

FEASIBILITY STUDY

NC 73 Extension
from US 321 Relocation (R-212) to NC 73 at SR 1356
Lincoln County
R-2705

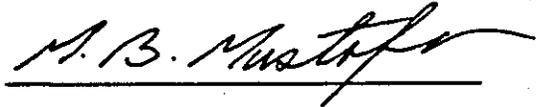
AND

NC 73
from SR 1356 to SR 2144
Lincoln and Mecklenburg Counties
R-2706

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



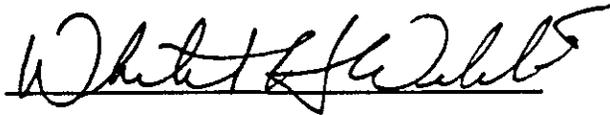
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I. GENERAL DESCRIPTION

This feasibility study combines projects R-2705 and R-2706 into one report. The projects are adjacent and involve improvements to NC 73 in Lincoln and Mecklenburg Counties (See Figure 1).

R-2705 proposes extending NC 73 from the proposed NC 150 extension (R-617) interchange with the US 321 relocation (R-212) south of Lincolnton, to NC 73 at SR 1356 in Lincoln County (See Figure 2). This study recommends a 4.0 mile length of four-lane highway divided by a 46-foot median, and a 0.25 mile two-lane extension of SR 1750. Total cost is estimated at \$14,460,000 (\$11,100,000 for construction and \$3,360,000 for right-of-way).

Project R-2706 begins at the eastern terminus of R-2705. It proposes the widening of NC 73 from SR 1356 in Lincoln County to SR 2144 in Mecklenburg County (See Figure 3). This study recommends widening NC 73 from NC 16 in Lincoln County to SR 2144 in Mecklenburg County. This improvement widens NC 73 for 6.2 miles, from a two-lane shoulder section to cross-sections ranging from a five-lane curb and gutter to a four-lane highway divided by a 46-foot median. Total recommended cost is estimated at \$18,480,000 (\$13,400,000 for construction and \$5,080,000 for right-of-way).

Termini on both projects have been changed from original TIP descriptions. This change was made to join NC 73 improvements with other programmed highway projects.

A feasibility study presents recommended cross sections for improvements, general alignments of improvements, and estimated cost of construction and right of way. This study attempts to identify any potential environmental, permitting, or other observed issues which deserve consideration in the planning and construction stages.

This study is not an exhaustive environmental investigation.

II. NEED FOR PROJECT

A. R-2705 NC 73 Extension from US 321 Relocation to NC 73 at SR 1356

Lincolnton does not have multilane access in any direction; however, currently programmed NCDOT projects will significantly improve transportation in the Lincolnton area. Project R-617 proposes the widening of NC 150 from Cherryville to Lincolnton (See Figure 1). The eastern end of R-617 will consist of an extension to NC 150 on new location as a four-lane highway divided by a 46-foot median. NC 150 will intersect with the US 321 relocation (R-212), which provides a north to south multilane highway through Lincolnton. Project R-2705 provides continuity of east-west movement by joining with NC 150 on the east side of the US 321 interchange with NC 150. The extension of NC 73 from US 321 relocation to SR 1356 is essentially a continuation of NC 150 (See Figure 2).

The 1991 Proposed Lincoln County Thoroughfare Plan shows the NC 73 Extension as a minor arterial which functions as an outer loop of Lincolnton. Land use surrounding the proposed alignment varies from agricultural to rural residential.

NC 73 is designated as the "Piedmont Spur" bicycle route from NC 27 to SR 1356. The North Carolina Bicycle Program has requested provisions to accommodate bicycle traffic.

Traffic volumes can be expected to increase with the widening/extension of NC 150, and construction of the US 321 relocation. At the writing of this report, no traffic projections were available. The corridor for the NC 73 extension will bypass the intersection where existing NC 73 joins NC 27 at a very acute angle. This intersection has a very high accident rate. With the NC 73 extension, through traffic will no longer use that intersection. Therefore, the high accident rate will be reduced significantly.

The City of Lincolnton has also requested an extension of SR 1750 to create direct access from NC 73, NC 27, and NC 150 to the Lincoln County Airport.

B. R-2706
Widening of NC 73 from SR 1356 in Lincoln County to SR 2144
in Mecklenburg County

Project R-2706 will improve transportation in both Lincoln and Mecklenburg Counties. The widening of NC 73 in Lincoln County will improve access from NC 16 and rural areas in Lincoln County, to Lincolnton and Mecklenburg County. The widening of NC 73 in Mecklenburg County is needed to improve access from NC 16 to I-77, and relieve traffic congestion on the portion of NC 73 which is south of Lake Norman.

Existing NC 73 consists of a two-lane roadway with pavement width ranging from 20 to 24 feet, and shoulders ranging from 6 to 8 feet. Claimed right-of-way varies from 60 to 100 feet.

Justification to widen NC 73 varies based upon the section studied (See Figure 3). The 1991 Proposed Lincoln County Thoroughfare Plan classifies NC 73 as a minor arterial from Lincolnton to Mecklenburg County. The highway is classified as a Rural Major Collector on the Statewide Functional Classification System. Development density increases to the east of NC 16 as the highway nears the Lake Norman area. Traffic volumes on NC 73 on the east side of NC 16 in Mecklenburg County are estimated to be approximately 50% higher than the west side of NC 16 in Lincoln County.

Land use surrounding NC 73 is primarily agricultural, with rural communities and churches bordering the highway. A high school and middle school are located in Lincoln County west of NC 16, and the Duke Power Nuclear Training Facility is located at the southern end of Lake Norman near the dam. Land use in the southern Lake Norman area shifts to denser residential and light industrial/commercial usage.

The North Carolina Bicycle Program has designated NC 73 from Lincolnton to I-77 as the "Piedmont Spur" bicycle route. Wider outside lanes in both directions of travel have been requested to accommodate bicycle traffic.

Since traffic and accident data differ significantly on the east and west sides of NC 16, NC 73 was divided into two parts for analysis.

1. NC 73 from SR 1356 to NC 16 (West of NC 16, See Figure 3):

From SR 1356 to NC 16, 1990 traffic counts range from 4000 to 5100 vehicles per day (vpd). By the design year of 2011, anticipated traffic is estimated at 10,200 vpd. With the current facility, traffic currently experiences a level

of service (LOS) C, and will experience a LOS D in the design year. With a four-lane highway divided by a median, current traffic will experience a LOS A, and design year traffic will experience a LOS B.

During the period from April 1, 1988 through March 31, 1991, a total of 53 accidents were reported along this section of NC 73, with no fatalities. This resulted in an accident rate of 185 accidents per 100 million vehicle miles, compared to a statewide average of 207.2 for similar routes. This accident rate is 10% below the statewide average.

2. NC 73 from NC 16 to SR 2144 (East of NC 16, See Figure 3):

From NC 16 to SR 2144, the present 8,200 vehicle per day (vpd) volumes is estimated to grow to 16,500 vpd by the design year of 2011. With the existing facility, traffic currently experiences a level of service (LOS) D, and will experience a LOS E in the design year. With a four-lane highway divided by a median, current traffic will experience a level of service A, and design year traffic will experience a LOS C. With a five-lane curb and gutter section, current traffic will experience a LOS B, and design year traffic will experience a LOS D.

During the period from April 1, 1988 through March 31, 1991, a total of 59 accidents were reported along this section of NC 73, with no fatalities. This resulted in an accident rate of 104.6 accidents per 100 million vehicle miles, compared to a statewide average of 207.2 for similar routes. This accident rate is 50% below the statewide average.

III. RECOMMENDATIONS

A. R-2705
NC 73 Extension from US 321 Relocation to NC 73 at SR 1356

The recommended typical section from US 321 to the SR 1750 extension consists of two 12-foot lanes with 2-foot inside and outside paved shoulders in each direction divided by a 46-foot median (See Figure 2). The recommended pavement width in each direction is 28 feet. From the SR 1730 extension to SR 1356, the recommended typical section consists of two 12-foot lanes with 2-foot inside and 4-foot outside paved shoulders in each direction divided by a 46-foot median. The recommended pavement width in each direction is 30 feet. Four foot outside shoulders are recommended to accommodate bicycle traffic. Recommended right-

of-way is 200 feet with partial control of access. At-grade intersections are to be constructed at SR 1001, SR 1321, and NC 27. Traffic signals will be required at SR 1001 and NC 27. A diamond interchange with US 321 relocation has already been included in Project R-617, the extension of NC 150 to the US 321 relocation. Total project length is approximately 4.0 miles. The recommended cross-section for NC 150 is a four-lane highway divided by a 46-foot median; therefore this project provides continuity of cross-section for east-west traffic. Existing NC 73 should be terminated just west of SR 1356, ending with a cul-de-sac.

Two 135-foot bridges with a 34-foot clear roadway width will be required to carry NC 73 over the CSX Railroad just west of NC 27.

A 0.25 mile extension of SR 1750 is recommended to connect Lincoln County Airport with the new NC 73 extension (See Figure 2). The termination of existing NC 73 will obstruct westbound NC 73 access to the airport. An extension of SR 1750 will improve access from NC 27, avoid the hazardous NC 27 intersection with existing NC 73, and improve access from NC 150. A two-lane, 32-foot pavement with 8-foot shoulders on 100 feet of right-of-way is recommended. The section should tie-in at an approximate 90 degree angle with the new NC 73 extension with an at-grade, signalized intersection. Bicycle traffic using old NC 73 as the "Piedmont Spur" route should be routed onto the SR 1750 extension. The signalized intersection with the NC 73 extension is to accommodate a crossing for eastbound bicycles to connect with NC 73 east.

Project R-2705 will cost an estimated \$14,460,000 for construction and right-of-way. Utility conflicts are low.

Total project cost is estimated at:

	NC 73 Extension	SR 1750 Extension
Right-of-Way	\$ 3,120,000	\$ 240,000
Construction	\$10,800,000	\$ 300,000
Project Cost:	\$13,920,000	\$ 540,000

B. R-2706
Widening of NC 73 from SR 1356 in Lincoln County to SR 2144 in Mecklenburg County

The 15.3 mile section on NC 73 from SR 1356 to SR 2144 has been divided into two parts for recommendation purposes.

1. NC 73 from SR 1356 to NC 16 (West of NC 16, See Figure 3):

This portion of NC 73 is not recommended for improvement at this time. Capacity analysis indicates that the existing facility will carry traffic at an acceptable level of service throughout the design period. Accident rates are 10% below the statewide average for similar routes.

2. NC 73 from NC 16 to SR 2144 (East of NC 16, See Figure 3):

Because of varying recommendations, this 6.2 mile section of NC 73 has been subdivided into three separate sections: Section A, Section B, and Section C.

Section A is from NC 16 to 1200 feet to the west side of SR 1395, a distance of 1.3 miles. A four-lane highway divided by a 46-foot median is recommended. Right-of-way width of 200 feet with no control of access is recommended because of the rural location. The recommended typical section consists of two 12-foot lanes with 2-foot inside and 4-foot outside paved shoulders in each direction divided by a 46-foot median. The recommended pavement width in each direction is 30 feet. Four foot outside shoulders are recommended to accommodate bicycle traffic. Widening should occur on the north side of NC 73 for most of the section, switching to the south side as NC 73 curves southeastward on the east side of SR 1396. The traffic signal at NC 16 is to be upgraded.

Section B is 2.7 miles in length, beginning 1200 feet to the west side of SR 1396 in Lincoln County, running across the Catawba River into Mecklenburg County, and ending at SR 2134. Right-of-way width of 200 feet with no control of access is recommended for the entire section. Section B is to begin with a 1200-foot transition from a 46-foot median to a 26-foot median section (widened on the south side) which extends to the Catawba River. The recommended typical section consists of two 12-foot lanes with 2-foot inside and 4-foot outside paved shoulders in each direction. The recommended pavement width in each direction is 30 feet. Four foot outside shoulders are recommended to accommodate bicycle traffic.

A 26-foot median may allow existing bridge #50, which carries NC 73 over the Catawba River, to be widened to accommodate four-lanes with a 36-foot clear roadway width in each direction, and 54 inch rails. (If this is not possible, a 46-foot median should be retained in this section to maintain continuity). Existing bridge #50 has a sufficiency rating of 65, a length of 883 feet, and a clear

roadway width of 28 feet. The construction estimate is based upon a rehabilitation and retrofit of the existing structure, and building a new 883 x 34-foot bridge.

The 26-foot median section is to continue until 1200 feet on the west side of SR 2134, where it begins an 800-foot transition into a symmetrically widened 68-foot, five-lane curb and gutter section with 8-foot berms (14-foot outside lanes to accommodate bicycle traffic). The last 400 feet of Section B is a 68-foot, five-lane curb and gutter section.

Section C is from SR 2134 to the east terminus of the project at SR 2144, a distance of 2.2 miles (See Figure 3). A symmetrically-widened, 68-foot curb and gutter section with 8-foot berms is recommended to accommodate bicycles. The cross-section is to consist of a center 12-foot left-turn lane, two 12-foot inside travel lanes, and two 14-foot outside lanes to accommodate bicycle traffic. A right-of-way width of 100 feet is recommended, with no control of access. This project joins R-2555 (See Figure 3), which recommends the widening of NC 73 from SR 2144 to SR 2195, to a five-lane curb and gutter section. Due to restrictive development and many access points in this section, a five-lane curb and gutter section will increase roadway capacity to meet future traffic demands, while still offering shelter for turning vehicles. Due to the proximity of homes and businesses to NC 73 in this section, a wider, median-divided cross-section would involve significantly more relocation and proximity damage costs.

In all sections, the existing alignment of the roadway is to be maintained and utilized to the extent possible. Utility conflict is low on Section A, and medium on Sections B and C.

The table below summarizes recommended costs for R-2706:

	Right-of-Way	Construction
Section A	\$1,500,000	\$1,650,000
Section B	\$1,580,000	\$8,700,000
Section C	\$2,000,000	\$3,050,000
Total Cost:	\$ 18,480,000	

Projects R-2705 and R-2706 compliment one another, since both involve improvements to NC 73. R-2705 provides both an improvement to east-west traffic movement in the region, and advances the Lincolnton Thoroughfare Plan.

IV. OTHER COMMENTS AND CONCERNS

A. R-2705
NC 73 Extension from US 321 Relocation to NC 73 at SR 1356

A new road on 200 feet of right-of-way and the SR 1750 extension on 100 feet of right-of-way may impact approximately 50 acres of woodland; however soil maps indicate no presence of hydric soils. The NC 73 extension passes near the A.A. Lockman House on SR 1321 near Hoyle Creek. The Lockman House may be eligible for the National Register of Historic Places. No archaeological sites or any public parks are known to lie in the alignment corridor. A Corps of Engineers Nationwide Permit will likely be required at Hoyle Creek. Coordination with the Federal Aviation Administration will be necessary due to the Lincoln Airport aircraft approach envelope.

It is anticipated that the construction of NC 73 from US 321 to SR 1356 will cause approximately 15 residential and one business relocatee. The extension of SR 1750 will cause two residential relocatees.

B. R-2706
Widening of NC 73 from NC 16 to SR 2144

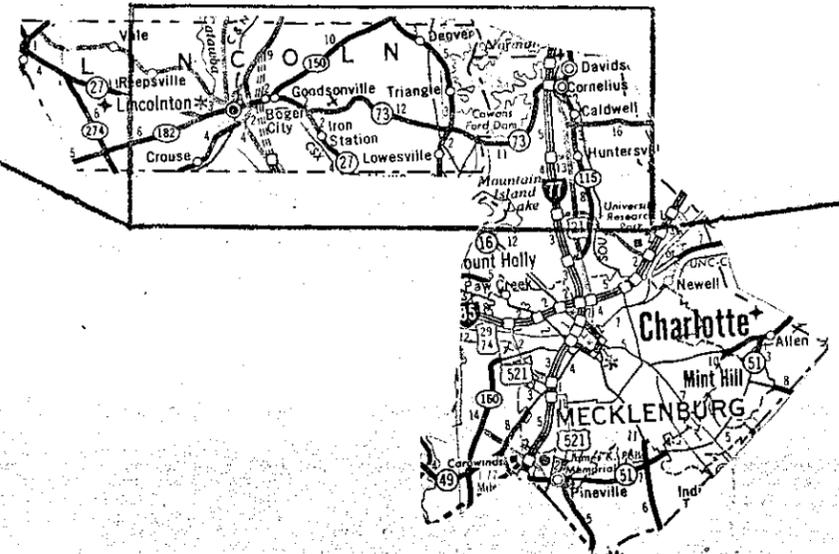
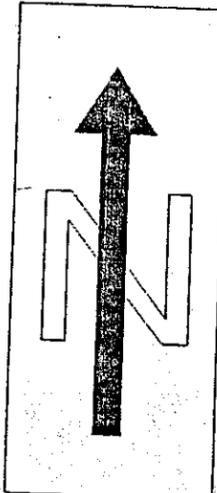
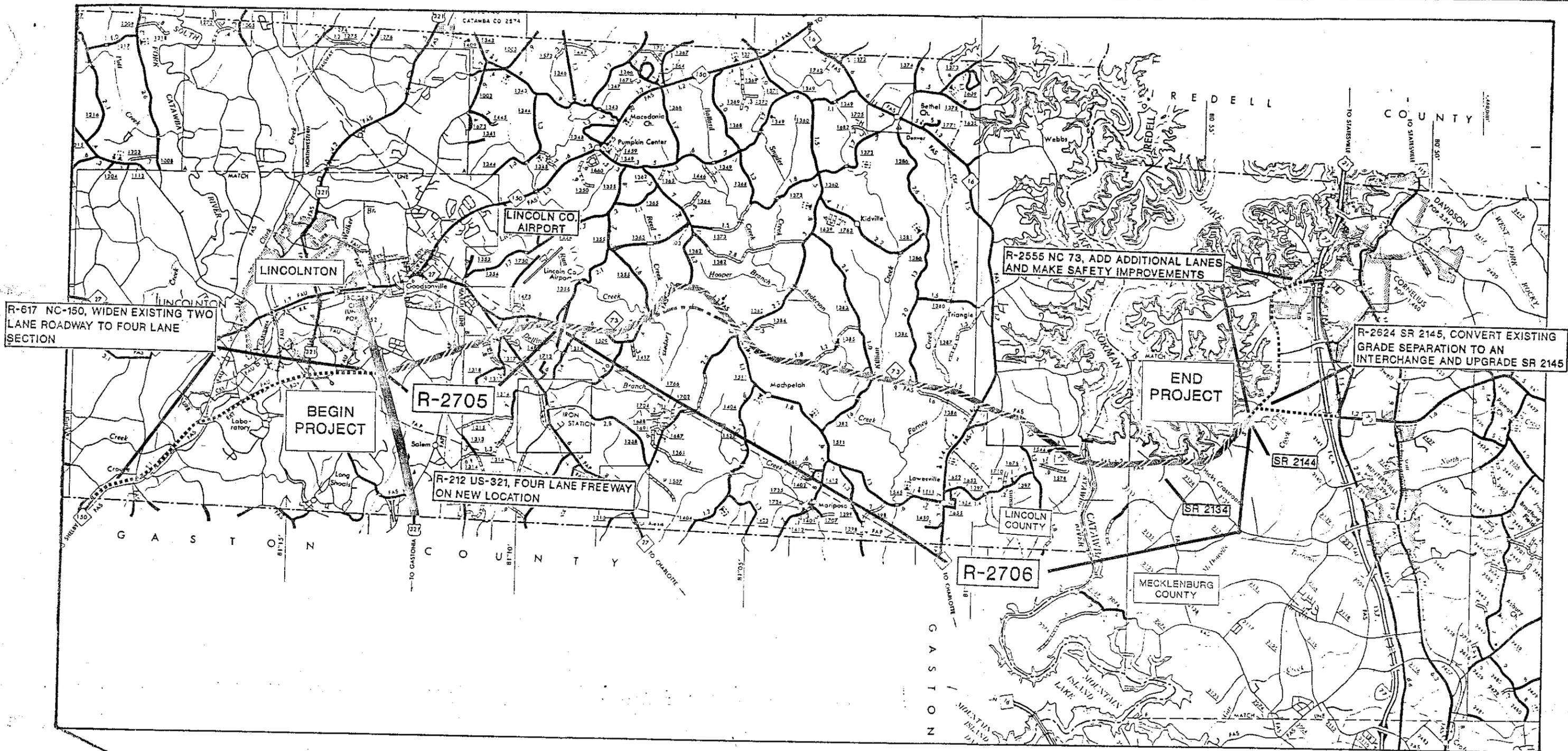
Widening this section of NC 73 will impact only a small area with hydric soils. A significant amount of fill will be required to widen the Catawba River bridge, therefore a Corps of Engineers Individual Permit will be required. If federal funding is used for this project, there may be Section 4(f) involvement.

Widening this portion of NC 73 from may cause approximately 14 residential and one business relocatee.

V. ALTERNATIVES STUDIED BUT NOT RECOMMENDED

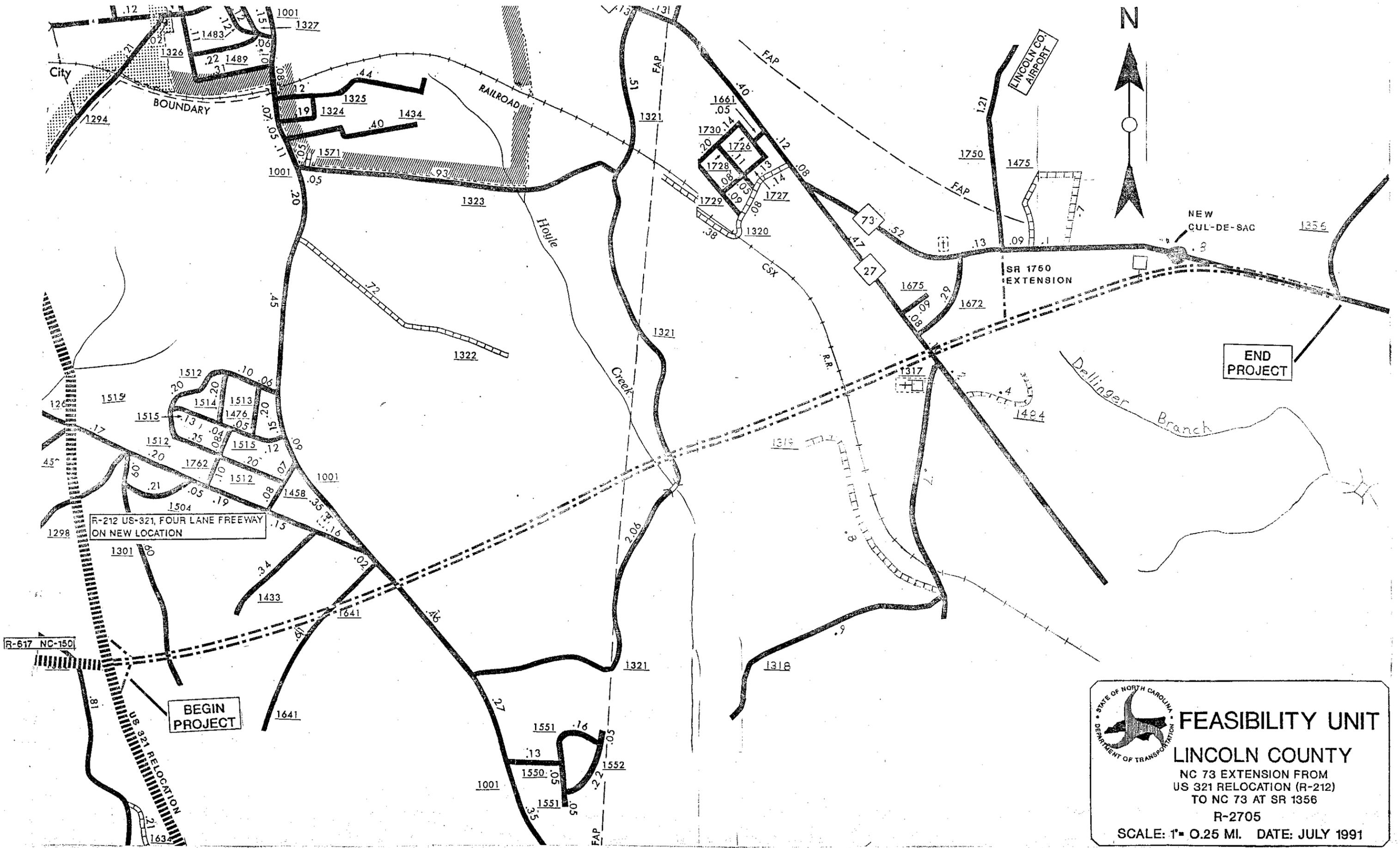
Project R-2706 was initially analyzed on new location from NC 27 to SR 1356 as a four-lane highway divided by a 46-foot median on the same alignment as shown by project R-2705. Because this overlap occurred, the termini for both projects were changed to eliminate the overlap and to provide for continuous movement on NC 73 in the event that one project is not programmed.

The Transportation Board Member for Division 12 requested that an alternative to widening existing NC 73 be analyzed between SR 1355 and SR 1350 in order to improve the alignment. As shown in Figure 4, two alignments were considered. The first alternative widens NC 73 on its present alignment. The second alternative is a more direct alignment on new location, thus 0.4 miles shorter than the existing alignment. Both alignments fall within acceptable standards for horizontal and vertical highway geometry. The alignment on new location is \$872,000 more expensive than widening NC 73, when considering right-of-way and construction cost. Although a benefit/cost analysis justifies the new alignment, this section of NC 73 is not recommended for improvement based upon projected traffic demands.



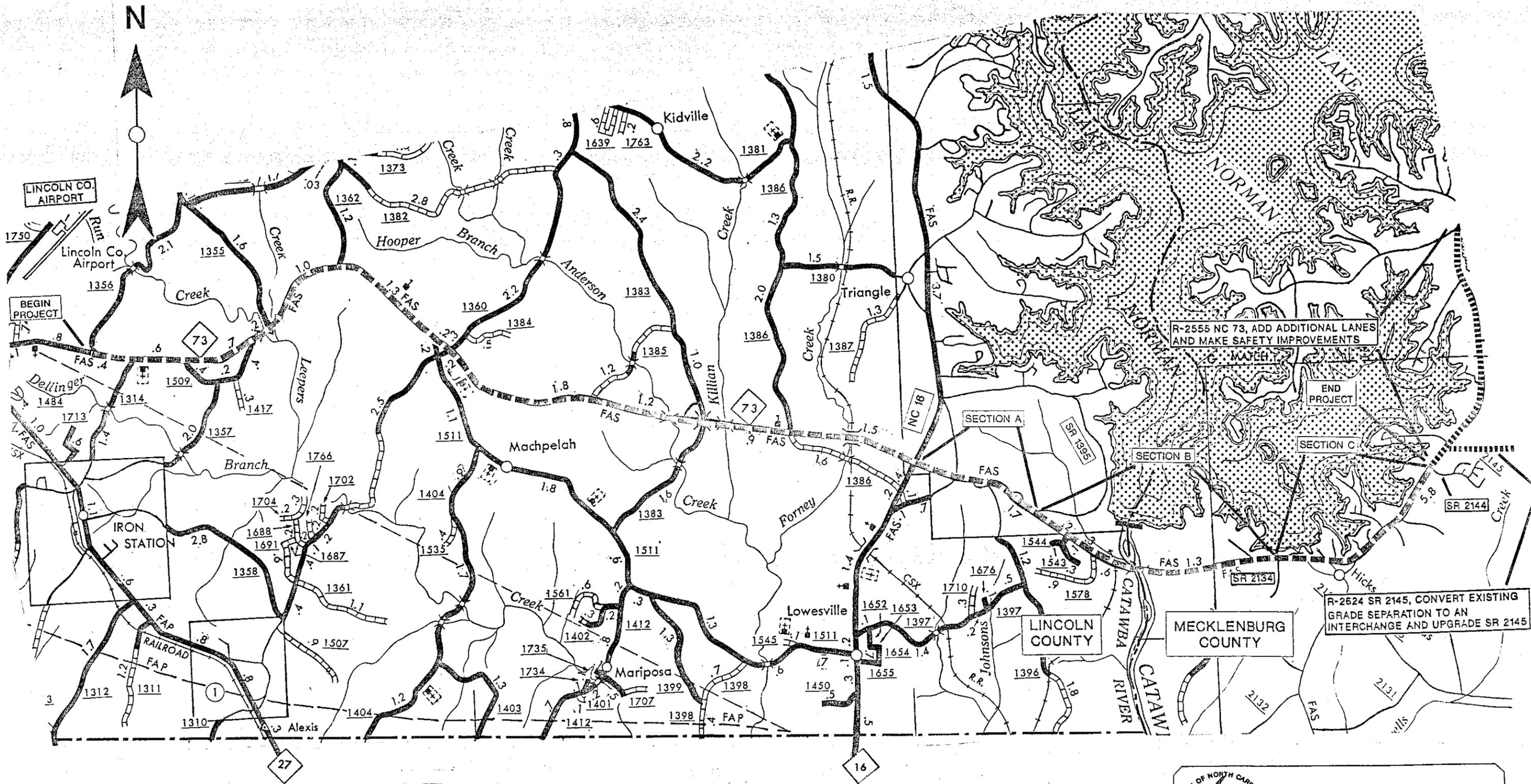

FEASIBILITY UNIT
LINCOLN, MECKLENBURG CO.
 NC 73 FROM SR 1356 TO SR 2144
R-2706
 SCALE: 1" = 2 MILES DATE: JULY 1991

FIGURE 1



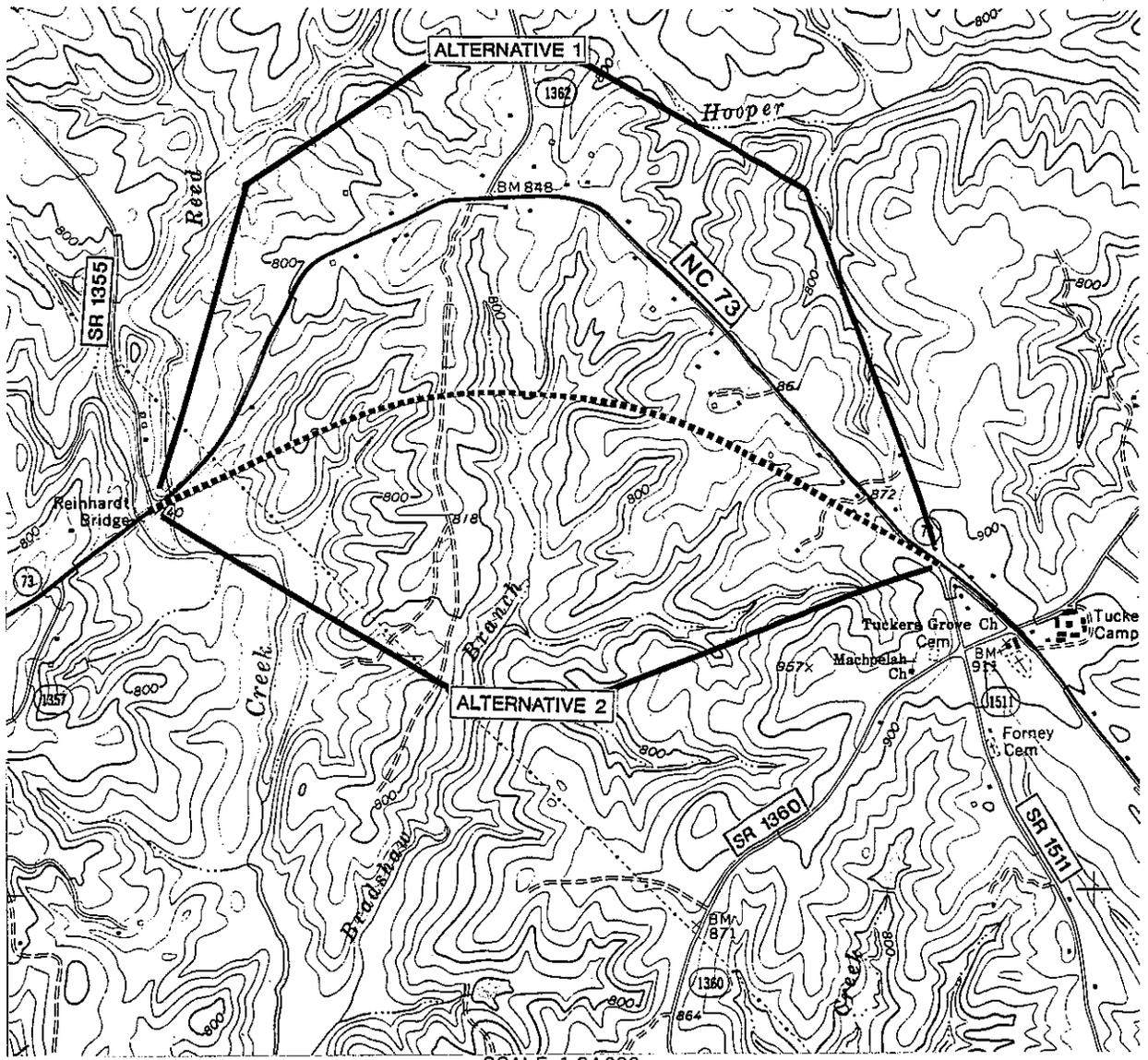

FEASIBILITY UNIT
LINCOLN COUNTY
 NC 73 EXTENSION FROM
 US 321 RELOCATION (R-212)
 TO NC 73 AT SR 1356
 R-2705
 SCALE: 1" = 0.25 MI. DATE: JULY 1991

FIGURE 2

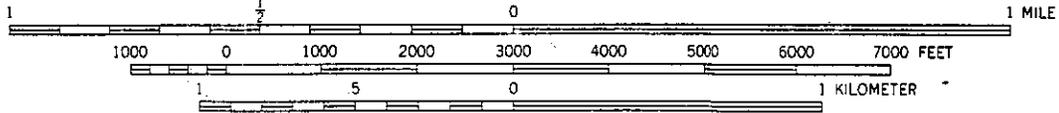



FEASIBILITY UNIT
LINCOLN, MECKLENBURG CO.
 NC 73 FROM SR 1356 TO SR 2144
 R-2706
 SCALE: 1" = 1 MILE DATE: JULY 1991

FIGURE 3



SCALE 1:24 000



CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL




FEASIBILITY UNIT
TOPOGRAPHIC MAP
LINCOLN, MECKLENBURG CO.
 SECTION C-2 ON NEW LOCATION
 FROM SR 1355 TO SR 1511
R-2706
 CONTOUR INTERVAL 20 FEET
 SCALE: 1" = 2000' DATE: JULY 1991

FIGURE 4