

FEASIBILITY STUDY

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Raleigh
Raleigh Beltline (I-440)
from
South of Walnut Street (SR 1313)
to
Wade Avenue (SR 1728)
Wake County
U-2719

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

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Date

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I. GENERAL DESCRIPTION

This preliminary study describes improvements on the Raleigh Beltline (I-440) from south of Walnut Street (SR 1313) to Wade Avenue (SR 1728) in Raleigh. The total project length is approximately 3.5 miles (5.6 km). The project location is shown on Figure 1. The existing Raleigh Beltline, within the project limits, is a 4-lane, median-divided, controlled access facility.

The result of the proposed improvements will be a 6-lane, median-divided, controlled access facility, built to Interstate standards. Generally, the median will be 22 feet (6.7 m) wide with a concrete median barrier and there will be 10-foot (3.0-m) wide paved shoulders in the median and on the right side of the travel lanes.

The structures at Jones Franklin Road, Athens Drive, and Melbourne Road will be replaced.

At Melbourne Road it is proposed to remove the existing half diamond interchange. It is felt that adequate access to the Beltline via Western Boulevard is available to the residents in this area.

At Western Boulevard the existing southbound flyover will be revised to provide a right lane entrance to the Beltline. This will require replacement of the existing flyover structure, and construction of two additional structures. Also, the width of the existing spread median will be reduced, and an 8-lane structure approximately 130 feet (39.6 m) wide will be built over Western Boulevard.

A collector-distributor road is proposed on the west side of the Beltline from just south of the Hillsborough Street interchange to the Wade Avenue interchange. At Hillsborough Street the existing structure will be rehabilitated and widened approximately 78 feet (23.8 m) on the west side, providing a total structure width of approximately 160 feet (48.8 m). The existing dual bridges over Wade Avenue will be widened by 12 feet (3.6 m) providing a total width of approximately 62 feet (18.9 m) for each structure.

Additional right-of-way will be required. The width of additional right-of-way varies depending on the location, but typically varies from 20 feet (6.1 m) to 80 feet (24.4 m). Twelve residential and two business relocations are anticipated due to this project.

The total cost including construction and right-of-way is estimated to be \$65,000,000.

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 needs, recommend a treatment including costs, and identify potential problem areas that require consideration in the planning and design phases.

II. NEED FOR PROJECT

The purpose of this project is to increase the traffic carrying capacity and safety of the Raleigh Beltline (I-440) in Raleigh. Recently, the Raleigh Beltline was designated an Interstate route (I-440) and these improvements will be constructed to Interstate standards. Under project U-2108, approximately 4.2 miles (6.7 km) of the Beltline north of this project have been widened to Interstate standards and approximately 6 miles (9.7 km) of widening are currently under construction.

The Raleigh Beltline is designated a Freeway on the Raleigh Thoroughfare Plan. The Raleigh Beltline, between I-40 and Wade Avenue, is classified as Urban Interstate in the North Carolina Statewide Functional Classification System.

Land use adjacent to the project corridor between the southern project terminus and I-40 is mostly commercial with shopping centers developed on both sides of the Beltline.

Between I-40 and Western Boulevard land use is primarily residential with some office and institutional use near the I-40 interchange.

Between Western Boulevard and Hillsborough Street land use is primarily a mix of commercial and institutional uses. On the east side there is a public elementary school, a park with related athletic fields, and a portion of the North Carolina State University campus. On the west side there is a large discount department store, part of the NCSU campus, a brick company distribution and sales center, and a paint company sales center.

Between Hillsborough Street and Wade Avenue, Meredith College is on the east side of the Beltline and the N.C. State University Faculty Club is on the west side.

Generally, the Raleigh Beltline is a 4-lane freeway with a 30-foot (9.1 m) wide grass median, and 10-foot (3.0-m) paved shoulders in the median and on the outside.

Near the south terminal the interchange with I-40 is a full cloverleaf interchange with four structures carrying I-40 over the Beltline.

The interchange with Jones Franklin Road is a partial diamond interchange with no ramps in the southwest quadrant. In the northwest quadrant there is a loop providing entrance to the southbound Beltline, and an exit ramp from the southbound Beltline.

Athens Drive is carried over the Beltline as a grade separation.

At Melbourne Road there is a half-diamond interchange. There is a southbound exit ramp from the Beltline in the northwest quadrant and a northbound entrance ramp from Melbourne Road in the northeast quadrant. There is no southbound entrance ramp to the Beltline, nor is there a northbound exit ramp from the Beltline.

The interchange at Western Boulevard is a partial cloverleaf interchange. All movements are handled in a conventional manner except westbound Western Boulevard to southbound Beltline traffic. This movement is accommodated with a flyover which results in a left lane merge situation south of the interchange proper.

At Hillsborough Street there is a half cloverleaf interchange with loops in the northwest and northeast quadrants.

Estimates of the 1995 Average Daily Traffic (ADT) on I-440 within the project limits range from 55,000 vehicles per day (vpd) to 75,000 vpd. Estimates of the ADT for the 2020 design year range from 95,000 vpd to 132,000 vpd.

The Level of Service (LOS) on I-440 within the project limits, with the proposed improvements, based on 1995 traffic, is estimated to be level C. The LOS for the 2020 design year is estimated to be level D with the proposed improvements.

During the three year period between January 1, 1992, and December 31, 1994, there were 625 accidents reported on I-440 within the project limits. This resulted in a total

accident rate of 223 accidents per 100 million vehicle miles (ACC/100MVM). This compares with the statewide average of 160 ACC/100MVM for all urban Interstate routes, in North Carolina, for 1994.

There were 2 fatal accidents reported, and 203 accidents resulted in 302 injured persons. The most prevalent type accidents were Rear-end (45%), Ran Off Road (15%), and Sideswipe (8 %). The proposed additional travel lane in each direction will reduce the potential for these type accidents.

III. RECOMMENDATIONS

It is recommended to widen the Raleigh Beltline (I-440) from south of Walnut Street (SR 1313) to Wade Avenue (SR 1728) in Raleigh. The total project length is approximately 3.5 miles (5.6 km). The project location is shown on Figure 1. The result of the proposed improvements will be a 6-lane, median-divided, controlled access facility, built to Interstate standards. Generally, the median will be 22 feet (6.7 m) wide with a concrete median barrier and there will be 10-foot (3.0-m) wide paved shoulders in the median and on the right side of the travel lanes.

The structures at Jones Franklin Road, Athens Drive, and Melbourne Road will be replaced.

At Melbourne Road it is proposed to remove the existing half diamond interchange. It is felt that adequate access to the Beltline via Western Boulevard is available to the residents in this area.

At Western Boulevard the existing southbound flyover will be revised to provide a right lane entrance to the Beltline. This will require replacement of the existing flyover structure, and construction of two additional structures. Also, the width of the existing spread median will be reduced, and an 8-lane structure approximately 130 feet (39.6 m) wide will be built over Western Boulevard.

A collector-distributor road is proposed on the west side of the Beltline from just south of the Hillsborough Street interchange to the Wade Avenue interchange. At Hillsborough Street the existing structure will be rehabilitated and widened approximately 78 feet (23.8 m) on the west side, providing a total structure width of approximately 160 feet (48.8 m). The existing dual bridges over Wade Avenue will be widened by 12 feet (3.6 m) providing a total width of approximately 62 feet (18.9 m) for each structure.

Additional right-of-way will be required. The width of additional right-of-way varies depending on the location, but

typically varies from 20 feet (6.1 m) to 80 feet (24.4 m). Twelve residential and two business relocations are anticipated due to this project.

The total cost including construction and right-of-way is estimated to be \$65,000,000 as follows:

Construction.....	\$ 50,000,000
Right-of-Way.....	15,000,000
Total Cost.....	\$ 65,000,000

IV. OTHER COMMENTS

The right of way estimate shown above was made assuming a complete taking of the brick company and the paint store located on the west side of the project near Hillsborough Street. If a complete taking is not required of these two properties, and they are not required to relocate, the total right-of-way cost is estimated to be \$13,000,000.

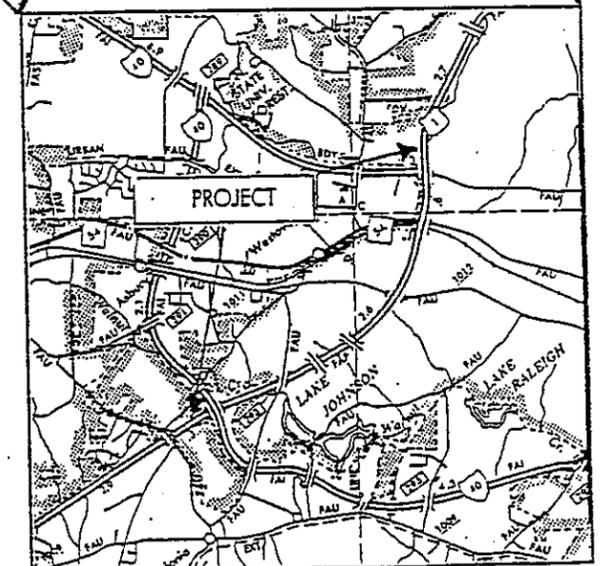
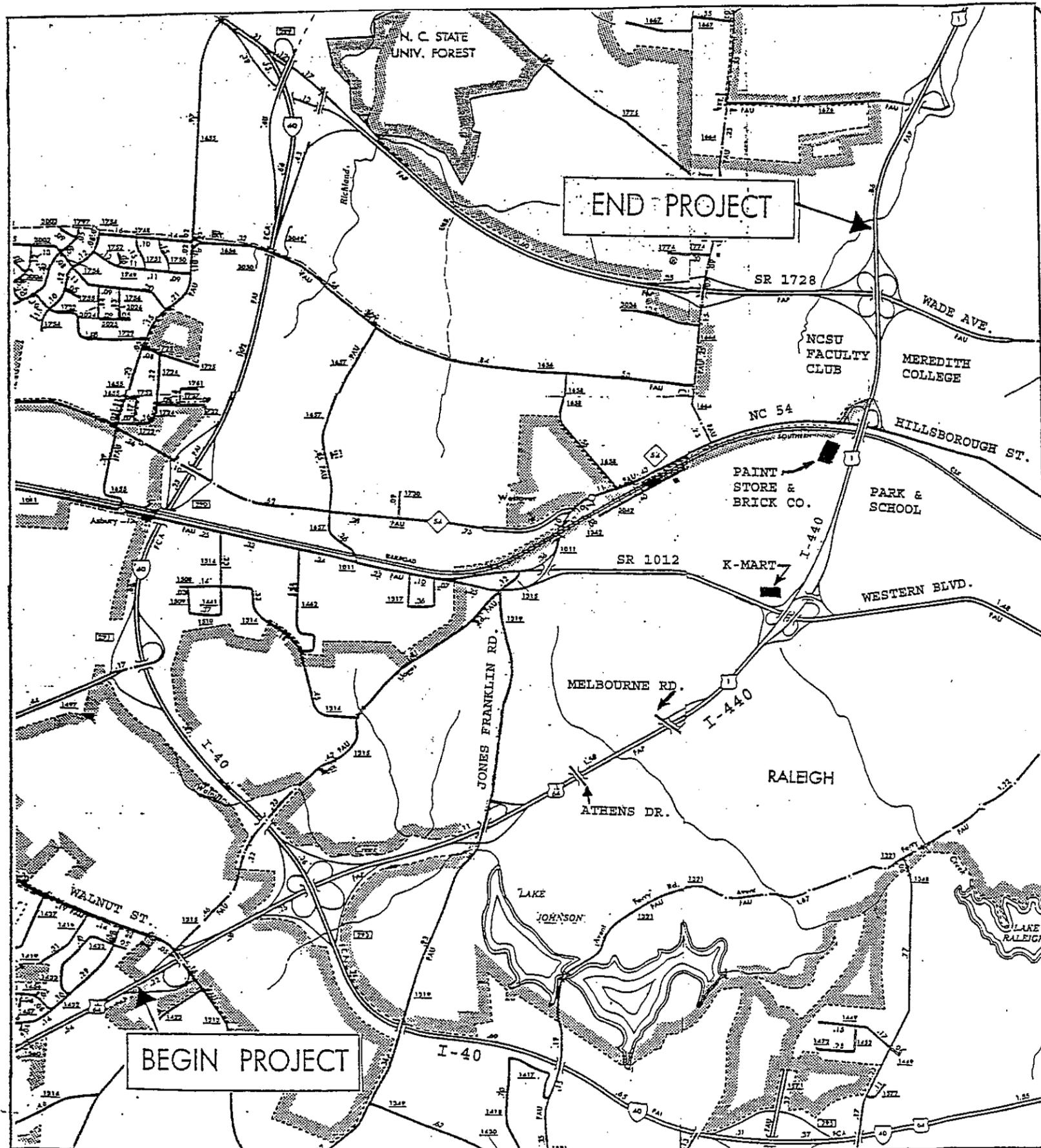
On the east side of the project between Western Boulevard and Hillsborough Street, there is a city park and a public school. It is beyond the scope of this study to determine the magnitude of the impact this project may have on these facilities, or to determine the degree to which any impacts may be mitigated. Therefore, the functional design on which this project is based has avoided any right of way taking from these properties. It is recommended that these impacts be studied in the preparation of the environmental document for this project.

If after development of the environmental document, it is deemed feasible to acquire right of way from these properties and from Meredith College, the amount of taking from the brick company, paint store, and Faculty Club may be reduced.

Noise walls may be warranted between Jones Franklin Road and Western Boulevard and the cost for these is included in the above estimate.

At Melbourne Road it is proposed to remove the existing half diamond interchange, thus denying access to the Beltline at this point. It is felt that adequate access to the Beltline via Western Boulevard is available to the residents in this area. Realizing that this proposal may be controversial, and may not prevail, the cost of converting this half diamond interchange into a full diamond interchange has been included in the project cost estimate as follows:

Construction.....	\$ 2,000,000
Right-of-Way.....	700,000
Total Cost.....	\$ 2,700,000



NORTH CAROLINA DEPARTMENT
 OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 PROGRAM DEVELOPMENT BRANCH

RALEIGH
 I-440
 FROM I-40 TO WADE AVE.
 WAKE COUNTY
 U-2719

DATE: 6-94

SCALE: 2" = 1 MILE

FIGURE: 1