

FEASIBILITY STUDY

Durham
Intersection of
SR 1116 (Garrett Road)
and
SR 2220 (Chapel Hill Road)
Durham County
U-3105

Prepared by
Program Development Branch
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8/1/94
Date

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I. GENERAL DESCRIPTION

This feasibility study describes proposed improvements at the intersection of Garrett Road (SR 1116) and Chapel Hill Road (SR 2220) in Durham, Durham County. The improvements include widening each leg of the intersection and extending the widening on the north leg of SR 2220 approximately 1600 feet (488 m) to tie into the existing multi-lane section on University Drive. The project location is shown on Figure 1. The existing lane configuration at the intersection is shown on Figure 2. The proposed widening is shown on Figure 3, and the proposed lane configuration at the intersection is shown on Figure 4. Additional right-of-way will be required, and four residential relocations are expected. The total cost including construction and right-of-way is estimated to be \$ 3,730,000.

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 proposed project including costs, and identify potential problems that may 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 subject intersection.

Both Garrett Road and Chapel Hill Road are classified as Major Thoroughfares in the Durham Thoroughfare Plan and both are listed as Urban Minor Arterials in the North Carolina Functional Classification System. University Drive, a non-system, city street, is also classified as a Major Thoroughfare, and is listed as an Urban Minor Arterial in the North Carolina Functional Classification System.

The north quadrant of the intersection is developed with a convenience store/gas station. The east quadrant is developed with a car wash and convenience store/gas station. In the south quadrant there is a small unoccupied frame building, and the west quadrant is undeveloped. Please see Figure 2 for a sketch of the existing intersection.

North of the intersection on Chapel Hill Road, there is a mobile home park on the east, and undeveloped land on the west. Land adjacent to Garrett Road west of the intersection is generally undeveloped within the project limits. Development on Garrett Road east of the intersection is partially undeveloped, with some single family residential development. South of the intersection on Chapel Hill Road, development is single family residential.

Both Garrett Road and Chapel Hill Road are two-way, two-lane, paved roads, each with a pavement approximately 24 feet (7 m) wide, that has been widened at the intersection to provide a separate left-turn lane, a combination through-right turn lane, and one lane exiting the intersection. Please see Figure 2 for a sketch of the existing intersection.

At the intersection each leg is approximately 36 feet wide (11 m) from face-to-face of curbs. On Garrett Road, west of the intersection, curb and gutter extends west from the intersection for a distance of approximately 150 feet (46 m). On Garrett Road, east of the intersection, curb and gutter extends east from the intersection for a distance of approximately 100 feet (30 m). There is additional curb and gutter on the north side of Garrett Road extending both east and west of Champaign Street. On Chapel Hill Road, south of the intersection, curb and gutter extends south for a distance of approximately 400 feet (122 m). On both roads, in areas where there is no curb and gutter, there are turf shoulders that vary in width from 1 to 8 feet (0.3 to 2.4 m).

The existing right-of-way width on Garrett Road, west of the intersection, appears to vary from 50 to 60 feet (15 to 18 m). On Garrett Road, east of the intersection, the existing right-of-way width appears to vary from 40 to 50 feet (12 to 15 m). On Chapel Hill Road, south of the intersection, the existing right-of-way appears to vary from 40 to 50 feet (12 to 15 m) in width. On Chapel Hill Road, north of the intersection, the existing right-of-way width appears to vary from 50 to 60 feet (15 to 18 m). On University Drive, in the vicinity of Old Chapel Hill Road, the existing right-of-way appears to be approximately 84 feet (26 m) wide.

The 1993 and 2010 peak hour turning movement traffic counts are shown on Figure 5. Based on the 1993 counts, the intersection is estimated to be operating at a level of service F. With the proposed improvements, the level of service will improve to level C, and remain C through the 2010 design year.

During the period from July 1, 1990, through June 30, 1993, there were 72 accidents reported at this intersection. One accident resulted in a fatal injury, while 29 accidents

resulted in 49 non-fatal injuries. The most prevalent type accidents were Rear-end (49%), Left-turn (26%), and Angle (15%). The proposed improvements should lessen the congestion at this intersection, and reduce the potential for these type accidents.

III. RECOMMENDATIONS

It is recommended to widen each leg of the intersection of Garrett Road and Chapel Hill Road and extend the widening on the north leg of Chapel Hill Road approximately 1600 feet (488 m) to tie into the existing multi-lane section on University Drive.

At the intersection, the north leg on Chapel Hill Road will be widened to provide a six lane, curb and gutter, cross-section that will be 80 feet (24.4 m) wide from face-to-face of curbs. There will be two left-turn lanes, one through lane, one combination through/right-turn lane, and two lanes exiting the intersection. This cross-section will extend approximately 320 (98 m) feet north of the intersection, from which point a five lane curb and gutter cross-section, 68 feet (20.7 m) wide from face-to-face of curbs will be constructed for a distance of approximately 1300 feet (396 m), tying into University Drive, an existing, four-lane, median-divided, facility. The required right-of-way width on this leg will vary from approximately 100 feet (31 m) at the intersection to approximately 90 feet (27 m) on University Drive. The widening is shown on Figure 3 and the lane use is shown on Figure 4.

The south leg on Chapel Hill Road will be widened to provide a six lane, curb and gutter, cross-section that will be 80 feet (24.4 m) wide from face-to-face of curbs. There will be a separate left-turn lane, two through lanes, a separate right-turn lane, and two lanes exiting the intersection. The approach lanes will be approximately 400 feet (122 m) in length, and the two southbound exit lanes will extend approximately 700 feet (214 m) south of the intersection. The required right-of-way width on this leg will vary from approximately 80 feet (24 m) to approximately 100 feet (31 m). The widening is shown on Figure 3 and the lane use is shown on Figure 4.

The west leg on Garrett Road will be widened to provide a six lane, curb and gutter, cross-section that will be 80 feet (24.4 m) wide from face-to-face of curbs. There will be a separate left-turn lane, two through lanes, a separate right-turn lane, and two lanes exiting the intersection. The approach lanes will be approximately 300 feet (92 m) in length, and the two westbound exit lanes will extend approximately 700 feet (214 m) west of the intersection. The required right-of-way width on this leg will vary from

approximately 80 feet (24 m) to approximately 100 feet (31 m). The widening is shown on Figure 3 and the lane use is shown on Figure 4.

The east leg on Garrett Road will be widened to provide a six lane, curb and gutter, cross-section that will be 80 feet (24.4 m) wide from face-to-face of curbs. There will be a separate left-turn lane, two through lanes, a separate right-turn lane, and two lanes exiting the intersection. The approach lanes will be approximately 400 feet (122 m) in length, and the two eastbound exit lanes will extend approximately 600 feet (183 m) east of the intersection. The required right-of-way width on this leg will vary from approximately 80 feet (24 m) to approximately 100 feet (31 m). The widening is shown on Figure 3 and the lane use is shown on Figure 4.

The total estimated cost including construction and right-of-way is \$ 3,730,000 as follows:

Construction	\$ 1,800,000
Right-of-Way	1,930,000
Total Cost	\$ 3,730,000

V. OTHER COMMENTS

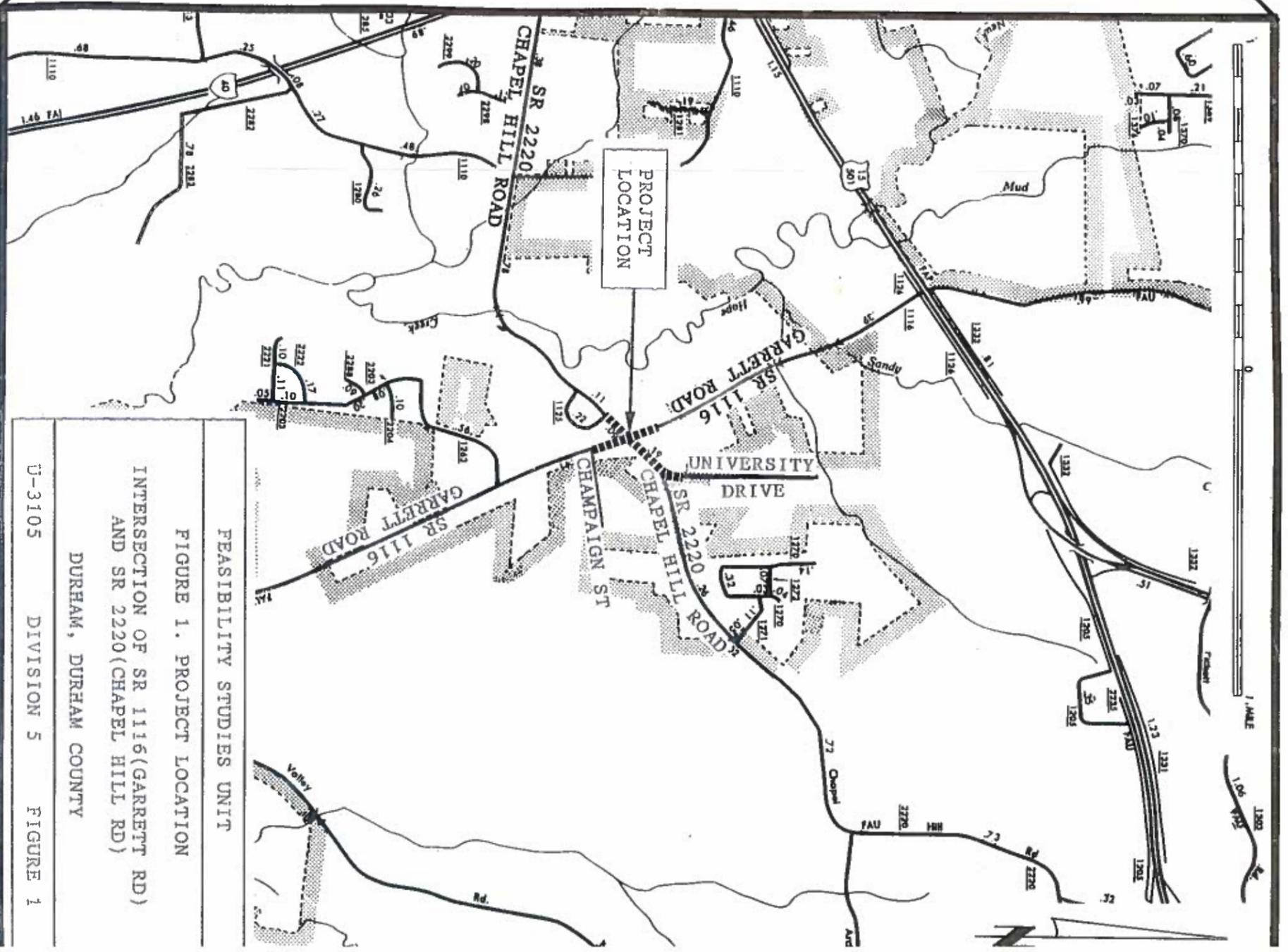
An environmental screening was not conducted for this study.

The need for bicycle accommodation on Chapel Hill Road has been identified by the Durham - Chapel Hill - Carrboro Urban Area Transportation Advisory Committee (TAC). Also, this need is addressed in The Regional Bicycle Plan prepared by the TAC. Further, the TAC has approved the 1995-2001 TIP Regional Priority List of the local Metropolitan Planning Organization (MPO) which includes requests to make bicycle accommodations on Chapel Hill Road. The cross sections recommended will provide 14-foot (4.3-m) outside lanes to accommodate these needs.

The recommended improvements include extending the widening on the north leg of Chapel Hill Road to the existing four lane median-divided section on University Drive. The part of this widening on University Drive (approximately 750 feet, or 229 m, in length) is not on the state highway system. It is estimated that the cost for construction and right-of-way for this segment is \$ 350,000, which is included in the above project cost.

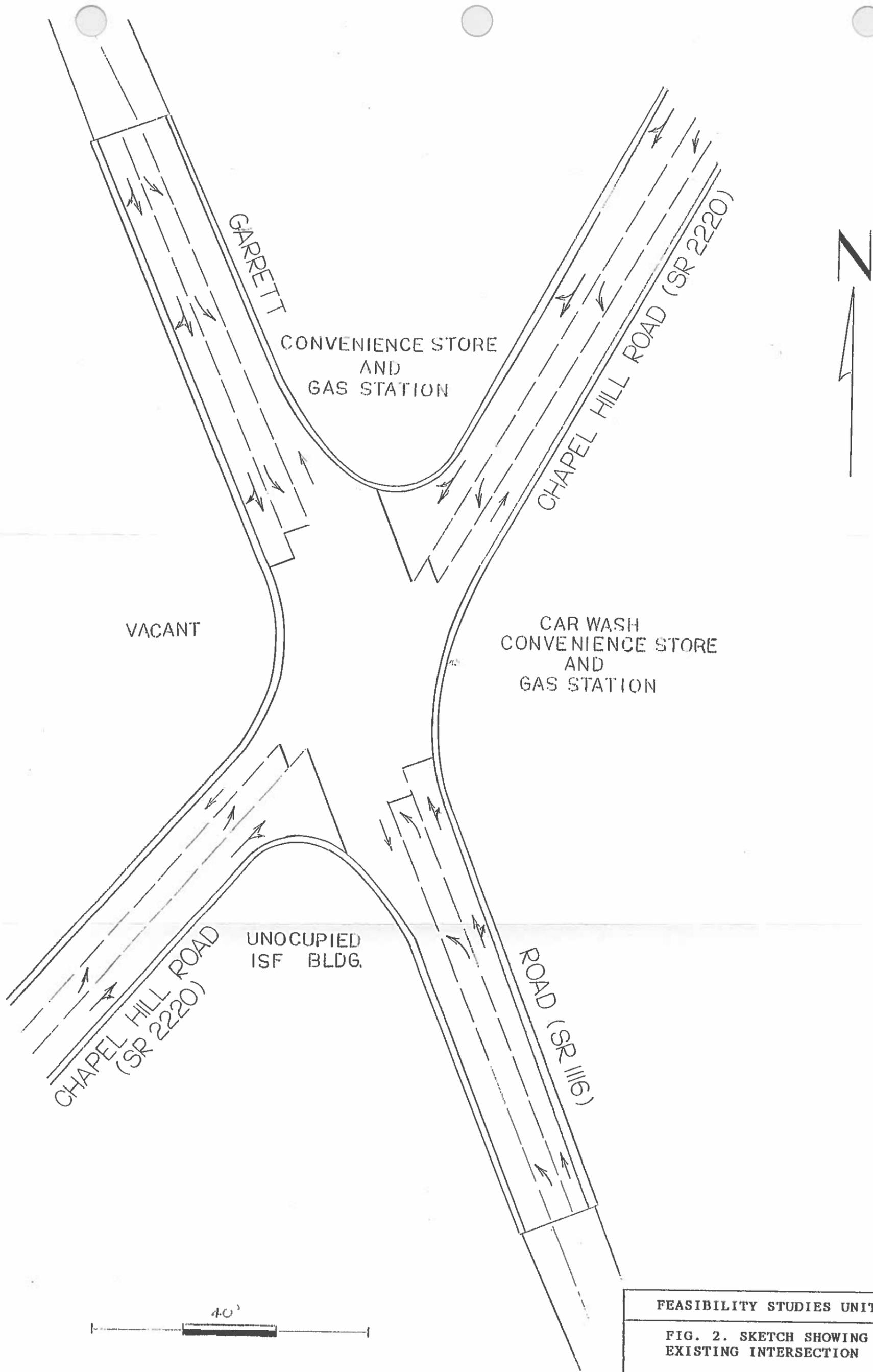
The full realization of the predicted level of service for the design year is dependent upon a high degree of utilization of the proposed additional through lanes. The degree of utilization is, in turn, dependent on the length

that the additional exit lanes extend from the intersection. While these exit lanes have been assigned a reasonable length, a numerical analysis is beyond the scope of this study. Therefore, the realization of the predicted level of service is problematic. For this reason, it is advised that consideration be given to including these improvements in a project that would provide widening of a greater length of Chapel Hill Road and/or Garrett Road. Also, economies of scale may result if this project is included as part of a larger project.

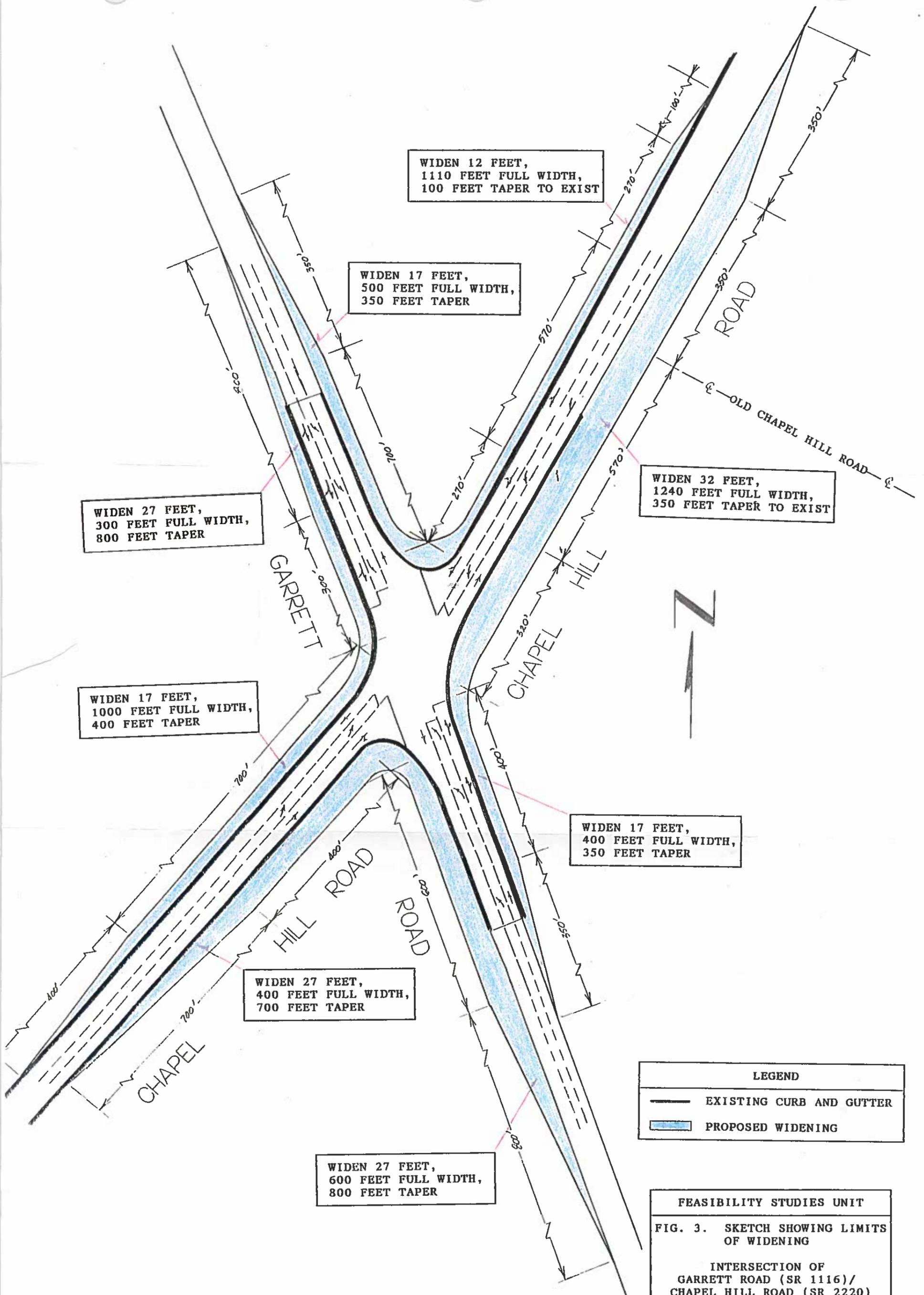


FEASIBILITY STUDIES UNIT
 FIGURE 1. PROJECT LOCATION
 INTERSECTION OF SR 1116(GARRETT RD)
 AND SR 2220(CHAPEL HILL RD)
 DURHAM, DURHAM COUNTY

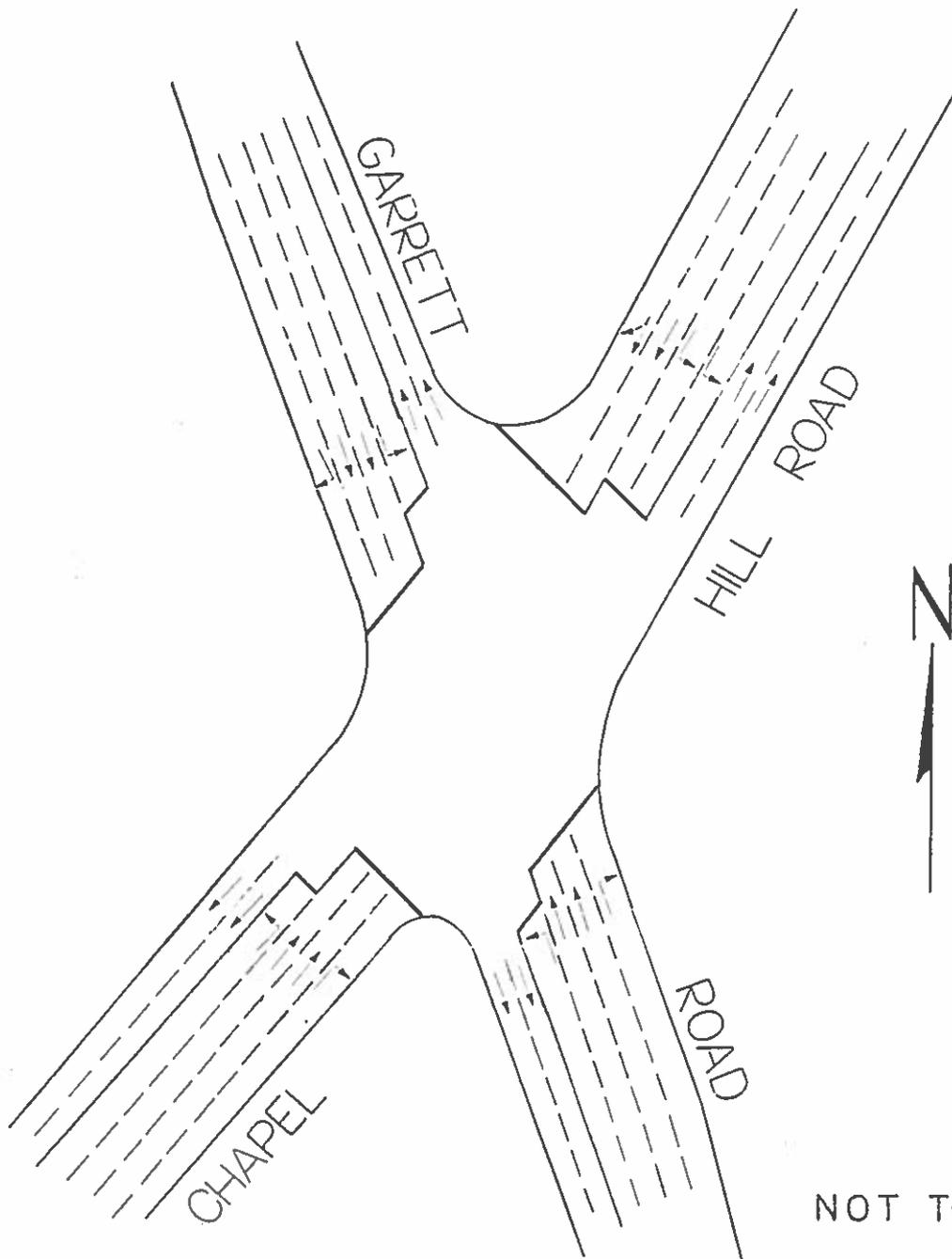
U-3105 DIVISION 5 FIGURE 1



FEASIBILITY STUDIES UNIT		
FIG. 2. SKETCH SHOWING EXISTING INTERSECTION		
INTERSECTION OF GARRETT ROAD (SR 1116)/ CHAPEL HILL ROAD (SR 2220)		
DURHAM, DURHAM COUNTY		
DIV. 5	U-3105	FIG. 2.

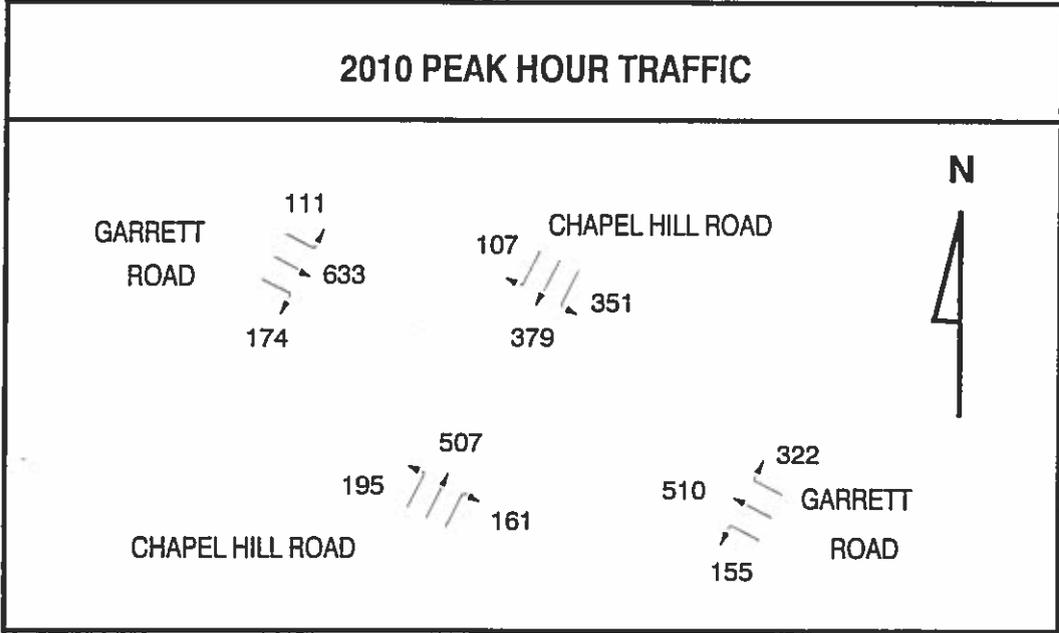
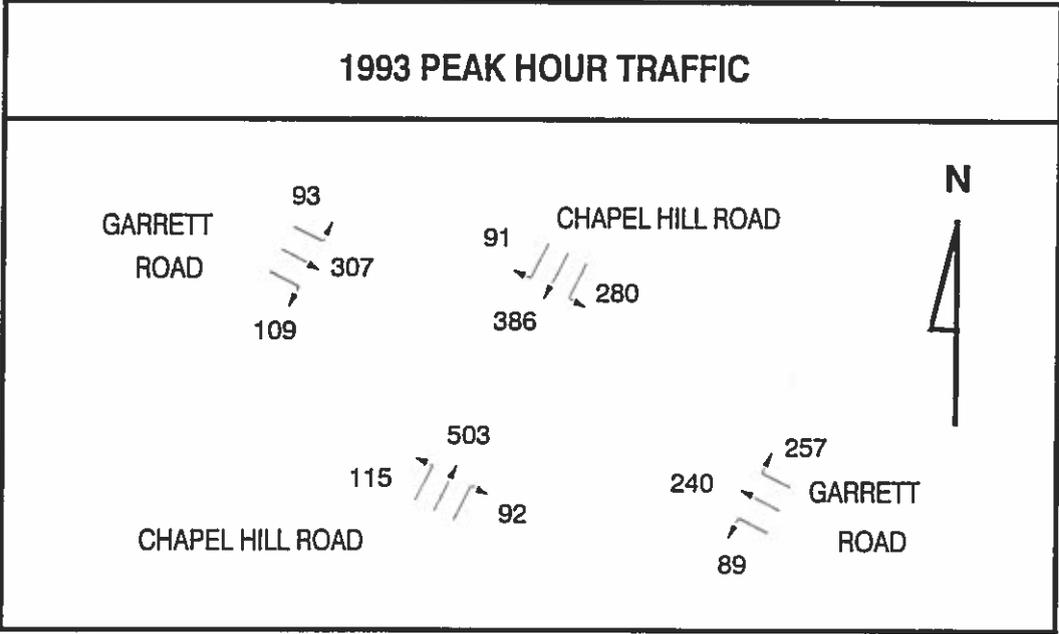


NOT TO SCALE



NOT TO SCALE

FEASIBILITY STUDIES UNIT		
FIG. 4. SKETCH SHOWING PROPOSED LANES		
INTERSECTION OF GARRETT ROAD (SR 1116)/ CHAPEL HILL ROAD (SR 2220)		
DURHAM, DURHAM COUNTY		
DIV. 5	U-3105	FIG. 4.



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FIGURE 5. 1993 & 2010 TRAFFIC VOLUMES
INTERSECTION OF GARRETT ROAD (SR 1116)
AND CHAPEL HILL ROAD (SR 2220)

DURHAM, DURHAM COUNTY

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