

South Columbia Street (NC 86)  
From Purefoy Road to Manning Drive (SR 1902)  
Chapel Hill, Orange County  
State Project No. 9.8070371  
U-624

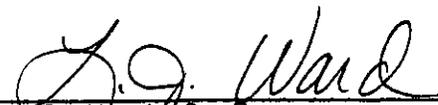
ADMINISTRATIVE ACTION  
STATE ENVIRONMENTAL ASSESSMENT

N. C. Department of Transportation  
Division of Highways  
In Compliance with the North Carolina Environmental Policy Act

For further information contact:

Mr. L. J. Ward, Manager  
Planning and Research Branch  
N. C. Department of Transportation  
P. O. Box 25201  
Raleigh, North Carolina 27611

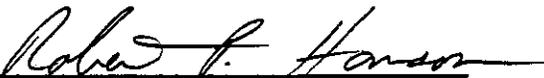
4-30-90  
Date

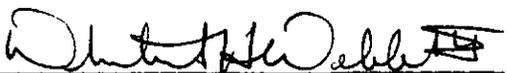
  
\_\_\_\_\_  
L. J. Ward, P. E.  
Manager of Planning and Research Branch, NCDOT

South Columbia Street (NC 86)  
From Purefoy Road to Manning Drive (SR 1902)  
Chapel Hill, Orange County  
State Project No. 9.8070371  
U-624

STATE ENVIRONMENTAL ASSESSMENT

Documentation Prepared in Planning and Research Branch By:

  
Robert P. Hanson  
Project Planning Engineer

  
Whitmel H. Webb, III, P.E.  
Urban Project Planning Unit Head



# TABLE OF CONTENTS

	Page
SUMMARY	
I. GENERAL DESCRIPTION .....	1
II. NEED FOR PROJECT	
A. General .....	1
B. Thoroughfare Plan .....	1
C. Traffic/Truck Volumes .....	1
D. Levels of Service .....	2
E. Accident Rate .....	2
III. EXISTING ROADWAY INVENTORY	
A. Length of Section Studied .....	3
B. Existing Cross Section .....	3
C. Right of Way .....	3
D. Horizontal and Vertical Alignment .....	3
E. Bridges .....	3
F. Intersecting Streets and Type of Control .....	3
G. Speed Limits .....	3
H. Access Control .....	4
I. Utilities .....	4
J. Retaining Walls .....	4
K. Sidewalks .....	4
L. Project Terminals .....	4
IV. PROPOSED IMPROVEMENTS FOR THE RECOMMENDED ALTERNATE	
A. Length of Project .....	4
B. Design Speed Proposed .....	5
C. Cross Section .....	5
D. Alignment .....	5
E. Right of Way .....	5
F. Access Control .....	5
G. Intersection Treatment and Type of Control .....	5
H. Railroad Work Required .....	6
I. Bridge Work Required .....	6
J. Parking .....	6
K. Sidewalks .....	6
L. Bicycles .....	6
M. Speed Limits .....	6
N. Cost Estimate .....	6
V. ALTERNATIVES	
A. Alignment .....	7
B. Cross Section Alternatives .....	7
C. No-Build Alternative .....	8
D. Other Alternatives .....	8

TABLE OF CONTENTS (Continued)

	Page
VI. PROBABLE IMPACTS OF PROPOSED ACTION	
A. Ecological Assessment .....	8
B. Wetland Involvement .....	9
C. Cultural Resources .....	9
D. Social Setting and Impacts .....	10
E. Relocation Impacts .....	10
F. Land Use .....	11
G. Construction Impacts .....	11
H. Floodplain Involvement .....	13
I. Highway Traffic Noise/Construction Noise Analysis .....	13
J. Air Quality Analysis.....	17
K. Hazardous Waste Sites.....	19
L. Special Permits Required of the Division of Highways.....	19
VII. COMMENTS, COORDINATION, AND PUBLIC INVOLVEMENT .....	20
Figures	
Appendix	

## ENVIRONMENTAL ASSESSMENT

Prepared by the Planning and Research Branch  
of the Division of Highways  
North Carolina Department of Transportation

### Summary

1. Description of Action - The North Carolina Department of Transportation proposes to improve South Columbia Street (NC 86) in Chapel Hill to a five lane facility with curb and gutter. South Columbia Street is presently a two lane facility with poor horizontal alignment. The project will extend from Purefoy Road to Manning Drive (SR 1902), a distance of 0.7 mile. The estimated cost of the project is \$3,480,000.
2. Summary of Environmental Impacts - The proposed project will have a positive impact by improving the safety and the traffic handling capacity of this major thoroughfare. Approximately seven (7) residential dwellings and one (1) business will be relocated by the project. There may be some erosion and siltation during construction; however, the effects will be short term in nature. No significant impacts to plant or animal life are expected. No wetlands, recreational facilities, or historic sites will be involved.
3. Alternatives Considered - To accommodate anticipated increases in traffic on South Columbia Street, the project must have two through-lanes in each direction with left turning vehicles separated from through vehicles. Cross section alternatives that were considered included 1) a five lane facility with continuous left turn lane, 2) median divided facilities, and 3) a four lane facility. The median divided facilities were eliminated due to their high cost. The four lane alternate was eliminated due to its inadequate traffic handling capacity and its safety deficiencies for left turn maneuvers.

Symmetrical and asymmetrical widening of South Columbia Street were both considered. Symmetrical widening was rejected because it would not improve the horizontal curvature of the facility. Right of way costs for symmetrical widening would be higher than asymmetrical widening.

The "do-nothing" alternate was also considered, but rejected because of the benefits an improved NC 86 will provide to the area.

4. Coordination - Several federal, state, and local agencies were consulted during the preparation of this environmental assessment. Comments from the following were received during the preparation of this report:

U. S. Army Corps of Engineers  
Town of Chapel Hill  
N. C. State Clearinghouse  
N. C. Department of Cultural Resources

N. C. Department of Natural Resources and Community Development  
N. C. Department of Public Instruction

5. Actions Required by Other Federal Agencies - none.
6. Additional Information - Additional information concerning the proposal and assessment can be obtained by contacting the following:

L. J. Ward, P. E.  
Manager, Planning and Research Branch  
N. C. Department of Transportation  
Post Office Box 25201  
Raleigh, North Carolina 27611  
Telephone 919-733-3141

South Columbia Street (NC 86)  
From Purefoy Road to Manning Drive (SR 1902)  
Chapel Hill, Orange County  
State Project No. 9.8070371  
U-624

I. GENERAL DESCRIPTION

The North Carolina Department of Transportation (NCDOT) proposes to widen South Columbia Street (NC 86) from Purefoy Road to Manning Drive (SR 1902) in Chapel Hill (see Figures 1 and 2). The 0.7 mile project will widen the existing two-lane roadway to five lanes with curb and gutter. This project is included in the 1990-1996 Transportation Improvement Program (TIP) with right of way acquisition scheduled to begin in Fiscal Year 1991 and construction scheduled to begin in Fiscal Year 1993. The project is currently estimated to cost \$3,480,000. The project is located within the Chapel Hill Town Limits in southern Orange County.

II. NEED FOR PROJECT

A. General

The subject section of NC 86 is currently a two lane facility with inadequate traffic handling capacity and poor horizontal alignment. The facility has experienced a high accident rate as compared to the state-wide average for similar routes. Traffic volumes along South Columbia Street are expected to increase beyond the facility's capacity if no improvements are made. This will lead to increased congestion and reduced safety. The proposed improvements will allow the facility to efficiently handle increases in traffic anticipated through the year 2008. By improving the facility's operating conditions, the proposed improvements will enable safer traffic interaction. The subject project will improve access to the University of North Carolina at Chapel Hill.

B. Thoroughfare Plan

South Columbia Street is designated as a major thoroughfare in the mutually adopted Chapel Hill-Carrboro Thoroughfare Plan. It is a part of Chapel Hill's radial street system. As a direct link between central Chapel Hill and US 15-501, South Columbia Street is an important route for access to the Town from the south.

C. Traffic/Truck Volumes

The 1988 Average Daily Traffic volumes along this section of South Columbia Street ranged from a low of 11,700 vehicles per day (vpd) near Manning Drive to a high of 13,800 vpd near Purefoy Road.

Traffic projections for the year 2008 along the facility range from a low of 21,300 vpd to a high of 25,100 vpd. Projections for truck volumes are as follows:

	1988		2008	
	<u>Low</u>	<u>High</u>	<u>Low</u>	<u>High</u>
Dual Tired Vehicles (vpd):	234	276	426	502
Truck Tractor Semi-Trailer (vpd):	117	138	213	251

See Figure 3 for additional traffic data.

#### D. Levels of Service

Level of Service is an engineering term used to describe the operating conditions of vehicles in a traffic stream. Operating conditions are based on such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety. Six levels of service are defined and are designated with letters from A to F. Level A represents the best operating condition with free flow and virtually no delay at signalized intersections. Level of service F represents the worst operating condition and occurs when traffic volumes exceed the capacity of a facility. At level of service F, long queues of traffic tend to form and delay at signalized intersections per vehicle tends to exceed 60 seconds.

A capacity analysis of the subject roadway yielded the following results:

1. The existing facility operated at a level of service (LOS) C with 1988 traffic.
2. With the proposed improvements (see Section IV.) the facility will experience LOS C with predicted 2008 traffic.
3. If no improvements are made, the facility will experience LOS F by the end of the planning period (2008).

#### E. Accident Rate

The accident rate for this section of South Columbia Street over a recent 6 year period (January, 1983 - December, 1988) was 1,445.70 accidents per 100 million vehicle miles. This rate exceeds the statewide average of 325.58 acc/100mvm for similar routes over that time period. The highest percentage of accidents (25%) were rear-end accidents. This is typical of a two lane facility. The proposed project will provide a safer facility and should lower the accident rate. The proposed continuous center turn lane will reduce the potential for rear-end accidents by providing a refuge area for left turning vehicles.

### III. EXISTING ROADWAY INVENTORY

#### A. Length of Section Studied

The length of this project is approximately 0.7 mile.

#### B. Existing Cross Section

Currently, this portion of South Columbia Street is a two lane facility with 12-foot travel lanes. The roadway shoulders are not paved and range in width from 4 feet to 12 feet. The roadway has been widened to provide turn lanes at Mason Farm Road (SR 1904) and Manning Drive (SR 1902). The west side of South Columbia Street currently has curb and gutter from Briarbridge Lane to Manning Drive. The east side has curb and gutter from 400 feet south of Mason Farm Road to Manning Drive.

#### C. Right of Way

Existing right of way along the project is approximately 50 to 60 feet of maintained right of way.

#### D. Horizontal and Vertical Alignment

The subject section of South Columbia Street currently has poor horizontal alignment with a 14 degree curve near Purefoy Road, a 15 degree curve near Valentine Lane and two 8 degree curves in between.

The roadway's vertical alignment maintains a 5 percent grade along most of its length with short sections having steeper grades.

#### E. Bridges

No bridges are located along the project.

#### F. Intersecting Streets and Type of Control

The following streets intersect this section of South Columbia Street at-grade and are stop sign controlled unless otherwise noted:

1. Manning Drive (SR 1902) - signal controlled
2. Briarbridge Lane
3. Mason Farm Road (SR 1904)/Westwood Drive - signal controlled
4. Westwood Drive
5. Valentine Lane
6. Old Pittsboro Road
7. Chase Avenue
8. Coolidge Street
9. Purefoy Road

#### G. Speed Limits

The existing speed limit along the project length is 35 mph.

#### H. Access Control

There is no control of access along the project.

#### I. Utilities

There are underground water, sewer, natural gas, and telephone lines along the project length. Power poles are also found along South Columbia Street.

#### J. Retaining Walls

Stone retaining walls are located on the west side of South Columbia Street from approximately 350 feet north of Purefoy Road to 240 feet north of Coolidge Street. Similar walls are also located on the west side from Westwood Drive to Briarbridge Lane.

The walls range in height from 1 foot to 4 feet. The walls are setback from 4 feet to 15 feet from the edge of the existing roadway pavement.

#### K. Sidewalks

A 5-foot wide paved sidewalk is located on the east side of South Columbia Street between Chase Avenue and Mason Farm Road. It is setback 9 feet from the near edge of the existing roadway pavement along most of this length. Near Mason Farm Road, the sidewalk's setback increases to approximately 16 feet.

#### L. Project Terminals

The southern project terminal is Purefoy Road. Purefoy Road is also the project limit for an adjoining NCDOT project (U-2003) which involves widening NC 54 and US 15-501 in Chapel Hill and Carrboro. Project U-2003 will revise existing interchanges including the US 15-501 interchange just south of Purefoy Road on South Columbia Street. As part of U-2003, South Columbia Street will be widened to five lanes from the US 15-501 interchange to Purefoy Road.

The northern project terminal is Manning Drive (SR 1902). North of Manning Drive, South Columbia Street is a northbound one-way facility with four lanes and operates as a one-way pair with Pittsboro Street.

### IV. PROPOSED IMPROVEMENTS FOR THE RECOMMENDED ALTERNATE

#### A. Length of Project

NC 86 will be widened approximately 0.7 mile.

## B. Design Speed Proposed

The sharpest horizontal curve along the project will have a design speed of 42 mph. The project will have a design speed of 42 mph or greater along its entire length.

## C. Cross Section

A five lane facility with curb and gutter (64 feet from face to face of curbs) is recommended for this project. A minimum 8-foot berm will be constructed behind the curbs. This cross section will match the adjoining NCDOT Project U-2003 (see Section III: I.).

This cross section design will provide the minimum roadway width capable of handling projected traffic volumes. This design will minimize construction and right of way costs. It will also minimize the damage to adjacent properties and to the existing stone retaining walls.

## D. Alignment

South Columbia Street will be widened primarily to the east side between Purefoy Road and Mason Farm Road (see Figure 2). From Mason Farm Road to Manning Drive, the project alignment will more closely follow the existing roadway alignment. The proposed alignment will improve the horizontal curvature along South Columbia Street and will minimize right of way costs.

## E. Right of Way

Proposed right of way width is 90 feet (symmetrical to the proposed new roadway centerline). Construction easements will also be needed.

## F. Access Control

There will be no control of access.

## G. Intersection Treatment and Type of Control

No intersections which are currently stop sign controlled are proposed to be signalized with this project.

Existing signals will be revised to accommodate the widened roadway. See Figure 4 for an illustration of the recommended lane configurations at signalized intersections.

Valentine Lane will be realigned as part of this project as shown in Figure 5. Currently, Valentine Lane intersects South Columbia Street only 50 feet north of Old Pittsboro Road. Realigning Valentine Lane will eliminate the vehicle conflicts caused by such close intersection spacing.

H. Railroad Work Required

No railroad work will be required.

I. Bridge Work Required

No bridge work will be required.

J. Parking

Parking is not presently permitted and will not be provided for or permitted along the project.

K. Sidewalks

Additional sidewalks are not proposed as part of this project. An 8-foot wide berm is proposed behind the curb on both sides of the project. This berm, or flat grassy area, will provide a place where pedestrians can walk and where a sidewalk can be built by the Town of Chapel Hill. Existing sidewalk disturbed during construction will be replaced.

L. Bicycles

Bicycles are widely used in the project vicinity. However, additional pavement width to accommodate bicycles would cause construction and right of way costs to increase.

Accommodating bicycles with 4-foot striped bicycle lanes was considered as described in Section V.B. Due to the increased cost, this is not recommended.

Accommodating bicycles by restriping the standard five lane section with wider striped outside lanes was considered. This alternative would decrease the width of inside lanes to 11 feet. Lane width less than 12 feet would create a hazard for vehicles in the inside lanes because of the vertical grade and horizontal curvature of the roadway. This alternative is therefore not recommended and no special accommodations for bicycles are recommended for this project.

M. Speed Limits

No changes to the existing 35 mph speed limit are proposed.

N. Cost Estimate

The proposed improvements are estimated to cost a total of \$3,480,000. Construction is estimated at \$1,310,000 including \$30,000 for traffic signal revisions. Right of way costs are estimated at \$2,170,000.

## V. ALTERNATIVES

### A. Alignment

Symmetrical widening was considered as an alternative to widening on the east side. Symmetrical widening is not recommended because it would not improve the horizontal curvature of the roadway. Symmetrical widening would be more disruptive to adjacent properties because the steep slopes found on the west side of the roadway would require wide construction easements. This would cause more properties to be impacted and may cause the number of relocatees to increase. Symmetrical widening would increase right of way costs because of the larger number of properties impacted. Construction costs would also increase because of the steep slopes that would be encountered.

### B. Cross Section

Many different alternatives were considered for this project's cross section. Alternatives with fewer than two travel lanes in each direction would be unable to serve projected traffic volumes at a desirable level of service. Therefore, no alternatives with fewer than two lanes in each direction were considered.

During the initial stages of project planning, a four lane undivided cross section was considered as an alternative to the five lane cross section. This alternative was rejected because it would allow left-turning traffic to interfere with through-traffic, decreasing the traffic handling capacity of the facility. This alternative would have a high potential for rear-end accidents because left turning vehicles would frequently stop in the inside travel lanes.

To avoid having an excessive number of left turning vehicles stopped in the travel lanes, a four lane facility along South Columbia Street would require left turn lanes at Purefoy Road, Coolidge Street, Chase Avenue, and Mason Farm Road. With the close spacing of these intersections, the left turn lanes would practically overlap each other. The four lane alternative was rejected because it would have less traffic handling capacity than the five lane alternative and it would have a higher potential for accidents.

To explore the feasibility of a planted median on South Columbia Street, the Town of Chapel Hill requested consideration of the following alternative cross sections:

1. Four lanes divided by a 16-foot raised median.
2. Four lanes divided by a 24-foot raised median.

At the Town's request, 4-foot striped bicycle lanes and turnouts for bus stops were considered for both of these alternatives and for the 5-lane (recommended) alternate. Preliminary designs were prepared for each of these alternatives. Cost estimates for each of these alternatives are shown in the Appendix, page A-11.

The 16-foot median alternative is the minimum width median that can have decorative plantings. It is anticipated this alternative would cause the number of relocatees to increase from 8 (recommended alternate) to 9. Adding bike lanes to this alternative would increase the number of relocatees to 10. The 16-foot median alternative would impact most of the existing stone walls located along South Columbia Street. Adding bike lanes to this alternative would leave only small segments of the existing stone walls south of Chase Avenue remaining; all stone walls north of Chase Avenue would be impacted.

The 24-foot median alternative would provide a greater opportunity for planting in the median than the 16-foot median alternative. It would also cause more disruption to adjacent properties. The 24-foot median alternative is the widest alternative considered. It is anticipated this alternative would cause 10 relocatees. Without bike lanes, this alternative would impact all stone walls north of Chase Avenue. Adding bike lanes would impact all stone walls.

The recommended 5 lane cross section will impact only a small segment of the existing stone walls located near Chase Avenue. Adding bike lanes to the 5 lane section could impact most of the stone walls along the project and would increase the anticipated number of relocatees from 8 to 9.

Each of the alternatives requested by the Town of Chapel Hill would increase the right of way and construction costs of the project. Much of the increased cost is due to the hilly terrain of the project area. NCDOT will fund the project alternative that requires the least right of way, but is capable of serving projected traffic volumes. This will minimize the damage to adjacent properties. Therefore, the five lane cross section with curb and gutter is recommended.

#### C. No-Build Alternative

The no-build alternative would lead to increased congestion and safety problems as traffic volumes continue to increase along the project length. Therefore, it is not recommended.

#### D. Other Alternatives

Alternatives that would involve no improvements to South Columbia Street such as use of public transit or park-and-ride facilities were considered. While these alternatives would offer additional means of accessing Chapel Hill, it is anticipated that most of the traveling public would continue to access the Town by automobile. Improvements to South Columbia Street are needed to handle the anticipated increases in vehicular traffic.

### VI. PROBABLE IMPACTS OF THE PROPOSED ACTION

#### A. Ecological Assessment

Due to the urban setting of the proposed project, the new alignment will primarily impact plant communities characterized by cultivated and

naturalized plant species. Typical plant cover of lawns and disturbed areas includes cultivated grasses, kudzu (Pueraria lobata), ivy (Hedera helix), honeysuckle (Lonicera japonica), privet (Ligustrum sinense), wild onion (Allium spp.), and bitter cress (Cardamine hirsuta).

Long, narrow strips of mature mixed pine-hardwood forest may also be impacted. Dominant overstory species include loblolly pine (Pinus taeda), sycamore (Platanus occidentalis), tulip poplar (Liriodendron tulipifera), southern red oak (Quercus falcata), northern red oak (Quercus rubra), post oak (Quercus stellata), white oak (Quercus alba), scarlet oak (Quercus coccinea), mockernut hickory (Carya tomentosa), and pignut hickory (Carya glabra). Midstory species include flowering dogwood (Cornus florida) and sourwood (Oxydendrum arboreum). Winter herb cover is sparse, dominated by wild ginger (Hexastylis virginica). Characteristic fauna include the gray squirrel, raccoon, whip-poor-will, great crested flycatcher, Carolina chickadee, brown creeper, and the northern cardinal.

A mixed pine-hardwood stand located on a south-facing slope between Chase Avenue and Mason Farm Road functions as an "island" of wildlife habitat in a forested area that has been fragmented by urban development. Although this stand may not be large enough to support viable populations of forest interior species, or species requiring large tracts of forested land, contiguous forest in this setting has considerable value in increasing regional diversity. Plant species such as oaks, hickories, and dogwood provide hard and soft mast for wildlife. The stand also provides den trees for nesting and roosting by a variety of mammals and birds. Partial clearing of this forested tract by the University of North Carolina is expected in the near future.

No impacts to threatened or endangered species are anticipated.

#### B. Wetland Involvement

No jurisdictional wetlands will be impacted by the proposed project. Two unnamed intermittent tributaries of Morgan Creek parallel South Columbia Street on either side, but are located beyond anticipated construction limits. Two additional drainages are channeled under the existing road to accommodate upland runoff. These drainages have poorly defined channels, and associated soils are sandy upland alluvium. A small ravine characterized by mesic vegetation, located between Purefoy Road and Manning Drive, may be impacted by asymmetrical widening. Canopy dominants include American elm (Ulmus americana), green ash (Flaxinus pennsylvanica), hackberry (Celtis laevigata), and tulip poplar (Liriodendron tulipifera). However, soils in the project area are well-drained upland soils, primarily Appling and Wedowee sandy loams. Accordingly, the three criteria for distinguishing jurisdictional wetlands are not satisfied.

#### C. Cultural Resources

The North Carolina Department of Cultural Resources, Division of Archives and History, has reported there are no known archaeological sites within the project area and it is unlikely that any archaeological resources eligible for inclusion in the National Register of Historic

Places will be affected by project construction. The State Historic Preservation Officer therefore recommended that no archaeological investigation be conducted for this project (see Appendix, pp. A-1).

In addition, the Department of Cultural Resources concurs with NCDOT that there are no structures of historical or architectural significance listed on the National Register of Historic Places which may be affected by the project (see Appendix, pp. A-3).

#### D. Social Setting and Impacts

The proposed project is located in the Town of Chapel Hill in Orange County. Orange County had a 1989 population of 87,504. Chapel Hill is the largest municipality in Orange County with a 1989 population of 37,715. The subject section of NC 86 contains mostly residential and institutional land use. The only commercial development existing along the project site is Merritt's Store. Increasing development will generate larger traffic volumes exceeding the capacity of the existing facility.

The project will be beneficial to the citizens of Chapel Hill and surrounding areas through reduced congestion, more efficient traffic operations, and improved access from US 15-501 to Memorial Hospital and other University of North Carolina facilities. Public services such as police and fire protection and other emergency services will benefit from a reduction in response time due to the reduced congestion.

#### E. Relocation Impacts

It is anticipated that one (1) business and seven (7) residential dwellings will need to be relocated as a result of this project (see Appendix, pages A-9 and A-10). The Division of Highways offers a Relocation Assistance Program to help minimize the effect of relocation. The program is designed to provide assistance to displaced persons in occupying a new place to live or in which to do business. At least one relocation officer is assigned to each highway project for this purpose.

The relocation officer will determine the needs of the displaced family for relocation assistance advisory services without regard to race, color, religion, sex, or national origin. He will contact the relocatee within ample time prior to displacement to allow negotiations for and possession of replacement housing which meets decent, safe and sanitary standards and is adequate to accommodate the relocatee. Relocation of displaced persons will be made in areas not generally less desirable in regard to public utilities and commercial facilities. Rent and sale prices of replacement housing offered will be within the financial means of the families and individuals displaced. Replacement properties will be made available to the displaced families and individuals in the same general area from which they are being displaced and reasonably accessible to their places of employment. The relocation officer will also assist owners of displaced businesses and non-profit organizations in obtaining and becoming established in suitable locations.

All tenant and owner occupant displacees will receive an explanation regarding all options available to them, such as (1) purchase of replacement housing, (2) rental or replacement housing, either private or public, or (3) relocating existing owner-occupant housing. The relocation officer will also supply information concerning other State or Federal programs offering assistance to displaced persons and will provide other advisory services as needed in order to minimize hardships to displaced persons in adjusting to a new location.

#### F. Land Use

The entire project lies within the jurisdiction of the Town of Chapel Hill. A land use plan for Chapel Hill was published in 1986. A thoroughfare plan was adopted in 1984 and the Town exercises zoning authority along the project.

The majority of the existing land use along the project is residential. Other uses include one church, one store and one research facility. There is also university property along the project zoned as office and institutional.

The urban zoning and current development activity is compatible with the proposed highway project. As the development increases the improved highway facility will provide easier and safer access to the adjoining urban lane uses.

#### G. Construction Impacts

There are a number of short term environmental impacts normally associated with the construction of highways that will be experienced with the construction of this project. Measures will be taken to mitigate these effects to the extent possible.

Traffic service on the roads intersecting the project may be subjected to brief periods of disruption during construction of the project. Every endeavor will be made to insure the transportation needs of the public will be met both during and after construction.

All possible measures will be taken to insure the public's health and safety will not be compromised during the movement of any materials to and from construction sites along the project and any inconveniences imposed on the public will be kept to a minimum.

Solid wastes will be disposed of in strict adherence to the Division of Highways "Standard Specifications for Roads and Structures". The contractor shall be required to observe and comply with all laws, ordinances, regulations, orders and decrees regarding the disposal of solid waste. Solid waste will not be placed into any existing land disposal site which is in violation of state rules and regulations.

Waste and debris shall be disposed of in areas that are outside of the right of way and provided by the contractor, unless otherwise required by the plans or special provisions or unless disposal within the right of way is permitted by the Engineer.

The contractor shall maintain the earth surface of all waste areas, both during the work and until the completion of all seeding and mulching, or other erosion control measures specified, in a manner which will effectively control erosion and siltation.

Before construction is started, a preconstruction conference involving the contractor, pertinent local officials, and the Division of Highways will be held to discuss various construction procedures, including a discussion of precautionary steps to be taken during the time of construction that will minimize damage or rupture to the water lines and interruption of water service.

Erosion and sedimentation will occur during the construction of this project. For this reason an erosion control schedule will be devised by the contractor before work is started. The schedule will show the time relationship between phases of work which must be coordinated to reduce erosion and shall describe construction practices and temporary erosion control measures which will be used to minimize erosion. In conjunction with the erosion control schedule the contractor will be required to follow those provisions of the plans and specifications which pertain to erosion and siltation.

The general requirements concerning erosion and siltation are covered in Article 107-13 of the Standard Specifications which is entitled "Control of Erosion, Siltation and Pollution". The N. C. Division of Highways has also developed an Erosion and Sedimentation Control Program which has been approved by the N. C. Sedimentation Control Commission. This program consists of the rigorous requirements to minimize erosion and sedimentation contained in the "Standard Specifications for Roads and Structures" together with the policies of the Division of Highways regarding control of accelerated erosion and sedimentation on work performed by State Forces.

Construction noise impacts, such as temporary speech interference for passersby and those individuals living or working near the project, can be expected particularly from paving operations and from the earth moving equipment during grading operations. Overall, construction noise impacts are expected to be moderate, since the proposed improvement is along an existing roadway. However, considering the relatively short term nature of construction noise, these impacts are not expected to be substantial. The transmission loss characteristics of nearby structures are believed to be sufficient to moderate the effects of intrusive construction noise.

During construction of the proposed project, all materials resulting from clearing and grubbing, demolition or other operations will be removed from the project, burned or otherwise disposed of by the Contractor. Any burning done will be done in accordance with applicable local laws and ordinances and regulations of the North Carolina SIP for air quality in compliance with 15 NCAC 2D.0520. Care will be taken to insure burning will be done at the greatest distance practicable from dwellings and not when atmospheric conditions are such as to create a hazard to the public. Burning will be performed under constant surveillance.

Measures will be taken in allaying the dust generated by construction when the control of dust is necessary for the protection and comfort of motorists or area residents.

Prior to the approval of any borrow source developed for use on this project, the contractor shall obtain a certification from the State Historic Preservation Officer of the State Department of Cultural Resources certifying that the removal of material from the borrow source will have no effect on any known district, site, building, structure, or object that is included or eligible for inclusion in the National Register of Historic Places. A copy of this certification shall be furnished to the Engineer prior to performing any work on the proposed borrow source.

Borrow pits and all ditches will be drained insofar as possible to alleviate breeding areas for mosquitoes.

#### H. Floodplain Involvement

There are no floodplains or regulated floodways in the project vicinity. The terrain in the vicinity of the project is relatively rolling with natural draws and streams located such that the project can be drained without difficulty. Existing drainage patterns and ground water will not be significantly affected by the project construction.

#### I. Highway Traffic Noise/Construction Noise Analysis

This analysis was performed to determine the effect of the proposed project on noise levels in the immediate project area. This investigation includes an inventory of existing noise sensitive land uses and a field survey of ambient (existing) noise levels in the study area. It also includes a comparison of the predicted noise levels and the ambient noise levels to determine if traffic noise impacts can be expected to result from the proposed project.

Traffic noise impacts are determined from the current procedures for the abatement of highway traffic noise and construction noise, appearing as Part 772 of Title 23 of the Code of Federal Regulations and Volume 7, Chapter 7, Section 3, of the Federal-Aid Highway Program Manual (FHPM 7-7-3). If traffic noise impacts are predicted, examination and evaluation of alternative noise abatement measures for reducing or eliminating the noise impacts must be considered.

#### Characteristics of Noise

Noise is basically defined as unwanted sound. It is emitted from many sources including airplanes, factories, railroads, power generation plants, and highway vehicles. Highway noise, or traffic noise, is usually a composite of noises from engine exhaust, drive train, and tire-roadway interaction.

The magnitude of noise is usually described by its sound pressure. Since the range of sound pressure varies greatly, a logarithmic scale is used to relate sound pressures to some common reference level, usually the decibel (dB). Sound pressures described in decibels are called sound pressure levels and are often defined in terms of frequency weighted scales (A, B, C, or D).

The weighted-A scale is used almost exclusively in vehicle noise measurements since it places most emphasis on the frequency range detected by the human ear (1,000-6,000 Hertz). Sound levels measured using A-weighting are often expressed as dBA. Throughout this report, references will be made to dBA, which translates to an A-weighted decibel level. Several examples of noise pressure levels in dBA are listed in the Appendix, page A-12.

Review of page A-12 indicates that most individuals in urbanized areas are exposed to fairly high noise levels from many sources as they go about their daily activities. The degree of disturbance or annoyance of unwanted sound depends essentially on three things:

- 1) the amount and nature of the intruding noise,
- 2) the relationship between the background noise and the intruding noise, and
- 3) the type of activity occurring when the noise is heard.

Over a period of time, individuals tend to accept the noises which intrude into their lives. Particularly if noises occur at predicted intervals and are expected. Attempts have been made to regulate many of these types of noises including airplane noises, factory noise, railroad noise, and highway traffic noise. In relation to highway traffic noise, methods of analysis and control have developed rapidly over the past few years.

#### Noise Abatement Criteria

In order to determine that highway noise levels are or are not compatible with various land uses, the Federal Highway Administration (FHWA) has developed noise abatement criteria and procedures to be used in the planning and design of highways. These abatement criteria and procedures are set forth in the aforementioned Federal references. A summary of the noise abatement criteria for various land uses is presented on page A-13. The Leq, or equivalent sound level, is the level of constant sound which in a given situation and time period has the same energy as does time varying sound. In other words, the fluctuating sound levels of traffic noise are represented in terms of a steady noise level with the same energy content.

#### Ambient Noise Levels

Ambient noise measurements were taken along the proposed project at representative locations using a GenRad 1988 Precision Integrating Sound-Level Meter and Analyzer. The noise levels were recorded for a 20

minute period during anticipated peak traffic periods. Traffic counts were taken at each measurement site during the sampling periods and differences in the measured noise levels are attributed to variations in site conditions and traffic volumes. The locations and measured exterior Leq noise levels are given on page A-14.

The existing roadway and traffic conditions were used with the most current traffic noise prediction model in order to calculate existing noise levels for comparison with noise levels actually measured. The calculated existing noise levels were within 0.2 to 3.1 dBA of the measured noise levels for all of the locations for which noise measurements were obtained. Differences in dBA levels can be attributed to "bunching" of vehicles, stop-and-go traffic movements, and actual vehicle speeds versus the computer's "evenly spaced" vehicles and single vehicle speed.

#### Procedure for Predicting Future Noise Levels

The noise analysis was based on a 5-lane curb-and-gutter section, 64-foot from face-to-face of curbs. The roadway sections and proposed intersections were assumed to be flat and at-grade. Thus, this analysis represents "worst-case" topographic conditions. The noise predictions made in this report are highway-related noise predictions for the traffic conditions during the year being analyzed.

The procedure used to predict future noise levels in this study was the Noise Barrier Cost Reduction Procedure, STAMINA 2.0 and OPTIMA (revised March, 1983). The BCR (Barrier Cost Reduction) procedure is based upon the FHWA Highway Traffic Noise Prediction Model (FHWA-RD-77-108). The BCR traffic noise prediction model uses the number and type of vehicles on the planned roadway, their speeds, the physical characteristics of the road (curves, hills, depressed, elevated, etc.), receptor location and height, and, if applicable, barrier type, barrier ground elevation, and barrier top elevation.

The computerized model was used to determine the number of land uses (by type) which, during the peak hour in the design year (2010), would be exposed to noise levels approaching or exceeding the FHWA noise abatement criteria. Land uses predicted to experience a substantial noise increase were also determined. Receptors at locations approaching 25, 50, 100, 200, 400, 800, and 1600 feet from the center of the near traffic lane were selected (adaptable to both sides of the roadway). The location of these receptors were determined by the change in projected traffic volumes along the proposed project. The result of this procedure was a grid of receptor points along the project. Using this grid, noise levels were calculated for each identified receptor.

The Leq traffic noise exposures associated with this project are listed on pages A-15 and A-16. The tables on pages A-15 and A-16 list all receptors in close proximity to the project, their ambient and predicted noise levels, and the estimated noise level increase for each.

The traffic noise abatement criteria summary is provided on page A-17. It lists those receptors expected to experience traffic noise levels approaching or exceeding FHWA noise abatement criteria. Only nine residences located over the project length approach or exceed FHWA noise abatement criteria.

Also found on page A-17 are the maximum extents of the 67 dBA and the 72 dBA noise level contours and predicted noise levels at 50, 100, and 200 feet from the center of the near travel lane. The extent of the 67 dBA and 72 dBA noise level contours is used to assess the exposure impacts on land uses. Residential receptors located within the 67 dBA noise level contour and most commercial receptors located within the 72 dBA contour could be expected to experience traffic noise levels above the FHWA noise abatement criteria. This information can assist local authorities in exercising land use control over properties adjacent to the roadway.

The exterior traffic noise level increases for certain receptors is shown on page A-18. Noise level increases range from -5 to +3 dBA. No receptors are predicted to experience an exterior traffic noise level increase equal to or exceeding 15 dBA. Generally, people can barely detect noise level changes of 2-3 dBA. A 5 dBA change is readily noticeable. A 10 dBA change is judged by most people as a doubling or a halving of the loudness of the sound.

#### Traffic Noise Impact Analysis

Traffic noise impacts occur when the predicted traffic noise levels either: a) approach or exceed the FHWA noise abatement criteria, or b) substantially exceed the existing noise levels (greater than or equal to 15 dBA). Consideration for noise abatement measures can be applied to receptors falling in either category. Physical measures to abate anticipated traffic noise levels can often be applied with a measurable degree of success by the application of solid mass, attenuable measures to effectively deflect, absorb, and reflect highway traffic noise emissions. Solid mass, attenuable measures may include earth berms or artificial abatement walls.

For a noise barrier to provide sufficient noise reduction it must be high enough and long enough to shield the receptor from significant sections of the highway. Access openings in the barrier severely reduce the noise reduction provided by the barrier. It then becomes economically unreasonable to construct a barrier for a small noise reduction. Safety at access openings (driveways, crossing streets, etc.) due to restricted sight distance is also a concern. Furthermore, to provide a sufficient noise reduction, a barrier's length would normally be eight times the distance from the barrier to the receptor. For example, a receptor located 50 feet from the barrier would normally require a barrier 400 feet long. An access opening of 40 feet (10 percent of the area) would limit its noise reduction to approximately 4 dBA (FUNDAMENTALS AND ABATEMENT OF HIGHWAY TRAFFIC NOISE, Report No. FHWA-HHI-HEV-73-7976-1, USDOT). Businesses, churches, and other related establishments located along a particular highway normally require

accessibility and high visibility. Solid mass, attenuable measures for traffic noise abatement would tend to disallow these two qualities and thus, would not be acceptable abatement measures.

Based on these factors, no physical abatement measures are feasible and none are recommended for this project.

#### "Do Nothing" Alternative

The traffic noise impacts for the "do nothing" alternative were also considered. If the project is not built, some 22 residences would be impacted by highway traffic noise. If the traffic currently using NC 86 were to double in the next 20 years, future noise levels would increase less than 3 dBA. This small increase in the present noise level would be barely noticeable.

#### Summary

Based on the preliminary noise impact analysis, no traffic noise abatement is reasonable or feasible along this project and none is proposed. This evaluation completes the highway traffic noise requirements of FHPM 7-7-3 and, unless a major project change develops, no additional reports are required for this project.

#### J. Air Quality Analysis

Air pollution is the result of industrial emissions and emissions from internal combustion engines. The impact resulting from the construction of a new highway or the improvement of an existing highway can range from aggravating existing air pollution problems to improving the ambient air conditions. Motor vehicles are known to emit carbon monoxide (CO), nitrogen oxide (NO), hydrocarbons (HC), particulate matter, sulfur dioxide (SO<sub>2</sub>), and lead (Pb) (listed in order of decreasing emission rate).

The primary pollutant emitted from automobiles is carbon monoxide. Automobiles are considered to be the major source of CO in the project area. For these reasons, most of the analyses presented are concerned with determining expected carbon monoxide levels in the vicinity of the project.

In order to determine the ambient CO concentration at a receptor near a highway, two concentration components must be used: local and background. The local component is due to CO emissions from cars operating on highways in the near vicinity (i.e., distances within 100 meters) of the receptor location. The background component is due to CO emissions from cars operating on streets further from the receptor location.

In this study, the local component was determined using line source computer modeling and the background component was determined by the North Carolina Department of Environment, Health and Natural Resources (NCDEHNR). These two concentration components were determined separately, then added together to determine the ambient CO concentration for comparison to the National Ambient Air Quality Standards (NAAQS).

Automobiles are generally regarded as sources of hydrocarbons and nitrogen oxides. Hydrocarbons and nitrogen oxides emitted from cars are carried into the atmosphere where they react with sunlight to form ozone and nitrogen dioxide. Ozone and nitrogen dioxide are of concern, not the precursor hydrocarbons and nitrogen oxide. Area-wide automotive emissions of HC and NO are expected to decrease in the future due to the continued installation and maintenance of pollution control devices on new cars, and thus help lower ambient ozone and nitrogen dioxide levels.

The photochemical reactions that form ozone and nitrogen dioxide require several hours to occur. For this reason, peak levels of ozone generally occur 10 to 20 kilometers downwind of the source of hydrocarbon emissions. Urban areas as a whole are regarded as sources of hydrocarbons, not individual streets and highways. The emissions of all sources in an urban area mix together in the atmosphere, and in the presence of sunlight, the mixture reacts to form ozone, nitrogen dioxide, and other photochemical oxidants. The best example of this type of air pollution is the smog which forms in Los Angeles, California.

Automobiles are not generally regarded as significant sources of particulate matter and sulfur dioxide. Nationwide, highway sources account for less than seven percent of particulate matter emissions and less than two percent of sulfur dioxide emissions. Particulate matter and sulfur dioxide emissions are predominantly the result of non-highway sources (e.g., industrial, commercial, and agricultural). Because emissions of particulate matter and sulfur dioxide from cars are very low, there is no reason to suspect that traffic on the project will cause air quality standards for particulate matter and sulfur dioxide to be exceeded.

Automobiles emit lead by burning gasoline containing tetraethyl lead added by refineries to increase the octane rating of the fuel. New cars with catalytic converters burn unleaded gasoline eliminating lead emissions. The United States Environmental Protection Agency (EPA) has required the reduction in the lead content of leaded gasolines. The overall average lead content of gasoline in 1974 was 2 grams per gallon and is expected to be 0.05 grams per gallon by 1990.

In the future, lead emissions are expected to decrease as more cars use unleaded fuels and as the lead content of leaded gasoline is reduced. Because of these reasons, it is not expected traffic on the proposed project will cause the NAAQS for lead to be exceeded.

A microscale air quality analysis was performed to determine future CO concentrations resulting from the proposed highway improvements. "CALINE3 - A Versatile Dispersion Model For Predicting Air Pollutant Levels Near Highways And Arterial Streets" was used to predict the CO concentration at the nearest sensitive receptors to the project.

Inputs into the mathematical model to estimate hourly CO concentrations consisted of a level roadway under normal conditions with predicted traffic volumes, vehicle emission factors, and meteorological parameters. The traffic volumes are based on the annual average daily traffic projections. The modeling analysis was performed for a "worse case" condition using winds blowing parallel to the roadway. Vehicle

carbon monoxide emission factors were calculated for the years 2000 and 2010 using the EPA publication "Mobile Source Emission Factors" and the MOBILE4 source emissions computer model.

The background CO concentration for the project area was estimated to be 2.4 parts per million (ppm). Consultation with the Air Quality Section, Division of Environmental Management, North Carolina Department of Environment, Health and Natural Resources indicated that an ambient CO concentration of 2.4 ppm is suitable for most urban areas.

The closest receptor affected by the "worst case" for the proposed widening is R54 (residence). The closest receptor affected by the "worst case" for the "no build" alternative is R25 (residence). The predicted 2000 and 2010 one hour average CO concentrations for the proposed widening and the "no build" alternative are as follows:

<u>Alternative</u>	<u>Closest Receptor</u>	<u>One Hour CO Conc.(ppm)</u>	
		<u>2000</u>	<u>2010</u>
Widen to 5-lane Road	R54 (Res)	3.3	3.2
"No Build"	R25 (Res)	3.4	3.4

Comparison of the predicted CO concentrations with the NAAQS (maximum 1-hour - 35 ppm; 8-hour average - 9 ppm) indicates no violation of these standards. Because the results of the "worst-case" 1-hour CO analysis is less than 9 ppm, the 8-hour CO level does not exceed the standard (see Tables A1, A2, A3, and A4 on pages A-19 and A-20 for input data).

The project is located within the Eastern Piedmont Air Quality Control Region. The ambient air quality for Orange County has been determined to be in compliance with the National Ambient Air Quality Standards. Because this project is located in an area where the State Implementation Plan (SIP) does not contain any transportation control measures, the conformity procedures of 23 CFR 770 do not apply.

#### K. Hazardous Waste Sites

A survey of the project area found no hazardous waste sites. Merritt's Store has underground petroleum storage tanks which will be within the proposed right of way limits. No soil or groundwater contamination from these tanks was discovered.

#### L. Special Permits Required of the Division of Highways

No special permits will be required of the Division of Highways.

## VII. COMMENTS, COORDINATION, AND PUBLIC INVOLVEMENT

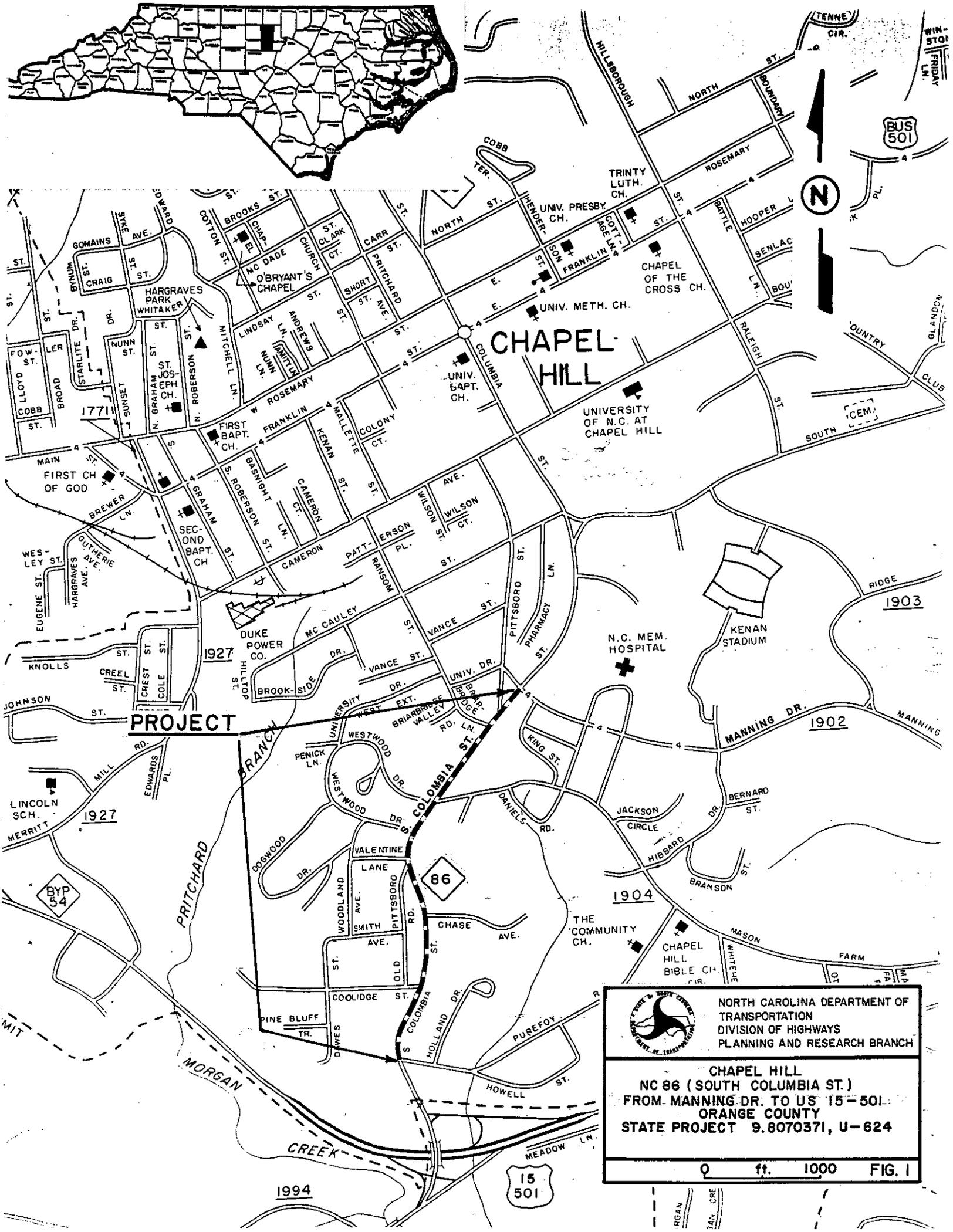
On November 21, 1988 a letter was mailed to the following federal, state, and local agencies to solicit suggestions and receive environmental input concerning the proposed project. Responses were received from each of these agencies.

U. S. Army Corps of Engineers  
Town of Chapel Hill  
N. C. State Clearinghouse  
N. C. Department of Cultural Resources  
N. C. Department of Natural Resources and Community Development  
N. C. Department of Public Instruction

On December 8, 1988 a public meeting was held in the Chapel Hill Town Hall to discuss this project with the public and to obtain comments and suggestions. Approximately 40 people attended the meeting.

RPH/plr

# FIGURES



**PROJECT**



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

**CHAPEL HILL**  
**NC 86 ( SOUTH COLUMBIA ST. )**  
**FROM MANNING DR. TO US 15-501**  
**ORANGE COUNTY**  
**STATE PROJECT 9.8070371, U-624**

0 ft. 1000 FIG. 1

**CHAPEL HILL**

BUS 501

N

1903

1902

1904

1994

15 501

BYP 54

1927

1927

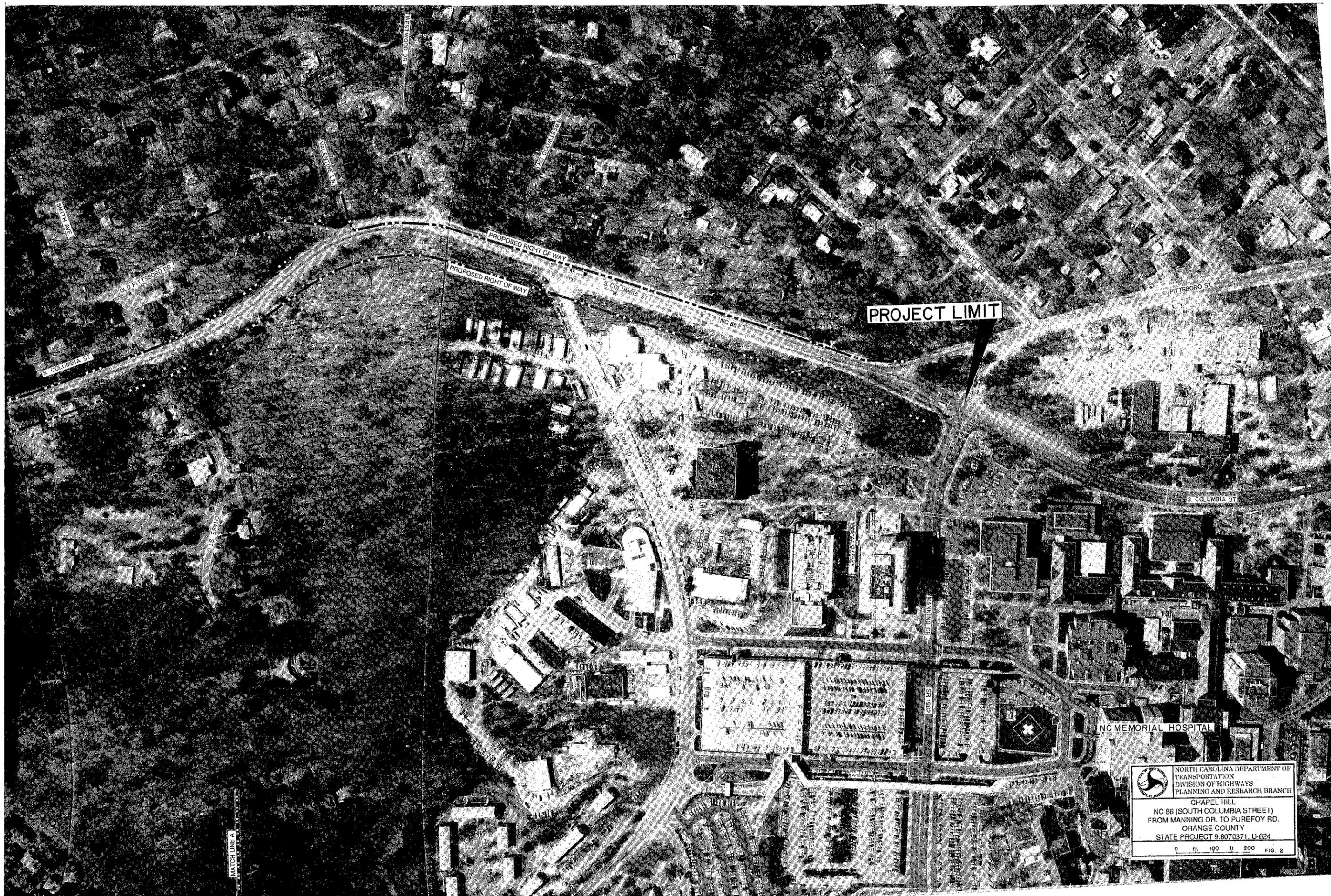
1771



PROJECT LIMIT

MATCH LINE





PROJECT LIMIT

NC MEMORIAL HOSPITAL


 NORTH CAROLINA DEPARTMENT OF  
 TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 PLANNING AND RESEARCH BRANCH  
 CHAPEL HILL  
 NC 86 (SOUTH COLUMBIA STREET)  
 FROM MANNING DR. TO PUREFOY RD.  
 ORANGE COUNTY  
 STATE PROJECT 9.8070371 U-624  
 0 ft. 100 ft. 200 ft. FIG. 2

MATCHLINE A

# NC 86 (S. COLUMBIA STREET) FROM PUREFOY ROAD TO SR 1902 (MANNING DRIVE) ESTIMATED 1988/2008 ADT IN HUNDREDS

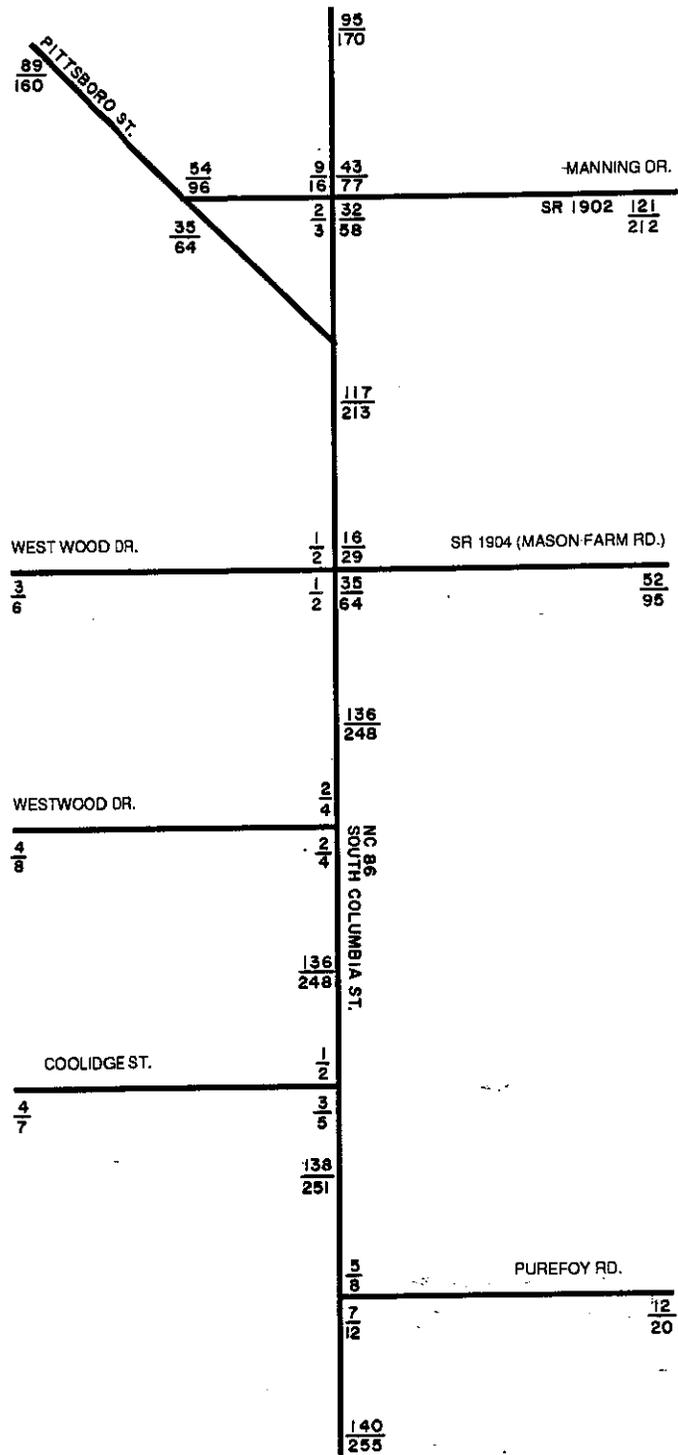


FIGURE 3

# NC 86 (S. COLUMBIA STREET) FROM PUREFOY ROAD TO SR 1902 (MANNING DRIVE) RECOMMENDED SIGNALIZED INTERSECTION CONFIGURATIONS

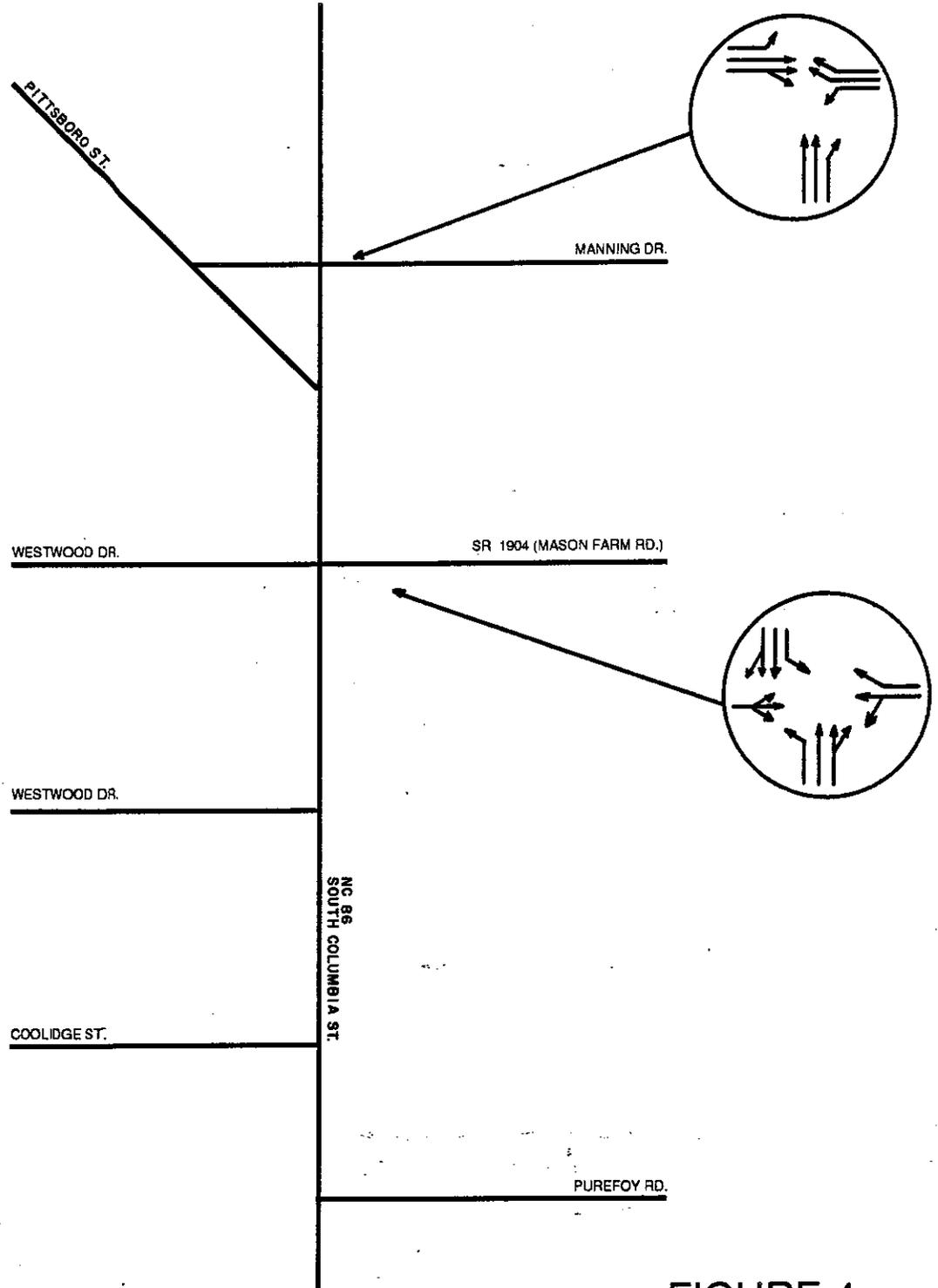
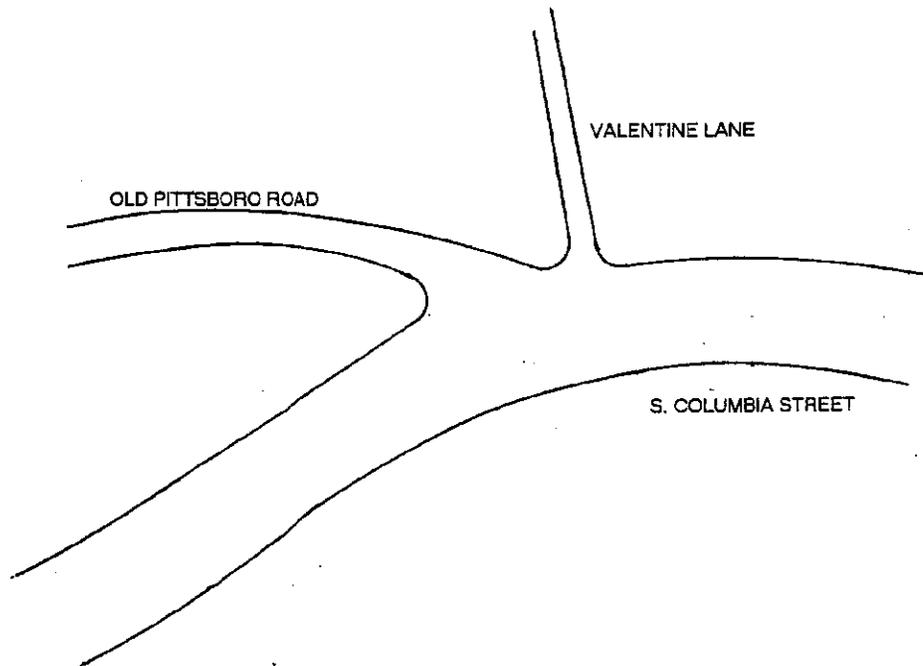


FIGURE 4

NC 86  
(S. COLUMBIA STREET)  
CHAPEL HILL, ORANGE COUNTY  
U-624

REALIGNMENT OF VALENTINE LANE

EXISTING CONFIGURATION



PROPOSED CONFIGURATION

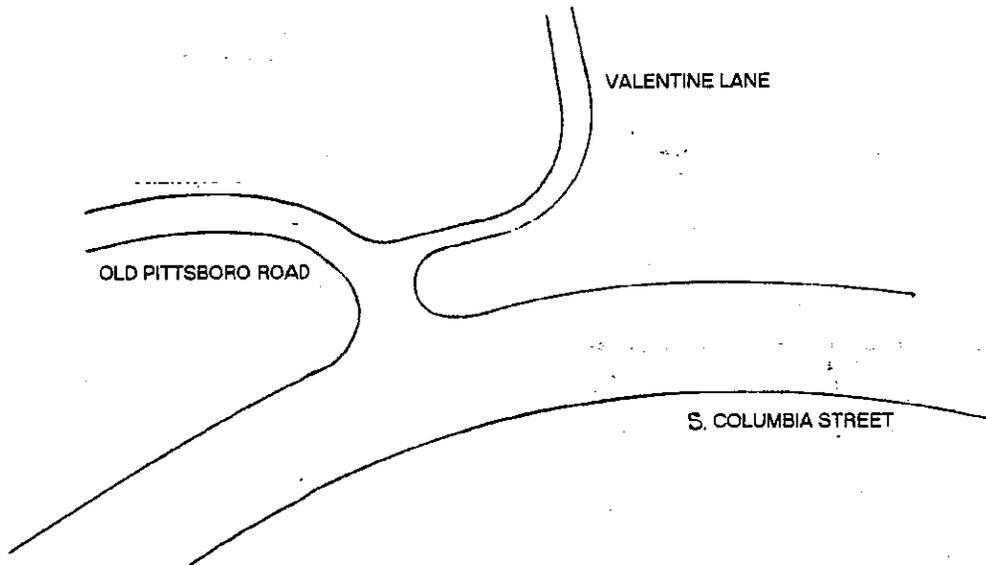


FIGURE 5

# APPENDIX



JAN 03 1989

## North Carolina Department of Cultural Resources

James G. Martin, Governor  
Patric Dorsey, Secretary

Division of Archives and History  
William S. Price, Jr., Director

December 29, 1988

### MEMORANDUM

TO: J. M. Greenhill, Manager  
Planning and Research Branch  
Division of Highways  
Department of Transportation

FROM: David Brook, Deputy State  
Historic Preservation Officer *David Brook*

SUBJECT: NC 86 (South Columbia Street) from Manning  
Drive to US 15-501, #9.8070371, U-624,  
Chapel Hill, Orange County, CH 89-E-4220-0385

We have received notification from the State Clearinghouse concerning the above project.

We have conducted a search of our files and are aware of no structures of historical or architectural importance located within the planning area. However, since a comprehensive historical architectural inventory of Orange County has never been conducted, there may be structures of which we are unaware located within the planning area.

We request that the Department of Transportation's architectural historian conduct a historic structures survey of the proposed project area and submit the results to our office for review. We will provide timely review and comment upon receipt of the requested information.

There are no known archaeological sites within the proposed project area. Based on our present knowledge of the area, it is unlikely that any archaeological resources which may be eligible for inclusion in the National Register of Historic Places will be affected by the project construction. We, therefore, recommend that no archaeological investigation be conducted in connection with this project.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act of 1966, the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106, codified at 36 CFR Part 800, and to Executive Order 11593, "Protection and Enhancement of the Cultural Environment."

J. M. Greenhill  
December 29, 1988, Page Two

Thank you for your cooperation and consideration. If you have questions concerning the above comments, please contact Ms. Renee Gledhill-Earley, environmental review coordinator, at 919/733-4763.

DB:slw

cc: Clearinghouse  
B. Church



REC-11  
APR 14 1989

## North Carolina Department of Cultural Resources

James G. Martin, Governor  
Patric Dorsey, Secretary

Division of Archives and History  
William S. Price, Jr., Director

April 12, 1989

### MEMORANDUM

TO: J. M. Greenhill, Manager  
Planning and Research Branch  
Division of Highways  
Department of Transportation

FROM: David Brook, Deputy State  
Historic Preservation Officer *David Brook*

SUBJECT: NC 86 (South Columbia Street), U-624, 9.8070371,  
Chapel Hill, Orange County, GS 89-0056

Thank you for your letter of March 13, 1989, and the excellent documentation (photographs keyed to a map).

We have reviewed the results of the Department of Transportation historic structures survey and concur that since there are no National Registered structures located within the area of potential impact, no further compliance with G.S. 121-12(a) is necessary. Please notify us if the funding for this project changes from state to federal money, since there are a number of important early twentieth century structures located along the proposed route.

Our office is pleased to acknowledge DOT's special effort regarding the stone retaining walls on the west side of the road, which we agree are a significant character-defining feature of the streetscape.

These comments are made in accord with G.S. 121-12(a) and Executive Order XVI. If you have any questions regarding them, please contact Ms. Renee Gledhill-Earley, environmental review coordinator, at 733-4763.

DB:slw

cc: B. Church/E. Kirkland



DEPARTMENT OF THE ARMY  
WILMINGTON DISTRICT, CORPS OF ENGINEERS  
P.O. BOX 1890  
WILMINGTON, NORTH CAROLINA 28402-1890  
December 13, 1988

DEC 20 1988

IN REPLY REFER TO  
Planning Division

Mr. J. M. Greenhill, Manager  
Planning and Research Branch  
Division of Highways  
North Carolina Department  
of Transportation  
Post Office Box 25201  
Raleigh, North Carolina 27611-5201

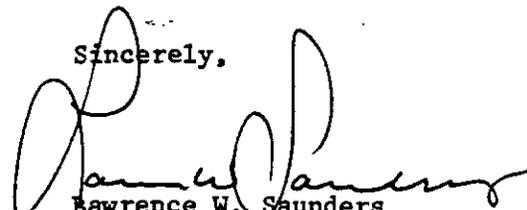
Dear Mr. Greenhill:

We have reviewed your letter of November 7, 1988, requesting information on "Chapel Hill, NC 86 (S. Columbia Street), from Manning Drive to US 15-501, Orange County, State Project No. 9.8070371, U-624" and offer the following comments.

The proposed project may require a Department of the Army permit authorization, pursuant to Section 404 of the Clean Water Act of 1977, as amended, for the placement of any excavated or fill material in waters of the United States and their adjacent wetlands. Accordingly, our Regulatory Branch would appreciate the opportunity to review the plans, when they become available, for a project-specific determination of Department of the Army permit requirements. Should you have any questions, please contact Ms. Kathy Trott, Regulatory Branch, at (919) 846-0749.

We appreciate the opportunity to comment on this project. If we can be of further assistance to you, please do not hesitate to contact us.

Sincerely,



Lawrence W. Saunders  
Chief, Planning Division

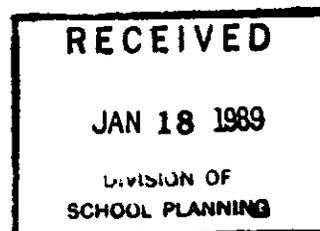


OFFICE OF THE SUPERINTENDENT

## Orange County Schools

200 EAST KING STREET  
HILLSBOROUGH, NORTH CAROLINA 27278-2570  
(919) 732-8126

January 12, 1989



Dr. Darrell Spencer  
Assistant State Superintendent  
School Planning  
State Department of Public Instruction  
217 W. Jones Street  
Raleigh, NC 27603-1336

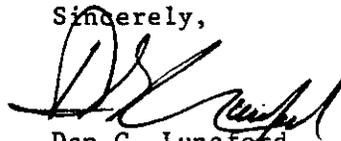
Dear Dr. Spencer:

Re: Request for Input - Chapel Hill, NC 86  
(S. Columbia Street), from Manning Drive  
to US 15-501, Orange County, State Project  
No. 9.8070371, U-624

We have reviewed the information on the above-noted project, and we would support the improvements to the identified road. We can handle this construction project in terms of bus routing without difficulty, and we certainly see this as an enhancement to safe bus routing once the project is completed.

I did review this with the Transportation Director for the Orange County School System and the Transportation Coordinator for the Chapel Hill/Carrboro City Schools. Thank you for the opportunity for input.

Sincerely,



Dan G. Lunsford  
Superintendent

DGL:ha

cc: Mr. Jerry Faulk, Transportation Director

State of North Carolina  
 Department of Natural Resources and Community Development  
 A95/EIS REVIEW - PROJECT COMMENTS

Reviewing Office: NRCD	
Project Number: 89-0385	Due Date:

After review of this project it has been determined that the NRCD permit(s) indicated must be obtained in order for this project to comply with North Carolina Law.  
 Questions regarding these permits should be addressed to the Regional Office indicated on the reverse of this form.  
 All applications, information and guidelines relative to these plans and permits are available from the same Regional Office.

PERMITS	SPECIAL APPLICATION PROCEDURES or REQUIREMENTS	Normal Process Time (statutory time limit)										
<input type="checkbox"/> Permit to construct & operate wastewater treatment facilities, sewer system extensions, & sewer systems not discharging into state surface waters.	Application 90 days before begin construction or award of construction contracts On-site inspection. Post-application technical conference usual	30 days (90 days)										
<input type="checkbox"/> NPDES - permit to discharge into surface waters and/or permit to operate and construct wastewater facilities discharging into state surface waters.	Application 180 days before begin activity. On-site inspection. Pre-application conference usual. Additionally, obtain permit to construct wastewater treatment facility-granted after NPDES. Reply time, 30 days after receipt of plans or issue of NPDES permit-whichever is later.	90-120 days (N/A)										
<input type="checkbox"/> Water Use Permit	Pre-application technical conference usually necessary	30 days (N/A)										
<input type="checkbox"/> Well Construction Permit	N/A	7 days (15 days)										
<input type="checkbox"/> Dredge and Fill Permit	Application copy must be served on each riparian property owner. On-site inspection. Pre-application conference usual. Filling may require Easement to Fill from N.C. Department of Administration and Federal Dredge and Fill Permit.	55 days (90 days)										
<input type="checkbox"/> Permit to construct & operate Air Pollution Abatement facilities and/or Emission Sources	N/A	60 days (90 days)										
<input checked="" type="checkbox"/> Any open burning associated with subject proposal must be in compliance with 15 NCAC 2D.0520.	N/A	60 days (90 days)										
<input checked="" type="checkbox"/> Demolition of structures containing asbestos material must be in compliance with 15 NCAC 2D.0525 which prohibits burning of such materials.												
<input type="checkbox"/> Complex Source Permit required under 15 NCAC 2D.0800.												
<input type="checkbox"/> The Sedimentation Pollution Control Act of 1973 must be properly addressed for any land disturbing activity. An erosion & sedimentation control plan will be required if one or more acres to be disturbed. Plan filed with proper Regional Office (Land Quality Sect.) at least 30 days before begin activity.												
<input type="checkbox"/> The Sedimentation Pollution Control Act of 1973 must be addressed with respect to the referenced Local Ordinance:												
<input type="checkbox"/> Mining Permit	On-site inspection usual. Surety bond filed with NRCD as shown:  <table border="0"> <tr> <td>AFFECTED LAND AREA</td> <td>AMOUNT OF BOND</td> </tr> <tr> <td>Less than 5 acres</td> <td>\$ 2,500</td> </tr> <tr> <td>5 but less than 10 acres</td> <td>5,000</td> </tr> <tr> <td>10 but less than 25 acres</td> <td>12,500</td> </tr> <tr> <td>25 or more acres</td> <td>25,000</td> </tr> </table>	AFFECTED LAND AREA	AMOUNT OF BOND	Less than 5 acres	\$ 2,500	5 but less than 10 acres	5,000	10 but less than 25 acres	12,500	25 or more acres	25,000	30 days (60 days)
AFFECTED LAND AREA	AMOUNT OF BOND											
Less than 5 acres	\$ 2,500											
5 but less than 10 acres	5,000											
10 but less than 25 acres	12,500											
25 or more acres	25,000											
<input type="checkbox"/> North Carolina Burning Permit	On-site inspection by N.C. Division Forest Resources if permit exceeds 4 days	1 day (N/A)										
<input type="checkbox"/> Special Ground Clearance Burning Permit (Dare, Hyde, Washington, Tyrell counties)	On-site inspection by N.C. Division Forest Resources required.	1 day (N/A)										
<input type="checkbox"/> Oil Refining Facilities	N/A	90-120 days (N/A)										
<input type="checkbox"/> Dam Safety Permit	If permit required, application 60 days before begin construction. Applicant must hire N.C. qualified engineer to: prepare plans, inspect construction, certify construction is according to NRCD approved plans. May also require Department of Human Resources permit under mosquito control program.	30 days (N/A)										
<input type="checkbox"/> Permit to drill exploratory oil or gas well	File surety bond of \$5,000 with NRCD running to State of N.C. conditional that any well opened by drill operator shall, upon abandonment, be plugged according to NRCD rules and regulations.	10 days (N/A)										
<input type="checkbox"/> Geophysical Exploration Permit	Application filed with NRCD at least 10 days prior to issue of permit Application by letter. No standard application form.	10 days (N/A)										

Continued on reverse

PERMITS	SPECIAL APPLICATION PROCEDURES or REQUIREMENTS	Normal Process Time (statutory time limit)
<input type="checkbox"/> State Lakes Construction Permit	Application fee based on structure size is charged. Must include descriptions & drawings of structure & proof of ownership of riparian property	15-20 days (N/A)
<input type="checkbox"/> 401 Water Quality Certification	N/A	60 days (130 days)
<input type="checkbox"/> CAMA Permit for MAJOR development	\$10.00 fee must accompany application	55 days (180 days)
<input type="checkbox"/> CAMA Permit for MINOR development	\$10.00 fee must accompany application	22 days (60 days)
<input type="checkbox"/> Several geodetic monuments are located in or near the project area. If any monuments need to be moved or destroyed, please notify: N.C. Geodetic Survey, Box 27687, Raleigh, NC 27611		
<input type="checkbox"/> A full EIS must be required under the provisions of NEPA and SEPA		
Other comments (attach additional pages as necessary, being certain to cite comment authority): <p>Sedimentation and Erosion Control must be carried out in accordance with the memorandum of understanding between the Sediment Control Commission and D.O.T.</p>		
<input type="checkbox"/> Melba McGee <i>MM</i> reviewer signature	<input type="checkbox"/> NRCDC agency	<input type="checkbox"/> 12/14/8 date

REGIONAL OFFICES

Asheville Regional Office  
 159 Woodfin Street  
 Asheville, NC 28801  
 (704) 253-3341

Fayetteville Regional Office  
 Suite 714 Wachovia Building  
 Fayetteville, NC 28301  
 (919) 486-1541

Mooresville Regional Office  
 1119 North Main Street  
 Mooresville, NC 28115  
 (704) 663-1699

Raleigh Regional Office  
 Box 27687  
 Raleigh, NC 27611  
 (919) 733-2314

Washington Regional Office  
 1502 North Market Street  
 Washington, NC 27889  
 (919) 946-6481

Wilmington Regional Office  
 7225 Wrightsville Avenue  
 Wilmington, NC 28403  
 (919) 256-4161

Winston-Salem Regional Office  
 8003 Silas Creek Parkway Extension  
 Winston-Salem, NC 27106  
 (919) 761-2351

LOP Several water lines are located in the path of and adjacent to the proposed project. Due to a possible rupture during construction, the contractor should contact the appropriate water system officials to specify a work schedule.

LOP Demolition waste should be disposed of in a properly permitted landfill.

LOP Trench pits and all ditches should be drained to alleviate breeding areas for mosquitoes. Care should also be taken not to block existing drainage ditches.

LOP A rodent control program may be necessary to prevent the migration of rodents to adjacent areas when the removal of a structure(s) is required.

**RELOCATION REPORT**  
 E.I.S.  CORRIDOR  DESIGN

North Carolina Department of Transportation  
**RELOCATION ASSISTANCE**

PROJECT: 9.8070371 COUNTY: Orange Alternate      of      Alternate  
 I.D. NO.: U-624 F.A. PROJECT: N/A

DESCRIPTION OF PROJECT: NC 86 (S. Colombia St.) from Manning Drive to Purefoy Rd., Chapel Hill

ESTIMATED DISPLACED				INCOME LEVEL					
Type of Displacee	Owners	Tenants	Total	Minority	0-15M	15-25M	25-35M	35-50M	50 UP
Individuals									
Families	3	12	15	2	12		1	2	
Businesses	1		1						
Farms									
Non-Profit Org.									

ANSWER ALL QUESTIONS										
YES	NO	EXPLAIN ALL "YES" ANSWERS								
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. Will project have significant impact								
<input type="checkbox"/>	<input checked="" type="checkbox"/>	2. Will project be disruptive to community								
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3. Will community be cut off from services								
<input type="checkbox"/>	<input checked="" type="checkbox"/>	4. Will neighborhoods be separated								
<input type="checkbox"/>	<input checked="" type="checkbox"/>	5. Will special relocation services be necessary								
<input type="checkbox"/>	<input checked="" type="checkbox"/>	6. Will schools or churches be affected by displacement								
<input type="checkbox"/>	<input checked="" type="checkbox"/>	7. Will business relocation be detrimental to community								
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. Will business services still be available after project								
<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. Will any business be displaced								
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. Will relocation cause a housing shortage								
<input type="checkbox"/>	<input type="checkbox"/>	11. Source for available housing (list)								
<input type="checkbox"/>	<input checked="" type="checkbox"/>	12. Will additional housing programs be needed								
<input checked="" type="checkbox"/>	<input type="checkbox"/>	13. Should Last Resort Housing be considered								
<input type="checkbox"/>	<input checked="" type="checkbox"/>	14. Is there a significant number of large families, disabled, elderly, etc.								

**ANSWER THESE ALSO FOR DESIGN**

<input type="checkbox"/>	<input type="checkbox"/>	15. Will public housing be needed for project
<input type="checkbox"/>	<input type="checkbox"/>	16. Is public housing available
<input type="checkbox"/>	<input type="checkbox"/>	17. Is it felt there will be adequate DSS housing available during relocation period
<input type="checkbox"/>	<input type="checkbox"/>	18. Will there be a problem of housing within financial means
<input type="checkbox"/>	<input type="checkbox"/>	19. Are suitable business sites available (list source)
<input type="checkbox"/>	<input type="checkbox"/>	20. Number months estimated to complete RELOCATION

VALUE OF DWELLING		DSS DWELLINGS AVAILABLE	
Owners	Tenants	For Sale	For Rent
0-20M	\$ 0-150	0-20M	\$ 0-150
20-40M	150-250	20-40M	150-250
40-70M	250-400	40-70M	250-400
70-100	400-600	70-100	400-600
100 UP	600 UP	100 UP	600 UP
TOTAL			

**REMARKS (Respond by Number)**

1. & 10. The housing market for UNC students in Chapel Hill is already tight. It is known that the demand already exceeds the supply. The tenant displaced all appear to be student (out-of-state license plates & typical student vehicles abound) living in houses converted to apartments.

8. The loss of one gas station-grocery-grill should not be significant, as other similar businesses are numerous.

9. As noted in 8(above), there is one. Estimate four (4) full-time and two (2) part-time employees(Non-Minority).

13. Last Resort Housing will be provided as needed. It appears that several could require it.

NOTE: A large easement area (needed due to a severe fill) comes very close to an apartment building (marked "A" on plans, located on a side street, Chase Avenue). If the fill toe line is no further out than the edge of the

Mary G. Jones: Mary G. Jones 2-12-90  
 Relocation Agent Date

W.D. Moon 2-12-90  
 Approved Date

Form 15.4 Revised 6/89

Original & 1 Copy: State Relocation Agent  
 2 Copy: Area Relocation File

CODE: 15-4.DOC

NOTE (cont.): easement, it would not be a problem. Otherwise, a retaining wall would be necessary. At worst, the building might need to be removed. If so, this could displace an additional 8-10 tenants, presumably students. This question should be resolved prior to authorization, since the worstcase would mean an increase from 15 to perhaps 25 displacees.

FURTHER NOTE: Since most students living just off campus double up and triple up to share the high rents, the number of non-related individuals could be very much higher than the displacee count. If they do not relocate together, the payments would probably be shared, but the need for additional housing units could make for a very difficult relocation problem. If at all possible, offers made during the summer could alleviate part of this problem, as occupancy rate could be lower.

COST ESTIMATES FOR THE WIDENING OF SOUTH CAROLINA STREET  
 CHAPEL HILL  
 ORANGE COUNTY  
 U-624

ESTIMATED COSTS IN THOUSANDS

<u>Alternative</u>	<u>Construction</u>	<u>Right of Way</u>	<u>Total</u>
*Std. 5 lane	1,310	2,170	3,480
bus turnouts	55	122	3,657
bike lanes	300	456	4,236
bike & bus	354	667	4,501
<hr/>			
4 lns, 16' med.	1,460	2,626	4,086
bus turnouts	60	211	4,357
bike lanes	140	728.5	4,954.5
bike & bus	200	828	5,114
<hr/>			
4 lns, 24' med.	1,560	3,354.5	4,914.5
bus turnouts	58	100	5,072.5
bike lanes	160	205.5	5,280
bike & bus	200	306	5,420.5

\*Recommended

Hearing: Sounds that bombard us daily

D E C I B E L S	140	Shotgun blast, Jet 100 ft away at takeoff	Pain
		Motor test chamber	Human ear pain threshold
	130		
	120	Firecrackers	
		Severe thunder, pneumatic jackhammer	
		Hockey crowd	
		Amplified rock music	Uncomfortably loud
	110		
	100	Textile loom	
		Subway train, elevated train, farm tractor	
		Power lawn mower, newspaper press	
		Heavy city traffic, noisy factory	Loud
	90		
	80	Diesel truck 40 mph 50 ft. away	
	Crowded restaurant, garbage disposal		
	Average factory, vacuum cleaner		
	Passenger car 50 mph 50 ft. away	Moderately loud	
70			
60	Quiet typewriter		
	Singing birds, window air-conditioner		
	Quiet automobile		
	Normal conversation, average office	Quiet	
50			
40	Household refrigerator		
	Quiet office	Very quiet	
30			
20	Average home		
	Dripping faucet		
	Whisper 5 feet away		
	Light rainfall, rustle of leaves		
		Average person's threshold of hearing	
10	Whisper	Just audible	
0			
		Threshold for acute hearing	

Sources: World Book, Rand McNally Atlas of the Human Body, Encyclopedia Americana, "Industrial Noise and Hearing Conversation" by J. B. Olishifski and E. R. Harford (Researched by N. Jane Hunt and published in the Chicago Tribune in an illustrated graphic by Tom Heinz.)

## NOISE ABATEMENT CRITERIA

Hourly A-Weighted Sound Level - decibels (dBA)

Activity Category	Leq(h)	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	Undeveloped lands
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: Federal-Aid Highway Program Manual 7-7-3, Procedures for Abatement of Highway Traffic Noise and Construction Noise, Federal Highway Administration, U.S. Department of Transportation, August 9, 1982, revised November 20, 1986.

AMBIENT NOISE LEVELS  
(Leq)

NC-86 (S. Columbia St.) From Manning Drive to US-15/501 Bypass  
Orange County, State Project 9.8070371, U-624

<u>SITE</u>	<u>LOCATION</u>	<u>DESCRIPTION</u>	<u>NOISE LEVEL (dBA)</u>
1	NC-86, 400' N of Mason Farm Rd.	Grassy Area	67
2	NC-86, 30' S of Purefoy Rd.	Gravel/Soil Area	69

Note:

dBA levels at numbered sites were measured at 50 feet from the center of the nearest lane of traffic.

## Leq TRAFFIC NOISE EXPOSURES

NC-86 (S. Columbia St.) From Manning Drive to US-15/501 Bypass  
Orange County, State Project 9.8070371, U-624

Receptor ID #	Receptor Land Use	Receptor Category	Nearest Roadway	Distance to Nearest Roadway	Ambient Noise Level	Distance to Proposed Roadway	Maximum Predicted Noise Level	Noise Level Increase
---------------	-------------------	-------------------	-----------------	-----------------------------	---------------------	------------------------------	-------------------------------	----------------------

## Beginning of Project to Mason Farm Road

1	Business	C	NC-86	215' L	57	200' L	57	0
2	Residence	B	"	110' R	63	130' R	61	-2
3	Residence	B	"	110' R	63	130' R	61	-2
4	Residence	B	"	210' R	57	230' R	56	-1
5	Business	C	"	260' R	55	285' R	54	-1
6	Church	E	"	125' R	61/<40	130' R	61/<40	0
7	Residence	B	"	125' R	61	145' R	60	-1
8	Residence	B	"	120' R	62	140' R	61	-1
9	Residence	B	"	125' R	61	140' R	61	0
10	Research	C	"	85' L	64	60' L	67	+3

## Mason Farm Road to End of Project

11	School	E	NC-86	170' L	61/<40	145' L	61/<40	0
12	School	E	"	170' L	61/<40	145' L	61/<40	0
13	School	E	"	175' L	60/<40	150' L	60/<40	0
14	School	E	"	190' L	60/<40	160' L	60/<40	0
15	School	E	"	175' L	60/<40	150' L	60/<40	0
16	School	E	"	195' L	59/<40	165' L	59/<40	0
17	School	E	"	200' L	59/<40	175' L	59/<40	0
18	Residence	B	"	115' R	64	135' R	61	-3
19	Residence	B	"	140' R	62	150' R	60	-2
20	Residence	B	"	135' R	62	165' R	59	-3
21	Residence	B	"	180' R	60	200' R	58	-2
22	Residence	B	"	185' R	60	200' R	58	-2
23	Residence	B	"	215' R	58	220' R	57	-1
24	Residence	B	"	250' R	57	245' R	56	-1
25	Residence	B	"	30' R	71	50' R	-----R/W-----	
26	Residence	B	"	75' R	67	100' R	64	-3
27	Residence	E	"	135' L	62	100' L	64	+2
28	Residence	B	"	50' L	69	20' R	-----R/W-----	
29	Residence	B	"	100' R	65	130' R	62	-3
30	Residence	E	"	95' R	65	115' R	63	-2

**NOTES:** Distances Are From Center of Existing or Proposed Roadway.  
All Noise Levels are Hourly A-weighted Noise Levels.  
Category E Noise Levels are shown as Exterior/Interior (58/48).  
\* => Traffic Noise Impacts (FHPM 7-7-3, paragraph 4g).

## Leq TRAFFIC NOISE EXPOSURES

NC-86 (S. Columbia St.) From Manning Drive to US-15/501 Bypass  
Orange County, State Project 9.8070371, U-624

Receptor ID #	Receptor Land Use	Receptor Category	Nearest Roadway	Distance to Nearest Roadway	Ambient Noise Level	Distance to Proposed Roadway	Maximum Predicted Noise Level	Noise Level Increase
---------------	-------------------	-------------------	-----------------	-----------------------------	---------------------	------------------------------	-------------------------------	----------------------

## Mason Farm Road to End of Project (continued)

31	Residence	B	NC-86	80' R	66	110' R	63	-3
32	Residence	B	"	50' L	69	20' L	-----R/W-----	
33	Residence	B	"	55' L	69	25' L	-----R/W-----	
34	Residence	B	"	220' R	58	255' R	55	-3
35	Residence	B	"	250' R	57	270' R	54	-3
36	Residence	B	"	190' R	60	210' R	57	-3
37	Residence	B	"	90' R	66	120' R	62	-4
38	Residence	B	"	90' R	66	115' R	63	-3
39	Residence	B	"	60' L	68	20' L	-----R/W-----	
40	Residence	B	"	75' L	67	35' L	-----R/W-----	
41	Residence	B	"	80' R	66	110' R	63	-3
42	Residence	B	"	65' R	68	100' R	64	-4
43	Residence	B	"	65' R	68	100' R	64	-5
* 44	Residence	B	"	85' L	66	55' L	68	+2
* 45	Residence	B	"	110' L	64	75' L	66	+2
46	Residence	B	"	60' L	68	40' L	-----R/W-----	
47	Residence	B	"	320' L	54	285' L	54	0
* 48	Residence	B	"	50' L	69	65' L	67	-2
49	Residence	B	"	140' L	62	165' L	59	-3
* 50	Residence	B	"	50' L	69	65' L	67	-2
* 51	Residence	B	"	50' L	69	70' L	67	-2
* 52	Residence	B	"	50' L	69	75' L	66	-3
* 53	Residence	B	"	90' L	69	70' L	67	-2
* 54	Residence	B	"	65' R	68	50' R	69	+1
* 55	Residence	B	"	75' R	67	55' R	68	+1
56	Residence	B	"	115' R	64	115' R	63	-1
57	Residence	B	"	130' L	63	150' L	60	-3

**NOTES:** Distances Are From Center of Existing or Proposed Roadway.  
All Noise Levels are Hourly A-weighted Noise Levels.  
Category B Noise Levels are shown as Exterior/Interior (58/48).  
\* => Traffic Noise Impacts (FHPM 7-7-3, paragraph 4g).

FHWA NOISE ABATEMENT CRITERIA SUMMARY

NC-86 (S. Columbia St.) From Manning Drive to US-15/501 Bypass  
 Orange County, State Project 9.8070371, U-624

Segment	Maximum Predicted Leq Noise Levels (dBA) <sup>1</sup>			Contour Distances (Maximum) <sup>2</sup>		Approximate Number Of Receptors Approaching or Exceeding FHWA Noise Abatement Criteria					
	50'	100'	200'	72 dBA	67 dBA	A	B	C	D	E	
Beginning of Project to Mason Farm Road	66	62	56	<25'	42'	0	0	0	0	0	
Mason Farm Road to End of Project	66	62	57	<25'	46'	0	9	0	0	0	
						<b>TOTAL</b>	0	9	0	0	0

Footnotes:

1. 50', 100', and 200' distances are measured from center of nearest travel lane.
2. 72 dBA and 67 dBA contour distances are measured from center of proposed roadway.

TRAFFIC NOISE LEVEL INCREASE SUMMARY

NC-86 (S. Columbia St.) From Manning Drive to US-15/501 Bypass  
 Orange County, State Project 9.8070371, U-624

SEGMENT	RECEPTOR EXTERIOR NOISE LEVEL INCREASES								
	<=0	1-2	3-4	5-6	7-8	9-10	11-12	13-14	>=15
Beginning of Project to Mason Farm Road	9	0	1	0	0	0	0	0	0
Mason Farm Road to End of Project	35	5	0	0	0	0	0	0	0
TOTAL	44	5	1	0	0	0	0	0	0

TABLE A1

CALINE3: CALIFORNIA LINE SOURCE DISPERSION MODEL - SEPTEMBER, 1979 VERSION

JOB: NC-86 ORANGE COUNTY U-624

RUN: 2000 BUILD

I. SITE VARIABLES

U = 1 M/S                      CLAS = 5 (E)                      VS = 0 CM/S                      ATIM = 60 MINUTES                      MIXH = 400 M  
 BRG = 7 DEGREES                      ZO = 10 CM                      VD = 0 CM/S                      AMB = 2.4 PPM                      TEMP = 29.1 °F

II. LINK VARIABLES

LINK DESCRIPTION	* LINK COORDINATES (M)				* LINK LENGTH (M)	LINK BRG (DEG)	TYPE	VPH	RF (G/MI)	H (M)	W (M)
	* X1	Y1	X2	Y2							
A. 5-LANE ARTERIAL	* 0	-1000	0	1000	* 2000	360	AG	1259	10.72	0	24.3

III. RECEPTOR LOCATIONS AND MODEL RESULTS

RECEPTOR	* COORDINATES (M)			* CO (PPM)
	* X	Y	Z	
1. R54 RES 50'RIGHT	* -15.2	0	1.8	* 3.3

TABLE A2

CALINE3: CALIFORNIA LINE SOURCE DISPERSION MODEL - SEPTEMBER, 1979 VERSION

JOB: NC-86 ORANGE COUNTY U-624

RUN: 2000 NO-BUILD

I. SITE VARIABLES

U = 1 M/S                      CLAS = 5 (E)                      VS = 0 CM/S                      ATIM = 60 MINUTES                      MIXH = 400 M  
 BRG = 7 DEGREES                      ZO = 10 CM                      VD = 0 CM/S                      AMB = 2.4 PPM                      TEMP = 29.1 °F

II. LINK VARIABLES

LINK DESCRIPTION	* LINK COORDINATES (M)				* LINK LENGTH (M)	LINK BRG (DEG)	TYPE	VPH	RF (G/MI)	H (M)	W (M)
	* X1	Y1	X2	Y2							
A. 2-LANE ARTERIAL	* 0	-1000	0	1000	* 2000	360	AG	1259	10.72	0	13.3

III. RECEPTOR LOCATIONS AND MODEL RESULTS

RECEPTOR	* COORDINATES (M)			* CO (PPM)
	* X	Y	Z	
1. R25 RES 30'RIGHT	* -9.100001	0	1.8	* 3.4

TABLE A3

## CALINE3: CALIFORNIA LINE SOURCE DISPERSION MODEL - SEPTEMBER, 1979 VERSION

JOB: NC-86 ORANGE COUNTY U-624

RUN: 2010 BUILD

## I. SITE VARIABLES

U = 1 M/S	CLAS = 5 (E)	VS = 0 CM/S	ATIM = 60 MINUTES	MIXH = 400 M
BRG = 7 DEGREES	Z0 = 10 CM	VD = 0 CM/S	AMB = 2.4 PPM	TEMP = 29.1 °F

## II. LINK VARIABLES

LINK DESCRIPTION	* LINK COORDINATES (M)				* LINK LENGTH (M)	LINK BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)
	* X1	Y1	X2	Y2							
A. 5-LANE ARTERIAL	* 0	-1000	0	1000	* 2000	360	AG	1259	10.03	0	24.3

## III. RECEPTOR LOCATIONS AND MODEL RESULTS

RECEPTOR	* COORDINATES (M)			* CO (PPM)
	* X	Y	Z	
1. R54 RES 50'RIGHT	* -15.2	0	1.8	* 3.2

TABLE A4

## CALINE3: CALIFORNIA LINE SOURCE DISPERSION MODEL - SEPTEMBER, 1979 VERSION

JOB: NC-86 ORANGE COUNTY U-624

RUN: 2010 NO BUILD

## I. SITE VARIABLES

U = 1 M/S	CLAS = 5 (E)	VS = 0 CM/S	ATIM = 60 MINUTES	MIXH = 400 M
BRG = 7 DEGREES	Z0 = 10 CM	VD = 0 CM/S	AMB = 2.4 PPM	TEMP = 29.1 °F

## II. LINK VARIABLES

LINK DESCRIPTION	* LINK COORDINATES (M)				* LINK LENGTH (M)	LINK BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)
	* X1	Y1	X2	Y2							
A. 2-LANE ARTERIAL	* 0	-1000	0	1000	* 2000	360	AG	1259	10.03	0	13.3

## III. RECEPTOR LOCATIONS AND MODEL RESULTS

RECEPTOR	* COORDINATES (M)			* CO (PPM)
	* X	Y	Z	
1. R25 RES 30'RIGHT	* -9.100001	0	1.8	* 3.4

A-20