FEASIBILITY STUDY

NC 87 Northeast Bypass
Burlington-Graham, Alamance County
U-2502

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

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Date

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I. DESCRIPTION

This report covers a preliminary study of a proposed NC 87 Bypass along the northern and eastern perimeter of the Cities of Burlington and Graham. This project is included in the 1990-1996 Transportation Improvement Plan (TIP) for feasibility study and/or right-of-way protection. It is not currently funded for engineering, right-of-way, or construction. A vicinity map of the Burlington-Graham areas is shown on Figure 1.

II. PURPOSE OF PROJECT

Existing Route

In the statewide highway network, NC 87 north of Burlington is classified as a minor arterial extending to the US 29 freeway at Reidsville. South of Graham, it is classified as a major collector extending to US 64 at Pittsboro. Within the urban boundaries of Burlington and Graham, the subject route is designated as an urban minor arterial. As noted on Figure 1, it coincides with several NC routes such as 49, 54, 62, and 100.

The studied facility through Burlington and Graham , with combined current population of approximately 50,000 persons, has a wide variety of cross sections and traffic flow conditions. Between the southern city limits of Graham and NC 62 in Burlington, NC 87 has variable curb and gutter sections operating as 3, 4, or 5 lanes. Parallel and angle parking are provided at some locations. Outside these curbed sections, NC 87 narrows to a 2-lane shoulder width, with left turn lanes added at various locations. In the central business area of Graham, NC 87 and several streets come into a traffic circle formed around the Alamance County Courthouse. Traffic flow throughout the adjoining cities is controlled by numerous signals, several turns, and varying speed limits of 20, 35, 40, and 50 MPH. Roadside development is primarily heavy density commercial with some intermixed residential and industrial uses.

The 1988 average daily traffic volumes (the latest available) on NC 87 ranged from lows of 4500 vehicles per day (vpd) north of Burlington and 7500 vpd south of Graham to highs of 11,000-20,000 vpd between NC 100 and the southern city limits of Graham. Approximately 3-5 percent of these volumes is composed of heavy trucks. Considering the effects of a sizable volume of traffic including heavy trucks, roadside interference, and signal controls, the studied road is experiencing capacity problems at some locations.

Need for Project

Justification for the proposed project derives from a need to provide a dual function: (1) better traffic operation for the NC 87 bypassable traffic and (2) improved accessibility between major radials

serving the suburbs of Burlington, Graham, and Haw River. The project would alleviate traffic congestion on the radial routes feeding into the heart of these communities. It is an important part in the development of the ultimate thoroughfare plan for the Burlington, Graham, and Haw River urban areas.

III. RECOMMENDATIONS AND COSTS

Location

Based on consideration of overall existing and proposed development, location of the Haw River, and development of an adequate ultimate thoroughfare system, the logical corridor for a NC 87 bypass, which would also serve as an outer loop, is shown on Figure 2. (Note: An aerial mosaic showing the bypass/outer loop corridor is on file in the Planning and Environmental Branch.) The corridor generally follows the proposed alignment shown on the recently adopted Alamance County Urban Area Thoroughfare Plan (see Figure 3).

The proposed route is located to maximize the use of existing road alignments wherever possible and minimize the impact on the area that is generally residential in nature. The project would be approximately 13.3 miles long, including 9.2 miles of new location and 4.1 miles of existing location. As shown on Figure 2, the recommended corridor traverses between the more developed areas of Burlington-Graham and the Haw River except in the eastern sector of Burlington where it would be necessary to cross Haw River twice to avoid severe disruption to existing residential neighborhoods and a sewage treatment plant located on the immediate south side of the river. Other factors that confine the location for the new route east of Burlington and Graham are the limited topographic conditions suitable for a proposed railroad separation at the intersection of US 70 and NC 49 and interchange spacing for a proposed interchange with I-40/85. Also, two new subdivisions (Riverbend Industrial Park and Raspberry Ridge) have made provisions to reserve limited space for the proposed route in accordance with the thoroughfare plan.

At the northern end of the proposed bypass/outer loop, existing NC 87 is scheduled in the TIP (R-2560) for widening to a 4-lane divided section in Alamance County and adjoining Rockingham County. According to the TIP, this project terminates at SR 1547, which is approximately 1.0 mile south of the proposed bypass/outer loop connection with NC 87. However, because traffic would be reduced on NC 87 south of the proposed connection, the NC 87 widening project should end where the proposed bypass/outer loop would tie into existing NC 87.

At the southern end of the proposed bypass/outer loop, existing NC 87 has 4 lanes with curb and gutter to the north and 2 lanes with shoulders to the south. NC 87 is intersected by two secondary roads, forming a K-type intersection. To avoid an undesirable connection of the bypass/outer loop to NC 87 and also allow future extension of the proposed project as specified in the thoroughfare plan, SR 2116 (Swepsonville Rd.) should be realigned to connect with NC 87 south of its present location (see Figure 2). Because of recent traffic and safety concerns

expressed about the K-type intersection, the Traffic Engineering Branch has been asked to study and resolve the problem. As a result of the study, Traffic Engineering is recommending the realignment of SR 2116 and seeking special funding for this improvement.

Design

Initial traffic volumes that would use the bypass/outer loop are estimated to range from 2000-5000 vehicles per day from NC 87 south to I-40/85, 10,000 vpd between I-40/85 and proposed US 70 Haw River Bypass, and 2000-4000 vpd between the Haw River Bypass and NC 87 north. These volumes would increase to approximately 3500-7000, 15,000, and 3500-6000 vpd, respectively, by the year 2010. Considerably more traffic is projected for the section between I-40/85 and US 70 due to the attraction of the interstate route to the Burlington-Haw River areas and the anticipated rerouting of NC 49 along this section of the project. Based on these volumes, a two-lane roadway would normally be adequate for the planning period except for the section between I-40/85 and the Haw River Bypass where a multi-lane section would be needed initially to accommodate the higher traffic volumes. However, sufficient right-of-way should be obtained initially along the two-lane sections to accommodate possible future widening to a multi-lane roadway.

Recommended cross section for the two-lane roadway is 24-foot pavement with 10-foot shoulders, including 2-foot paved shoulders. Recommended cross section for the multi-lane roadway is: (a) 5-lane, 64-foot pavement with curbing where the project utilizes existing road alignments and (b) 2 @ 26-foot pavements with curbing separated by a raised 30- foot grassed median where the project is on new location. The recommended ultimate cross section for the entire project would be consistent with the anticipated overall speed limit of 45 MPH. Estimated right-of-way widths used for cost estimate purposes are 100 feet with no control of access along existing locations and 160 feet with partial control of access (generally one access point per property) along new locations.

Major bridge construction would be required at two crossings of the Haw River, an underpass of the Southern Railway , and an overpass of I-40/85. Separation of Southern Railway is clearly justified by the exposure index of 150,000 (10 trains per day x 15,000 vehicles per day) which is much greater than the minimum index of 30,000 required for consideration of railroad separations in urban areas. Construction of the railroad separation would require a temporary detour for the train traffic and a relocation of NC 49 which currently underpasses the railroad and intersects US 70 at grade. NC 49 should be realigned as shown on Figure 2 to provide adequate intersection spacing along the proposed route.

Estimated Costs

Estimated costs of the recommended improvements for the 13.3-mile project are as follows:

Construction	$25,500,000	
Right-of-Way	19,000,000	(81 relocatees)
Total	$44,500,000	

Consideration was given to possible staging of the project for reduced funding purposes. If staging is desired, the project should be divided in the following order of priority:

Priority 1 - From I-40/85 (including interchange) to planned US 70 Haw River Bypass, 2.1 miles. This section would serve much more traffic and allow the possible rerouting of NC 49 away from the highly urbanized areas of Burlington, Graham, and Haw River. Estimated costs are as follows:

Construction	$10,500,000	
Right-of-Way	7,400,000	(33 relocatees)
Total	$17,900,000	

Priority 2 - From planned US 70 Haw River Bypass to NC 87 north, 8.7 miles. This section would enable traffic to bypass many miles of congestive routes in and through Burlington and Graham. Estimated costs are as follows:

Construction	$11,500,000	
Right-of-Way	8,050,000	(36 relocatees)
Total	$19,550,000	

Priority 3 - From NC 87 south to I-40/85, 2.5 miles. This section should logically be the last stage for construction, because the project traffic can be adequately served by the current routing of NC 87 and I-40/85, both multi-lane facilities for years. Estimated costs are as follows:

Construction	$ 3,500,000	
Right-of-Way	4,050,000	(12 relocatees)
Total	$ 7,550,000	

All construction costs include engineering and contingencies, and all right-of-way costs include acquisition , relocation, and utility costs. The cost estimates were prepared by the Preliminary Construction Engineer and Right-of-Way Branch.

IV. OTHER COMMENTS

No other corridor for a NC 87 bypass or outer loop was found to be more desirable or feasible from traffic service, environmental, and cost standpoints. For various reasons previously discussed, the selected corridor for a bypass/outer loop around Burlington and Graham is virtually confined to the proposed thoroughfare plan location. A completely new location for a NC 87 bypass to provide a higher type, limited access facility is an ideal goal for a route of some arterial importance.

However, it is not a practical alternative when faced with extreme cost and environmental problems of construction through growing areas of development and other barriers such as the Haw River, Southern Railway, and I-40/85.

Noticeable negative impacts that would result from construction of the studied proposed facility are: (1) wetland and floodplain encroachment at two river crossings; (2) loss of forested land and wildlife habitat; (3) loss of land required for right-of-way; (4) displacement of approximately 77 residences and 4 businesses; (5) increased noise levels for nearby development; and (6) change in traffic patterns of the existing street system affected by the project. Since most of the project parallels near Haw River, there would be the possibility of siltation and contamination of Haw River caused by the road construction. However, Haw River is classified as WS-III waters north of the Stony Creek Tributary and C waters south of this tributary. Class WS-III waters have no categorical restrictions on watershed development or discharges and is suitable for all Class C uses. Class C waters indicate fish and wildlife propagation, secondary recreation, agriculture, and other uses requiring waters of lower quality.

If this project is funded for design, right-of-way, and construction, it would have to undergo a comprehensive evaluation of all feasible alternatives and their associated impacts in a planning/environmental document, and a final decision would be made on the most appropriate improvements.

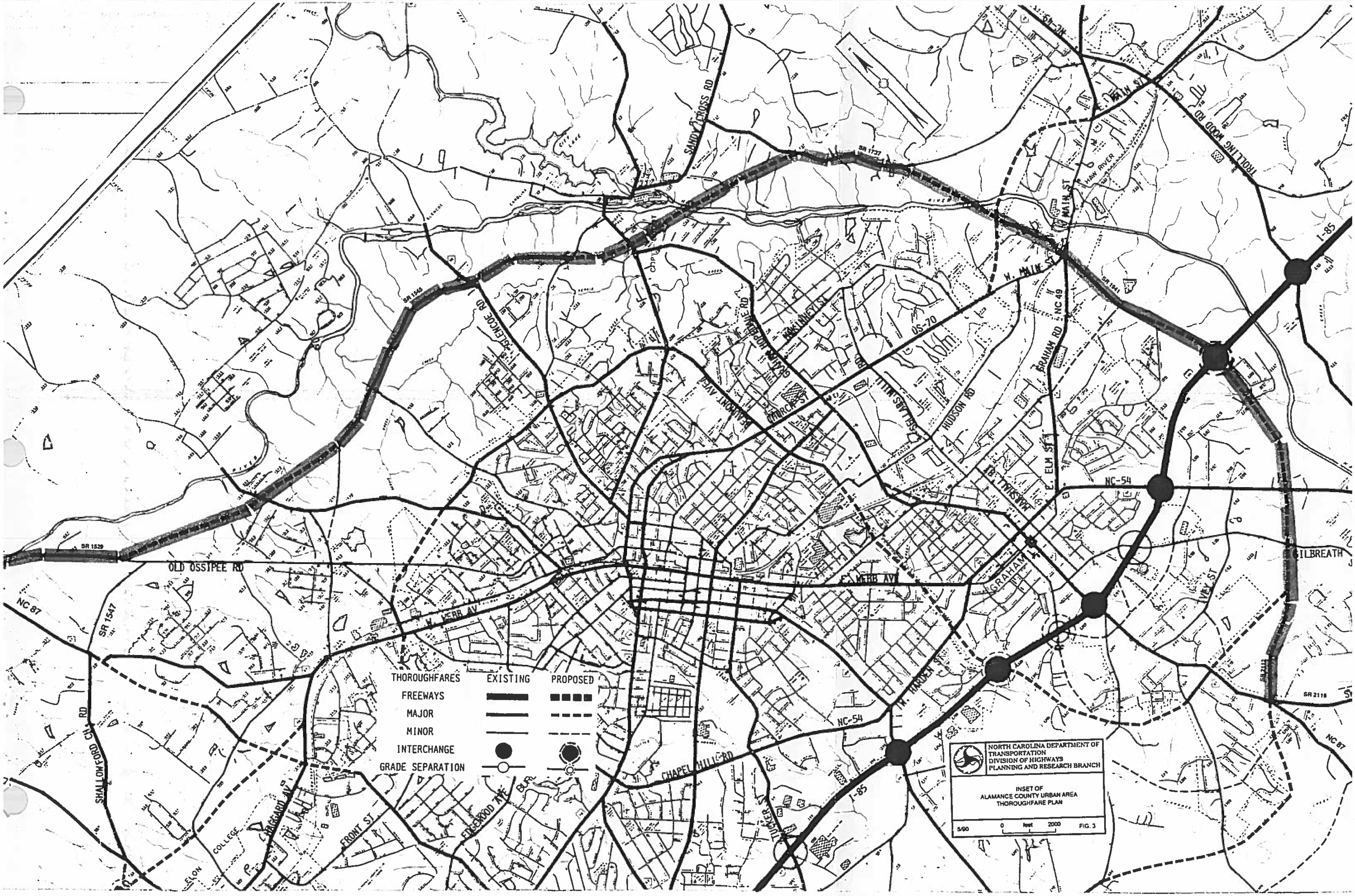
RGD/plr

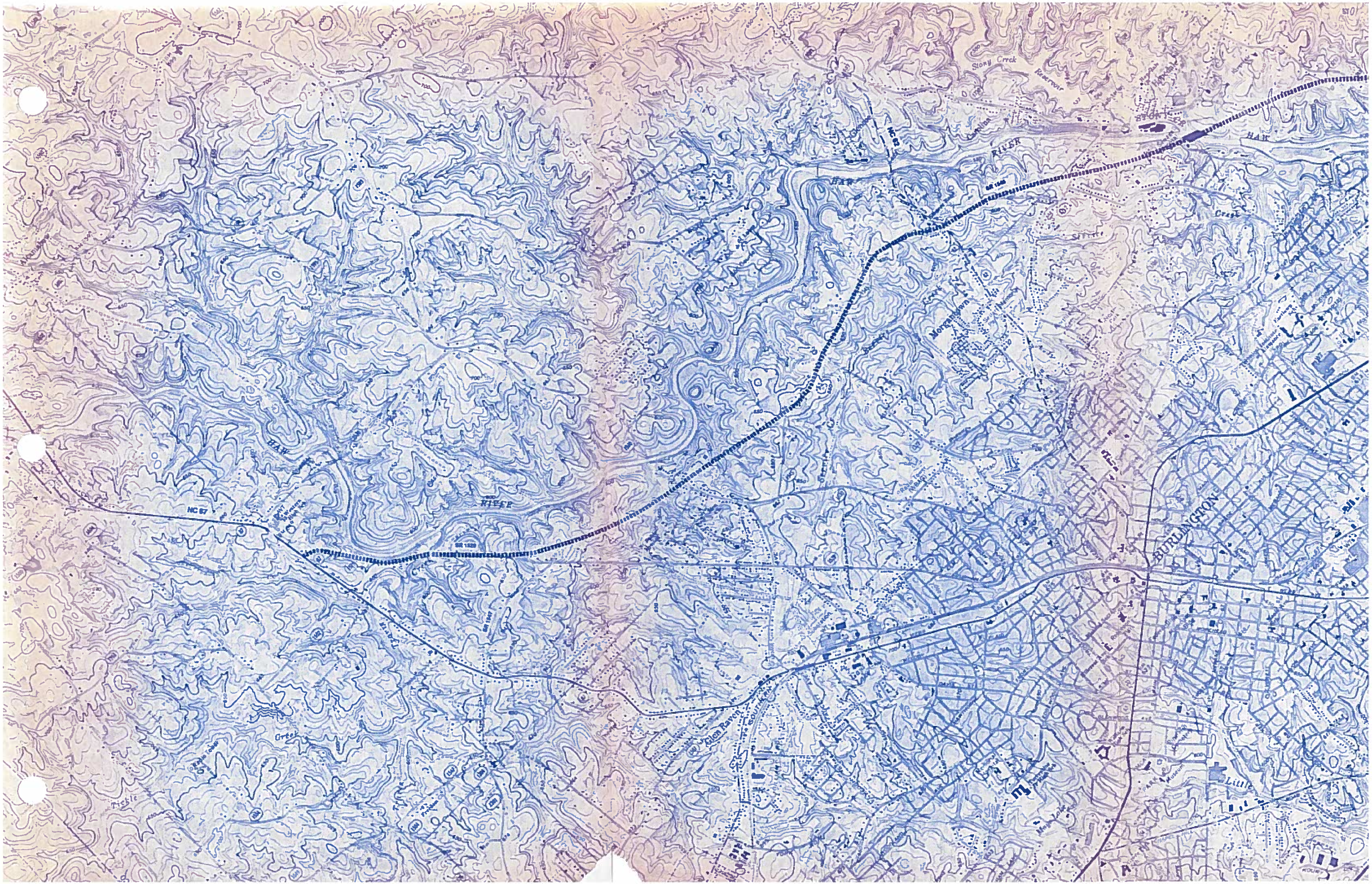
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PLANNING AND RESEARCH BRANCH

NC 87
NORTHEAST BYPASS
BURLINGTON & GRAHAM, ALAMANCE CO.
U-2502

0 mile 1

FIG. 1


THOROUGHFARES
EXISTING
PROPOSED
FREEWAYS
MAJOR
MINOR
INTERCHANGE
GRADE SEPARATION
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PLANNING AND RESEARCH BRANCH
INSET OF
ALAMANCE COUNTY URBAN AREA
THOROUGHFARE PLAN
5/90
0 feet 2000
FIG. 3
I-85
NC-54
NC 87
US-70
W. MAIN ST
N. MAIN ST
E. MAIN ST
W. WEBB AV
E. WEBB AV
OLD OSSIPEE RD
CHAPEL HILL RD
ROLLING WOOD RD
SANDY CROSS RD
GLENCOE RD
GRAHAM RD
HUDSON RD
E. ELM ST
N. HARDEN ST
GRAHAM
GILBREATH
SHALLOWFORD CH. RD
SR 1547
SR 1545
SR 1529
SR 1737
SR 1941
SR 2116
HAGGARD AV
FRONT ST
EDGEWOOD AV
COLLEGE
ELON
TUCKER ST
CHURCH ST
IVEY ST
HAW RIVER
NC 49



HAW
RIVER
NC 87
BURLINGTON
Stony Creek
Reservoir

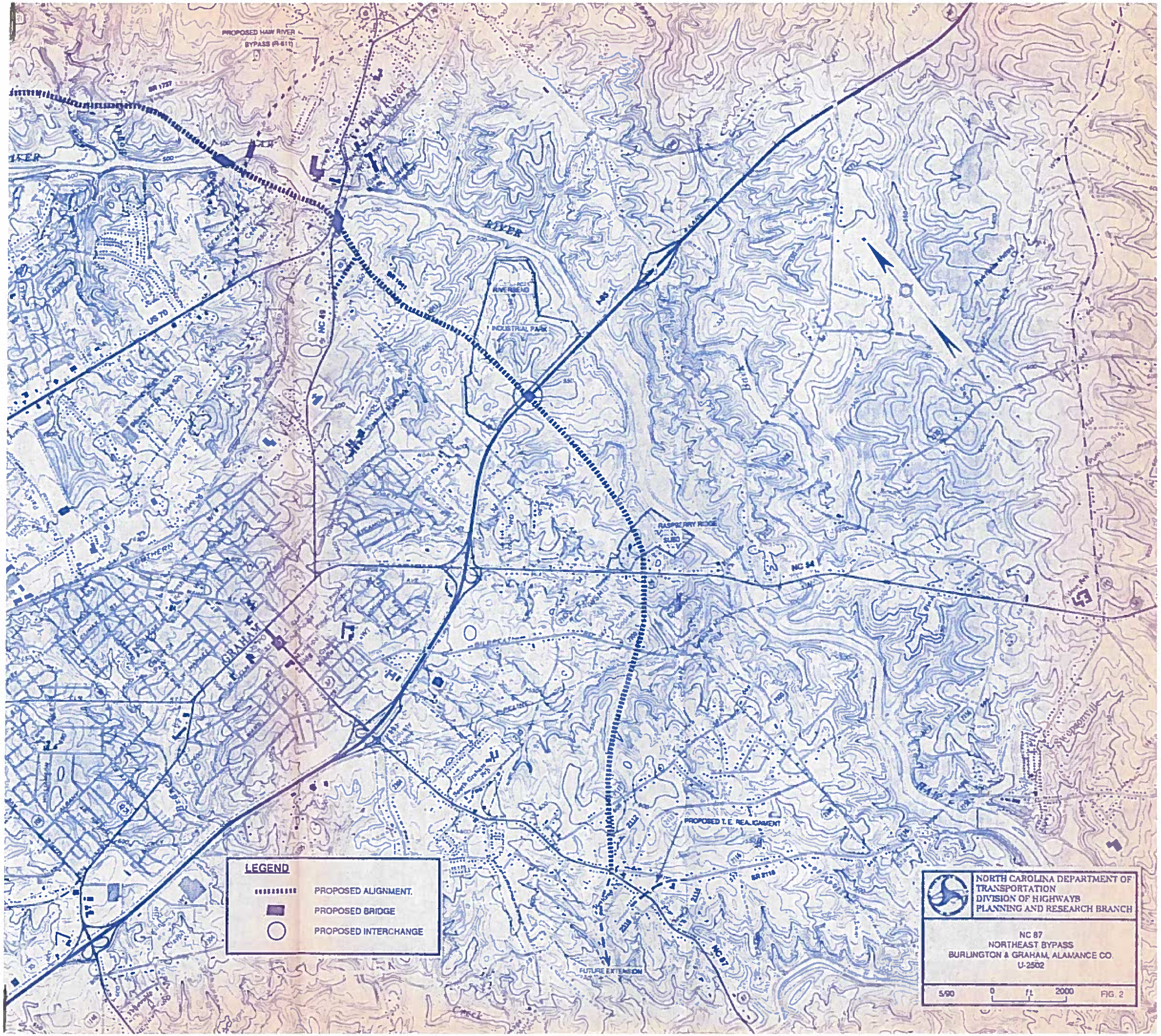

PROPOSED HAW RIVER BYPASS (R-611)
Haw River
RIVER
US 70
NC 49
I-85
RIVERBEND INDUSTRIAL PARK
RASPBERRY RIDGE SUBD.
NC 54
GRAHAM
PROPOSED T. E. REALIGNMENT
FUTURE EXTENSION
NC 87
LEGEND
PROPOSED ALIGNMENT
PROPOSED BRIDGE
PROPOSED INTERCHANGE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PLANNING AND RESEARCH BRANCH
NC 87
NORTHEAST BYPASS
BURLINGTON & GRAHAM, ALAMANCE CO.
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FIG. 2