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FEASIBILITY STUDY

US 401, From Existing Four Lanes North of
Fayetteville to Fuquay-Varina
Cumberland, Harnett, Wake Counties
R-2609

Prepared by
Planning and Research Branch
Division of Highways
N. C. Department of Transportation

R. J. Booker, III
Project Planning Engineer

R. G. Dawson, Jr., P. E.
Head of Feasibility & Special
Studies Unit

6-4-90
Date

L. J. Ward, P. E.
Manager, Planning and Research

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I. DESCRIPTION

This report covers a preliminary study of the proposed improvement to US 401 from the end of the 68-foot curb and gutter section north of Fayetteville to the beginning of the four-lane divided section on US 401 north of Fuquay Varina, a distance of approximately 34 miles. The project location is shown on Figure 1. This project is included in the 1990-1996 Transportation Improvement Program for feasibility study and/or right-of-way protection. No funds have been appropriated for this project.

II. PURPOSE OF PROJECT

Existing Road Characteristics

US 401 is classified as a Rural Minor Arterial in the North Carolina Functional Classification System and is a Federal Aid Primary Route. It also serves as major north-south route through the state connecting many towns and cities such as Raleigh, Fuquay-Varina, Lillington and Fayetteville.

The basic cross section of the studied section of road is a 24-foot pavement with shoulders ranging from 8 to 12 feet. Horizontal alignment is fair with curves generally ranging from 3° to 6° (55 mph safe speed). Vertical alignment is rolling with maximum grades of 6 percent. The speed limit is 55 mph reducing to 45 mph through Chalybeate Springs and Bunnlevel. Speed limits through the Central Business Districts (CBD) of Fuquay Varina and Lillington range from 35 mph to 20 mph. The cross section through Fuquay-Varina is 3 lanes curb and gutter with parking on one side. Through Lillington's business district, the cross section is 4 lanes curb and gutter with parking on both sides.

There are four bridges located along this section of US 401. They are listed below with pertinent information.

Bridge No.	Location	Length (ft.)	Width (ft.)	Date Built	Rating (new = 100)
Cumberland Co.					
60	Lower Little River	176	25.8	1940	59.5
Harnett Co.					
24	Upper Little River	250	36.0	1986	95.9
45	Cape Fear River	739	20.0	1931	19.0
46	Cape Fear River	808	31.5	1958	78.6

Roadside development is light to medium density with scattered commercial and institutional development. Development through Fuquay Varina and Lillington is much more dense with commercial and retail development as predominating uses.

Traffic, Volume, Capacity, and Accident Record

Generally, current traffic volumes range from 5200 vehicles per day (vpd) in Harnett County to 7300 vpd in Wake County. Traffic volumes in Fuquay Varina and Lillington are 15,600 vpd and 15,000 vpd, respectively. By the year 2010, it is estimated that traffic volumes will range from 8,000 vpd to 13,000 vpd along the rural sections of US 401, and up to 25,000 vpd in the urban centers.

The existing facility has a capacity of approximately 6,000 vpd in the rural areas and 12,000 vpd in the urban centers, at desirable level of Service C. It can be seen that US 401 is operating near capacity on the rural sections and over capacity in Fuquay-Varina and Lillington.

During the period from January 1, 1986 to October 31, 1989, a total of 630 accidents was recorded on the studied section of road. There were 7 fatalities and 315 of the accidents resulted in injury. The record yields an accident rate of 213.6 accidents per hundred million vehicle miles (A/100 MVM). This compares with the state average of 188.0 A/100 MVM over the same time period. The predominant accident types were ran off road and rear-end collisions which accounted for 57% of the total accidents.

Need for Project

US 401 is a major north-south route with increasing traffic volumes and capacity problems that will become critical during the planning period. The provision of additional lanes and the bypassing of Fuquay-Varina and Lillington are justified by the need to provide adequate capacity and increase driver safety and comfort along the route.

III. OTHER PROGRAMMED PROJECTS AFFECTING US 401

There are four programmed projects affecting the studied section of US 401. One project on US 401 (R-2026) starts at the end of the existing curb and gutter section in Fuquay-Varina and extends north to the intersection of NC 42-55. A 5-lane curb and gutter section is proposed with right of way acquisition starting in FFY 90 (Federal Fiscal Year 1990) and construction scheduled to begin in FFY 91. The second project on US 401 (R-2416), also in Fuquay-Varina, begins at the intersection of NC 42-55 and extends north to the existing 4-lane divided section. Right of way acquisition is scheduled to begin in FFY 93 with construction beginning in FFY 94. The third project is a bridge replacement project (B-1217) and will replace bridge #45 over the Cape Fear River north of Lillington. Construction is scheduled to start in FFY 91. The fourth project R-844, US 421 north of Lillington eastward to NC 27 is presently under construction and is being widened to a multi-lane facility.

IV. RECOMMENDATIONS AND COSTS

The recommended improvement to US 401 is widening the existing roadway to a 4-lane divided section, and bypassing the towns of Fuquay-Varina, Lillington, Chalybeate Springs and Bunnlevel. Widening of US 401 to increase capacity in these towns is not feasible due to heavy development and high cost.

The recommended cross section for widening the existing sections is 2 @ 24-foot pavements separated by a minimum 46-foot median. The roadway should have 10-foot usable shoulders including 2-foot paved. The estimated right-of-way width for this roadway is 225 feet. For the bypasses, the proposed cross section is 2 @ 24-foot pavements with a minimum 60-foot median on a right-of-way width of 250 feet. Control of access is recommended around Fuquay-Varina and Lillington. Although desirable, no interchanges are recommended to be constructed initially due to substantial higher cost and moderate volumes of traffic that would use the new facility. However, right-of-way should be acquired for the future interchanges. The locations of the proposed interchanges and grade separations are shown on Figures 1, 2, and 3.

It is also recommended US 421 be improved to a 4-lane divided facility from NC 210 north of Lillington westward to the proposed bypass to also provide a US 421 bypass of Lillington.

The total estimated costs of this 34-mile project are as follows:

Construction	$65,300,000
Right-of-Way	$29,600,000
Total	$94,900,000

The construction cost includes engineering and contingencies, and the right-of-way cost includes relocation, acquisition, and utility costs.

V. STAGING

Because of the high cost and length of roadway involved, the project is divided into four sections for the possible staging of the improvements. These four sections are shown on Figure 1. Section A goes from US 401 north of Fuquay Varina to SR 1447 in Rawls. Section B goes from SR 1447 to the proposed Lillington bypass. Section C is the Lillington bypass. Section D goes from the bypass to the beginning of the 5-lane section north of Fayetteville. The following is a breakdown of costs and other information for each section:

Highway Section	Length (Miles)	Relocation Residences	Relocation Businesses	Construction	Right of Way Cost[3]	Total Cost
A	6.2	27	2	17,300,000[1]	5,800,000	23,100,000
B[4]	7.2	42	5	12,300,000	5,400,000	17,700,000
C	5.6	42	1	18,500,000[2]	8,300,000	26,800,000
D	15.0	69	12	17,200,000	10,100,000	27,300,000

[1] Add 8 million for 2 future interchanges.
[2] Add 16 million for 4 future interchanges.
[3] Includes ROW for future interchanges.
[4] Includes improvements to 1.8 miles of US 421 from proposed Lillington bypass to NC 210.

If a decision is made to stage construct the project, it is recommended the Fuquay Varina bypass (Section A) be built first due to the traffic flow restrictions and slow speed through town and to provide continuity of a 4-lane divided facility. Section B is recommended as the second stage due to the lower comparative cost and higher accident rate. Section C (Lillington Bypass) is recommended to be stage four due to the high cost of crossing the Cape Fear River, the planned improvement to the existing crossing, and the fact that Lillington has a multi-lane facility through and north of town to US 421. Section D is recommended as the third stage, because it would extend an existing multi-lane facility north of Fayetteville.

It would be preferable that all sections be built as soon as possible. The staging recommendations are only suggestions in case of funding constraints.

VI. OTHER COMMENTS

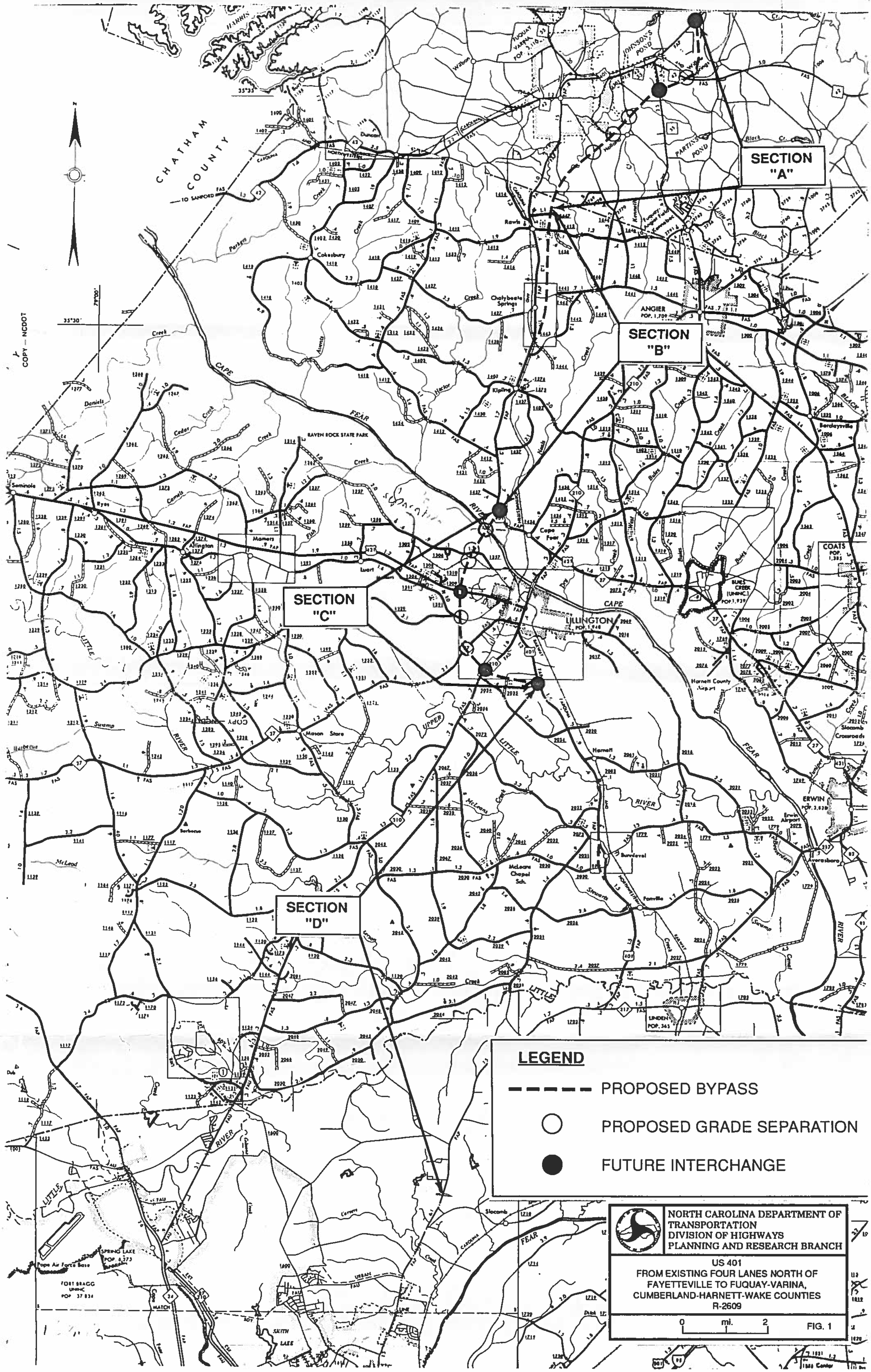
No other alternative improvement was found to be more feasible or economical than the one proposed. Relocation of the entire length of the project was looked at but rejected due to the high cost and the fact that less traffic would be served with this alternative.

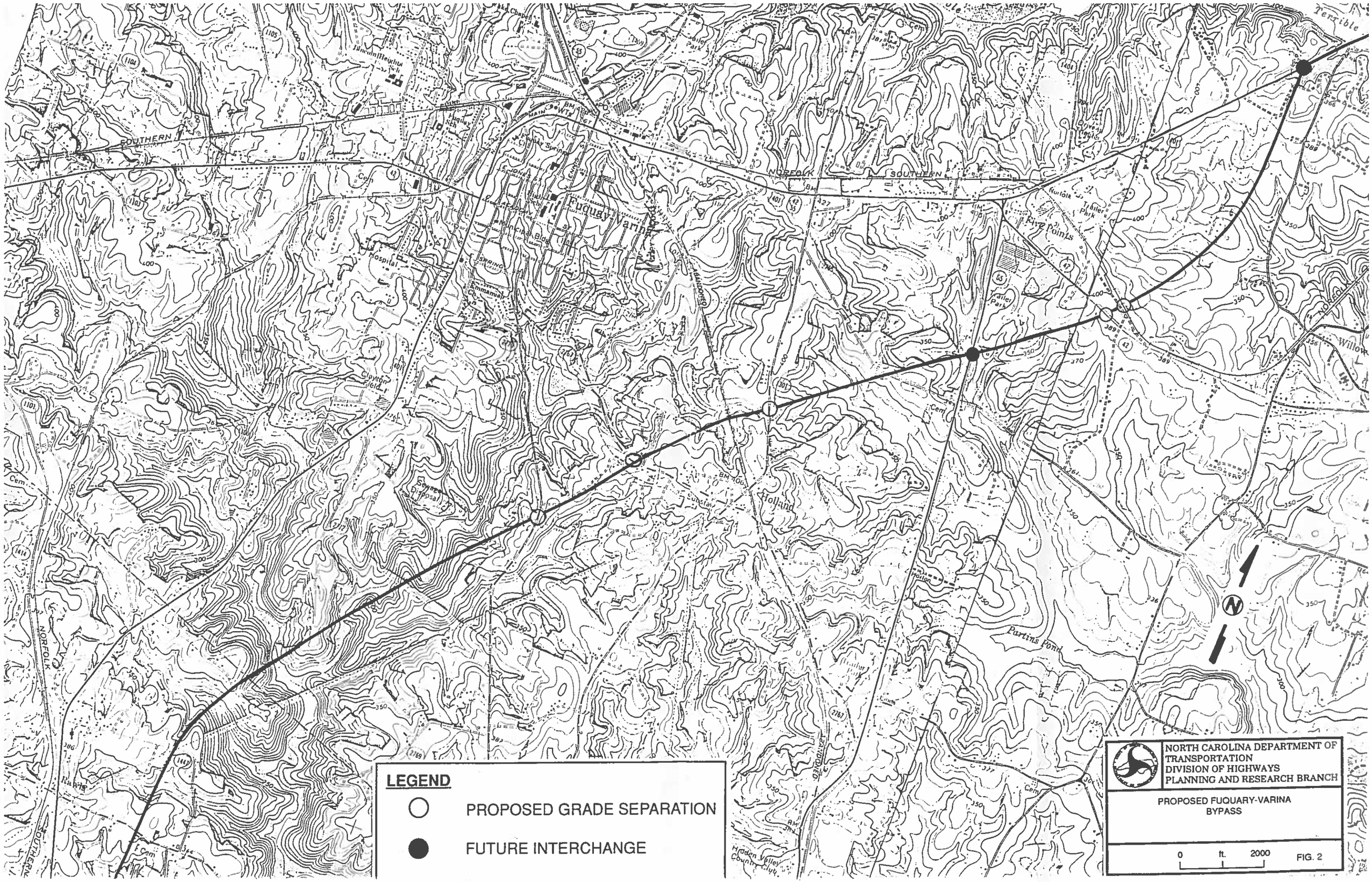
During the final design of the project, an effort should be made to reduce the number of residential and business relocatees by changing the alignment, cross section width, or right-of-way width.

The project crosses a number of streams and rivers between Fuquay-Varina and Fayetteville. Wetland impact at these crossings should be expected. Other impacts will be primarily related to the actual construction of the project and will cease upon the completion of the project. These include increased noise levels from construction machinery and delay and inconvenience to motorists using the facility.

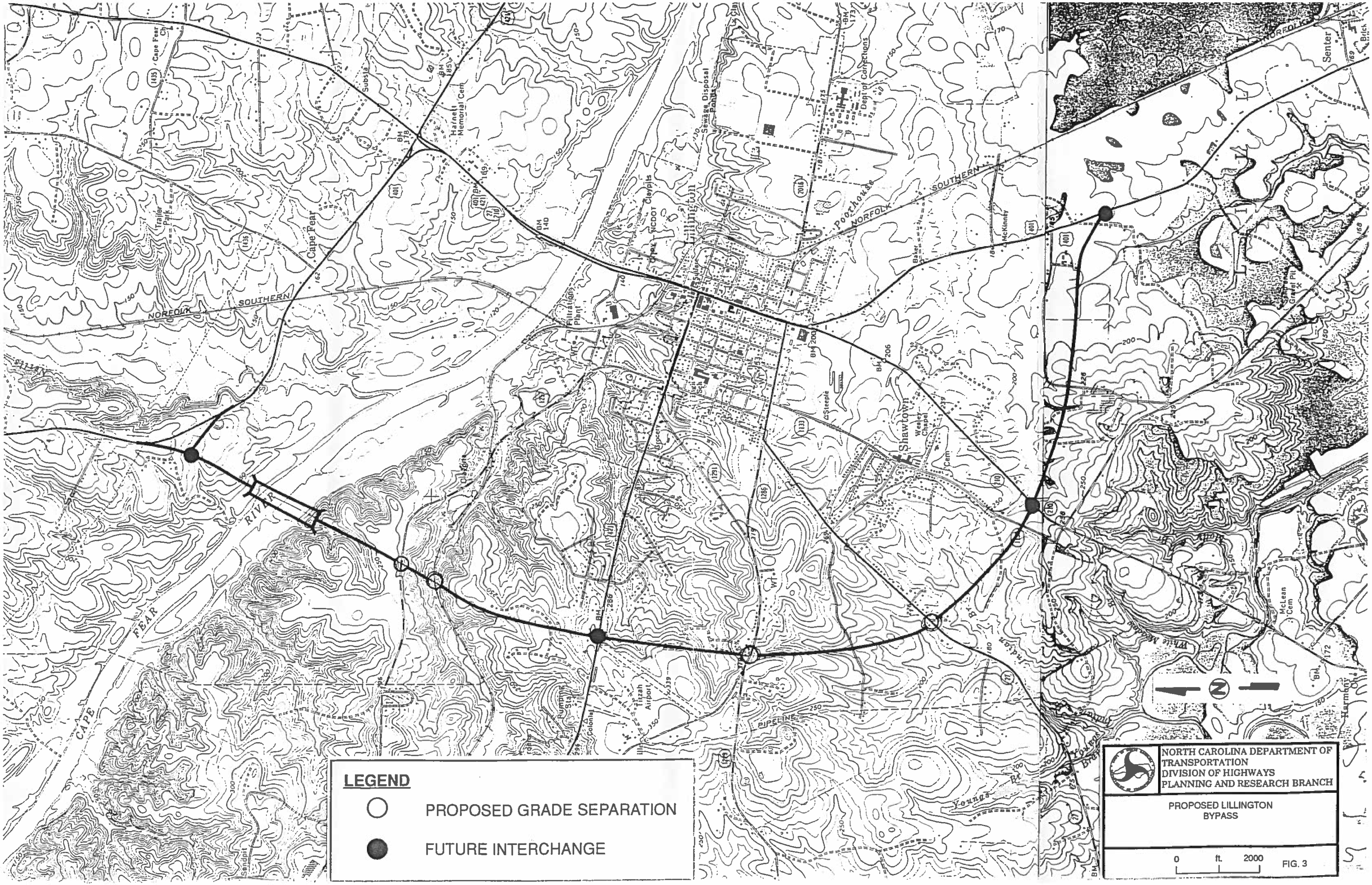
If the project is to be implemented at a future date, all feasible alternatives and their associated impacts will have to be evaluated in a detailed planning/environmental document prior to that time, and a final decision made as to the most appropriate location and improvement.

BB/rm


SECTION "A"
SECTION "B"
SECTION "C"
SECTION "D"
CHATHAM COUNTY
TO SANFORD
FUQUAY VARINA POP. 3,110
JOHNSON'S POND
PARTINS POND
Cokesbury
Chalybeate Springs
ANGIER POP. 1,709
Kipling
RAVEN ROCK STATE PARK
CAPE FEAR RIVER
Seminole
Ryes
Mamers
Lillington
LILLINGTON POP. 1,948
BUIES CREEK (UNINC.) POP. 1,939
COATS POP. 1,385
Barclaysville
Cape Fear
Mason Store
Harnett County Airport
Slocomb Crossroads
ERWIN POP. 2,828
Erwin Airport
Averasboro
Harnett
Buruleval
Fonville
McLeans Chapel Sch.
UPPER LITTLE RIVER
LINDEN POP. 345
SPRING LAKE POP. 6,273
Pope Air Force Base
FORT BRAGG UNINC POP. 37,834
Slocomb
COPY — NCDOT
LEGEND
PROPOSED BYPASS
PROPOSED GRADE SEPARATION
FUTURE INTERCHANGE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PLANNING AND RESEARCH BRANCH
US 401
FROM EXISTING FOUR LANES NORTH OF FAYETTEVILLE TO FUQUAY-VARINA,
CUMBERLAND-HARNETT-WAKE COUNTIES
R-2609
0 mi. 2
FIG. 1



LEGEND
PROPOSED GRADE SEPARATION
FUTURE INTERCHANGE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PLANNING AND RESEARCH BRANCH
PROPOSED FUQUARY-VARINA BYPASS
0 ft. 2000
FIG. 2
Fuquay-Varina
Five Points
Holland
Partins Pond
Hospital
Clayton Field
Sewage Disposal
Hidden Valley Country Club
SOUTHERN
NORFOLK
Terrible
Willow


LEGEND
PROPOSED GRADE SEPARATION
FUTURE INTERCHANGE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PLANNING AND RESEARCH BRANCH
PROPOSED LILLINGTON BYPASS
0 ft. 2000
FIG. 3
Lillington
Shawtown
CAPE FEAR RIVER
NORFOLK SOUTHERN
Cape Fear
Trailer Park
Harnett Memorial Cem
Sewage Disposal Ponds
Dept of Corrections
Filtration Plant
Claypits
Poorhouse
Wesley Chapel
Tirzah Airport
Pumping Sta
PIPELINE
McLean Cem
Gravel Pit
Senter
Youngs Br
Indian Br
White Meadow
Harmony