

FEASIBILITY STUDY

**Widening of NC 184
From NC 105 to SR 1342 (Hickory Nut Gap Road)**

Avery County

Division 11

FS-0811A



**Prepared by the
Program Development Branch
N. C. Department of Transportation**

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3/18/10
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I. General Description

This feasibility study describes the proposed widening of NC 184 from NC 105 to SR 1342 (Hickory Nut Gap Road), a distance of approximately 3.8 miles. The project location is shown on Figure 1. As part of the study, several different cross-sections were investigated, the details of which are as follows:

- ◆ Two-lane shoulder section with at-grade intersection improvements on existing right of way.
- ◆ Three-lane shoulder section on 120 feet of right of way.
- ◆ Four-lane divided shoulder section with a raised grass median on 150 feet of right of way.
- ◆ Five-lane shoulder section on 150 feet of right of way.

This is the initial step in the planning and design process for this project and is not the product of exhaustive environmental or design investigations. The purpose of this study is to describe the proposed project including cost, and to identify potential problems that may require consideration in the planning and design phases.

II. Background

The purpose of this project is to improve the traffic safety and operations along NC 184. High Country Rural Planning Organization and the Town of Banner Elk officials support this project.

NC 184 is designated as a major collector in the North Carolina Statewide Functional Classification System and as a major thoroughfare in the October 2003 Towns of Banner Elk and Beech Mountain Thoroughfare Plan. NC 184 currently is a two-lane shoulder section with pavement widths between 20-22 feet from edge of pavement to edge of pavement.

The following Transportation Improvement Program (TIP) project is located within the project corridor:

- TIP# R-2566: Widen NC 105 to multi-lanes from US 221 to SR 1107 in Boone.

There are two existing bridges within the project study area. Bridge No. 19 is a two-lane bridge, 34.1 feet wide and 57 feet long which crosses over the Elk River. Bridge No. 19 was built in 1929 and has a sufficiency rating of 76.1 out of 100. Bridge No. 79 is a two-lane bridge, 19.1 feet wide and 41 feet long which crosses over Banner Elk Creek. Bridge No. 79 was built in 1970 and has a sufficiency rating of 15.2 out of 100.

III. Traffic and Safety

An existing traffic signal is located at the intersection of NC 184 and NC 105.

The current year Average Daily Traffic (ADT) along NC 184 is estimated to range from 10,100 vehicles per day (vpd) to 12,000 vpd. For the design year 2035, the traffic volume along NC 184 is estimated to range between 14,100 vpd to 17,600 vpd. Truck traffic is estimated to make up approximately 5 percent of the daily traffic.

The existing segment of NC 184 operates at a level of service (LOS) E under current traffic volumes. If no improvements are made in the 2035 design year, it is projected that NC 184 will continue to operate at a LOS E. With the proposed two-lane and three-lane improvements, NC 184 is projected to operate at a LOS E. With the proposed four-lane and five-lane improvements, NC 184 is projected to operate at a LOS D or better.

Between 2005 and 2007, 44 crashes were reported within the proposed project study area. The crash rate for NC 184 is 107.19 crashes per 100 million vehicle miles (crashes/100MVM) traveled. This rate is lower than the statewide rate of 191.04 crashes/100MVM for two-lane undivided rural North Carolina route. There were 15 non-fatal injury crashes, 29 property damage only crashes, and no fatal crashes. The most prevalent types of crashes were Rear End (36%), Fixed Object (20%), and Left Turn (18%).

IV. Description of Alternatives

It is proposed to widen NC 184 from NC 105 to SR 1342 (Hickory Nut Gap Road), a distance of approximately 3.8 miles. The project location is shown on Figure 1.

ALTERNATIVE 1: Existing two-lane shoulder section with intersection improvements on existing right of way. Included in the costs below are the replacement of Bridge No. 79 over Banner Elk Creek and left turn lanes along NC 184 added to the following intersections:

- NC 184 and Grouse Moor Drive/Castlerock Road
- NC 184 and Sugar Mountain Road
- NC 184 and SR 1337 (Dobbins Road)
- NC 184 and SR 1342 (Hickory Nut Gap Road)

With this proposed cross-section, it is anticipated that there will be zero (0) residences and zero (0) businesses relocated due to this project. The total cost of this alternative, including utility relocation and construction, is estimated to be \$2,900,000.

Right-of-way.....	\$0
Utility Relocation.....	\$100,000
Construction.....	\$2,800,000
Total Cost (Alternative 1).....	\$2,900,000

ALTERNATIVE 2: Three-lane shoulder section, 44 feet from edge of pavement to edge of pavement, with 12-foot travel lanes and 8-foot shoulders (4 feet of which are paved) on 120 feet of right of way. Included in the costs below are the replacement of Bridge No. 79 over Banner Elk Creek and the replacement of Bridge No. 19 over the Elk River.

With this proposed cross-section, it is anticipated that there will be eight (8) residences and forty-nine (49) businesses relocated due to this project. The total cost of this alternative, including right of way, utility relocation and construction, is estimated to be \$45,000,000.

Right-of-way.....	\$35,100,000
Utility Relocation.....	\$1,000,000
Construction.....	\$8,900,000
Total Cost (Alternative 2).....	\$45,000,000

ALTERNATIVE 3: Four-lane divided shoulder section, 79 feet from edge of pavement to edge of pavement, with 12-foot travel lanes, a 23-foot raised grass median, and 8-foot shoulders (4 feet of which are paved) on 150 feet of right of way. Included in the costs below are the replacement of Bridge No. 79 over Banner Elk Creek and the replacement of Bridge No. 19 over the Elk River.

With this option, it is anticipated that there will be ten (10) residences and sixty-three (63) businesses relocated due to this project. The total cost of this alternative, including right of way, utility relocation and construction, is estimated to be \$69,800,000.

Right-of-way.....	\$47,500,000
Utility Relocation.....	\$1,000,000
Construction.....	\$21,300,000
Total Cost (Alternative 3).....	\$69,800,000

ALTERNATIVE 4: Five-lane shoulder section, 68 feet from edge of pavement to edge of pavement, with 12-foot travel lanes and 8-foot shoulders (4 feet of which are paved) on 150 feet of right of way. Included in the costs below are the replacement of Bridge No. 79 over Banner Elk Creek and the replacement of Bridge No. 19 over the Elk River.

With this option, it is anticipated that there will be ten (10) residences and sixty-three (63) businesses relocated due to this project. The total cost of this alternative, including right of way, utility relocation and construction, is estimated to be \$68,200,000.

Right-of-way.....	\$47,500,000
Utility Relocation.....	\$1,000,000
<u>Construction.....</u>	<u>\$19,700,000</u>
Total Cost (Alternative 4).....	\$68,200,000

V. Community Issues

A detailed investigation was not conducted for this feasibility study, however no impacts to schools, parks, recreation areas, or community facilities are anticipated with this project.

Maps at the Survey and Planning Branch of the North Carolina State Historic Preservation Office were used to determine if any historic properties on the National Register of Historic Places (NRHP) or state study lists exist within the proposed project corridor. No properties within the project study area were found to be potentially historic properties.

A portion of the project study area is located in a land trust priority area.

VI. Natural Environment Issues

The following is a preliminary review of environmental issues that might have a potential impact to the project. The information obtained for the environmental screening is from a Geographic Information System (GIS) database. The purpose of the environmental screening is to identify potential environmental issues early in the process.

Stream Classification

The proposed project study area is located in the Catawba and Watauga River Basins. NC 184 crosses several water bodies in the project corridor. Banner Elk Creek has a stream classification of C. The Elk River and Hanging Rock Creek have a stream classification of C Tr. These water bodies will likely need to be surveyed and have the appropriate coordination with the North Carolina Department of Environment and Natural Resources (NCDENR) and the U.S. Army Corps of Engineers (USACE)

during any environmental document study. A portion of the project study area is located in a high quality water zone.

Wetlands

NC 184 crosses wetlands associated with Banner Elk Creek, the Elk River, and Hanging Rock Creek. Permitting with the U.S. Army Corps of Engineers (USACE) will likely need to be obtained before construction of the project, and appropriate mitigation measures should be taken if deemed necessary. A portion of the project study area is located in a 100 and 500-year floodplains.

Threatened and Endangered Species

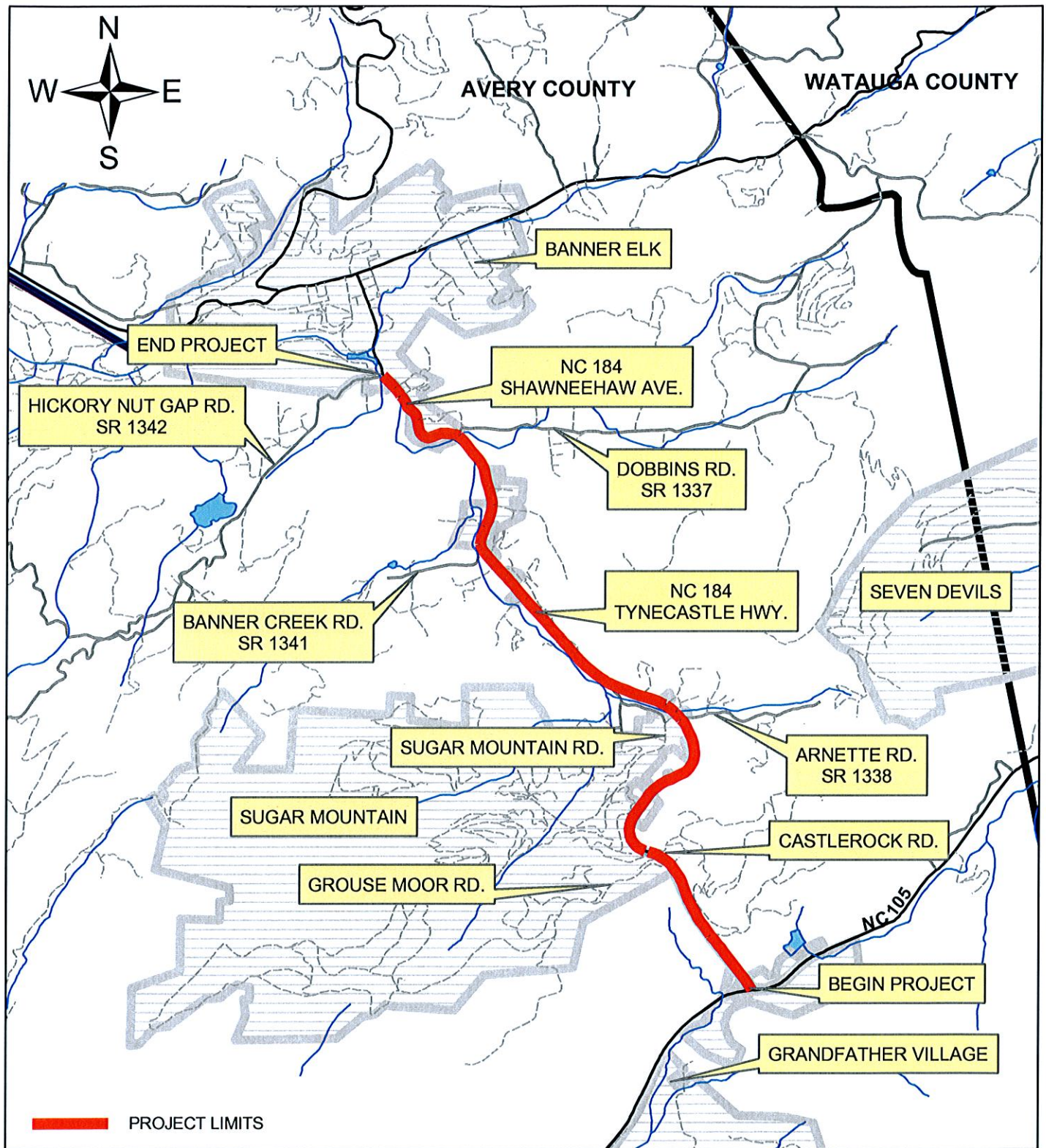
Several trout streams were identified within the project study area.

VII. Recommendations

ALTERNATIVES 1& 2: It was found that the two-lane shoulder and the three-lane shoulder section would not be able to accommodate the projected 2035 design year traffic volumes.

ALTERNATIVES 3 & 4: It was found that the four-lane divided shoulder section and the five-lane shoulder section would be able to accommodate the projected 2035 design year traffic volumes with an acceptable level of service. However, five-lane sections tend to promote strip development and indiscriminate left turn movements, while four-lane divided sections minimize strip developments, prevent indiscriminate left turn movements, and allow pedestrian refuge if needed. Because of these factors, ***Alternative 3 would be the preferred alternative.***

The total estimate for the preferred Alternative 3, a four-lane divided shoulder section, with 12-foot travel lanes, a 23-foot raised grass median, and 8-foot shoulders (4 feet of which are paved) on 150 feet of right of way and the replacements of Bridge No. 19 and Bridge No. 79 is \$69,800,000.



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Feet



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
PROGRAM DEVELOPMENT BRANCH

FS-0811A

NC 184 (TYNECASTLE HIGHWAY/SHAWNEEHAW AVENUE)
FROM NC 105 TO SR 1342 (HICKORY NUT GAP ROAD)

AVERY COUNTY

DIVISION 11

FIGURE 1