



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

JAMES B. HUNT JR.
GOVERNOR

DIVISION OF HIGHWAYS
P.O. BOX 25201, RALEIGH, N.C. 27611-5201

GARLAND B. GARRETT JR.
SECRETARY

March 15, 1996

MEMORANDUM TO: Mr. Clark Jenkins, Member, Board of Transportation
Mr. D. R. Dupree, Division Engineer, Division 4
Mr. C. W. Leggett, P.E.
Mr. W. H. Webb, P.E.
Mr. J. M. Lynch, P.E. (6) Attention: Roberto Canales, P.E.
Congestion Management Engineer
Mr. J. B. Williamson
Mr. H. F. Vick, P.E. (2)
Mr. D. R. Morton, P.E.
Mr. G. T. Shearin, P.E.
Mr. M. R. Poole, P.E.
Mr. A. L. Avant (2)
Mr. J. D. Lane
Mr. T. A. Peoples, P.E.
Mr. L. K. Barger, P.E.

FROM: David G. Modlin, Ph.D., P.E.
Head of Feasibility Studies

A handwritten signature in cursive script that reads "David G. Modlin".

SUBJECT: Feasibility Study # R-3410, NC 42 from NC 50 to US 70,
Johnston County.

Our staff has completed a feasibility study for the subject proposed project. This brief analysis suggests improvements that would be logical if the project were to be funded. A copy of our report is attached for your information.

DGM/joa

Attachment

cc: Dr. L. R. Goode, P.E.
Mr. B. G. Jenkins, P.E.
Mr. David W. Conner

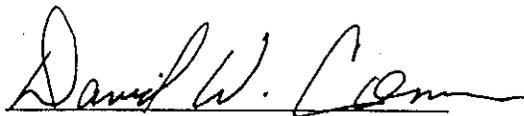


FEASIBILITY STUDY

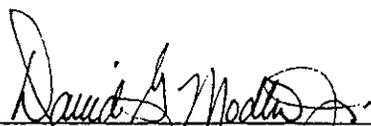
NC 42 From NC 50 to US 70
Johnston County

R-3410

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



David W. Conner
Highway Planning Engineer



David G. Modlin, Jr., Ph.D., P.E.
Head of Feasibility Studies

2/28/96
Date

R-3410

NC 42 From NC 50 to US 70 Johnston County

I. General Description

This preliminary study describes recommended improvements to NC 42 in Johnston County. It is recommended that NC 42 be widened from NC 50 to SR 1010 and from the eastern I-40 interchange ramps to US 70 (the segment of roadway between SR 1010 and the eastern I-40 interchange ramps is being widened as part of Project R-3301). The total length of recommended widening is 8.0 miles (12.9 km) and the total project length is 8.6 miles (13.9 km). For a location map, please see Figure 1.

From NC 50 to SR 1010 and from the eastern I-40 interchange ramps to SR 1552, the recommended cross section is a rural shoulder section with two 12-foot (3.6-m) wide travel lanes in each direction, a 12-foot (3.6-m) wide center turn lane, and 10-foot (3.0-m) wide shoulders of which 4 feet (1.2 m) are paved. The recommended pavement width is 68 feet (20.7 m) from edge-of-pavement to edge-of-pavement, including the paved shoulders. The required right-of-way width is 100 feet (30.5 m).

From SR 1552 to the eastbound interchange ramp at US 70, a 64-foot (19.5-m) wide (face-to-face), curb-and-gutter section with two travel lanes in each direction, a center turn lane, and 8-foot (2.4-m) wide berms is recommended on a 100-foot (30.5-m) wide right-of-way.

It is estimated that there will be 15 residences and 1 business relocated as a result of this project.

The total cost for right-of-way and construction is estimated to be \$25,050,000 as follows:

Right-of-Way	-----	\$ 6,800,000
Construction	-----	<u>18,250,000</u>
Total	-----	\$25,050,000

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. Need For Project

The purpose of this project is to improve the traffic carrying capacity and accident experience of NC 42 within the project terminals.

NC 42 is designated as a major thoroughfare on the Clayton Thoroughfare Plan and as a rural major collector in the North Carolina Statewide Functional Classification System.

The NC 42 corridor is generally characterized as wooded and farm lands with light residential development adjacent to the roadway; however, the roadway corridor is beginning to experience rapid residential and commercial development. At this time, a school, subdivisions, and businesses are prevalent in close to Clayton and the I-40 interchange area is experiencing heavy commercial growth.

NC 42 is generally a 2-lane roadway with a 20-foot (6.1-m) wide pavement and 5-foot (1.5-m) wide soil shoulders. Exceptions are the area immediately west of I-40 where the roadway has been widened to three lanes and a segment from approximately 0.5 miles (0.8 km) west of US 70 to US 70 which includes curb-and-gutter and sidewalks on the north side. Also, at the intersections with SR 1010 and SR 1552, NC 42 has been widened to 3 lanes to facilitate turning movements.

The intersections of NC 42 with NC 50, SR 1010, and SR 1552 are signalized.

At the western project terminal, NC 50 is generally a 2-lane roadway with a pavement width of 28 feet (8.5 m) and 8-foot (2.4-m) wide soil shoulders. The roadway has been widened to 3 lanes at the intersection to facilitate turning movements.

At the eastern project terminal, US 70 is a 4-lane median divided facility which is grade separated from NC 42.

The 1995 Average Daily Traffic (ADT) on NC 42 is estimated to range from approximately 4,100 vehicles per day (vpd) near NC 50 to approximately 12,100 vpd near US 70. The design year (2020) volumes on NC 42 are estimated to range from approximately 7,600 vpd to 22,400 vpd respectively.

The Level of Service is currently estimated to be a level E near NC 50 and level F just west of US 70. With the recommended improvements the Level of Service is expected to improve to a level A throughout the project length. The improved Level of Service should prevail through the design year (2020).

During the period from May 1, 1992, through April 30, 1995, there were 203 accidents reported on NC 42 between NC 50 and US 70. There were 5 fatalities and 194 non-fatal injuries reported during this period. This resulted in a total accident rate of 444.5 accidents per 100 million vehicle miles (Acc/100MVM), a fatal accident rate of 8.8 Acc/100MVM, and a non-fatal accident rate of 225.5 Acc/100MVM. The statewide averages for all rural NC routes are 207.3 Acc/100MVM, 2.4 Acc/100MVM, and 99.0 Acc/100MVM respectively. The most prevalent accident types were rear-end (36.5%), angle (24.1%), and left turn (20.7%). The wider cross section with center turn lane will reduce the potential for these types of accidents.

III. Recommendations

It is recommended that NC 42 be widened from NC 50 to SR 1010 and from the eastern I-40 interchange ramps to US 70 (the segment of roadway between SR 1010 and the eastern I-40 interchange ramps is being widened as part of Project R-3301). The total length of recommended widening is 8.0 miles (12.9 km) and the total project length is 8.6 miles (13.9 km). For a location map, please see Figure 1.

From NC 50 to SR 1010 and from the eastern I-40 interchange ramps to SR 1552, the recommended cross section is a rural shoulder section with two 12-foot (3.6-m) wide travel lanes in each direction, a 12-foot (3.6-m) wide center turn lane, and 10-foot (3.0-m) wide shoulders of which 4 feet (1.2 m) are paved. The recommended pavement width is 68 feet (20.7 m) from edge-of-pavement to edge-of-pavement, including the paved shoulders. The required right-of-way width is 100 feet (30.5 m).

From SR 1552 to the eastbound interchange ramp at US 70, a 64-foot (19.5-m) wide (face-to-face), curb-and-gutter section with two travel lanes in each direction, a center turn lane, and 8-foot (2.4-m) wide berms is recommended on a 100-foot (30.5-m) wide right-of-way.

Traffic signal modifications will be required at NC 50, SR 1010, and SR 1552. All other intersections should be at-grade and stop-sign controlled.

At NC 50, NC 42 should include a right-turn lane, a through lane, a left-turn lane, and two lanes exiting the intersection.

At the eastern project terminal (US 70), the outside northbound lane of NC 42 should be a mandatory right-turn lane onto eastbound US 70. Two eastbound lanes should proceed under US 70 with one lane becoming a left-turn lane to US 70 westbound and the other lane continuing into Clayton. One westbound lane should proceed from Clayton under US 70 and a second westbound lane should begin at the US 70 eastbound exit-ramp.

At SR 1010 and the eastern I-40 interchange ramps, NC 42 should tie into the 5-lane section being constructed as part of R-3301.

SR 1524 and SR 1556 should be realigned at NC 42 to create an intersection that is generally 90 degrees.

It is estimated that there will be 15 residences and 1 business relocated as a result of this project.

The total cost for right-of-way and construction is estimated to be \$25,050,000 as follows:

Right-of-Way	-----	\$ 6,800,000
Construction	-----	<u>18,250,000</u>
Total	-----	\$25,050,000

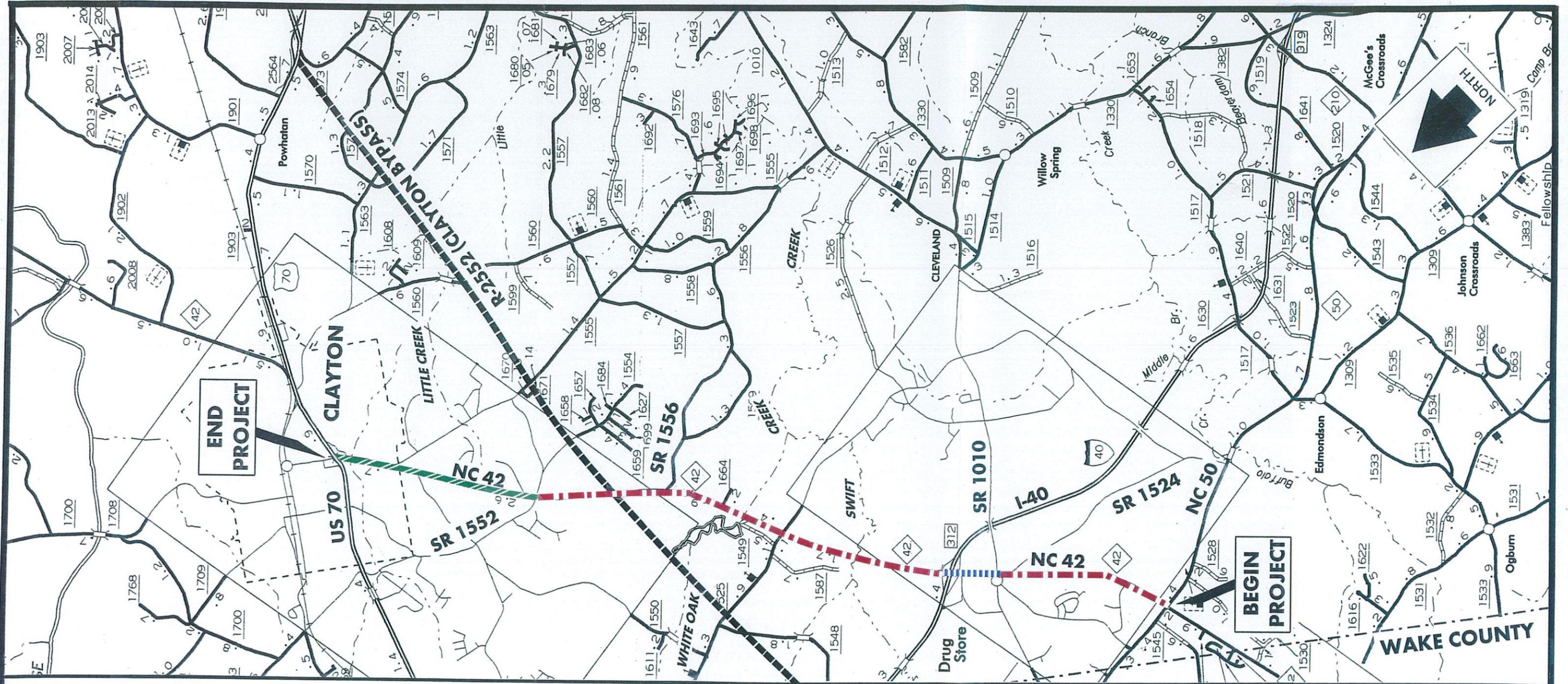
IV. Other Comments

The costs of the recommended improvements included in this feasibility study are based on symmetrical widening for the entire project length. It is thought that asymmetrical widening may reduce the right-of-way cost by approximately \$2.3 million.

The recommendations of this feasibility study and the traffic projections on which the Level Of Service calculations are based assume that project R-2552 (Clayton Bypass) will be constructed prior to these recommended improvements.

An environmental screening was not conducted for this study; however, due to the construction potential in the areas of Swift Creek, White Oak Creek, and Little Creek, Corps of Engineers permits and wetlands mitigation will be required. The costs for wetland mitigation is not included as part of the above estimated project costs.

No provisions for bicycles have been included in this report.



END PROJECT

BEGIN PROJECT

WAKE COUNTY



LEGEND	
	5-LANE SHOULDER SECTION
	5-LANE CURB AND GUTTER SECTION
	PROJECT R-3301 (5-LANE CURB AND GUTTER)



FEASIBILITY STUDIES UNIT

**NC 42
from NC 50
to US 70
JOHNSTON COUNTY**

DIV 4 R-3410 FIGURE 1