STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

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January 12, 2004

MEMORANDUM TO: Mr. Alan Thornburg, Member, Board of Transportation
Mr. Jay Swain, Division Engineer, Division 13
Mr. David King
Mr. Calvin Leggett, P.E.
Mr. Troy Peoples, P.E. (3) Attention: Jim Dunlop, P.E.
Mr. John Williamson
Dr. Gregory Thorpe (2)
Ms. Deborah Barbour, P.E.
Mr. Jay Bennett, P.E.
Mr. Mike Bruff, P.E.
Mr. Art McMillan, P.E.
Mr. Anthony Houser, P.E.
Mr. A. L. Avant
Mr. Van Argabright, P.E.
Mr. Doug Lane
Mr. Omar Sultan
Mr. Drew Joyner, P.E. (2)

FROM: Ms. Nicole M. Hackler
Feasibility Studies Unit

SUBJECT: Feasibility Study FS-9913D; SR 3556 (Meadow Road/ Amboy Road) from I-240 to NC 81/SR 3214 (Biltmore Avenue) in the City of Asheville; Buncombe County

Our staff has completed a feasibility study for the proposed project referenced above. 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.

NMH/nmh

Attachment

cc: Mr. Len Sanderson, P.E.

PHONE 919-733-2039 FAX 919-733-3585

FEASIBILITY STUDY

City of Asheville

SR 3556 (Meadow Road/Amboy Road)
From I-240 to
NC 81 / SR 3214 (Biltmore Avenue)

Buncombe County

Division 13

FS-9913 D

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

Nicole M. Hackler
Feasibility Studies Engineer

Derrick W. Lewis, P.E.
Feasibility Studies Unit Head

1/12/2004
Date

SR 3556 (Meadow Road/Amboy Road)
From I-240 to
NC 81 / SR 3214 (Biltmore Avenue)
Buncombe County
FS-9913 D

I. General Description

This feasibility study describes the widening of SR 3556 (Meadow Road/Amboy Road) from I-240 to NC 81 / SR 3214 (Biltmore Avenue), a distance which varies between 2.6 and 2.8 miles, depending upon the alternative selected. The project location is shown on Figure 1. As part of this study, two different cross-sections were investigated, each with a bridge replacement option and a bridge on new alignment option. The details of each are as follows:

- ***ALTERNATIVE A-1***: Four-lane divided curb and gutter section on 100' of right of way, with bridge replacement using the current alignment over French Broad River and bridge replacement over the Southern Railway.

- ***ALTERNATIVE B-1:*** Four-lane divided curb and gutter section on 100' of right of way, with a bridge on **NEW** alignment over French Broad River and bridge replacement over the Southern Railway.

- **ALTERNATIVE *A-2*:** Five-lane curb and gutter section on 100' of right of way, with bridge replacement using the current alignment over French Broad River and bridge replacement over the Southern Railway.

- ***ALTERNATIVE B-2:*** Five-lane curb and gutter section on 100' of right of way, with a bridge on **NEW** alignment over French Broad River and bridge replacement over the Southern Railway.

This study 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 costs, and to identify potential problems that may require consideration in the planning and design phases.

II. Background

The purpose of this project is to increase the traffic carrying capacity and safety of SR 3556 (Meadow Road/Amboy Road), as well as provide improved multilane access from NC 81 / SR 3214 (Biltmore Avenue) to I-240 in the City of Asheville. This project will help the Biltmore Village area by both easing congestion along the Biltmore Avenue corridor, and by improving access to Memorial Mission Hospital, Asheville-Buncombe (A-B) Technical Community College and the businesses surrounding the Norfolk-Southern rail yards. The City of Asheville supports this project.

SR 3556 (Meadow Road/Amboy Road) is designated as a major thoroughfare in the Asheville Urban Area Thoroughfare Plan, and as a minor arterial in the North Carolina Statewide Functional Classification System. SR 3556 is currently a two-lane facility along most of the project, with a short three-lane section in the vicinity of A-B Technical Community College. The development along this road is a combination of commercial, institutional (A-B Technical Community College), municipal (French Broad River Park) and undeveloped land.

There are four existing traffic signals within the project limits. They are located at Amboy Road and State Street; Amboy Road and Meadow Road/Lymon Street; Meadow Road and Victoria Road; and Meadow Road and Biltmore Avenue (NC 81 / SR 3214).

The interchange redesign at I-240 and Amboy Road will be covered under proposed TIP Project I-2513A. These improvements will extend approximately 2000' east of the interchange, and will tie into the western-most limits of this project. NCDOT is also investigating a potential connector from I-40 to SR 3556 (Amboy Road) under proposed project FS-9913A.

The current year Average Daily Traffic (ADT) along Meadow Road/Amboy Road within the project limits ranges from 16,300 vehicles per day (vpd) at the west end of the project to 12,200 vpd at the east end. For the design year 2025, the estimated traffic volumes on Meadow Road/Amboy Road will range from 24,400 vehicles per day (vpd) at the west end of the project to 18,400 vpd at the east end. Truck traffic is estimated to make up approximately four percent of daily traffic on the project.

Currently, all major intersections along Meadow Road/Amboy Road are operating at a Level of Service (LOS) "F". If no improvements are made to Meadow Road/Amboy Road, all intersections will still be operating at a LOS "F" in design year (DY) 2025. With the proposed widening of Meadow Road/Amboy Road, the facility is anticipated to operate at a LOS "C" or better in DY 2025, with the exception of the intersection at Meadow Road and Biltmore Avenue. This intersection is expected to operate at a LOS "F" unless additional improvements to Biltmore Avenue are provided, which would be greatly beyond the scope of

this project. However if additional improvements to Biltmore Avenue are made under another project, this intersection should function at a LOS "D" in the design year.

During the three year period from October 1995 to September 1998, there were 125 accidents reported within the project limits. There were 60 injury accidents and no fatalities as a result of these incidents. The accident rate for this 2.8 mile portion of roadway is 307.5 accidents per 100 million vehicle miles of travel (acc/100mvm), which is lower than the 1999-2001 statewide rate of 376.59 accidents/100mvm for two-lane undivided secondary routes.

III. Description of Project

It is proposed to widen SR 3556 (Meadow Road/Amboy Road) from I-240 to NC 81 / SR 3214 (Biltmore Avenue), a distance which varies between 2.6 and 2.8 miles depending upon the alternative selected. The project location is shown on Figure 1. Two cross-sections were studied for this project, each with a bridge replacement option and a new bridge location option, the details of which are as follows:

ALTERNATIVE A-1: Four-lane divided curb and gutter section with a 23-foot raised grass median, 75-feet wide face to face of curbs, with 10-foot berms on 100-feet of right of way. This option includes bridge replacement over the French Broad River using the existing alignment and bridge replacement over the Southern Railway. The length of this alternative is approximately 2.8 miles.

In order to support the modifications to Meadow Road/Amboy Road, it was also necessary to include auxiliary turn lane improvements to the intersecting roadways at both Victoria Road and at State Street. In addition, Lyman Street will require multi-lane widening improvements extending approximately 1500' to the north of the intersection with Amboy Road. The costs for these additional Y-Line improvements have been included below.

With this proposed cross-section, it is anticipated there will be no residences and 14 businesses relocated due to this project. The total cost of this alternative, including construction and right-of-way, is estimated to be $ 34,000,000.

Construction.....	$ 19,700,000
Right-of-Way.....	$ 14,300,000
Total Project Cost (Alternative A-1).....	$ 34,000,000

The construction of two feet of additional pavement on each side of the road for the length of the project was also investigated. This pavement

would accommodate a "Share the Road" bicycle alternative, and would add an additional $ 700,000 to the Alternative A-1 project cost.

A separate cost was also provided for the installation of a five-foot sidewalk, to be installed on one side of the roadway for the length of the project. This option would add an additional $ 250,000 to the Alternative A-1 project cost.

ALTERNATIVE B-1: Four-lane divided curb and gutter section with a 23-foot raised grass median, 75-feet wide face to face of curbs with 10-foot berms, on 100-feet of right of way. This option includes a bridge on **NEW** alignment over the French Broad River and bridge replacement over the Southern Railway. The length of this alternative is approximately 2.6 miles.

In order to support the modifications to Meadow Road/Amboy Road, it was also necessary to include auxiliary turn lane improvements to the intersecting roadways at both Victoria Road and at State Street. In addition, Lyman Street will need to be realigned approximately 1500' to the south in order to accommodate the new crossing of the French Broad River. The costs for these additional Y-Line improvements have been included below.

With this proposed cross-section, it is anticipated there will be zero residences and 14 businesses relocated due to this project. The total cost of this alternative, including construction and right-of way, is estimated to be $ 38,800,000.

Construction.....	$ 24,300,000
Right-of-Way.....	$ 14,500,000
Total Project Cost (Alternative B-1).....	$ 38,800,000

The construction of two feet of additional pavement on each side of the road for the length of the project was also investigated. This pavement would accommodate a "Share the Road" bicycle alternative, and would add an additional $ 900,000 to the Alternative B-1 project cost.

A separate cost was also provided for the installation of a five-foot sidewalk, to be installed on one side of the roadway for the length of the project. This option would add an additional $ 230,000 to the Alternative B-1 project cost.

ALTERNATIVE A-2: Five-lane curb and gutter section, 68-feet wide face to face of curbs, with 10-foot berms on 100-feet of right of way. This option includes bridge replacement over the French Broad River using the current alignment and bridge replacement over the Southern Railway. The length of this alternative is approximately 2.8 miles.

In order to support the modifications to Meadow Road/Amboy Road, it was also necessary to include auxiliary turn lane improvements to the intersecting roadways at both Victoria Road and at State Street. In addition, Lyman Street will require multi-lane widening improvements extending approximately 1500' to the north of the intersection with Amboy Road. The costs for these additional Y-Line improvements have been included below.

With this proposed cross-section, it is anticipated there will be no residences and 14 businesses relocated due to this project. The total cost of this alternative, including construction and right-of-way, is estimated to be $ 31,000,000.

Construction.....	$ 16,700,000
Right-of-Way.....	$ 14,300,000
Total Project Cost (Alternative A-2).....	$ 31,000,000

The construction of two feet of additional pavement on each side of the road for the length of the project was also investigated. This pavement would accommodate a "Share the Road" bicycle alternative, and would add an additional $ 700,000 to the Alternative A-2 project cost.

A separate cost was also provided for the installation of a five-foot sidewalk, to be installed on one side of the roadway for the length of the project. This option would add an additional $ 250,000 to the Alternative A-2 project cost.

ALTERNATIVE B-2: Five-lane curb and gutter section, 68-feet wide face to face of curbs with 10-foot berms, on 100-feet of right of way. This option includes a bridge on **NEW** alignment over the French Broad River and bridge replacement over the Southern Railway. The length of this alternative is approximately 2.6 miles.

In order to support the modifications to Meadow Road/Amboy Road, it was also necessary to include auxiliary turn lane improvements to the intersecting roadways at both Victoria Road and at State Street. In addition, Lyman Street will need to be realigned approximately 1500' to the south in order to accommodate the new crossing of the French Broad River. The costs for these additional Y-Line improvements have been included below.

With this proposed cross-section, it is anticipated there will be zero residences and 14 businesses relocated due to this project. The total cost of this alternative, including construction and right-of way, is estimated to be $ 37,400,000.

Construction	$ 22,900,000
Right-of-Way	$ 14,500,000
Total Project Cost (Alternative B-2)	$ 37,400,000

The construction of two feet of additional pavement on each side of the road for the length of the project was also investigated. This pavement would accommodate a "Share the Road" bicycle alternative, and would add an additional $ 900,000 to the Alternative B-2 project cost.

A separate cost was also provided for the installation of a five-foot sidewalk, to be installed on one side of the roadway for the length of the project. This option would add an additional $ 230,000 to the Alternative B-2 project cost.

IV. Recommendations

ALTERNATIVES A-1 AND A-2: The analyses for both the four-lane divided curb and gutter section with bridge replacement using current alignment over French Broad River and bridge replacement over the Southern Railway (Alternative A-1) and the five-lane curb and gutter section with bridge replacement using current alignment over the river and bridge replacement over the railroad (Alternative A-2) showed either of these alternatives would accommodate the projected 2025 design year volumes with an acceptable level of service. However, the proposed bridge replacement over French Broad River using the current alignment would NOT relieve the heavy turning movements and subsequent queues between Amboy Road and Meadow Road. The most desirable intersection configuration is one in which the heaviest traffic movement is accommodated as a through movement rather than a turning movement. This would not be the case if the bridge were widened in the current location, because the heaviest traffic movements would still be the left and right turn movements from Meadow Road to Amboy Road. With this configuration, the queue lengths at the intersection of Meadow and Amboy Roads were extensive, and safety and efficiency of the facility were deemed inferior to the two alternatives shown below. For these reasons, neither Alternative A-1 nor A-2 were selected as the recommended option.

ALTERNATIVES B-1 AND B-2: It was found that the four-lane divided curb and gutter section with a bridge on **NEW** alignment over the French Broad River and bridge replacement over the Southern Railway (Alternative B-1) and the five-lane curb and gutter section with a bridge on **NEW** alignment over the river and bridge replacement over the railroad (Alternative B-2) would both be able to accommodate the projected 2025 design year volumes with an

acceptable level of service. The new bridge alignment over the French Broad River would eliminate the queuing problems with the existing configuration, thus providing a higher level of safety and efficiency for the motoring public. In addition there would be improved maintenance of traffic during construction, since motorists would continue traveling on the old bridge until the new structure was built.

In order to choose between Alternatives B-1 and B-2, it must be noted five-lane curb and gutter sections tend to promote strip development and indiscriminate left turn movements, while four-lane divided sections help minimize strip development, prevent indiscriminate left turn movements and allow pedestrian refuge if needed. **Therefore, Alternative B-1 was selected as the preferred option for this project.**

The total project cost of the recommended four-lane divided curb and gutter section with a bridge on **NEW** alignment over the French Broad River and bridge replacement over the Southern Railway, and including a two-foot "Share the Road" bicycle facility on both sides of the project with a five-foot sidewalk on one side is $ 39,930,000.

V. Additional Comments

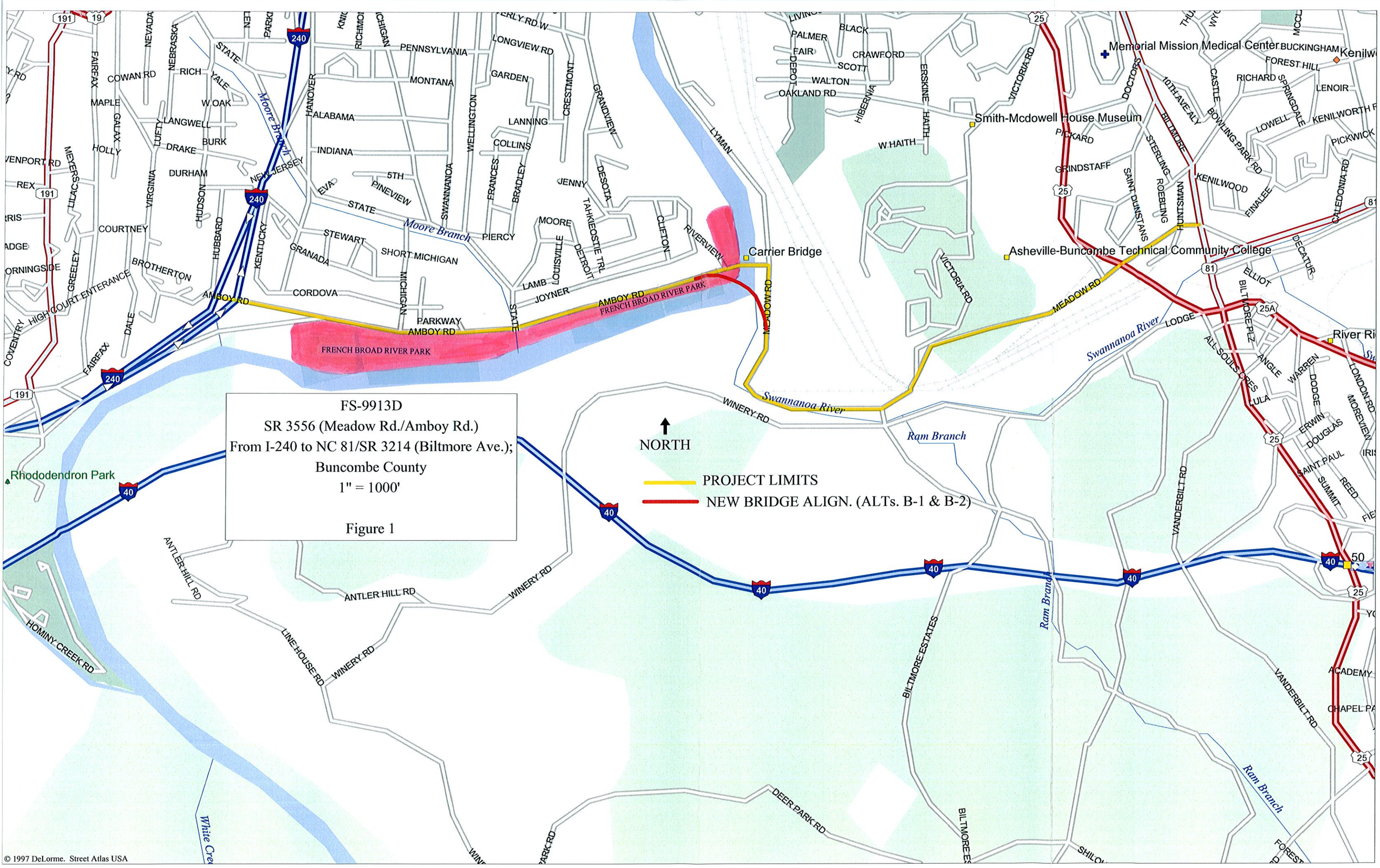
A detailed environmental study was not conducted for this feasibility study, however this project falls in an environmentally sensitive area. Impacts to wetland areas are expected, and permitting with the U.S. Army Corps of Engineers will likely be necessary. In addition, based on maps at the Department of Environment, Health and Natural Resources – National Heritage Section, an endangered species was identified, the Percina Aurantiaca. Lastly, Section 4-F impacts to the French Broad River Park are also anticipated, and will need to be addressed during the NEPA planning process. (Please see Figure 1 for park location.)

It should also be noted that the Biltmore Estate, a landmark site on the National Historic Register, is located directly across the French Broad River from this proposed project. However, it is not anticipated any direct impacts to this historic property would result from the recommended alternative.

It was recently brought to our attention that a local initiative was underway called the Wilma Dykeman Riverway Project. This initiative aspires to "creatively link the French Broad and Swannanoa River into a continuous multi-access roadway and to review development in the urban riverfront to suggest sustainable economic development strategies designed to invigorate activity along the urban riverfront corridor". This project investigates many different upgrades to the riverway areas for both the French Broad River and the Swannanoa River, with proposed improvements including (but not limited to) walking and biking trails, recreation areas, park improvements, housing projects

and finally, roadway improvements to both Meadow Road and Amboy Road. The Wilma Dykeman Riverway Project is also listed as a priority on the French Broad River M.P.O. Priority List, adopted on December 11, 2003.

There are portions of the Wilma Dykeman Riverway Project with which this Feasibility Study closely coincides, most notably the road widening options for both Meadow Road and Amboy Road. However, there are differences in the proposed road widening alternatives between the initiative and this study. Our unit still stands by its recommendation for a four-lane divided curb and gutter section with a 23-foot raised grass median, 75-feet wide face to face of curbs with 10-foot berms, on 100-feet of right of way with a bridge on **NEW** alignment over the French Broad River. Should this feasibility study be funded, it will be essential to carefully coordinate with the Wilma Dykeman Riverway Project so that a consensus is reached on the desired improvements.


FS-9913D
SR 3556 (Meadow Rd./Amboy Rd.)
From I-240 to NC 81/SR 3214 (Biltmore Ave.);
Buncombe County
1" = 1000'
Figure 1
NORTH
PROJECT LIMITS
NEW BRIDGE ALIGN. (ALTs. B-1 & B-2)
Carrier Bridge
Asheville-Buncombe Technical Community College
Memorial Mission Medical Center
Smith-Mcdowell House Museum
Rhododendron Park
AMBOY RD
FRENCH BROAD RIVER PARK
MEADOW RD
Swannanoa River
Ram Branch
Moore Branch
WINERY RD
ANTLER HILL RD
LINE HOUSE RD
HOMINY CREEK RD
BILTMORE ESTATES
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