

**FEASIBILITY STUDY**

**Town of Mayodan**

**NC 135/US 220 Interchange Improvements**

**Rockingham County**

**Division 7**

**FS-0507B**



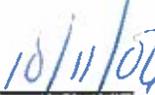
**Prepared by the  
Program Development Branch  
N. C. Department of Transportation**

  
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**Date**

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NC 135/US 220 Interchange Improvements

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**I. General Description**

This feasibility study describes the proposed improvements to the NC 135/US 220 interchange, including upgrading the interchange and widening NC 135 from SR 2177 (Dan Valley Road) to SR 2178 (Philpott Road), a distance of approximately 0.6 miles. The project location is shown on Figure 1. As part of the study, two different cross-sections for the widening of NC 135 were investigated, the details of which are as follows:

- ◆ **ALTERNATIVE 1:** Four-lane divided curb and gutter section, with a 30' raised grass median, on 130' right-of-way.
  
- ◆ **ALTERNATIVE 2:** Five-lane curb and gutter section on 130' right-of-way.

This is the initial step in the planning and design process for this project and is not the product of exhaustive environmental or design investigations. The purpose of this study is to describe the proposed project including cost, and to identify potential problems that may require consideration in the planning and design phases.

**II. Background**

The purpose of this project is to improve the traffic safety, operations, and access along NC 135 through the US 220 interchange area. The development along this section of NC 135 is institutional, industrial, and commercial. The Town of Mayodan and Rockingham County support this project.

NC 135 is designated as a major collector in the North Carolina Statewide Functional Classification System and as a major thoroughfare in the 1999 Madison and Mayodan Thoroughfare Plan. NC 135 currently varies from a two-lane to a three-lane shoulder section with pavement widths ranging between 28' and 40' from edge of pavement to edge of pavement. Curb and gutter is located from Dalton McMichael High School to SR 2238 (Commerce Drive)/SR 2271 (Shakey Road).

US 220 is designated as a principal arterial in the North Carolina Statewide Functional Classification System and as a major thoroughfare in the 1999 Madison and Mayodan Thoroughfare Plan. US 220 currently is a four-lane divided shoulder section with 12' travel lanes, 6' inside shoulders, a 10' outside left shoulder, a 12' outside right shoulder and a 30' grass median.

There is one existing bridge within the project corridor. Bridge No. 74 is a 28' wide and 209' long, 2-lane bridge with a reinforced concrete deck. Bridge No. 74 was built in 1960 and has a sufficiency rating of 69 out of 100.

### **III. Traffic and Safety**

The existing traffic signals will need to be modified to accommodate the proposed improvements. They are located at the following intersections:

- SR 2177 (Dan Valley Road)
- US 220 Northbound Ramp
- US 220 Southbound Ramp
- SR 2238 (Commerce Drive)/SR 2271 (Shakey Road)

The current year Average Daily Traffic (ADT) along NC 135 ranges from 10,100 to 17,500 vehicles per day (vpd) and along US 220 ranges from 14,800 to 19,800 vpd. For the design year 2035, the traffic volumes along NC 135 range between 18,400 to 31,400 vpd and along US 220 range between 36,800 to 44,200 vpd. Truck traffic along NC 135 is estimated to make up approximately 5 percent of the daily traffic through most of the area. However, a substantial increase to approximately 10 percent trucks is anticipated between US 220 and Commerce Drive. Truck traffic along US 220 is estimated to make up approximately 18 percent of the daily traffic.

The existing segment of NC 135 operates at a level of service (LOS) F under current traffic volumes, with the intersection of NC 135 and the southbound US 220 off ramp also operating at LOS F. By the 2035 design year, the four intersections along this section of NC 135 are projected to operate at a LOS F. With the proposed improvements, this section of NC 135 is projected to operate at a LOS D or better, thus greatly improving traffic safety and operations in this area.

Between 2003 and 2005, 13 crashes were reported along this section of NC 135. The crash rate for NC 135 is 298.85 crashes per 100 million vehicle miles (crashes/100MVM) traveled. This rate is substantially higher than the statewide rate of 184.65 crashes/100MVM for two-lane undivided rural North Carolina routes. There were 7 injury crashes, 6 property damage only crashes, and no fatal crashes. The most prevalent types of crashes were Rear End (46%) and Left Turn (38%). With the proposed interchange modifications and widening of NC 135, these types of crashes are expected to decrease.

### **IV. Description of Alternatives**

It is proposed to reconfigure the NC 135/US 220 interchange into a Single Point Urban Interchange because of right-of-way constraints in the area. This project also proposes to widen NC 135 to a multilane facility from SR 2177 (Dan Valley Road) to SR 2178 (Philpott Road), a distance of approximately 0.6 miles. The project location is shown on Figure 1.

**ALTERNATIVE 1:** Four-lane divided curb and gutter section, 82' from face of curb to face of curb, with 12' lanes, a 30' raised grass median, and 15' berms on 130' right-of-way. All options under Alternative 1 include the reconfiguration of the NC 135/US 220 interchange into a Single Point Urban Interchange, the costs of which are included in all options below.

**Option A:** This option maintains the full movement intersection at SR 2238 (Commerce Drive)/SR 2271 (Shakey Road), but restricts left turn movements at the NC 135 intersection with SR 2177 (Dan Valley Road)/Dalton McMichael High School's driveway. Included in this option are the addition of dual southbound right turn lanes on SR 2238 and the acquisition of 24' of right-of-way on SR 2238. It should be noted that the current intersection spacing between the proposed Single Point Urban Interchange at US 220 and the full movement intersection at SR 2238/SR 2271 is inadequate and does not comply with the current median opening policy.

With this proposed option, it is anticipated that there will be zero (0) residences and zero (0) businesses relocated due to this project. The total cost of this alternative, including construction and right-of-way, is estimated to be \$26,100,000.

Right-of-way.....	\$700,000
<u>Construction.....</u>	<u>\$25,400,000</u>
Total Cost (Alternative 1, Option A).....	\$26,100,000

**Option B:** This option, through the construction of proposed connector roads, provides a full movement intersection at SR 2178 (Philpott Road), but restricts left turn movements at the NC 135 intersections with SR 2177 (Dan Valley Road)/Dalton McMichael High School's driveway and SR 2238 (Commerce Drive)/SR 2271 (Shakey Road). The intersection spacing between the proposed Single Point Urban Interchange at US 220 and the full movement intersection at SR 2178 exceeds the current median opening policy. Included in this option are the following improvements:

- The construction of two new connector roads from SR 2238 to NC 135, a distance of approximately 800 feet and 1,000 feet, respectively. The new connector roads have a proposed cross-section of a three-lane curb and gutter section with 12' lanes and 15' berms on 100' right-of-way.
- The construction of a new connector road from SR 2271 to SR 2178, a distance of approximately 800 feet. The new connector road has a proposed cross-section of a two-lane shoulder section with 12' lanes and 8' shoulders (4' of which are paved) on 100' right-of-way.
- The addition of a northbound left turn lane on SR 2178.
- Widening the right-of-way of SR 2178 to 100' for approximately 900 feet.

With this proposed option, it is anticipated that there will be zero (0) residences and zero (0) businesses relocated due to this project. The total cost of this

alternative, including construction and right-of-way, is estimated to be \$28,000,000.

Right-of-way.....	\$1,000,000
<u>Construction.....</u>	<u>\$27,000,000</u>
Total Cost (Alternative 1, Option B).....	\$28,000,000

**ALTERNATIVE 2:** Five-lane curb and gutter section, 64' from face of curb to face of curb, with 12' lanes and 15' berms on 130' right-of-way. All options under Alternative 2 include the reconfiguration of the NC 135/US 220 interchange into a Single Point Urban Interchange, the costs of which are included in all options below.

**Option A:** This option maintains the full movement intersection at SR 2238 (Commerce Drive)/SR 2271 (Shakey Road), but restricts left turn movements at the NC 135 intersection with SR 2177 (Dan Valley Road)/Dalton McMichael High School's driveway. Included in this option are the addition of dual southbound right turn lanes on SR 2238 and the acquisition of 24' of right-of-way on SR 2238. It should be noted that the current intersection spacing between the proposed Single Point Urban Interchange at US 220 and the full movement intersection at SR 2238/SR 2271 is inadequate and does not comply with the current median opening policy.

With this proposed option, it is anticipated that there will be zero (0) residences and zero (0) businesses relocated due to this project. The total cost of this alternative, including construction and right-of-way, is estimated to be \$25,300,000.

Right-of-way.....	\$700,000
<u>Construction.....</u>	<u>\$24,600,000</u>
Total Cost (Alternative 2, Option A).....	\$25,300,000

**Option B:** This option, through the construction of proposed connector roads, provides a full movement intersection at SR 2178 (Philpott Road), but restricts left turn movements at the NC 135 intersections with SR 2177 (Dan Valley Road)/Dalton McMichael High School's driveway and SR 2238 (Commerce Drive)/SR 2271 (Shakey Road). The intersection spacing between the proposed Single Point Urban Interchange at US 220 and the full movement intersection at SR 2178 exceeds the current median opening policy. Included in this option are the following improvements:

- The construction of two new connector roads from SR 2238 to NC 135, a distance of approximately 800 feet and 1,000 feet, respectively. The new connector roads have a proposed cross-section of a three-lane curb and gutter section with 12' lanes and 15' berms on 100' right-of-way.
- The construction of a new connector road from SR 2271 to SR 2178, a distance of approximately 800 feet. The new connector road has a proposed cross-section of a two-lane shoulder section with 12' lanes and 8' shoulders (4' of which are paved) on 100' right-of-way.

- The addition of a northbound left turn lane on SR 2178.
- Widening the right-of-way of SR 2178 to 100' for approximately 900 feet.

With this proposed option, it is anticipated that there will be zero (0) residences and zero (0) businesses relocated due to this project. The total cost of this alternative, including construction and right-of-way, is estimated to be \$27,300,000.

Right-of-way.....	\$1,000,000
<u>Construction.....</u>	<u>\$26,300,000</u>
Total Cost (Alternative 2, Option B).....	\$27,300,000

## V. Community Issues

A detailed community impact investigation was not conducted for this feasibility study; however, possible impacts to an existing school and church are anticipated. No impacts to parks, recreation areas, or other community facilities are anticipated with this project.

Maps at the Survey and Planning Branch of the North Carolina State Historic Preservation Office were used to determine if any historic properties on the National Register of Historic Places (NRHP) or state study lists exist within the proposed project corridor. Two properties within the project corridor were found to be a potential historic property: the Billy Wall House and an unnamed property.

## VI. Natural Environment Issues

The following is a preliminary review of environmental issues that might have a potential impact to the project. The information obtained for the environmental screening is from a Geographic Information System (GIS) database. The purpose of the environmental screening is to identify potential environmental issues early in the process.

### Stream Classification and Wetlands

The proposed project corridor is located in the Roanoke River Basin. The project corridor does not cross any water bodies or streams. Therefore, it is anticipated that there will be no impacts to streams or wetlands.

### Threatened and Endangered Species

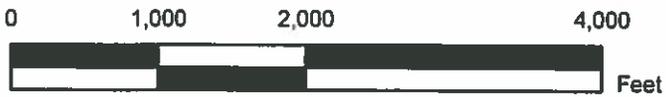
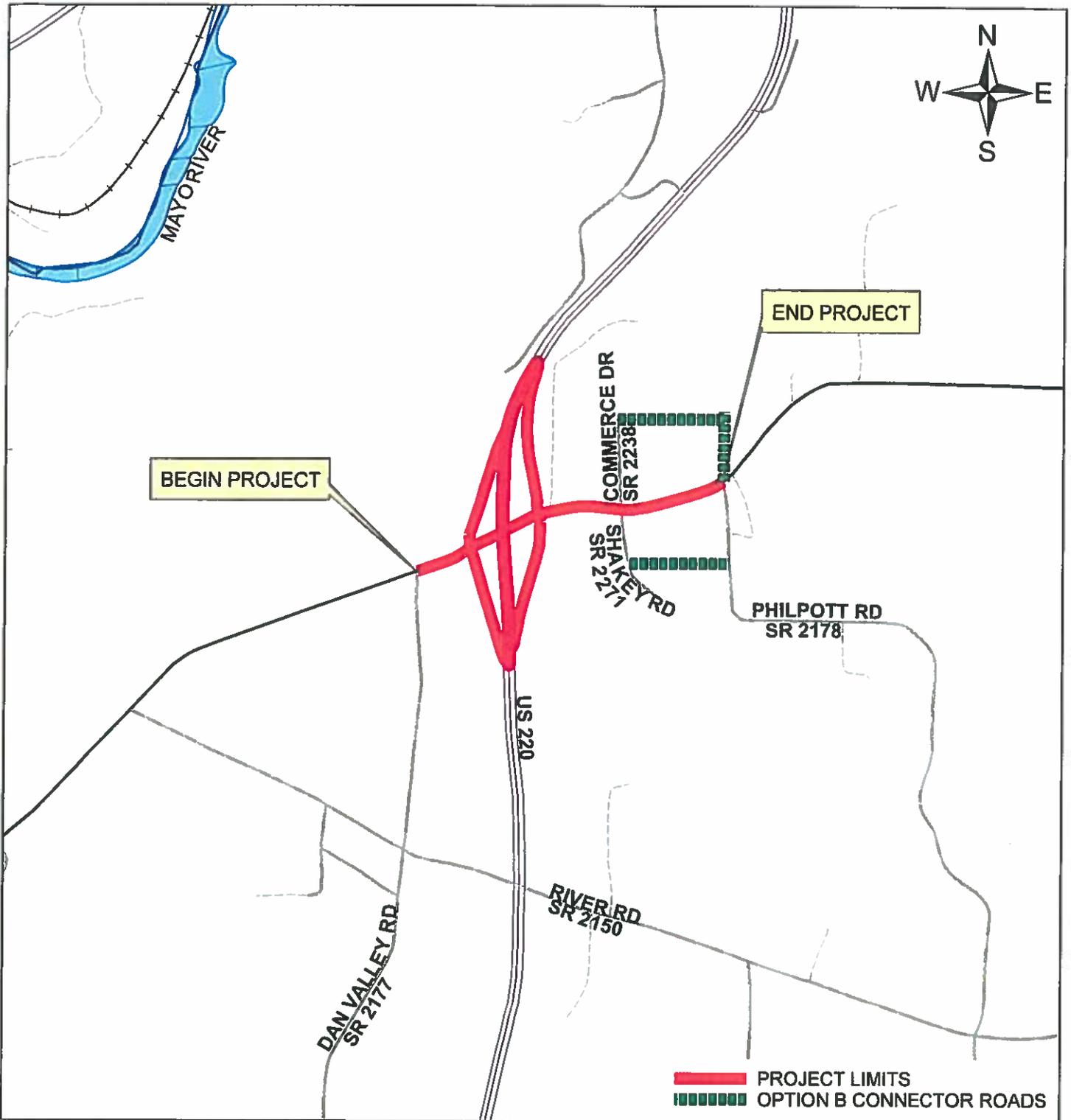
There were no threatened and endangered species identified within the project corridor on the existing GIS database.

## VII. Recommendations

***ALTERNATIVES 1 & 2 (OPTIONS A & B):*** It was found that both the four-lane divided curb and gutter section (Alternative 1 – Options A & B) and the five-lane curb and gutter section (Alternative 2 – Options A & B) would be able to accommodate design year 2035 traffic volumes. However, five-lane sections tend to promote strip development and indiscriminate left turn movements, while four-lane divided sections minimize strip development, prevent indiscriminate left turn movements, and allow for pedestrian refuge if needed. The four-lane divided section will also minimize the negative impacts of access on the interchange. From an operational and safety perspective, Alternative 1 - Option B provides adequate full movement intersection spacing from the interchange, which is also desirable. ***Because of these factors, Alternative 1 – Option B would be the preferred option for the proposed NC 135/US 220 interchange improvements and NC 135 widening.***

The total project cost of the preferred Alternative 1 - Option B with the reconfiguration of the NC 135/US 220 interchange into a Single Point Urban Interchange, the widening of NC 135 into a four-lane divided curb and gutter section with 12' travel lanes, a 30' raised grass median, and 15' berms on 130' right-of-way, and the recommended intersection improvements is \$28,000,000.

If funding is not available to provide the optimal improvement, Alternative 1 - Option A is an acceptable option.



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 PROGRAM DEVELOPMENT BRANCH  
 FS-0507B  
 NC 135/US 220 INTERCHANGE MODIFICATIONS  
 MAYODAN, ROCKINGHAM COUNTY  
 DIVISION 7 FIGURE 1