

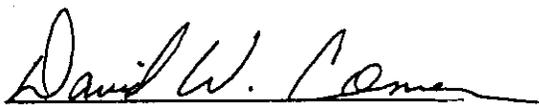
FEASIBILITY STUDY

**US 64-NC 28
from Franklin to Highlands
Macon County**

Division 14

R-3623

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



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I. General Description

This preliminary study describes alternates for providing the motoring public a safe and expeditious route from Franklin to Highlands, in Macon County. Other studies have been previously completed which address spot-type improvements to existing roadways serving the area; however, it is the purpose of this study to evaluate alternatives to provide a continuous safe route.

US 64-NC 28 is the only existing main route which directly connects Franklin to Highlands. From Highlands to the Gneiss community, US 64-NC 28 is a 2-lane roadway with narrow travel lanes, steep grades, "hairpin" curves, and sheer slopes adjacent to the roadway. The existing roadway is dangerous and does not have the necessary characteristics to handle existing and future traffic volumes at an acceptable Level of Service. From Gneiss to Franklin, the roadway is a standard 2-lane rural shoulder section with adequate width travel lanes and the driving conditions are good. The location of this route is shown on the attached Figure 1.

A second heavily traveled route from Highlands to Franklin is via NC 106 from Highlands to Georgia Route 246, Georgia Route 246 to US 23/441, and US 23/441 into Franklin. NC 106 is also a 2-lane roadway with narrow travel lanes, steep grades, and "hairpin" curves. Safety improvements to NC 106 are included in the Draft 2000-2006 Transportation Improvement Program (R-2567) as an Unfunded Project. The location of this route is also shown on the attached Figure 1.

Based on current and future traffic estimates, neither of the above routes are adequate, and there is a need for an improved connecting route between Highlands and Franklin.

This study is the initial step in the planning and design process for this project and is not to be considered the product of exhaustive environmental or design investigations. The purpose of the study is to describe the problem, recommend a treatment including costs, and identify potential problem areas that deserve consideration in the planning and design phases.

II. Feasible Alternates

Of the alternates evaluated, four were deemed feasible as a part of this study process. These are the only alternates where it is felt that a continuous and safe roadway could be constructed, from Franklin to Highlands, which could meet current roadway standards at a reasonable cost. The locations of these alternates are shown on Figure 2, and the alternates are described as follows:

Alternate 1

Alternate 1 is the upgrading of existing US 64-NC 28 from approximately 0.3 miles (0.5 km) west of NC 106, in Highlands, to SR 1533 at Gneiss. The studied upgrading consists of:

- A. Where practical, widen the existing roadway to a 2-lane, rural shoulder section with 12-foot (3.6-m) wide travel lanes and 6-foot (1.8-m) wide shoulders of which 4 feet (1.2 m) would be paved.
- B. Where practical, realign segments of the existing roadway which presently have a high degree of horizontal curvature.
- C. In the area of Cullasaja Falls, construct a 2-lane, 2-way, 32-foot (9.8-m) wide (clear deck width) viaduct to span approximately 2,200 feet (670 m) of the Cullasaja Gorge and tunnel through approximately 800 feet (244 m) of mountain adjacent to the Gorge.
- D. Construct a new 32-foot (9.8-m) wide (clear deck width) bridge over Buck Creek.
- E. Replace approximately 30,000 lineal feet (9,144 m) of steel beam guardrail.
- F. Upgrade existing Buck Creek Road (SR 1535 and SR 1538) to be used as a detour route during construction. Upgrading will consist of some widening, shoulder modifications, horizontal alignment modifications, and realignment of SR 1535 at its intersection with US 64-NC 28.

The studied right-of-way width for Alternate 1 is 100 feet (30.5 m). It is estimated that acquisition of a 100-foot (30.5-m) wide right-of-way would result in the relocation of 6 residences and 3 businesses.

The total cost for right-of-way and construction, for Alternate 1, is estimated to be \$109,400,000 as follows:

Right-of-Way	\$ 2,900,000
Construction	106,500,000
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Total Cost	\$109,400,000

Although implementation of this alternate would substantially increase the safety and capacity of the existing roadway, the improved capacity would be approximately 50% of that necessary to adequately handle projected design year (2020) traffic volumes.

Implementation of this alternate would require major construction in the area of the Cullasaja Gorge. The environmental impacts of construction in the gorge area are beyond the scope of this study and should be evaluated in depth if this alternative is considered for implementation.

Alternate 2

Alternate 2 is the upgrading of existing Buck Creek Road (SR 1535 and SR 1538) from US 64, north of Highlands, to US 64-NC 28, at Gneiss. The studied upgrading consists of:

- A. Where practical, widen the existing roadway to a 2-lane, rural shoulder section with 12-foot (3.6-m) wide travel lanes and 6-foot (1.8-m) wide shoulders of which 4 feet (1.2 m) would be paved.
- B. Where practical, realign segments of the existing roadway, which presently have a high degree of horizontal curvature.
- C. Replace Bridge # 61, over Big Creek, with a new bridge having a clear deck width of 32 feet (9.8 m).
- D. Install approximately 26,000 lineal feet (7,925 m) of steel beam guardrail.
- E. Realign SR 1535 at its intersection with US 64-NC 28.
- F. Implement spot safety improvements along existing US 64-NC 28.

The studied right-of-way width for Alternate 2 is 100 feet (30.5 m). It is estimated that acquisition of a 100-foot (30.5-m) wide right-of-way would result in the relocation of 2 residences and 3 businesses.

The total cost for right-of-way and construction, for Alternate 2, is estimated to be \$27,000,000 as follows:

Right-of-Way	\$ 2,600,000
Construction	24,400,000
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Total Cost	\$27,000,000

Implementation of this alternate would substantially increase the level of safety for motorists traveling between Highlands and Franklin; however, the improved capacity would only be approximately 50% of that necessary to adequately handle projected design year (2020) traffic volumes.

Alternate 3

Alternate 3 includes upgrading existing NC 106 from Highlands to the Georgia state line and utilizing NC 106, Georgia Route 246 and US 23/441 as an alternate route to US 64-NC 28. The studied upgrading consists of:

- A. Construct roadway improvements to NC 106 between the Georgia state line and Spring Street in Highlands to include:
 - 1. Where practical, widen the existing roadway to a 2-lane, rural shoulder section with 12-foot (3.6-m) wide travel lanes and 6-foot (1.8-m) wide shoulders of which 4 feet (1.2 m) would be paved.
 - 2. Where practical, realign segments of the existing roadway which presently have a high degree of horizontal curvature.
 - 3. Replace Bridge # 26, over Middle Creek, with a new bridge having a clear deck width of 32 feet (9.8 m).
- B. In Highlands, widen Spring Street to a 40-foot (12.2-m) wide (face-to-face) curb-and-gutter section with 10-foot (3.0 m) wide berms.

The studied right-of-way width for Alternate 3 is 100 feet (30.5). It is estimated that acquisition of a 100-foot (30.5-m) wide right-of-way would result in the relocation of 7 residences and 2 businesses.

The total cost for right-of-way and construction, for Alternate 3, is estimated to be \$22,700,000 as follows:

Right-of-Way	\$ 1,900,000
Construction	20,800,000
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Total Cost	\$22,700,000

The Alternate 3 studied improvements are necessary, but are not recommended as a part of this project. Though the improvements would significantly improve NC 106, this route would not improve the NC 64-NC 28 congestion problem as further explained in Section III below.

Alternate 4

Alternate 4 includes upgrading both US 64-NC28 and Buck Creek Road from Highlands to Gneiss. The upgrade of Buck Creek Road would be the same as outlined in Alternate 2 above. The upgrade of US 64-NC28 would be a scaled down version of Alternate 1 above and would consist of:

- A. Where practical, widen the existing roadway to a 2-lane, rural shoulder section with 12-foot (3.6-m) wide travel lanes and 2-foot (0.6-m) wide paved shoulders
- B. Where practical, realign segments of the existing roadway, which presently have a high degree of horizontal curvature.
- C. Construct a new 32-foot (9.8-m) wide (clear deck width) bridge over Buck Creek.
- D. Replace approximately 30,000 lineal feet (9,144 km) of steel beam guardrail.

Implementation of upgrades to these routes should be on a 100-foot (30.5-m) wide right-of-way. It is estimated that acquisition of a 100-foot (30.5-m) wide right-of-way, for each route, would result in a total the relocation of 10 residences and 5 businesses.

The total cost of right-of-way and construction for upgrading these routes is estimated to be \$53,700,000 as follows:

	<u>US 64-NC 28</u>	<u>Buck Creek Road</u>	<u>Total Cost</u>
Right-of-way	\$ 2,900,000	\$ 2,600,000	\$ 5,500,000
Construction	23,800,000	24,400,000	48,200,000
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Total Cost	\$26,700,000	\$27,000,000	\$53,700,000

Implementation of this alternate would allow the truck route to be shifted to Buck Creek Road, from US 64-NC 28, thereby decreasing the scope of upgrade required for US 64-NC 28 to adequately and safely handle the anticipated traffic volumes. This alternate would significantly reduce the magnitude of construction required in the Cullasaja Gorge area and would maintain the scenic and environmental qualities of existing US 64-NC 28. Through traffic would be allowed to flow smoothly along Buck Creek Road, and tourist traffic could continue to travel the scenic route.

III. Roadway Capacities and Volumes

From Highlands to Gneiss, the estimated 1996 Average Daily Traffic (ADT) volumes on US 64-NC 28 and Buck Creek Road are approximately 3,000 vehicles per day (vpd), and 450 vpd, respectively. It is further estimated that the two roadways will have a combined volume of approximately 6,700 vpd in the design year (2020).

Based on the above traffic volumes, it is estimated that US 64-NC 28 and Buck Creek Road are currently operating at Levels of Service E and B, respectively. Both of the roadways have the potential (with improvements) of operating independently at Level C with combined existing traffic; however, neither of the roadways has the potential of operating independently at Level C with combined design year (2020) traffic. It is felt, though, that a major upgrade of either roadway, coupled with a minor upgrade of the other, would allow both roadways to operate at Level of Service C until close to the design year.

Within the studied area of US 64-NC 28, the estimated 1996 Average Daily Traffic (ADT) volumes range from a high of approximately 4,700 vehicles per day (vpd), in Highlands, to a low of approximately 3,000 vpd, in the Cullasaja Gorge area. The design year (2025) estimates range up to 5,900 vpd.

It is estimated that the 1996 ADT on NC 106, between Highlands and Georgia, is approximately 4,000 vehicles per day, and the 2020 estimated volume is expected to exceed 6,700 vpd.

Based on estimated traffic volumes, NC 106 is currently operating at Level of Service E. As an improved 2-lane roadway with 12-foot (3.6-m) wide travel lanes and 4-foot (1.2-m) wide useable shoulders, it is estimated that it will still operate at Level of Service E in the design year, and therefore could not adequately alleviate any of the congestion in the US 64-NC 28 area.

IV. Corridors Considered and Eliminated

In addition to the alternates described in Section II above, 5 additional corridors were considered but rejected as not being feasible. An attempt was made to develop a new acceptable alternate route by considering corridors totally on new location and corridors combining new location with existing state system and national park system roadways. Four corridors east of existing US 64-NC 28 and one corridor west were considered and are shown on Figure 3. The alternates considered and rejected, as well as the rationale for rejection are as described below:

All of the new corridors evaluated were rejected based on the same set of parameters. Problems common to all new-location corridors are:

1. There is a mountain range which runs generally west to east between Highlands and Franklin. The only workable corridors through these mountains appear to be existing US 64-NC 28 and Buck Creek Road (SR 1535/SR 1538). To develop other corridors would require numerous cut and fill sections up to 150 feet (45.7 m) deep and/or very lengthy tunnel sections in order to maintain even a 10% grade. An estimate of construction costs for Corridor 1 (thought to be the least costly corridor) is \$76,300,000. The land area (right-of-way) required for construction of slopes for this magnitude of cut and fill would be massive.

2. Any corridor developed east or west of existing US 64-NC 28, in order to be financially comparable to upgrading the existing routes, would be located so far away as to be impractical, and motorists would seek to use the existing routes.
3. The majority of the land area east and west of existing US 64-NC 28, between Highlands and Franklin, is part of the Nantahala National Forest. Development of new corridors through the national forest would meet with extreme Federal opposition due to existing disturbed routes available that could be upgraded.

V. Existing Conditions

US 64-NC 28 from Franklin to Highlands

On the North Carolina Statewide Functional Classification System and in the Macon County Thoroughfare Plan, US 64-NC 28 is designated as a minor arterial between Highlands and Franklin.

From Highlands to the Gneiss community, US 64-NC 28 is a 2-lane roadway with an 18-foot (5.5-m) wide pavement and virtually no shoulders. Terrain varies from moderate rolling, near Highlands, to heavy mountainous south of the Gneiss community in the area of the Cullasaja Gorge. Roadway elevations range from 3,721 feet (1,134 m), near Highlands to 2,115 feet (645 m), at Gneiss. Steep grades, "hairpin" horizontal curves, narrow shoulders, and precipitous slopes, both left and right, characterize the roadway. There are sections of the road where it is almost impossible for two passenger vehicles to pass each other. The roadway is undeveloped except for the segment close to Highlands. The roadway has just recently been fitted with guardrail.

From Gneiss to Franklin, the roadway is a standard 2-lane rural shoulder section with 12-foot (3.6-m) wide travel lanes and 4-foot (1.2-m) wide paved shoulders. The terrain is moderately rolling, and driving conditions are good.

US 64-NC 28 generally runs parallel to the Cullasaja River and primarily through the Nantahala National Forest. In this area, there are four developed recreational areas and during the summer and fall seasons, the Cullasaja River is the focal point for diverse recreational activities. The route is very scenic in nature and passes 3 waterfalls that are significant tourist attractions. Local and state movements are in the process of trying to have the Cullasaja River included in the National Wild and Scenic Rivers System.

The segment of US 64-NC 28 between Highlands and Franklin has been included on the North Carolina National Register Advisory Committee's Study List for possible nomination as a historic property. The roadway was constructed in the 1920's by prison labor and is considered by some to be an "engineering marvel". The roadway is characterized by sheer rock walls on the east side and shear rock cliffs, up to 200 feet deep, into the Cullasaja Gorge on the west side.

North of the intersection with SR 1535 (Buck Creek Road), US 64-NC 28 is a part of the "Route 33 Highlands Spur" bicycle route.

There are five structures located along the studied section of US 64-NC 28. All five structures are culverts and are located at the intersections with the Cullasaja River, Big Creek, Brush Creek, Buck Creek, and Walnut Creek.

During the period from August 1, 1995, through July 31, 1998, there were 76 accidents reported on US 64-NC 28, between NC 106 and SR 1533. This resulted in an accident rate of

236.9 accidents per 100 million vehicle miles (Acc/100MVM), compared to a statewide average of 201.4 Acc/100 MVM for all US routes during the period 1995-1997. There was one fatality reported during the period, and 21 of the accidents resulted in non-fatal injuries. Forty-seven percent of the accidents were ran-off-the-road accidents.

SR 1538 and SR 1535 (Buck Creek Road) from Highlands to Gneiss

The combination of SR 1538 and SR 1535 (Buck Creek Road) forms a continuous route from US 64, northeast of Highlands, to US 64-NC 28 at Gneiss. The roadway is a 2-lane shoulder section with generally an 18-foot (5.5-m) wide pavement and grassy shoulders. The shoulders vary in width from approximately 1 foot (0.3 m) wide to 6 feet (1.8 m) wide. The roadway is a typical mountain road with numerous curves and some steep grades. At US 64-NC 28, Buck Creek Road includes a switchback on a steep grade. Although needed, there is not presently any guardrail along the roadway.

Development along Buck Creek Road can be characterized as light residential and the roadway serves primarily local passenger car traffic. The 1996 average daily traffic volume is estimated to be less than 500 vehicles per day. Growth patterns are not likely to cause an increase in traffic volumes in the near future.

Buck Creek Road is an integral part of the "Route 33 Highlands Spur" bicycle route.

There is one bridge located on Buck Creek Road. Bridge # 61, over Big Creek, is located approximately 0.8 miles (1.3 km) north of US 64. The bridge is a timber floor structure, which is 37 feet (11.3 m) long, and has a clear deck width of 24.3 feet (7.4 m). It was constructed in 1971 and has a sufficiency rating of 62.4 out of a possible 100 points. In addition to Bridge # 61, there is a culvert on Buck Creek Road at Buck Creek.

During the period from July 1, 1995, through June 30, 1998, there were 21 accidents reported on SR 1538 and SR 1535 (Buck Creek Road), in Macon County. This resulted in an accident rate of 207.1 accidents per 100 million vehicle miles (Acc/100MVM), compared to a statewide average of 268.9 Acc/100 MVM for all rural secondary routes during the period 1995-1997. There were no fatal accidents reported during the period, and 6 of the accidents resulted in non-fatal injuries. Forty-nine percent of the accidents were ran-off-the-road accidents.

NC106 from Highlands to Georgia

NC 106 is classified as a rural major collector in the Statewide Functional Classification System. The studied section of NC 106 is a 2-lane roadway with an 18-foot (5.5-m) wide pavement and grassy shoulders. Average useable shoulder width is 1-foot wide. The alignment contains several steep grades and "hairpin" curves.

NC 106 carries local traffic and a substantial volume of through traffic from Dilliard, Georgia to US 64 in Highlands.

There is one bridge on the studied section of roadway. Bridge # 26, over Middle Creek, was constructed in 1938, has a clear deck width of 18.8 feet (5.7 m), and is 85 feet (25.9 m) long. The bridge has a sufficiency rating of 51.5 out of a possible 100 points.

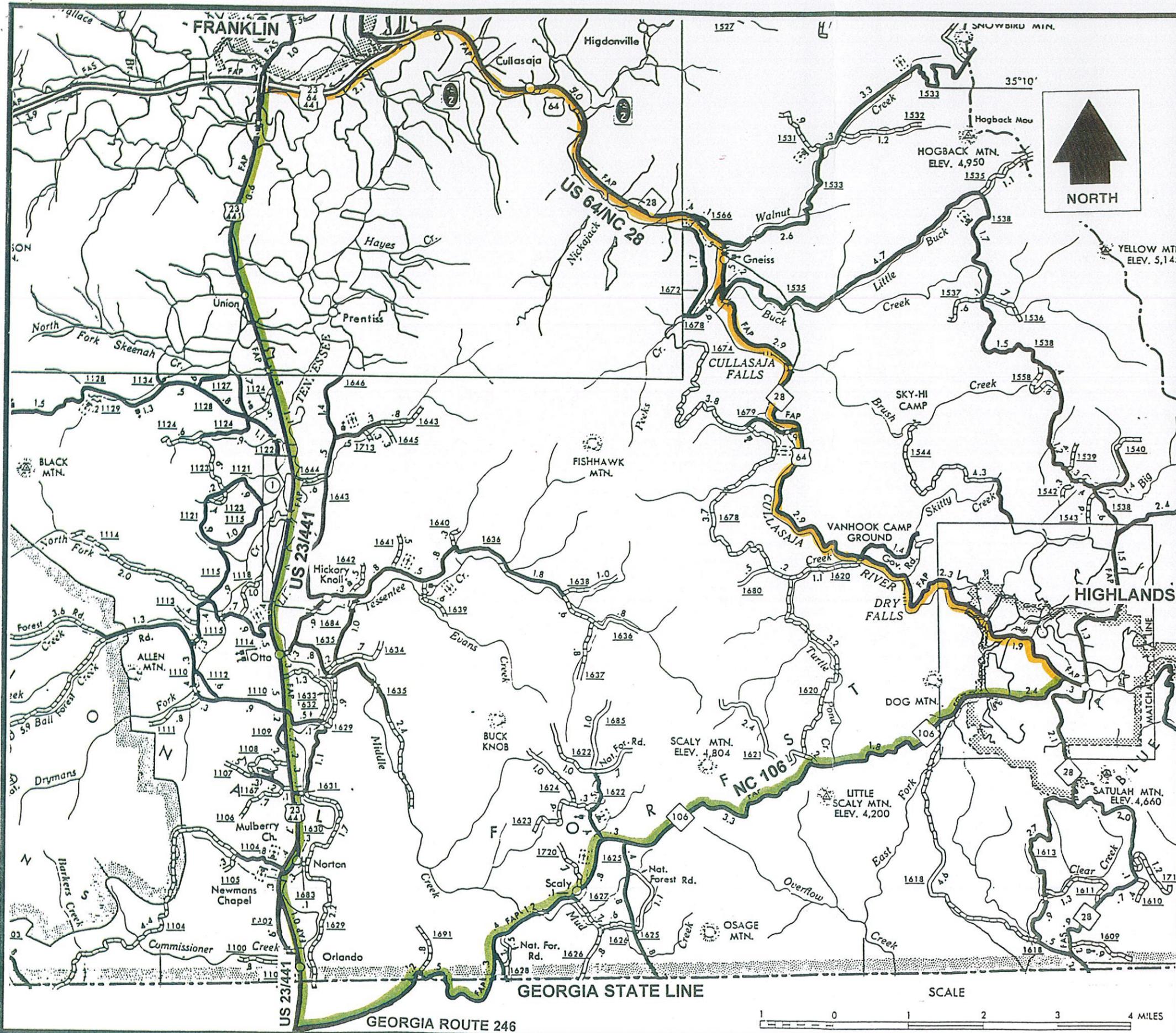
During the period from August 1, 1995, through July 31, 1998, there were 84 accidents reported on NC 106 between Highlands and the Georgia state line. This resulted in an

accident rate of 167.5 accidents per 100 million vehicle miles (Acc/100MVM), compared to a statewide average of 221.4 Acc/100 MVM for all rural NC routes during 1996. There were no fatal accidents reported during the period and 30 of the accidents resulted in non-fatal injuries. Sixty-three percent of the accidents were ran-off-the-road accidents.

VII. Other Comments

An environmental screening was not conducted for this study; however, due to the construction potential in the areas of Big Creek, Skitty Creek, Brush Creek, Buck Creek, and the Cullasaja River, Corps of Engineers permits and wetlands mitigation will be required. The costs for wetlands mitigation is not included as part of the above estimated project costs.

A section of this project is a part of the "Route 33 Highlands Spur" bicycle route. The recommended 4-foot (1.2-m) wide paved shoulders should be adequate to accommodate bicycle usage.



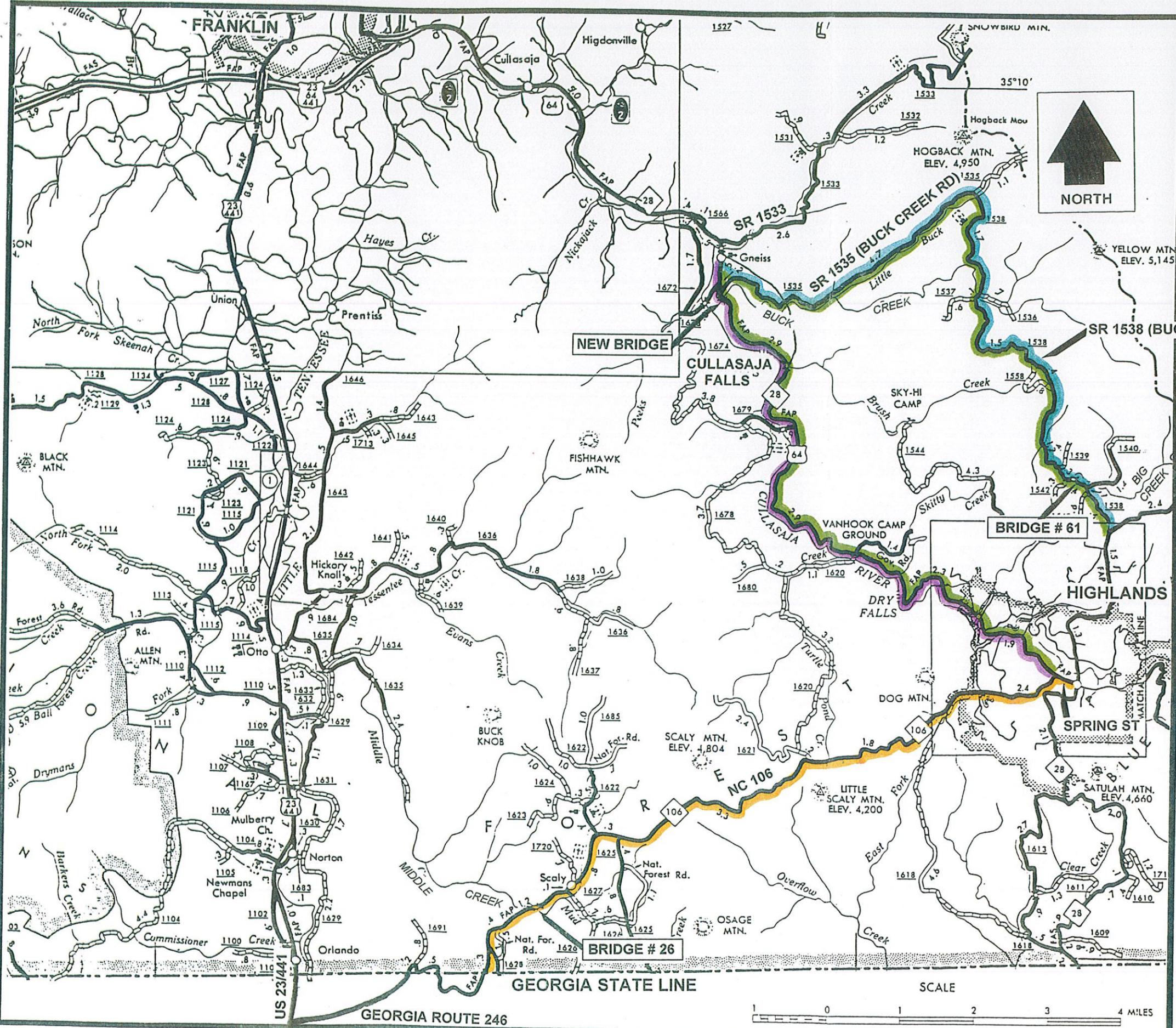
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EXISTING CONNECTING ROUTES

Franklin to Highlands
 Macon County

DIVISION 14 FIGURE 1



LEGEND

- ALTERNATE 1
- ALTERNATE 2
- ALTERNATE 3
- ALTERNATE 4

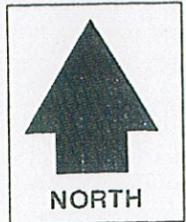
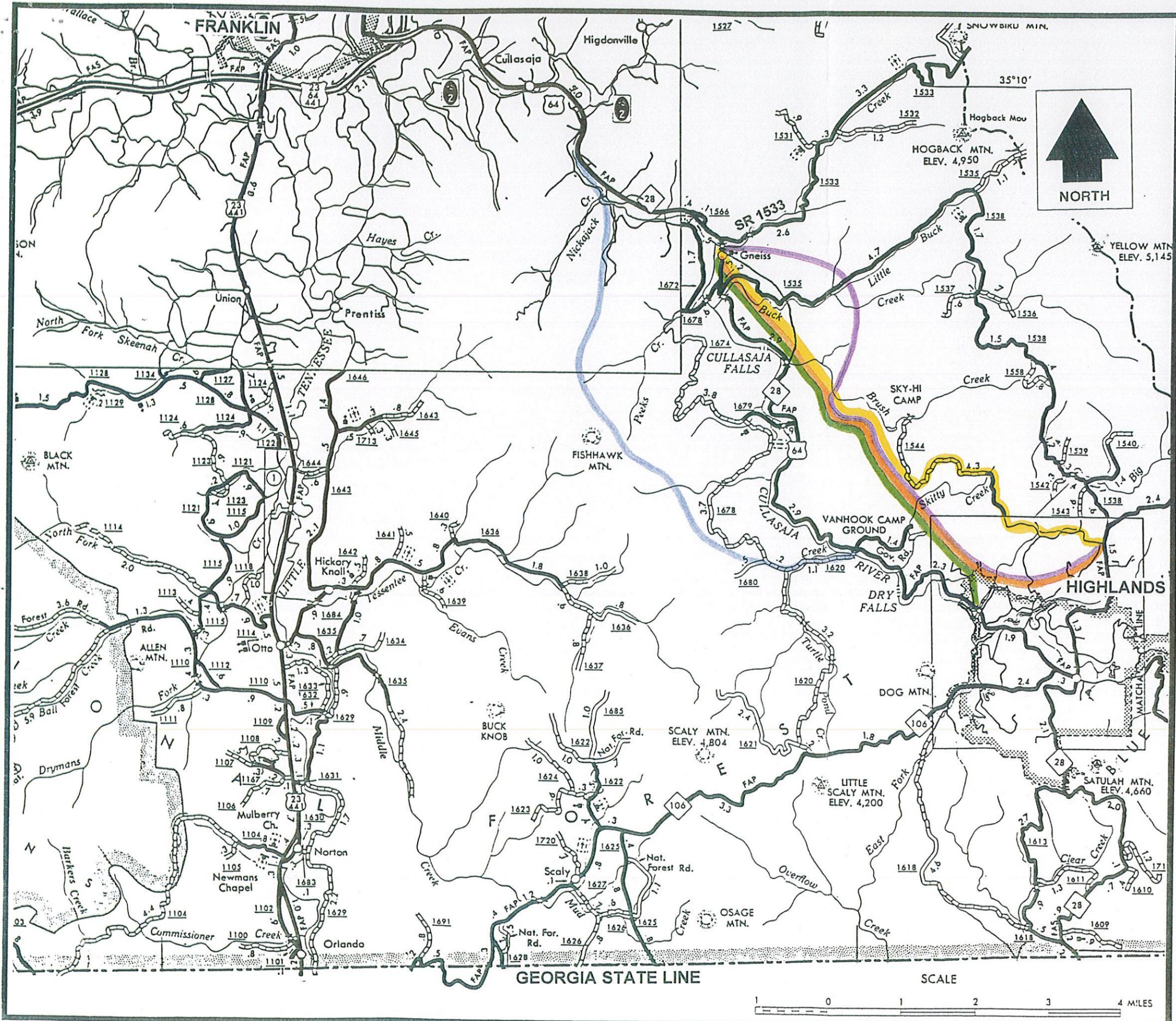


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FEASIBLE ALTERNATES EVALUATED
 US 64-NC 28
 From Franklin to Highlands
 Macon County

DIVISION 14 FIGURE 2





LEGEND

- CORRIDOR 1
- CORRIDOR 2
- CORRIDOR 3
- CORRIDOR 4
- CORRIDOR 5



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UNFEASIBLE CORRIDORS STUDIED
 US 64-NC 28
 From Franklin to Highlands
 Macon County

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