FEASIBILITY STUDY

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US 220
From NC 704
to the
Virginia State Line
Project R-2232
Rockingham County

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

June, 1987

The subject project is included in the 1987-1995 Transportation Improvement Program for feasibility study and/or right-of-way protection. This report provides a brief initial analysis of possible improvements. The project is not currently funded. The location of the project is shown on Figure 1.

I. LOCATION AND TYPE OF FACILITY

The section of US 220 covered in this study begins at the US 220-NC 704 interchange and terminates at the Virginia State Line. This section of US 220 is approximately 12 miles in length and lies entirely within Rockingham County (See Figure 1). This section of US 220 consists primarily of two lanes with 22 to 24 feet of pavement and 10-foot shoulders. At the NC 704 and NC 135 interchanges, the roadway is comprised of four-lanes (2 in each direction), 10-foot shoulders, and a 30-foot grass median.

The subject section of US 220 was constructed in the early 1960's and, with the exception of resurfacing, no major improvements have occurred since that time. US 220 is classified as a rural minor arterial in the North Carolina Functional Classification System. In addition, US 220 is a part of the Federal-Aid Primary System, designated FAP-45-2.

II. SUMMARY OF NEEDED IMPROVEMENTS

The primary emphasis of the study was to evaluate the provision of a multi-lane facility. The results of this study reveal that it would be feasible and desirable to widen the existing facility to a four-lane, divided facility (See Table 2). It is further recommended that improvements to US 220 be made along the existing highway corridor.

The recommended improvements are desirable to improve traffic flow and safety. The improvements are warranted to provide additional capacity for increasing volumes of traffic. These improvements would also serve to make this section of US 220 compatible, in the future, with the section of US 220 between NC 68 and NC 704 which is currently scheduled for upgrading (widening the existing 2 lanes to 4 lanes, divided by a 30-foot median) beginning in fiscal year 1989.

The estimated total cost of the proposed improvements is $21,208,000.

III. EXISTING CONDITIONS

A. General

US 220 traverses the western Piedmont in a north-south direction. In the studied area, US 220 connects the cities of Greensboro and High Point with Martinsville, Virginia. The route bypasses the Towns of Madison, Mayodan, and Stoneville.

US 220 is basically a two-lane facility throughout the studied area; however, short segments of four-lane, divided roadway have been constructed within interchange areas. The studied section has a 55 mph posted speed limit. The pavement condition is generally good.

Rolling terrain exists along the subject section of US 220. The vertical and horizontal alignments are judged to be good with no curves greater than 3-degrees located along this section. Grades range from ± 3% to ± 4%, and approximately 50% of the segment has unrestricted passing sight distance of 1500 feet or more. Partial control of access exists throughout the majority of the studied section of US 220. The existing right-of-way widths are shown in Table 2.

At the southern terminal, the studied section of US 220 ties into an existing four-lane, divided segment approximately one-mile north of NC 704 (See Figure 1). This four-lane segment of US 220 extends southward approximately one-half mile before returning to a two lane, undivided facility. As previously mentioned, beginning in 1989, US 220 is proposed to be improved to a multi-lane facility between NC 68 and NC 704.

US 220 becomes a four-lane, divided facility with a 100-foot median in Virginia, approximately 0.5 mile north of the subject project's northern terminal, the Virginia State Line.

B. Traffic Volumes and Capacity Analysis

Current traffic volumes along the studied section of US 220 are shown on Figure 2. These volumes range from a low of 7,200 vehicles per day to a high of 12,000 vehicles per day. In 20 years (2007), traffic volumes along this section are expected to range from a low of 13,700 vehicles per day to a high of 22,900 vehicles per day. Based on capacity analysis calculations, this section of US 220 is currently operating in the Level-of-Service E range, and it will be operating in the Level-of-Service F range in 20 years (based on traffic projections).

C. Characteristics of Development

The density of development along the subject section of US 220 is basically light and rural-residential in nature. This situation can probably best be attributed to the existence of partial control of access along this section of US 220.

D. Accident Experience

An accident study of the subject location was conducted by the Traffic Engineering Branch of the North Carolina Department of Transportation from January 31, 1984 to January 31, 1987. Summarized accident statistics are as follows:

	US 220 From NC 704 to the Virginia State Line	Statewide Average for Similar Rural US Routes (1986)
Total Accidents	101	N/A
Fatal Accidents	2	N/A
Non-Fatal Injury Accidents	40	N/A
Total Accident Rate *	131.53	191.90
Fatal Accident Rate *	2.60	4.00
Non-Fatal Injury Accident Rate *	52.09	91.70

* Measured in Accidents Per 100 Million Vehicle Miles (ACC/MVM)

Thirty (or 29.7%) of the accidents reported involved cars running off of the road, and 25 (or 24.8%) involved vehicles striking one another at an angle.

E. Structures

There are 8 major structures located on the studied segment of US 220. Data on these structures are shown in Table 1. These structures are not considered to be deficient.

Each of the structures carrying US 220 over intersecting features has a width of at least 28 feet. Each of the Y-line structures provides a horizontal clearance (on US 220) of at least 36 feet.

Consultation with the Bridge Maintenance Unit revealed that most of the structures can be widened or rehabilitated. Provision of a second mainline structure will be necessary.

IV. PROPOSED IMPROVEMENTS

The most practical method of improving the subject section of US 220 is to construct a four-lane, divided facility (with a 30-foot median). This would make this section compatible with the section of US 220 from NC 68 up to NC 704, which is currently scheduled for upgrading beginning in Fiscal Year 1989. It will be necessary to construct the two new lanes parallel to the existing lanes. Additionally, the construction of the new lanes should be shifted from east to west of the existing highway, where feasible, in order to utilize the majority of the existing right-of-way and to minimize property damages.

When the subject section of US 220 was constructed in the 1960's, sufficient amounts of right-of-way were acquired to accommodate the future construction of a four-lane, divided roadway from the NC 704 interchange to approximately one mile south of the Virginia State Line (near the Norfolk-Southern Railroad crossing). However, no new right-of-way was acquired beyond that point; consequently, an additional 50 feet of new right-of-way will have to be obtained to supplement the existing 150-foot right-of-way width (i.e., an additional 50' for a distance of

one mile). The costs of acquiring this relatively small amount of additional right-of-way and partial control of access are reflected in the cost estimates shown below.

The estimated cost of the proposed improvements is as follows:

Construction:	$20,400,000**
Right-of-Way Acquisition:	$ 808,000*
Total	$21,208,000

*Right-of-way estimates are based on residential and business relocation costs, cost of land and damages, utility costs, and acquisition costs.

V. POSSIBLE ENVIRONMENTAL IMPACTS

The primary potential environmental consequence of constructing the proposed projects would be its impact upon the wetlands of the Dan River. Since a second structure is proposed to be built over the Dan River, it is reasonable to assume that Section 404 Permits would have to be obtained from the U. S. Army Corps of Engineers prior to the initiation of any work in this area. Any other possible environmental impacts of constructing the proposed improvements are not considered of major consequence.

VI. SPECIAL CONSIDERATIONS

The scope of Project R-2232, as described in the 1987-1995 Transportation Improvement Program, calls for US 220 to be improved between NC 704 and the Virginia State Line in Rockingham County. However, US 220 tapers from a two-lane roadway to a four-lane roadway approximately one-half mile north of the North Carolina-Virginia border. If the improvements to US 220 were terminated at or near the Virginia State Line, then the result would be a potentially dangerous short segment of two-lane roadway (approximately 1 mile in length-taper to taper) bordered by a four-lane divided roadway on both ends. In order to avoid this potential problem, the state of Virginia will need to make an improvement to the 0.5 mile two-lane section of US 220 located within their boundaries. It would be desirable to have the improvements to US 220 in Virginia coordinated with the improvements in North Carolina.

If the R-2232 is implemented in the future, it may be possible for the State of North Carolina to negotiate a contract with the State of Virginia which would allow Virginia to reimburse North Carolina for the cost of the proposed 0.5 mile US 220 improvement contained in their state. The total estimated cost of improving the segment of US 220 in Virginia is $800,000.

VII. BASIS FOR FINDINGS

The recommendations contained in this document were based on the following:

1. Field Investigations
2. Correspondences with the Division Engineer
3. Previous Environmental Assessments (Project R-2019 File)
4. Aerial Mosaics dated April, 1987
5. Cost estimates provided by the Right-of-Way Branch and Design Services Unit
6. Copies of the original construction plans

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TABLE 1

US 220 MAINLINE STRUCTURES

LOCATION	BRIDGE NUMBER	REMAINING LIFE (YEARS)	SUFFICIENCY RATING	VERTICAL CLEARANCE (FT)	HORIZONTAL CLEARANCE (FT)	STRUCTURE LENGTH (FT)	RECOMMENDED IMPROVEMENTS
DAN RIVER	63	23	73.0	N/A	28.0	605	ADD DUAL
NORFOLK-SOUTHERN RAILROAD	131	22	72.8	N/A	28.0	121	ADD DUAL
US 220 BUSINESS	150	30	70.7	18.0	28.0	250	ADD DUAL

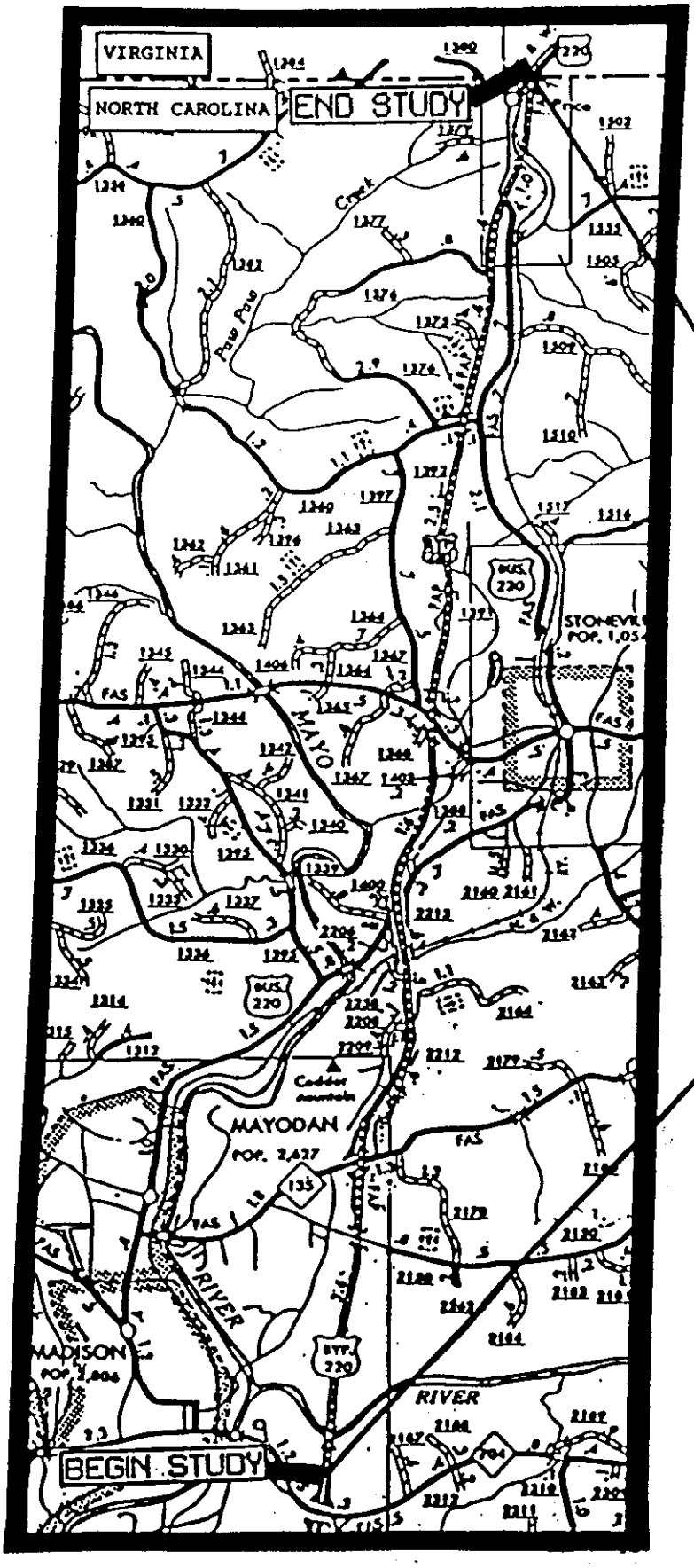
Y-LINE STRUCTURES OVER US 220

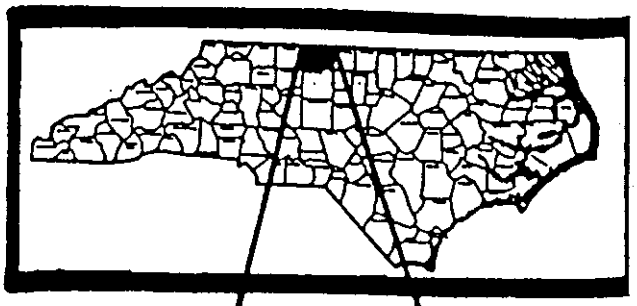
LOCATION	BRIDGE NUMBER	REMAINING LIFE (YEARS)	SUFFICIENCY RATING	VERTICAL CLEARANCE (FT)	HORIZONTAL CLEARANCE (FT)	STRUCTURE LENGTH (FT)	RECOMMENDED IMPROVEMENTS
SR 2150	123	22	76.6	14.8	2 @ 55.0	195	NONE
NC 135	74	23	71.5	14.9 TO 15.3	2 @ 57.0	209	NONE
NC 770	69	21	57.9	14.4	2 @ 70.0	241	REPLACE
SR 1360	170	22	72.0	15.4	2 @ 62.0	212	NONE
NORFOLK-SOUTHERN RAILROAD	R179	UNKNOWN	UNKNOWN	14.4	36.0	61	REPLACE

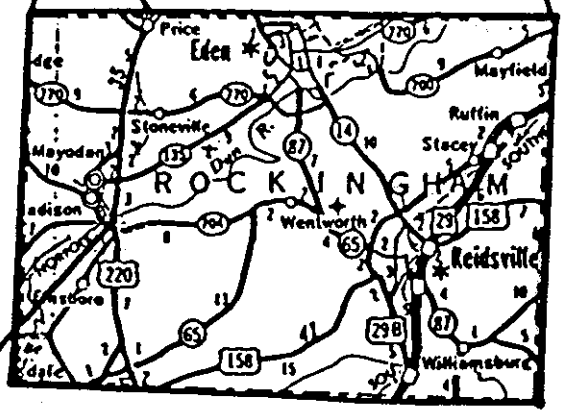
TABLE 2

SUMMARY OF FEASIBILITY STUDY FINDINGS

LOCATION	LENGTH (MILES)	EXISTING PAVEMENT WIDTH (FEET)	EXISTING RIGHT-OF-WAY WIDTH (FEET)	RECOMMENDED IMPROVEMENT	PROPOSED RIGHT-OF-WAY WIDTH (FEET)	TOTAL ESTIMATED PROJECT COST
US 220 FROM NC 704 TO 1.0 MILE SOUTH OF THE VIRGINIA STATE LINE	12.0	22-24	VARIABLE 73' TO 200' LEFTSIDE 73' TO 179' RIGHTSIDE PARTIAL CONTROL OF ACCESS	ADD TWO NEW LANES TO COMPLETE FOUR-LANE, DIVIDED FACILITY THROUGHOUT ENTIRE PROJECT	A MINIMUM OF 200 FEET (TOTAL) THROUGHOUT THE ENTIRE PROJECT	$21,208,000
FROM 1.0 MILE SOUTH OF THE VIRGINIA STATE LINE TO THE VA-NC BORDER			150' FROM NORFOLK-SOUTHERN RAILROAD CROSSING TO THE VIRGINIA LINE, NO CONTROL OF ACCESS		WILL NEED TO ACQUIRE 50' OF NEW RIGHT-OF-WAY FROM THE NORFOLK-SOUTHERN RAILROAD CROSSING TO THE VIRGINIA LINE (APPROX. 1 MILE)	







ROCKINGHAM COUNTY

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PLANNING AND RESEARCH BRANCH

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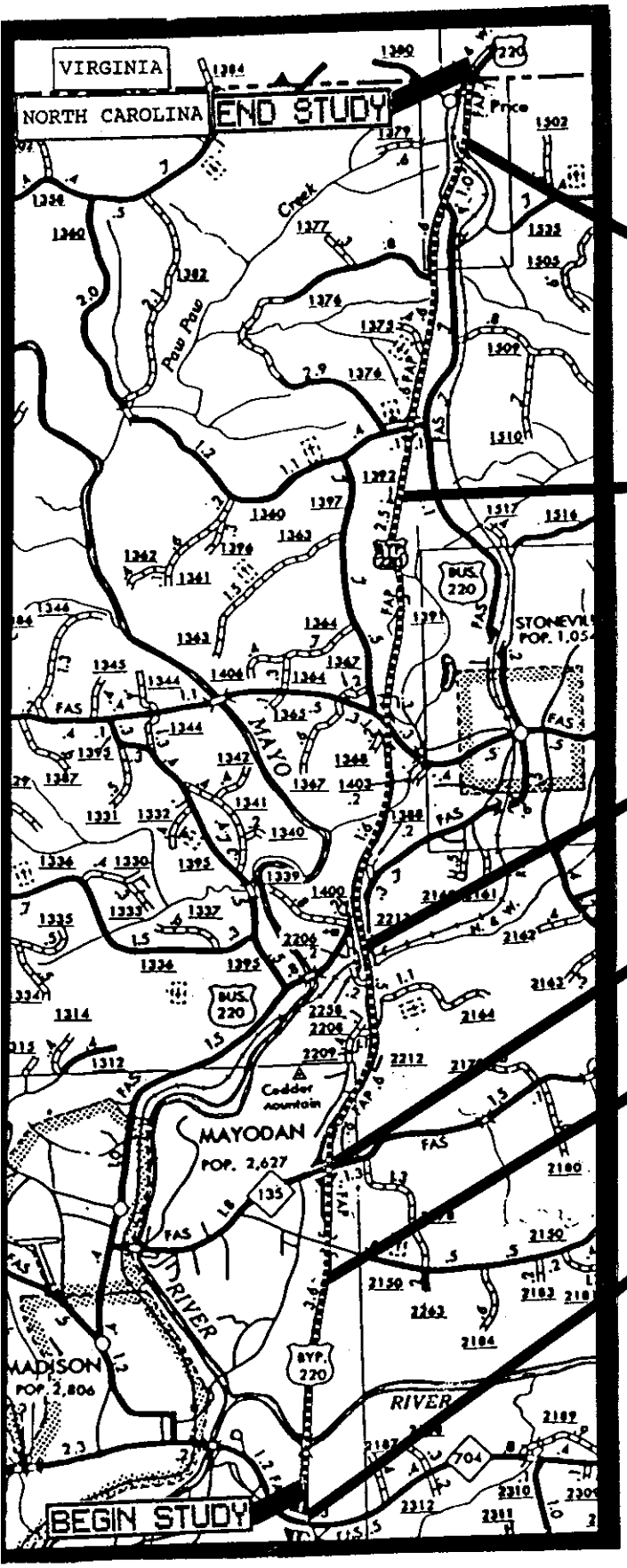
4/87		FIGURE 1



LEGEND
EXISTING PAVEMENT WIDTH
1987 ADT
2007 ADT

24 FT.
7,800
13,700

24 FT.
7,200
13,700

24 FT.
7,800
14,900

2 @ 24 FT.
8,400
15,500

24 FT.
9,600
16,600

2 @ 24 FT.
12,000
22,900

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4/87		FIGURE 2