

Location



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

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GOVERNOR

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

R. SAMUEL HUNT III
SECRETARY

February 23, 1994

MEMORANDUM TO: Mr. Dalton D. Ruffin, Member, Board of Transportation
Mr. D. B. Waters, Division Engineer, Division 9
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Mr. W. H. Webb, P.E.
Mr. J. M. Lynch, P.E.
Mr. A. D. Allison, II
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Mr. G. T. Shearin, P.E.
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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, Jr., Ph.D., P.E.
Head of Feasibility Studies

SUBJECT: Feasibility Study, U-3119, Winston-Salem, Bridge
Number 213 over US 421, Forsyth 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. M. B. Mustafa, P.E.



FEASIBILITY STUDY

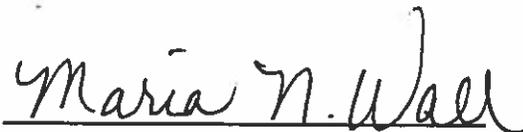
Winston-Salem

Bridge Number 213
over US 421

Forsyth County

U-3119

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



Maria N. Wall
Highway Planning Engineer



Mohammed B. Mustafa, P.E.
Highway Planning Engineer



Date



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

FEASIBILITY STUDY

Winston-Salem

Bridge Number 213
over US 421

Forsyth County

U-3119

I. GENERAL DESCRIPTION

This is a feasibility study for the reconstruction of Bridge Number 213 over US 421 and the widening of SR 1103 (Lewisville-Clemmons Road/Styer's Ferry Road), from SR 3580 to SR 1153. The project length is approximately 1.4 miles (2.3 kilometers) (See Figures 1 and 2). Based on traffic volumes and patterns through the studied corridor, it is recommended that the project be expanded beyond the original TIP description, to include improvements to SR 1103. If only Bridge Number 213 is improved, the existing traffic bottleneck would be transferred to SR 1103. It is recommended that Bridge Number 213 be replaced with a wider bridge to carry seven lanes of traffic. Also, it is recommended that SR 1103 be widened to a five-lane, 64-foot (19.5-meter) face-to-face curb and gutter section with 8-foot (2.4-meter) berms on a 100-foot (30.5-meter) wide right-of-way with no control of access. Estimated cost of the project is \$6,450,000 (\$1,850,000 for right-of-way and \$4,600,000 for construction).

This study is not a detailed planning/environmental investigation. A feasibility study presents recommended cross-sections for improvements, general alignments of improvements, and estimated costs 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.

II. NEED FOR PROJECT

The recommended improvements are needed to reduce traffic congestion on Bridge Number 213 and SR 1103. Current traffic volumes cause a bottleneck of traffic on Bridge Number 213 and the US 421 exit ramps. Also, additional turn lanes are needed to reduce traffic delays and congestion caused by vehicles turning into the many drives along SR 1103. SR 1103 is on the Federal Aid Urban System (FAU 5946), and is classified as a minor arterial on the Statewide Functional Classification System.

Bridge Number 213 carries SR 1103 over US 421 (See Figure 2). The sufficiency rating of this bridge is 59.5 out of 100. Bridge Number 213 is approximately 216 feet (65.9 meters) long with a deck width of 31.5 feet (9.6 meters) and an approach roadway width of 28 feet (8.5 meters).

The existing SR 1103, from SR 3580 to approximately 400 feet (120 meters) south of SR 1145, is a two-lane, 24 to 32-foot (7.3 to 9.8-meter) pavement with 4 to 8-foot (1.2 to 2.4-meter) shoulders. From approximately 400 feet (120 meters) south of SR 1145 to US 421 eastbound ramps, SR 1103 is a three-lane, 36-foot (11-meter) wide pavement with 4 to 8-foot (1.2 to 2.4-meter) shoulders. SR 1103, between the US 421 eastbound and westbound ramps is a two-lane roadway with single left turn lanes at each ramp intersection. The roadway is 28 to 32 feet (8.5 to 9.8 meters) wide with 4 to 8-foot (1.2 to 2.4-meter) shoulders. From the US 421 westbound ramps to SR 1153, SR 1103 is a two-lane roadway, with an additional continuous left-turn lane in the vicinity of the US 421 westbound ramps. The pavement in this section is 24 to 36 feet (7.3 to 10.8 meters) wide with 4 to 8-foot (1.2 to 2.4-meter) shoulders. Land use along SR 1103 is commercial, institutional, and rural residential.

The south terminal is located at the intersection of SR 1103 and SR 3580 (See Figure 2). SR 1103 is a two-lane, 24-foot (7.3-meter) roadway with 4 to 8-foot (1.2 to 2.4-meter) shoulders south of this intersection. Land use is rural residential in this area. West Forsyth High School is located approximately 1000 feet (305 meters) north of this intersection, on the east side of SR 1103.

The north terminal is located at the intersection of SR 1103 and SR 1153 (See Figure 2). SR 1103 is a two-lane, 24-foot (7.3-meter) roadway with 4 to 8-foot (1.2 to 2.4-meter) shoulders north of this intersection. Land use is rural residential in this area.

Estimated 1993 average daily traffic (ADT) on SR 1103 is 17,600 vehicles per day (vpd). In 2013, the traffic volume is expected to be 24,800 vpd. The existing SR 1103 is operating at a level of service (LOS) E, and is anticipated to operate at a LOS F in 2013. With the recommended improvements, the current traffic volume along SR 1103 would experience a LOS A and is anticipated to experience a LOS B in the year 2013.

During the period from July, 1990, through June, 1993, 71 accidents were reported along the studied section of SR 1103. This resulted in an accident rate of 242.5 accidents per 100 million vehicle miles (acc/100mvm), compared to a statewide average of 199.2 acc/100mvm for this type of facility. The most prevalent type of accident along SR 1103 involved vehicles making left-turns (26%). No fatalities were reported. The recommended improvements, including providing a continuous left-turn lane, are expected to reduce the accident rate.

III. RECOMMENDATIONS

It is recommended that Bridge Number 213 be replaced. The recommended bridge deck width is 86 feet (26.2 meters), which would accommodate seven lanes of traffic. The bridge length would remain at approximately 216 feet (65.9 meters). The US 421 ramps would be extended to compensate for the wider new bridge and traffic volumes.

The existing unsignalized intersection of SR 1103 and the US 421 eastbound ramp is currently operating at LOS E and is estimated to operate at LOS F before the year 2013. Traffic signals are recommended for this intersection. The recommended configuration for this intersection is two westbound lanes (one right-turn lane and one left-turn lane), four southbound lanes (two left-turn lanes and two thru lanes) and four northbound lanes (three thru-lanes and one right-turn lane). With the recommended configuration this intersection would operate at a LOS A throughout the year 2013. The US 421 eastbound ramps would operate at a LOS B in 1993 and a LOS C in 2013.

The existing signalized intersection of SR 1103 and the US 421 westbound ramp is currently operating at LOS C and is estimated to operate at LOS F before the year 2013. The recommended configuration for this intersection is three eastbound lanes (one right-turn lane and two left-turn lanes), four southbound lanes (three thru-lanes and one right-turn lane), and four northbound lanes (two thru-lanes and two left-turn lanes). With the recommended configuration this intersection would operate at a LOS B throughout the year 2013. The US 421 westbound ramps would operate at a LOS C or better in 1993 and a LOS D or better in 2013.

SR 1103, from SR 3580 to SR 1153 would be widened to a five-lane, 64-foot (19.5-meter) face-to-face curb and gutter section with 8-foot (2.4-meter) berms on a 100-foot (30.5-meter) wide right-of-way with no access control.

SR 1156 currently intersects the US 421 westbound entrance ramp. This intersection would be eliminated to improve safety and capacity. SR 1156 would be realigned on new location to form a four-leg intersection with SR 1103 and SR 1153 (See Figure 2). The recommended typical cross-section is a two-lane, 24-foot (7.3 meters) travelway with 8-foot (2.4-meter) usable shoulders, including 4-foot (1.2-meter) paved shoulders on a 100-foot (30.5-meter) wide right-of-way with no access control.

The recommended improvements would decrease traffic congestion and improve safety on Bridge Number 213 and SR 1103. Additional through lanes and turn lanes on Bridge Number 213 would reduce traffic bottlenecks along this section of SR 1103.

Moderate utility conflicts are expected.

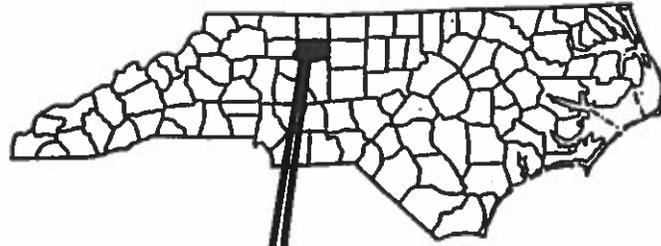
The following table shows the estimated project costs.

DESCRIPTION	CONSTRUCTION COST	RIGHT-OF-WAY COST
Bridge Number 213	\$2,200,000	\$ 30,000
SR 1103	\$2,400,000	\$1,820,000
Total Project	\$4,600,000	\$1,850,000

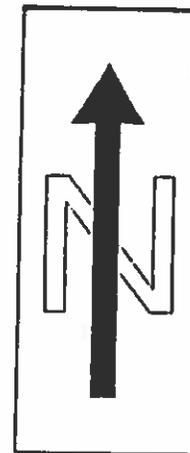
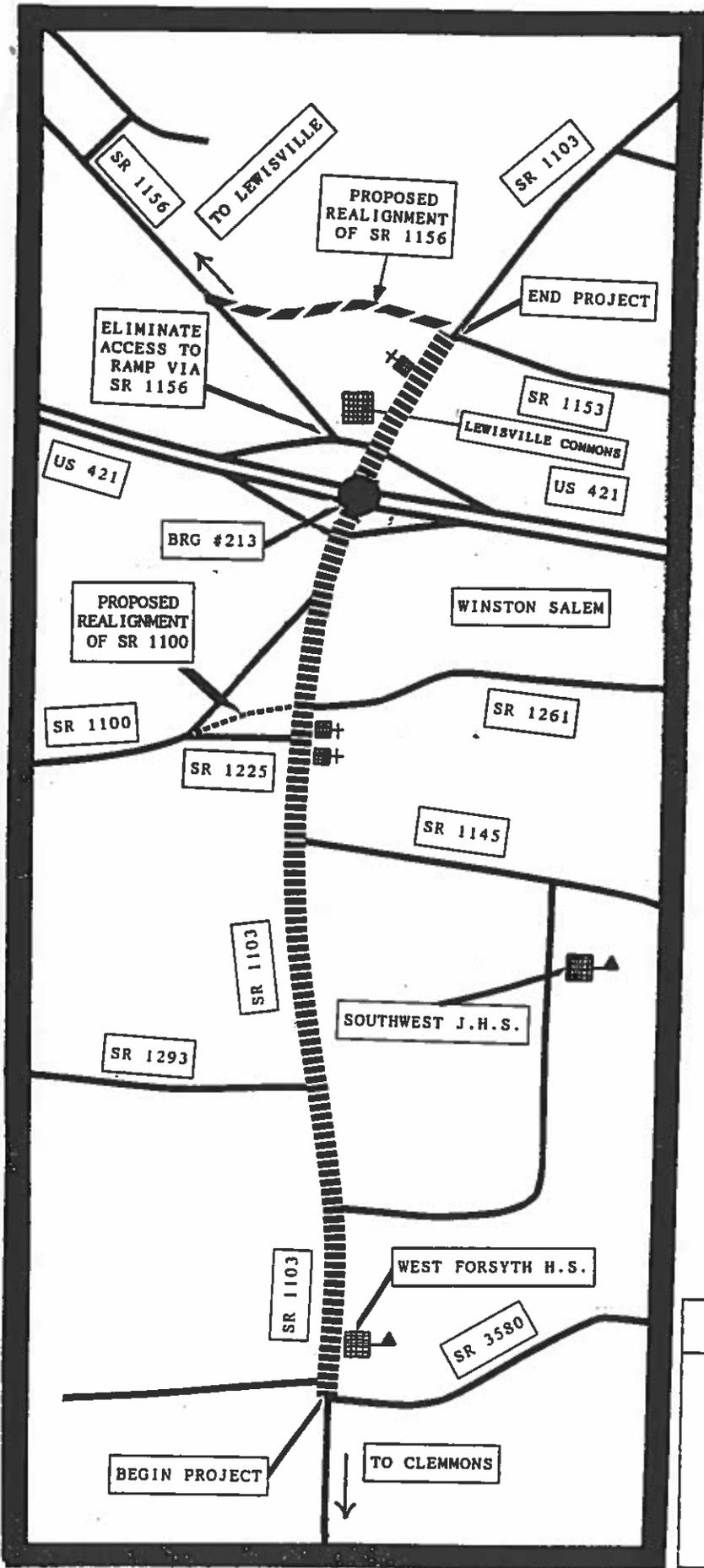
IV. OTHER COMMENTS AND CONCERNS

It is estimated that this project would require the relocation of five residences and two businesses.

This project may require a Section 404, Corps of Engineers Nationwide Permit. A portion of this project borders a water supply watershed. No historical or architecturally significant sites are known to be impacted.



FEASIBILITY STUDIES UNIT	
U-3119	
WINSTON-SALEM	
Bridge Number 213 over US 421	
Forsyth County	
DIV. 9	FIGURE 1



FEASIBILITY STUDIES UNIT	
U-3119	
WINSTON-SALEM	
Bridge Number 213 over US 421	
Forsyth County	
DIV. 9	FIGURE 2