FEASIBILITY STUDY

Cary
SR 1652 (Harrison Avenue)
From NC 54 (Chapel Hill Road) to I-40
Wake County
U-2804

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

W. J. Watson, P.E.
Highway Planning Engineer

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Whitmel H. Webb, III, P.E.
Head of Feasibility Studies

Date

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I. GENERAL DESCRIPTION

This preliminary study describes proposed improvements to Harrison Avenue in Cary. It is proposed to widen Harrison Avenue from NC 54 (Chapel Hill Road) to I-40 (including the widening of bridge number 138 which spans I-40), a total length of 3.4 miles. Please see Figure 1 for the project location.

Between NC 54 and Weston Parkway (a non-system street), a distance of 2.8 miles, a five lane curb and gutter cross section (68 feet wide from face to face of curbs) is proposed on a 100 foot wide right of way.

Between Weston Parkway and the entrance to SAS Institute, a distance of approximately 0.2 mile, it is proposed to widen Harrison Avenue on the east side by 12 feet. Approximately 12 feet of new right of way will be required on the east side in this segment.

Between the entrance to SAS Institute and the westbound exit ramp from I-40, including the bridge over I-40, a distance of approximately 0.4 mile, it is proposed to widen Harrison Avenue on the east side by 24 feet. Approximately 24 feet of new right of way will be required on the east side in this segment. These widenings will provide an additional northbound lane on Harrison Avenue between the SAS Institute entrance and the westbound exit ramp from I-40 and an additional southbound lane on Harrison Avenue between the westbound entrance ramp to I-40 and Weston Parkway. Also, at the northern project terminal, it is proposed to widen the westbound I-40 entrance ramp from Harrison Avenue in order to provide a two-lane entrance ramp, and to restripe the westbound exit ramp from I-40 in order to provide two left turn lanes from the ramp to southbound Harrison Avenue. Please see Figure 1 for a project vicinity map.

It is proposed to implement these improvements in three chronological stages as shown on Figure 2. Stage I includes all the improvements north of Weston Parkway.

Stage II includes all the improvements between Maynard Road (SR 1747) and Weston Parkway.

Stage III includes all the improvements between NC 54 and Maynard Road.

The widening between NC 54 and Maynard Road will retain and utilize the existing alignment to the extent possible and will be generally symmetrical to the centerline of the existing roadway. It is estimated that there will be nine residential relocatees and no business relocatees on this project.

The total cost for right of way and construction is estimated to be $ 11,500,000 as follows:

	Construction	Right of Way	Stage Total
Stage 1:	$ 1,800,000	$ 700,000	$2,500,000
Stage 2:	4,600,000	2,000,000	6,600,000
Stage 3:	600,000	1,800,000	2,400,000
TOTAL COST:	$ 7,000,000	4,500,000	11,500,000

This study is the initial step in the planning and design process for this project and is not to be considered the product of exhaustive environmental or design investigations. The purpose of the study is to describe the problem, recommend a treatment including costs, and identify potential problem areas that deserve consideration in the planning and design phases.

II. NEED FOR PROJECT

The purpose of this project is to improve the traffic carrying capacity and accident experience of Harrison Avenue. The project was requested by the Town of Cary and has strong local support.

Harrison Avenue is designated a major thoroughfare on the Greater Raleigh Urban Area Thoroughfare Plan. Within the study limits it is classified an Urban Minor Arterial in the North Carolina Statewide Functional Classification System. Development on Harrison Avenue is heavy residential from NC 54 to Maynard Road, light residential from Maynard Road to Dynasty Drive (a non system street), and light to medium commercial and institutional from Dynasty Road to Weston Parkway. From Weston Parkway to I-40 Harrison Avenue is heavily developed with commercial and institutional properties.

Existing Harrison Avenue is a four lane, 48 foot wide, curb and gutter section between NC 54 and Maynard Road. Between Maynard Road and Weston Parkway, Harrison Avenue is generally a two lane roadway with a pavement width of 24 feet and two foot wide paved shoulders on each side. The Maynard Road, Dynasty Road and Weston Parkway intersections are signalized and the Harrison Avenue approaches have been widened to provide left turn lanes.

Between Weston Parkway and the I-40 bridge, Harrison Avenue is a multilane curb and gutter section of variable width. On the west side of Harrison Avenue, separate southbound right turn lanes have been established at the Harris Park Shopping Center entrance and at Weston Parkway. On the east side a separate right turn lane has been established at the SAS Institute entrance. The bridge over I-40 (Bridge No. 138) is 295 feet long with a clear deck width of 34 feet and provides a 12 foot wide travel lane in each direction with a five foot wide shoulder on each side. The bridge was constructed in 1969 and has a sufficiency rating of 79.5 out of a possible 100 points.

The Average Daily Traffic (ADT) on Harrison Avenue, between NC 54 and Maynard Road, for the years 1992 and 2012 are estimated to be approximately 13,000 vehicles per day (vpd) and 23,000 vpd respectively. Between Maynard Road and I-40 the 1992 and 2012 ADTs are estimated to be 16,000 vpd and 29,000 vpd respectively.

The signalized intersection of Harrison Avenue with the westbound I-40 exit ramp is now approaching capacity during the morning and afternoon peak traffic periods. During these times traffic on the ramp has been observed to back up into I-40. Also, during these times the traffic queue destined for the westbound I-40 entrance ramp extends across and south of the I-40 bridge. The proposed bridge widening and widening of the entrance and exit ramps, will provide two left turn lanes from the exit ramp to southbound Harrison Avenue and will provide two left turn lanes from Harrison Avenue to the westbound entrance ramp. The current Level Of Service (LOS) for this part of Harrison Avenue is estimated to be level E. With the proposed improvements it is estimated that this will improve to LOS B, and in the design year of 2012 a LOS D is expected.

The LOS on Harrison Avenue, between Maynard Road and Weston Parkway, is estimated to currently be a low C, and approaching level D. With the proposed improvements the LOS is expected to improve to a high level C, and in the design year of 2012 a level D will be provided. Without these improvements it is estimated that in the design year the LOS will be F.

The current LOS on Harrison Avenue, between NC 54 and Maynard Road, is estimated to be level C, and being a four lane section, is expected to remain a level C, even without the proposed improvements. The proposed improvement on this segment, widening to provide a center turn lane, is designed to improve the accident experience, which is currently approximately 2.7 times greater than the statewide average for roads of this type.

During the period from January 1, 1989 through December 31, 1991 there were 83 accidents reported on Harrison Avenue between NC 54 and Maynard Road. This resulted in an accident rate of 820 accidents per 100 million vehicle miles (Acc/100MVM), compared to a statewide average of 295.0 Acc/100 MVM for all secondary routes during 1991. There were no fatalities reported during the period, but 27 of the accidents resulted in injuries. The most prevalent accident types were left-turn (47%), and rear-end (24%). The wider cross section with center turn lane proposed for Harrison Avenue will reduce the potential for these types of accidents.

The accident rate on Harrison Avenue north of Maynard Road is below the statewide average for roads of this type.

III. RECOMMENDATIONS

It is recommended to widen Harrison Avenue, between NC 54 and I-40, a distance of approximately 3.4 miles. The recommended improvements include widening the bridge over I-40 and widening the westbound entrance ramp to I-40. It is recommended that these improvements be implemented in three chronological stages. The recommended staging and project details are as follows:

Stage I - Between Weston Parkway and the entrance to SAS Institute, a distance of approximately 0.2 mile, it is proposed to widen Harrison Avenue on the east side by 12 feet. Between the entrance to SAS Institute and the westbound exit ramp from I-40, including the bridge over I-40, a distance of approximately 0.4 mile, it is proposed to widen Harrison Avenue on the east side by 24 feet. These widenings will provide an additional northbound lane on Harrison Avenue between the SAS Institute entrance and the westbound exit ramp from I-40, enabling dual left turn lanes to be established on the bridge. Also, an additional southbound lane on Harrison Avenue between the westbound entrance ramp to I-40 and Weston Parkway will be provided. At the northern project terminal, it is proposed to widen the westbound I-40 entrance ramp from Harrison Avenue in order to provide a two-lane entrance ramp. The full width of widening should extend a distance of approximately 2500 feet. Further, it is recommended to restripe the westbound exit ramp from I-40 in order to provide two left turn lanes from the ramp to southbound Harrison Avenue. Please see Figure 1 for a project vicinity map.

Stage II - Widen Harrison Avenue from Maynard Road to Weston Parkway, a distance of approximately 1.8 miles. The recommended cross section is a 68 foot face-to-face curb and gutter section on a 100 foot wide right of way.

Stage III - Widen Harrison Avenue from NC 54 to Maynard Road, a distance of approximately 0.8 miles. The recommended cross section is a 68 foot face-to-face curb and gutter section on a 100 foot wide right of way.

The total cost for right of way and construction is estimated to be $ 11,500,000 as follows:

	Construction	Right of Way	Stage Total
Stage 1:	$ 1,800,000	$ 700,000	$2,500,000
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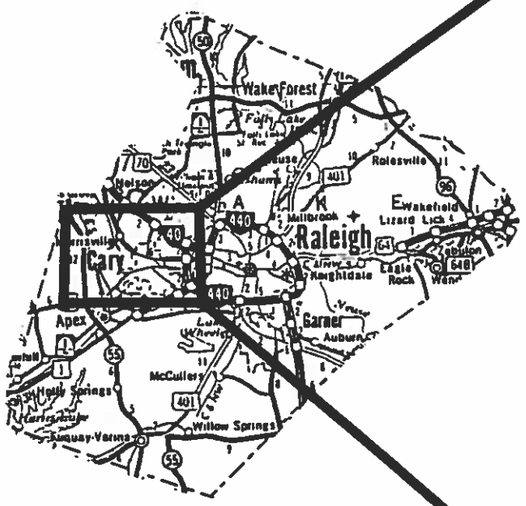
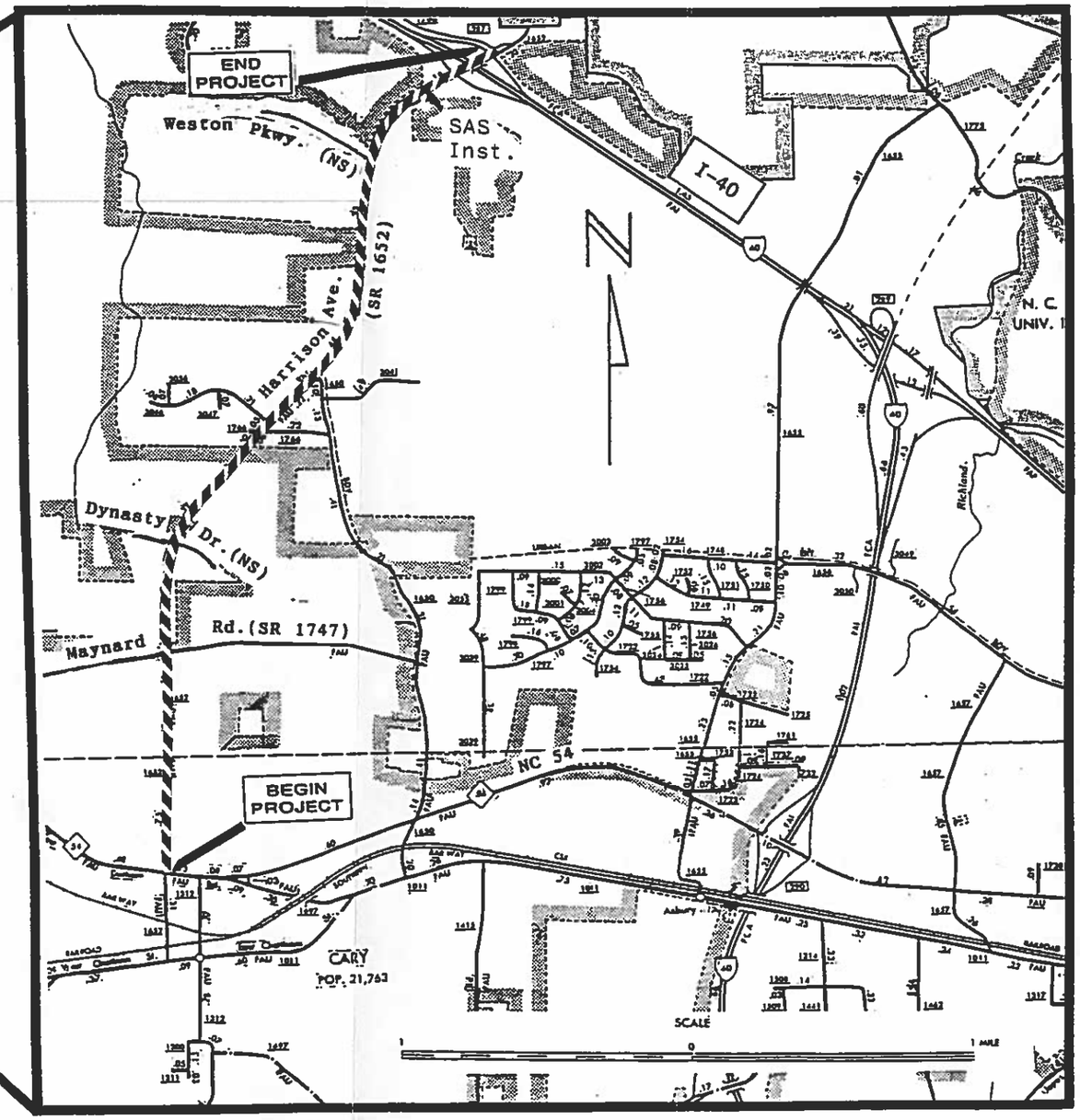
TOTAL COST:	$ 7,000,000	4,500,000	11,500,000

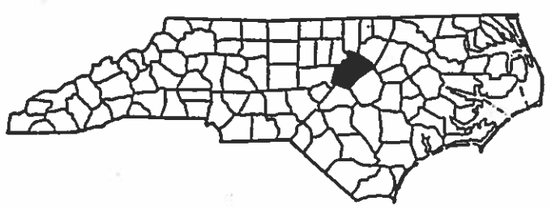
V. OTHER COMMENTS

The NCDOT Bicycle Program has identified Harrison Avenue as a roadway with potentially significant bicycle use, and has requested that this project include wide outside lanes to accommodate this use. The 68 foot wide recommended cross section provides this extra width. Also, the Bicycle Program has requested that in the design phase, techniques and ideas be explored with regard to lane configurations in the I-40 interchange area, to protect bicyclists from the heavy turning movements to and from I-40.

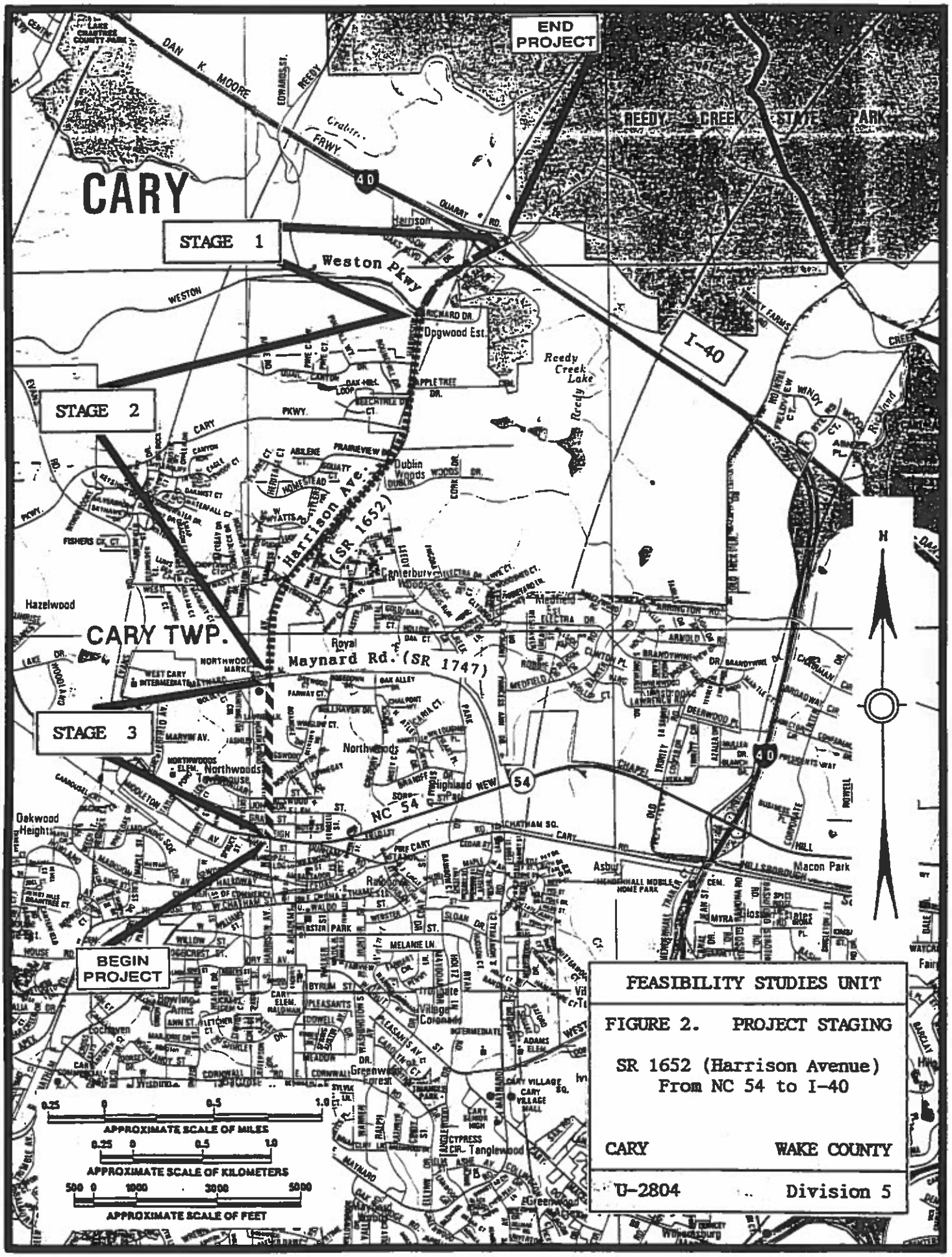
An environmental screening was not conducted for this study, however, a survey for historic properties found none eligible.







FEASIBILITY STUDIES UNIT	
FIGURE 1. VICINITY MAP	
SR 1652 (Harrison Avenue) From NC 54 to I-40	
CARY	WAKE COUNTY
U-2804	Division 5



FEASIBILITY STUDIES UNIT

FIGURE 2. PROJECT STAGING

SR 1652 (Harrison Avenue)
From NC 54 to I-40

CARY WAKE COUNTY

U-2804 Division 5