Architectural Historian — Date

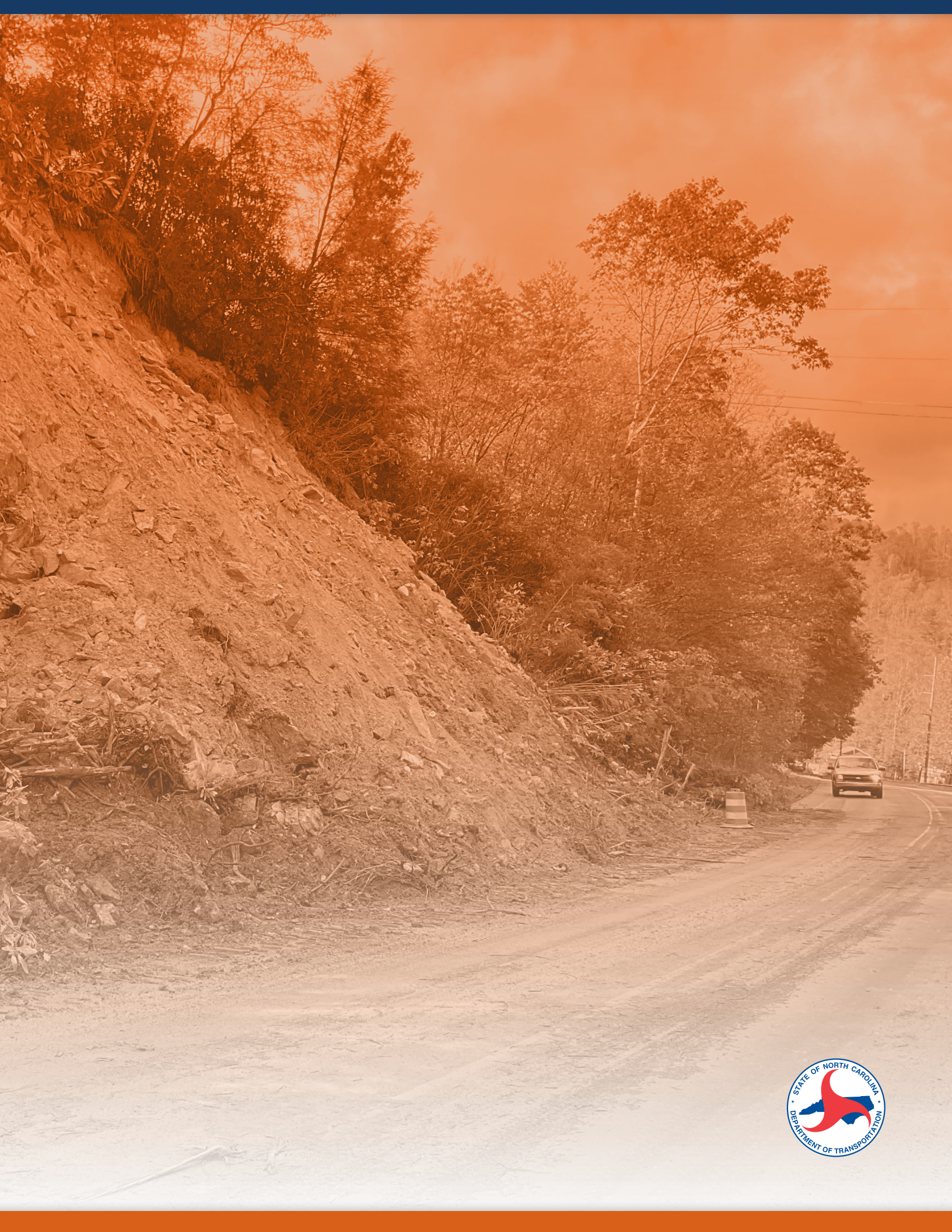
Renee Gledhill-Earley — 6/7/16

State Historic Preservation Office Representative — Date

Funding Changed to Federal 9/8/2016

9-27-16

Federal Agency Representative — Date


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION