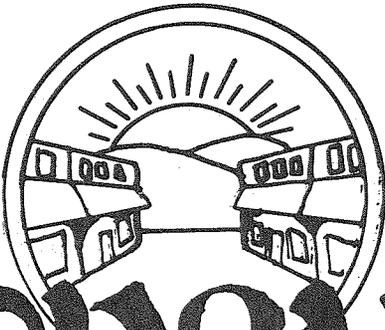




North Carolina Department of Transportation
Statewide Planning Branch
Small Urban Planning Unit

THOROUGHFARE PLAN
FOR



Stoneville

1992

THOROUGHFARE PLAN
FOR
STONEVILLE, NORTH CAROLINA

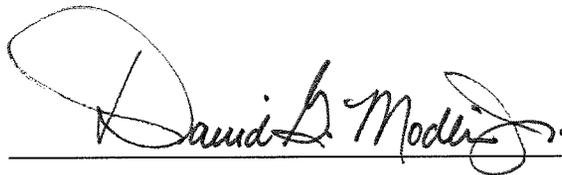
Prepared by the :

Statewide Planning Branch
Division of Highways
N. C. Department of Transportation

In Cooperation with :

The Town of Stoneville
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June, 1992



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EXECUTIVE SUMMARY

In September of 1990 the Town of Stoneville was contacted in a survey conducted by the Piedmont Triad Council of Governments. In response to this survey, the Town requested that the North Carolina Department of Transportation develop a Stoneville Thoroughfare Plan.

Meetings were held with Stoneville's Planning Board in January and February of 1992 to receive their input and to discuss preliminary recommendations. Following these meetings two Thoroughfare Plan Alternates were taken to a meeting with both the Planning Board and the Town Board in March of 1992 for discussion.

The two alternates differed in their proposed alignments connecting South Glenn Street and South Henry Street. The first alternate included a section on new location and proposed an additional railroad crossing. The second alternate utilized existing US 220 Business and the existing railroad crossing. The Planning and Zoning Board unanimously supported the first alternate due primarily to the improvement in safety that would be provided by the proposed railroad crossing.

In April of 1992, a public hearing was held in the Stoneville Town Hall. At the closing of this meeting, the Planning and Zoning Board moved to recommend that the Town Board proceed with adoption of the Thoroughfare Plan.

On April 7, 1992 the Stoneville Town Board adopted the Thoroughfare Plan in a four to one vote.

I. INTRODUCTION

The economic growth of a region is largely dependant on the efficiency of its transportation system. Unless people and goods are able to move from one place to another quickly and conveniently, the area stagnates and fails to reach its full potential. Therefore, it is essential to develop a thoroughfare system which can efficiently handle present and future traffic needs. This report proposes such a system for the Town of Stoneville.

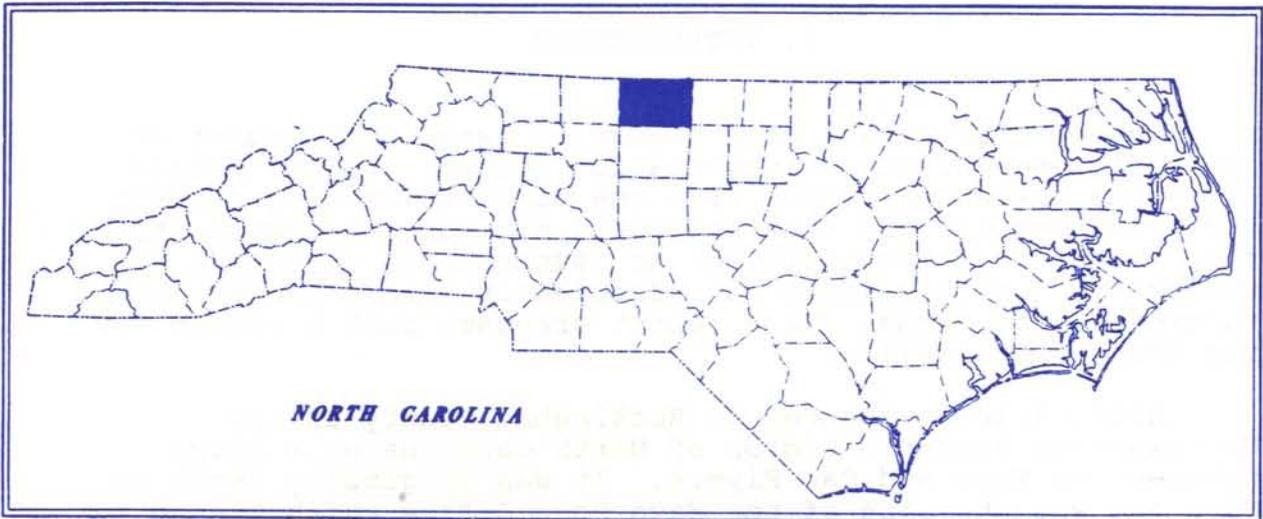
Stoneville is located in Rockingham County in the Northwestern Piedmont region of North Carolina on a ridge between the Mayo and Dan Rivers. It was originally known as Mayo and was the site of the Mayo Post Office which opened in 1821. In 1877 the Town incorporated under its present name and relied primarily on the tobacco trade for its early prosperity.

Today major contributors to Stoneville's economy include the textile and furniture industries and expanded farming production. Highway service to the area is provided by NC 220 and NC 770. NC 220 runs north-south and connects Stoneville to both Greensboro and Martinsville, Virginia. NC 770, the east-west route, links Stoneville to Eden which is seven miles to the east.

The purpose of this report is to present a thoroughfare plan for the Town of Stoneville that will address the area's projected traffic and land development needs for the next twenty years. It defines a functional system of roadways and recommends physical improvements including new road construction and pavement widening. In order for this plan to be of use, the community must coordinate approval of future land development with the thoroughfare plan.

Growth trends in the population, economy, land use, and traffic for the past twenty years were analyzed to project the area's growth to the year 2020. The forecasted traffic volumes and travel patterns determined the extent and type of transportation facilities included in this report.

Lastly, it should be emphasized that the proposed thoroughfare plan is based on the anticipated growth of the Town of Stoneville and its surrounding area as described in this report. It is possible that the actual growth patterns differ somewhat from those logically anticipated. As a result, it may be necessary to accelerate or retard the implementation of some portions of the plan and/or make revisions which will accommodate unexpected changes in urban development.



**GEOGRAPHIC LOCATION
OF**

STONEVILLE

ROCKINGHAM COUNTY

FIGURE 1

II. THOROUGHFARE PLANNING PRINCIPLES

Objectives

Typically, the urban street system occupies 25 to 30 percent of the total developed land in an urban area. Since the system is permanent and expensive to build and maintain, care and foresight are needed in its development. Thoroughfare planning is the process public officials use to assure the development of the most appropriate street system to meet the existing and future travel desires within the urban area.

The primary aim of a thoroughfare plan is to guide the development of the urban street system in a manner consistent with changing traffic demands. Through proper planning for street development, costly errors and needless expense can be averted. A thoroughfare plan will enable street improvements to be made as traffic demands increase, and help eliminate unnecessary improvements. By developing the urban street system to keep pace with increasing traffic demands, a maximum utilization of the system can be attained that will require a minimum amount of land for street purposes. In addition to providing for traffic needs, the thoroughfare plan should embody those details of good urban planning necessary to present a pleasing and efficient urban community. The location of present and future population, commercial enterprises, and industry affects major street and highway locations. Conversely, the location of major streets and highways within the urban area will influence the urban development pattern.

Other objectives of a thoroughfare plan include:

- (1) To provide for the orderly development of an adequate major street system as land development occurs;
- (2) To reduce travel and transportation costs;
- (3) To reduce the cost of major street improvements to the public through the coordination of a street system with private action;
- (4) To enable private interests to plan their actions, improvements, and development with full knowledge of public intent;
- (5) To minimize disruption and displacement of people and businesses through long range advance planning for major street improvements;
- (6) To reduce environmental impacts such as air pollution, resulting from transportation;
- (7) To increase travel safety.

Thoroughfare planning objectives are achieved through both: (1) improving the operational efficiency of thoroughfares; and (2) improving the system efficiency through system coordination and layout.

Operational Efficiency

A street's operational efficiency is improved by increasing the capability of the street to carry vehicular traffic and people. In terms of vehicular traffic, a street's capacity is defined as the maximum number of vehicles which can pass a given point on a roadway during a given time period under prevailing roadway and traffic conditions. Capacity is affected by the physical features of the roadway, nature of traffic, and weather.

Physical ways to improve vehicular capacity include **street widening, intersection improvements, improving vertical and horizontal alignment, and eliminating roadside obstacles**. For example, widening of a street from two to four travel lanes more than doubles the capacity of the street by providing additional maneuverability for traffic. Impedances to traffic flow caused by slow moving or turning vehicles and adverse effects of horizontal and vertical alignments are thus reduced.

Operational ways to improve street capacity include:

- (1) **Control of access** - A roadway with complete access control can often carry three times the traffic handled by a non-controlled access street with identical lane widths and number of lanes.
- (2) **Parking removal** - Increases capacity by providing additional street width for traffic flow and reducing friction to flow caused by parking and unparking vehicles.
- (3) **One-way operation** - The capacity of a street can sometimes be increased 20-50%, depending upon turning movements and overall street width, by initiating one-way traffic operations. One-way streets can also improve traffic flow by decreasing potential traffic conflicts and simplifying traffic signal coordination.
- (4) **Reversible lanes** - Reversible traffic lanes may be used to increase street capacity in situations where heavy directional flows occur during peak periods.
- (5) **Signal phasing and coordination** - Uncoordinated signals and poor signal phasing restrict traffic flow by creating excessive stop-and-go operation.

Altering travel demand is a third way to improve the efficiency of existing streets. Travel demand can be reduced or altered in the following ways:

- (1) Encourage people to form **carpools** and **vanpools** for journeys to work and other trip purposes. This reduces the number of vehicles on the roadway and raises the people carrying capability of the street system.
- (2) Encourage the use of alternate modes of travel such as **transit** and **bicycles**.
- (3) Encourage industries, business, and institutions to **stagger work hours** or establish variable work hours for employees. This will reduce travel demand in peak periods and spread peak travel over a longer time period.
- (4) Plan and encourage **land use development** or redevelopment in a more travel efficient manner.

System Efficiency

Another means of altering travel demand is the development of a more efficient system of streets that will better serve travel desires. A more efficient system can reduce travel distances, time, and cost. Improvements in system efficiency can be achieved through the concept of functional classification of streets and development of a coordinated major street system.

Functional Classification

Streets perform two primary functions -- traffic service and land access -- which when combined, are basically incompatible. The conflict is not serious if both traffic and land service demands are low. However, when traffic volumes are high, conflicts created by uncontrolled and intensely used abutting property lead to intolerable traffic flow friction and congestion.

The underlying concept of the thoroughfare plan is that it provides a functional system of streets which permits travel from origins to destinations with directness, ease and safety. Different streets in this system are designed and called on to perform specific functions, thus minimizing the traffic and land service conflict. Streets are categorized as to whether they function as local access streets, minor thoroughfares or major thoroughfares (**see Figure 2**).

Local access streets provide access to abutting property. They are not intended to carry heavy volumes of traffic and should be located such that only traffic with origins and destinations on the streets would be served. Local streets may be further classified as either residential, commercial and/or industrial depending upon the type of land use which they serve.

Minor thoroughfares are more important streets in the city system. They collect traffic from local access streets and carry it to the major thoroughfare system. They may in some instances supplement the major thoroughfare system by facilitating minor through traffic movements. A third function which may be performed is that of providing access to abutting property. They should be designed to serve limited areas so that their development as major thoroughfares will be prevented.

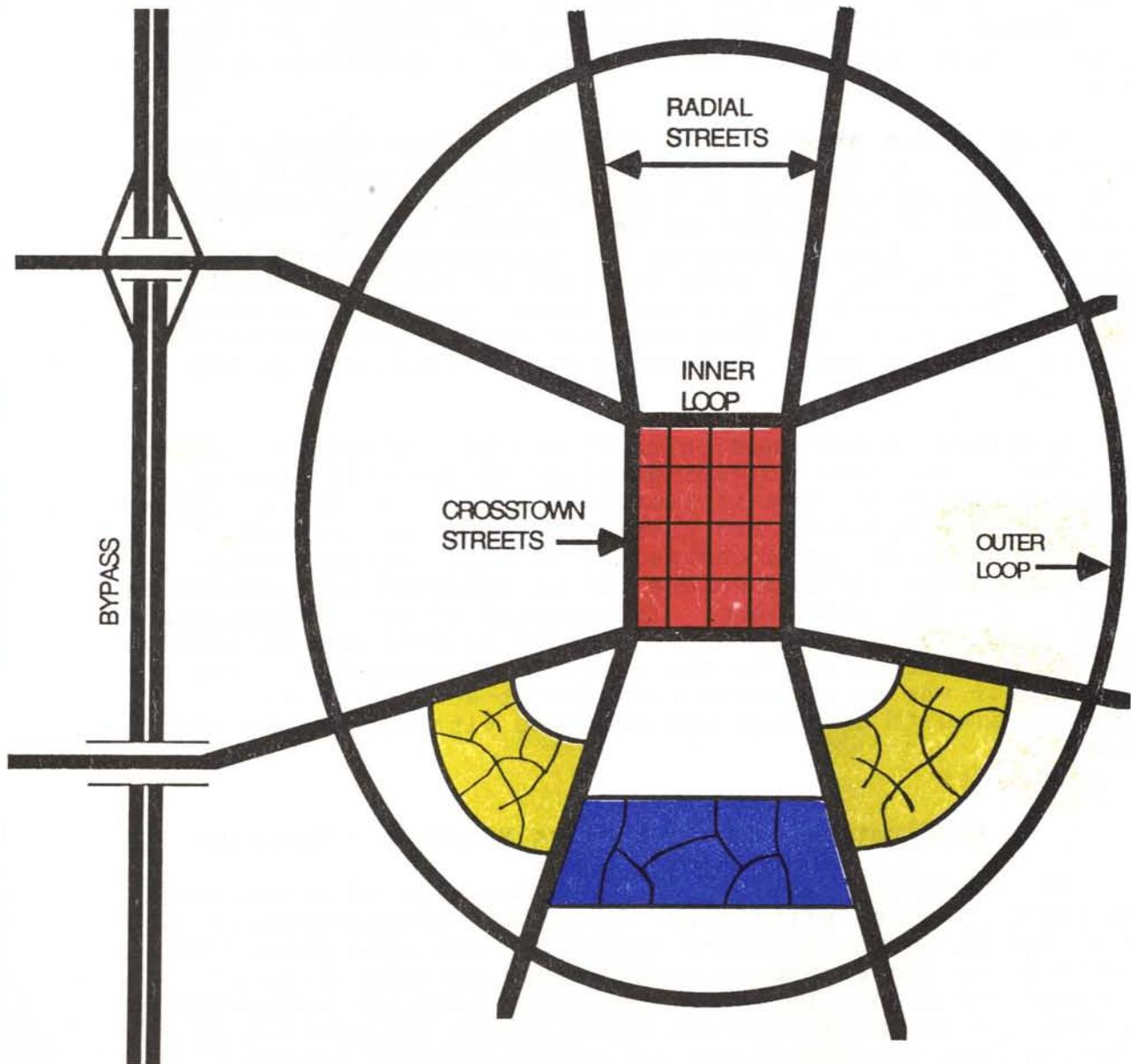
Major thoroughfares are the primary traffic arteries of the city. Their function is to move intra-city and inter-city traffic. The streets which comprise the major thoroughfare system may also serve abutting property; however, THEIR MAJOR FUNCTION IS TO CARRY TRAFFIC. They should not be bordered by uncontrolled strip development because such development significantly lowers the capacity of the thoroughfare to carry traffic and each driveway is a danger and an impediment to traffic flow. Major thoroughfares may range from a two-lane street carrying minor traffic volumes to major expressways with four or more traffic lanes. Parking normally should not be permitted on major thoroughfares.

Idealized Major Thoroughfare System

A coordinated system of major thoroughfares forms the basic framework of the urban street system. A major thoroughfare system which is most adaptable to desire lines of travel within an urban area and which permits movement between various areas of the city with maximum directness is the radial-loop system. This system consists of several functional elements--radial streets, crosstown streets, loop system streets, and bypasses (**Figure 2**).

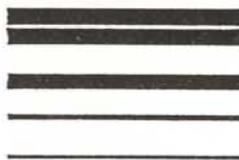
Radial streets provide for traffic movement between points located in the outskirts of the city and the central area. This is a major traffic movement in most cities, and the economic strength of the central business district depends upon the adequacy of this type of thoroughfare.

IDEAL SMALL URBAN THOROUGHFARE PLAN



MAJOR THOROUGHFARE BYPASS

OTHER MAJOR THOROUGHFARES
MINOR THOROUGHFARES
LOCAL LAND ACCESS STREETS



LAND USES:

RESIDENTIAL



COMMERCIAL



INDUSTRIAL



F.L.R.

FIGURE 2

If all radial streets crossed in the central area, an intolerable congestion problem would result. To avoid this problem, it is very important to have a system of **crosstown streets** which form a loop around the central business district. This system allows traffic moving from origins on one side of the central area to destinations on the other to follow the area's border and allows central area traffic to circle and then enter the area near a given destination. The effect of a good crosstown system is to free the central area of crosstown traffic, thus permitting the central area to function more adequately in its role as a pedestrian shopping area.

Loop system streets move traffic between suburban areas of the city. Although a loop may completely encircle the city, a typical trip may be from an origin near a radial thoroughfare to a destination near another radial thoroughfare. Loop streets do not necessarily carry heavy volumes of traffic, but they function to relieve central areas. There may be one or more loops, depending on the size of the urban area, and they are generally spaced one-half mile to one mile apart, depending on the intensity of the land use.

A **bypass** is designed to carry traffic through or around the urban area, thus providing relief to the city street system by removing from it traffic which has no desire to be in the city. Bypasses are usually designed to through highway standards, with control of access. Occasionally, a bypass with low traffic volume can be designed to function as a portion of an urban loop. The general effect of bypasses is to expedite the movement of through traffic and to improve traffic conditions within the city. By freeing the local streets for use by shopping and home-to-work traffic, bypasses tend to increase the economic vitality of the local area.

Application of Thoroughfare Planning Principles

The concepts presented in the discussion of operational efficiency, system efficiency, functional classification, and idealized major thoroughfare system are the conceptual tools available to the transportation planner in developing a thoroughfare plan. In actual practice, thoroughfare planning is done for established urban areas and is constrained by existing land use and street patterns, existing public attitudes and goals, and current expectations of future land use. Compromises must be made because of these and the many other factors that affect major street locations.

Throughout the thoroughfare planning process it is necessary from a practical viewpoint that certain basic principles be followed as closely as possible. These principles are as follows:

- (1) The plan should be derived from a thorough knowledge of today's travel - its component parts, as well as the factors that contribute to it, limit it, and modify it.
- (2) Traffic demands must be sufficient to warrant the designation and development of each major street. The thoroughfare plan should be designed to accommodate a large portion of all major traffic movements on a relatively few streets.
- (3) The plan should conform to and provide for the land development plan of the area.
- (4) Certain considerations must be given to urban development beyond the current planning period. Particularly in outlying or sparsely developed areas which have development potential, it is necessary to designate thoroughfares on a long-range planning basis to protect rights-of-way for future thoroughfare development.
- (5) While being consistent with the above principles and realistic in terms of travel trends, the plan must be economically feasible.

III. EXISTING AND PROJECTED CONDITIONS

Factors Affecting Transportation

Thoroughfare planning is a process whose objective is to develop a transportation system which will enable people and goods to travel safely and economically. To determine the needs of an area its population, land use, and traffic must be examined. To make these determinations, it is important to understand and describe the type and volume of travel which takes place in the area, and also to clearly identify the goals and objectives to be met by the transportation plan.

In order to fulfill the objectives of an adequate twenty year thoroughfare plan, reliable forecasts of future travel patterns must be achieved. Such forecasts are possible only when the following major items are carefully analyzed:

(1) significant trends in the economy; (2) historic and potential population changes; (3) character and intensity of land development; and (4) ability of the existing transportation system to meet existing and future travel demand. Additional items that vary in influence include the effects of legal controls such as zoning ordinances and subdivision regulations, availability of public utilities and transportation facilities, and topographic and other physical features of the urban area.

Economy and Employment

In recent years, industry has grown in importance in and around Stoneville. The town's largest employer is Stoneville Furniture which employs approximately 525 persons. Its location along both sides of a two block section of South Henry Street contributes significant truck traffic to the surrounding street system. Stoneville's second largest employer is Macfield Textiles located on NC 770 east of town. Macfield employs approximately 425 persons in the textiles industry.

Other sources of employment include the central business district (CBD) around Henry and Main Streets and some companies along US 220 Bypass. The citizens of Stoneville consider the CBD to be the heart of their community and have joined together to renovate this area.

Population Trends

Travel is directly related to population. The volume of traffic on any road is a direct result of the size and distribution of the area's population. The population growth has been slow for the Town of Stoneville and for Rockingham County, meanwhile the Mayo Township demonstrates a faster paced growth. **Table 1** shows the past and projected population figures for Stoneville and its vicinity.

TABLE 1

POPULATION TRENDS AND PROJECTIONS					
YEAR	1960	1970	1980	1990	2020
Rockingham Co.	69,629	72,402	83,426	86,064	87,561
Mayo Township	3,940	4,458	5,519	5,988	9,647
Stoneville Planning Area	1,770	2,010	2,480	2,770	4,340

NOTE: The planning area population is estimated to be 45% of the Township. Population data obtained from Office of State Planning.

Land Use

The generation of traffic on a particular street is closely related to the adjacent land use. Attraction between different land uses varies with the intensity and spatial separation of the uses. As a result, for the purpose of transportation planning, it is necessary to designate land use by type. An analysis of the distribution of existing land uses serves as a basis for fore-casting future land use needs and the resulting travel patterns.

For thoroughfare planning purposes, the land uses were grouped into four broad categories: **(1) Residential** - all land devoted to the housing of people, with the exception of hotels and motels; **(2) Commercial** - all land devoted to retail trade, including consumer and business services and offices; **(3) Industrial** - all land devoted to manufacturing, storage, warehousing, and transportation of products; and **(4) Public** - all land devoted to social, religious, educational, cultural, and political activities.

The Stoneville planning area's land use is shown in **Figure 3**.

Existing Highway System

Currently, Stoneville is served by US 220 and NC 770. US 220 Bypass is a 2-lane highway that runs north-south. It is programmed in the T.I.P. for improvement to a 4-lane facility with a median. US 220 Business carries traffic past Stoneville Furniture through the center of Town. The east-west thoroughfare, NC 770, is a 2-lane highway that intersects with US 220 Business at the center of Town.

The US 220 Bypass, with its programmed improvements, should adequately meet foreseeable traffic demand through the design period. US 220 Business and NC 770 are both well maintained in the planning area and no improvements are directly recommended to them. However, both routes intersect in the center of Town and are subject to significant truck traffic from Stoneville Furniture and Macfield textiles. This central intersection contributes to backups and it decreases the general level-of-service. Therefore an alternate route is recommended that avoids the center of Town.

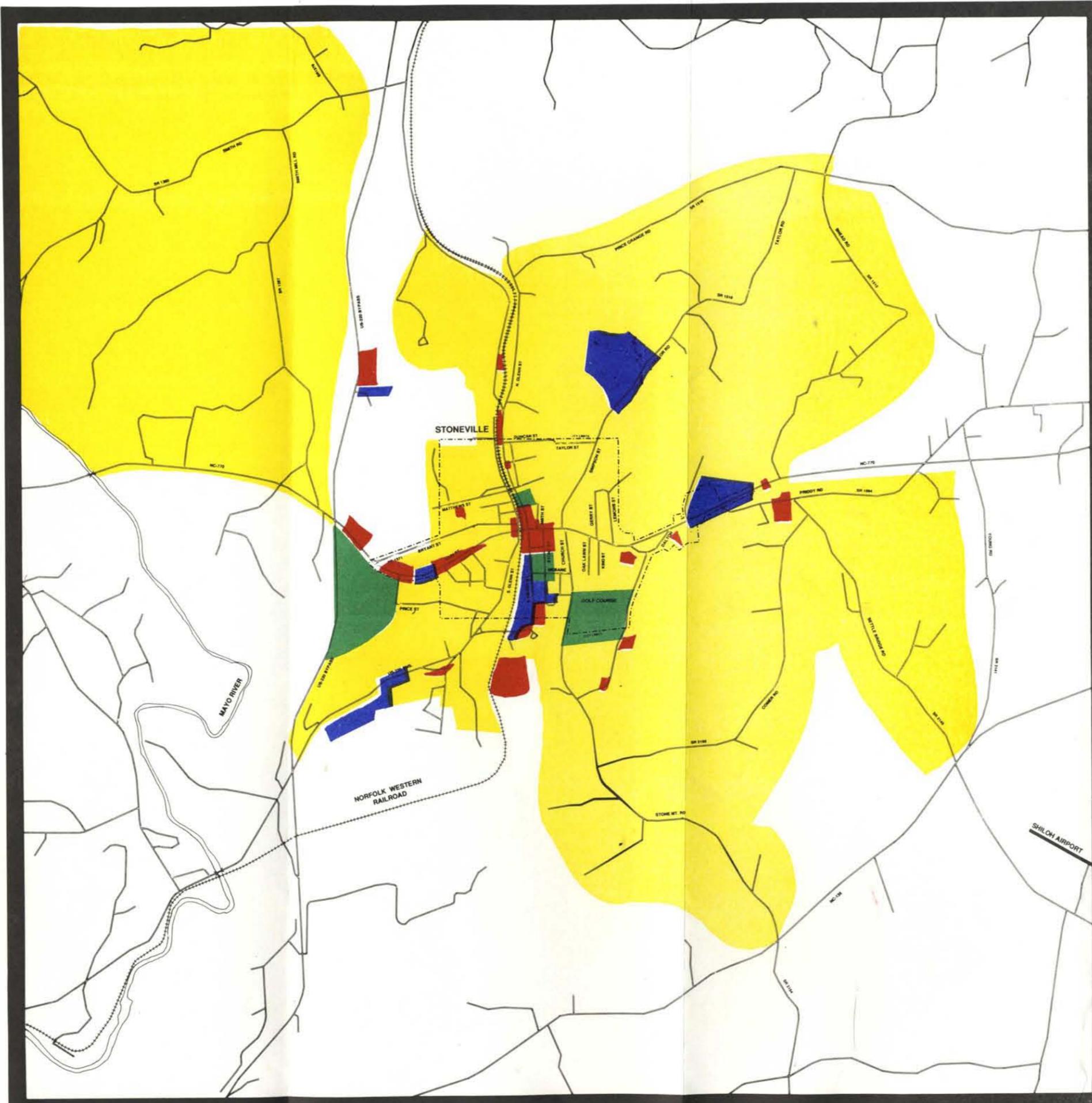
The existing system is shown with current and projected traffic in **Figure 4**.

Traffic Accidents

Accident records for January 1988 through December 1990 were studied for the Stoneville planning area. The majority of the accidents occurred during the afternoon rush hour along East Main Street, South Henry Street, and at the intersection of Mebane and Stone Streets. However, the quantity of accidents during the study period was extremely low with the highest frequency being three accidents at each of the two previously mentioned locations over a three year period.

Railroad

Norfolk and Western Railroad operates a line through the heart of Stoneville. Overhead railroad structures provide grade separation with US 220 Business immediately north and south of the Stoneville city limits. Both structures are over sixty years in age and provide for only two lanes of traffic with a 13 foot 6 inch vertical clearance. An at-grade crossing over NC 770 is less than 200 feet from the signalized intersection of NC 770 (Main Street) and US 220 Business (Henry Street). About 9 trains pass through this intersection at 35 mph with no switching movements each day.



LEGEND

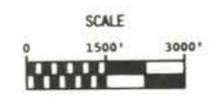
- RESIDENTIAL
- COMMERCIAL
- INDUSTRIAL
- PUBLIC

LAND USE

FIGURE 3



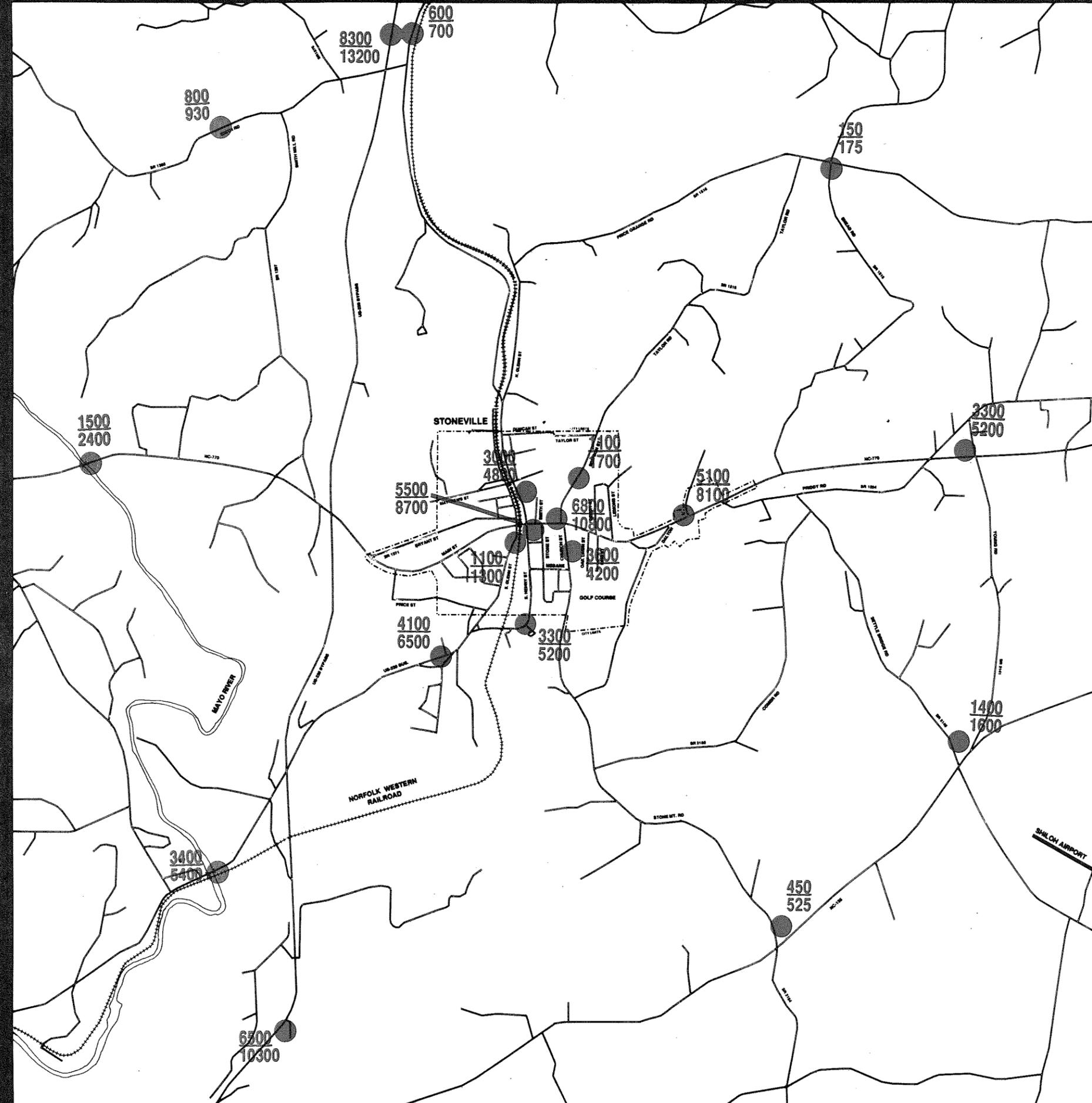
STONEVILLE
 COUNTY
 NORTH CAROLINA
 PREPARED BY THE
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS-PLANNING AND ENVIRONMENTAL BRANCH
 IN COOPERATION WITH
 U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION



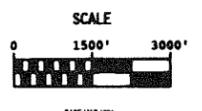
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FIGURE 4 CURRENT AND PROJECTED ADTs

1989
2020 ADTs



STONEVILLE
 COUNTY
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 NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS-PLANNING AND ENVIRONMENTAL BRANCH
 IN COOPERATION WITH
 U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION



DATE MAP 1981

IV. SYSTEM DEFICIENCIES

Deficiencies in a road system are evidenced by poor levels of service, high accident locations, and, in general, a difficulty in traveling from an origin to a particular destination. These deficiencies include highway sections where either the lane widths do not meet state standards, the bridges are obsolete and structurally deficient, or the accident frequency is excessive.

The most evident deficiency in Stoneville's street network is that all major routes currently run through the center of town. Presently, this problem is not at a critical level, but any future growth could cause a major breakdown. Therefore, a system is needed that will allow vehicles, especially trucks, to access the highways without being forced through the downtown area.

The railroad structure over US 220 Business south of Town is a hazard because its clearance is too low for large trucks. Trucks have become stuck beneath the structure or have had to back up in the curve to avoid it. This provides the potential for severe accidents in addition to stopping traffic. The at-grade railroad crossing is also a problem because it is so close to the signalized intersection of US 220 Business and NC 770. If traffic backs up at the signal, vehicles can get caught on the tracks.

There are also deficiencies in the continuity of Stoneville's major street system. System continuity is the ability to travel between different sections of the planning area in a direct and efficient manner. The proposed southern loop as well as improvements to Duncan and Taylor Streets and the extension of Settle Bridge Road will improve system continuity.

Capacity Analysis

Capacity is defined as the maximum number of vehicles, under prevailing roadway and traffic conditions, that have a reasonable expectation of passing over a given roadway section in one or both directions during a given time period. A comparison of capacity with actual traffic volumes is a good indicator of the adequacy of the existing major street network.

An analysis of roads in Stoneville was made to determine if the projected traffic (year 2020) would exceed the practical capacity of the system. Based on this analysis, only two sections of road are expected to approach their capacity within the design period:

1. US 220 Business (S. Henry St.) from Main St. to US 220 Bypass
2. US 770 (Main St.) from S. Henry St. to Dalton Loop

In an urban area, a street's ability to move traffic is generally controlled by the spacing of major intersections, the pavement width, and the type and number of traffic control devices. These characteristics can be manipulated to increase the capacity and improve the level of service.

The level of service is a function of the ease of movement experienced by motorists using the facility. Six levels of service, shown in **Figure 5**, have been selected to identify the conditions existing under various speed and volume conditions on any highway or street. The six levels of service are:

1. **Level of service A** - A condition of free flow with low traffic volumes and high speeds. Individual users are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to maneuver within the traffic stream is extremely high. The general level of comfort and convenience provided to the motorist, passenger, or pedestrian is excellent.
2. **Level of service B** - A zone of stable flow, where the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver within the traffic stream from LOS A, because the presence of others in the traffic stream begins to affect individual behavior.
3. **Level of service C** - Also in the range of stable flow, but the operation of individual users becomes significantly affected by interactions with others in the traffic stream. The selection of speed is now affected by the presence of others, and maneuvering within the traffic stream requires substantial vigilance on the part of the user. The general level of comfort and convenience declines noticeably at this level.

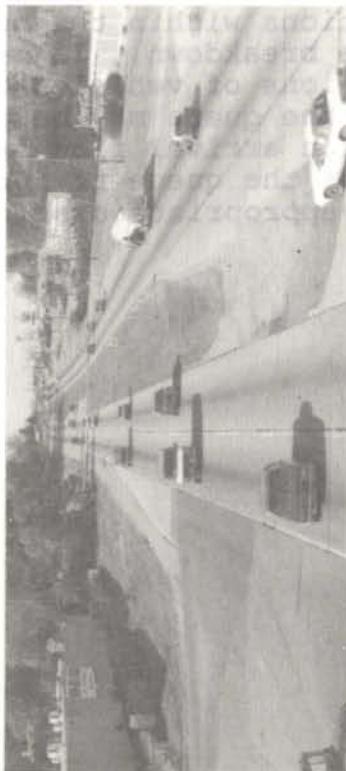
4. **Level of service D** - Approaches unstable flow, where speed and freedom to maneuver are severely restricted. The driver or pedestrian experiences a generally poor level of comfort and convenience. Small increases in traffic flow will generally cause operational problems at this level.
5. **Level of service E** - Represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform value. Maneuvering within the traffic stream is extremely difficult, and it is generally accomplished by forcing a vehicle or pedestrian to "give way" to accommodate such maneuvers. Comfort and convenience levels are extremely poor. Driver and pedestrian frustration is generally high. Operations at this level are usually unstable because small increases in flow or minor perturbations within the traffic stream will cause breakdowns.
6. **Level of service F** - Forced flow operations at low speeds, where volumes are below capacity. This condition exists wherever the amount of traffic approaching a point exceeds the amount which can traverse the point. Queues form behind such locations. Operations within the queue are characterized by stop-and-go waves, and they are extremely unstable. Vehicles may progress at reasonable speeds for several hundred feet or more, then be required to stop in a cyclic fashion. Level-of-service F is used to describe the operating conditions within the queue, as well as the point of the breakdown. In many cases, operating conditions of vehicles or pedestrians discharged from the queue may be quite good. It is the point at which arrival flow exceeds discharge flow which causes the queue to form. Level-of-service F is an appropriate designation for such points.



LEVEL OF SERVICE - A



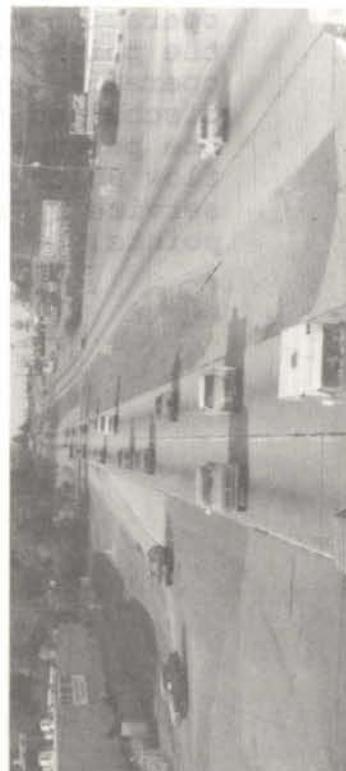
LEVEL OF SERVICE - D



LEVEL OF SERVICE - B



LEVEL OF SERVICE - E



LEVEL OF SERVICE - C



LEVEL OF SERVICE - F

LEVELS OF SERVICE

FIGURE 5

V. THOROUGHFARE PLAN

A brief discussion of the classified roads in the Stoneville Thoroughfare Plan is included in the following section. The recommended plan itself is shown in **Figure 6**. Specific details on physical and operational characteristics are given in **Appendix B, Table 5**.

Major Thoroughfares

Existing major thoroughfares include:

US 220 Bypass - This highway serves as the major carrier for north-south traffic. It is currently 2 lanes with partial control of access and grade separations at all intersections in the planning area. Widening to 4 lanes from NC 704 to the Virginia State line is scheduled to begin construction in 1993 in the North Carolina Transportation Improvement Program (TIP R-2232). No additional improvements to this facility are deemed necessary.

US 220 Business - This route brings traffic from Mayodan and the US 220 Bypass to the center of Town. It is recommended that sections of this road be widened with the addition of paved shoulders for a uniform 24-foot width throughout the planning area. These improvements will increase safety and improve driver comfort. It would also be beneficial if off-street parking were provided for employees of Stoneville Furniture. This roadside parking is detrimental to the downtown level of service.

NC 770 - NC 770 serves as the travelway between Stoneville and Eden and also connects with the US 220 Bypass. It is a 2-lane facility and has on-street parking in the downtown area. The projected design year volume approaches capacity between the intersections with South Henry St. and Church St. The recommended Southern Loop should alleviate this traffic thereby eliminating the need for major improvements to NC 770.

Ponderosa Road (SR 2157) - Ponderosa road connects NC 770 with SR 2154. It is an integral part of the proposed Southern Loop which will tie into it immediately south of the golf course. It is recommended that the section between NC 770 and this tie-in be improved to a 24-foot cross section.

Settle Bridge Road (SR 2145) - This route provides access from NC 770 across from the textile plant to NC 135 in the south. A connector is proposed extending SR 2145 from Priddy Road to NC 770. This would allow better access to NC 770 and eliminate unnecessary travel on Priddy Road. Widening to meet State standards is also recommended for this road.

Simpson St./Taylor Rd. (SR 1518) - SR 1518 is predicted to continue carrying small volumes of traffic and remain well within capacity through the design year. It should be widened to a standard 24 feet.

Southern Loop - This proposed facility will consist of both improvement of existing roads and construction on new location. It would allow traffic to travel throughout the planning area without having to pass through the intersection of NC 770 and NC 220 Business. It would utilize existing sections of Price Street, Ponderosa Road and Dalton Street and would accommodate any future growth in Stoneville. This facility will benefit Stoneville by reducing travel through the center of Town, allowing trucks from local industry to more efficiently access the highways, and providing a safer grade separation railroad crossing as an alternate to the existing structure over US 220 Business.

Smith Rd. (SR 1360) - Smith Road is located in the northwest section of the planning area and runs from US 220 Business to the west. It has an adequate cross section.

Snead Rd. (SR 1515) - This road carries a small volume of traffic between NC 770 and the northern boundary of the planning area. There are a few houses along either side of this road. Snead Road is adequate for the small amount of traffic that it carries. However it should be widened to meet State standards.

Stone Mt. Road (SR 2154) - Traffic counts on this road between NC 135 and the Town limits are very low. They increase significantly in Town (Church St.) but are still well below capacity and are predicted to stay that way. It is recommended to be widened to 24 feet in order to meet State standards.

Minor Thoroughfares

Existing minor thoroughfares include:

Bryant St. (SR 1371) - This connector between NC 770 and North Glenn Street is adequate.

Comer Rd. (SR 2155) - This connector between Stone Mountain Road and Settle Bridge Road has an adequate cross section.

Duncan St./Taylor St. - These streets serve together as offset local streets connecting North Henry Street and Simpson Street. Currently the middle section connecting them is unpaved. It is recommended that the alignment in the center section be improved and then paved.

Mebane St. - Mebane Street connects South Henry Street and Church Street. No changes are recommended in its width.

North Glenn St./Price Grange Rd. (SR 1516) - The existing cross section is adequate.

Smith Mill Rd. (SR 1397) - Smith Mill Road serves as a connector between NC 770 and SR 1360. The cross section is adequate.

South Glenn St. - A collector for neighborhoods in the southwest part of the planning area, its cross section is adequate.

Stone St. - It is recommended that this minor connector be extended to the proposed Price Street extension. This extension would be located on an existing gravel road and gravel truck parking lot. The existing road should be widened from Mebane Street south to the proposed extension. The existing width between NC 770 and Mebane Street does not require improvement.



LEGEND

	EXISTING	PROPOSED
MAJOR THOROUGHFARES		
MINOR THOROUGHFARES		

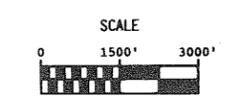
ADOPTED BY:
 STONEVILLE APRIL 7, 1992
 STATEWIDE PLANNING BRANCH APRIL 13, 1992 *m.r. De*
 N.C. DEPT. OF TRANSPORTATION MAY 8, 1992
 PUBLIC HEARING DATE APRIL 6, 1992



**FIGURE 6
 THOROUGHFARE PLAN**

STONEVILLE
 & VICINITY
 ROCKINGHAM CO.
 NORTH CAROLINA
 PREPARED BY THE
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS-PLANNING AND ENVIRONMENTAL BRANCH
 IN COOPERATION WITH
 U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION

MARCH 3, 1992



VI. CONSTRUCTION PRIORITIES

Construction priorities depend on the potential that proposed projects have to satisfy various objectives. Some of the most important objectives are (1) improvement of the State's arterial system; (2) cost effective improvement of the safety and level-of-service of all roads and highways on the State system; (3) encouragement of economic development; (4) preservation of the environment; and (5) fair and equitable allocation of project funding.

Environmental Concerns

Evaluation of the environmental impacts of a project is one of the more difficult tasks. Environmental factors usually considered in highway project evaluation can be divided into three categories -- physical, social and/or cultural, and economic. Factors from all of these categories are utilized in the benefits analysis. The relative environmental impact of a project is measured by summing the positive and negative impacts. The primary environmental factors considered in the project evaluation are shown in **Table 2**.

TABLE 2

Environmental Considerations		
Physical Environment	Social and/or Cultural Environment	Economic Environment
Air Quality	Housing	Businesses
Water Resources	Neighborhoods	Employment
Wildlife	Noise	Economic Development
Vegetation	Education Facilities	Public Utilities
	Churches	Transportation Costs
	Park and Recreational Facilities	Capital Costs
	Public Health and Safety	Operation and Maintenance Costs
	National Defense	
	Aesthetics	

Benefits Analysis

The major element of the Stoneville Thoroughfare Plan is a proposed Southern Loop that is composed of sections on new location between the following roads; NC 770 and Price Street; South Henry Street and Stone Mountain Road; Stone Mountain Road and Ponderosa Road; and Dalton Loop and NC 770. It also includes improvements to existing Price Street and Ponderosa Road.

A benefits analysis was completed for the entire loop and the results are shown in **Table 3**. The loop was then partitioned into three sections which were each separately analyzed. These sections are prioritized in **Table 3** on the basis of potential benefits per mile. This prioritization is meant to direct the construction of the loop in sections as funds become available.

The three analyzed sections of the loop are described below:

- 1) South Henry St. (US 220 Bus) to NC 770
- 2) Stone Mt. Rd. (SR 2154) to South Henry St (US 220 Bus)
- 3) NC 770 to Stone Mt. Rd. (SR 2154)

TABLE 3

Project	Benefits (1000's)	Costs (1000's)	Length Mile	Benefit Per Mile	Econ. Benefit	Environ. Impact
Southern Loop	8,911	2,441	1.78	5,006	+ 0.5	+ 0.6 - 0.4
Section #1 *	1,410	1,677	0.68	2,074	+ 0.4	+ 0.6 - 0.1
Section #2	396	257	0.21	1,886	+ 0.2	+ 0.3 - 0.1
Section #3	917	757	0.88	1,042	+ 0.3	+ 0.4 - 0.3

* This project section provides a considerable safety benefit with a new railroad grade separation.

Project Costs

Construction cost estimates for all elements of the Stoneville Thoroughfare Plan are shown below. These values are based on rough estimates of both construction and right-of-way costs. Suggested funding sources for each project are listed in **Table 5**.

TABLE 4

Potential Project Cost Estimates	
Project Description	Total Cost (1000's)
Southern Loop	2,441
Settle Bridge Rd. (SR 2145) extension	213
Stone St. widening & extension	280
Duncan St. & Taylor St. improvements	57
SR 2154 widening	2,350
SR 2145 widening	1,540
SR 1515 widening	1,590
SR 1518 widening	2,340
US 220 Business widening	331

VII. IMPLEMENTATION

There are several methods through which a local government may implement a Thoroughfare Plan. They are as follows:

State-Municipal Adoption of the Thoroughfare Plan

Both the Town of Stoneville and the North Carolina Department of Transportation have responsibility for implementation of the Stoneville Thoroughfare Plan. Chapter 136, Article 3A, Section 136-66.2 of the North Carolina General Statutes provides that after development of a thoroughfare plan, the plan may be adopted by the governing body of the municipality and the Board of Transportation as the basis for future street and highway improvements. After mutual adoption, negotiations will begin to determine which of the existing and proposed thoroughfares will be a Department of Transportation responsibility and which will be a municipal responsibility. Facilities which are designated as State responsibility will be constructed and maintained by the Division of Highways; however, the municipality may share in the right-of-way cost. This share of costs will be determined at the time of construction.

In general, the State is responsible for those facilities which will be serving major volumes of through traffic and traffic from outside the area to major commercial, industrial, and institutional areas inside the municipality. Those facilities which will serve primarily internal traffic are to be a municipal responsibility.

After adoption of the thoroughfare plan, a municipality has the legal authority provided by the General Statutes of North Carolina to protect existing and proposed highway corridors through subdivision regulations and future street-line ordinances.

Subdivision Controls

Subdivision regulations require every subdivider to submit to the local planning commission a plan of his proposed subdivision and requires that the subdivision be constructed to certain standards. Through this process, it is possible to require the subdivision streets to conform to the Thoroughfare Plan and to reserve or protect necessary rights-of-way for projected roads and highways that are to become a part of the Thoroughfare Plan. The construction of subdivision streets to adequate standards would reduce maintenance costs and would facilitate the transfer of the streets to the State Highway System. **Appendix B** outlines the recommended design standards.

Roadway Corridor Official Map

North Carolina General Statutes 136-44.50 through 133-44.53 are collectively designated as the "Roadway Corridor Official Map Act." For cities contemplating the adoption of a Roadway Corridor Map, more commonly referred to as an official street map, there several things to consider prior to implementation. First and foremost, it should be recognized that an official street map places severe, but temporary, restrictions on private property rights. These restrictions are in the form of a prohibition, for a period of up to three years, for the issuance of building permits or subdivision of property lying within an official street map corridor. This authority should be used carefully and only in cases where less restrictive powers will be ineffective. The Price Street Extension is an example of a proposal that could be protected by using an Official Street Map.

The Statute establishing the Official Street Map authority is fairly explicit in outlining the procedures to be followed and the types of projects to be considered. As required by the Statute, a project being considered for an Official Street Map must be programed in the State's Transportation Improvement Program (TIP) **or** included in a locally adopted capital improvement plan, in addition to appearing on the adopted street system plan. The Statute states that the capital improvement plan must be for a period of ten years or less, and must identify the estimated cost of acquisition and construction of the proposed project as well as the anticipated financing.

The Program and Policy Branch of the North Carolina Department of Transportation is responsible for facilitating the adoption of Official Street Maps. Cities considering Official Street Map projects should contact this Branch for their "Guidelines for Municipalities Considering Adoption of Roadway Corridor Maps" at:

Programming and Policy Branch
NC Department of Transportation
P.O. Box 25201
Raleigh, NC 27611

Zoning

A zoning ordinance can be beneficial to thoroughfare planning in that planned locations of various land uses and planned densities of dwellings can be realized. This provides a degree of stability on which to make future traffic projections and to plan streets and highways.

Other benefits of a good zoning ordinance are: **(1)** the establishment of standards of development which will aid

traffic operations on major thoroughfares, and (2) minimizing strip commercial development which creates traffic friction and increases the traffic accident potential.

Urban Renewal

Urban renewal is defined as the rehabilitation of downtown areas by demolishing, remodeling, or repairing existing structures in accordance with comprehensive plans. This process allows for corrections to basic problems in the street system layout and design.

To qualify for community development funds or discretionary funds for urban renewal, a city must first prepare a community development program. Urban areas compete throughout the State on the bases of demographic points which consider such conditions as percent of substandard housing, people per square feet of housing, dwelling unit age, etc.

An effort can be made to ensure that community development and transportation plans are compatible.

Capital Improvements Program

One of the tools which makes it easier to build a planned thoroughfare system is a capital improvements program. This is a long range plan for the spending of money on street improvements, acquisition of right-of-way, and other capital improvements within the bounds of projected revenues. Municipal funds should be available for construction of street improvements which are a municipal responsibility, right-of-way cost sharing on facilities designated as Division of Highways responsibility, and advance purchase of right-of-way where such action is required.

The section of the capital improvements program which deals with the thoroughfare plan requires a fairly detailed knowledge of the costs of various projects. This program could be used to benefit any of the improvements listed in this plan.

Development Reviews

Driveway access to a State-maintained street or highway is reviewed by the District Engineer's office and by the Traffic Engineering Branch of the North Carolina Department of Transportation prior to access being allowed. Any development expected to generate large volumes (i.e. shopping centers, fast food restaurants, large industries, etc.) may be comprehensively studied by staff from the Traffic

Engineering, Planning and Research, and Roadway Design Branches of NC DOT. If done at an early stage, it is often possible to significantly improve the development's accessibility at minimal expense. Since the municipality is the first point of contact for developers, it is important that the municipality advise them of this review requirement and cooperate in the review process.

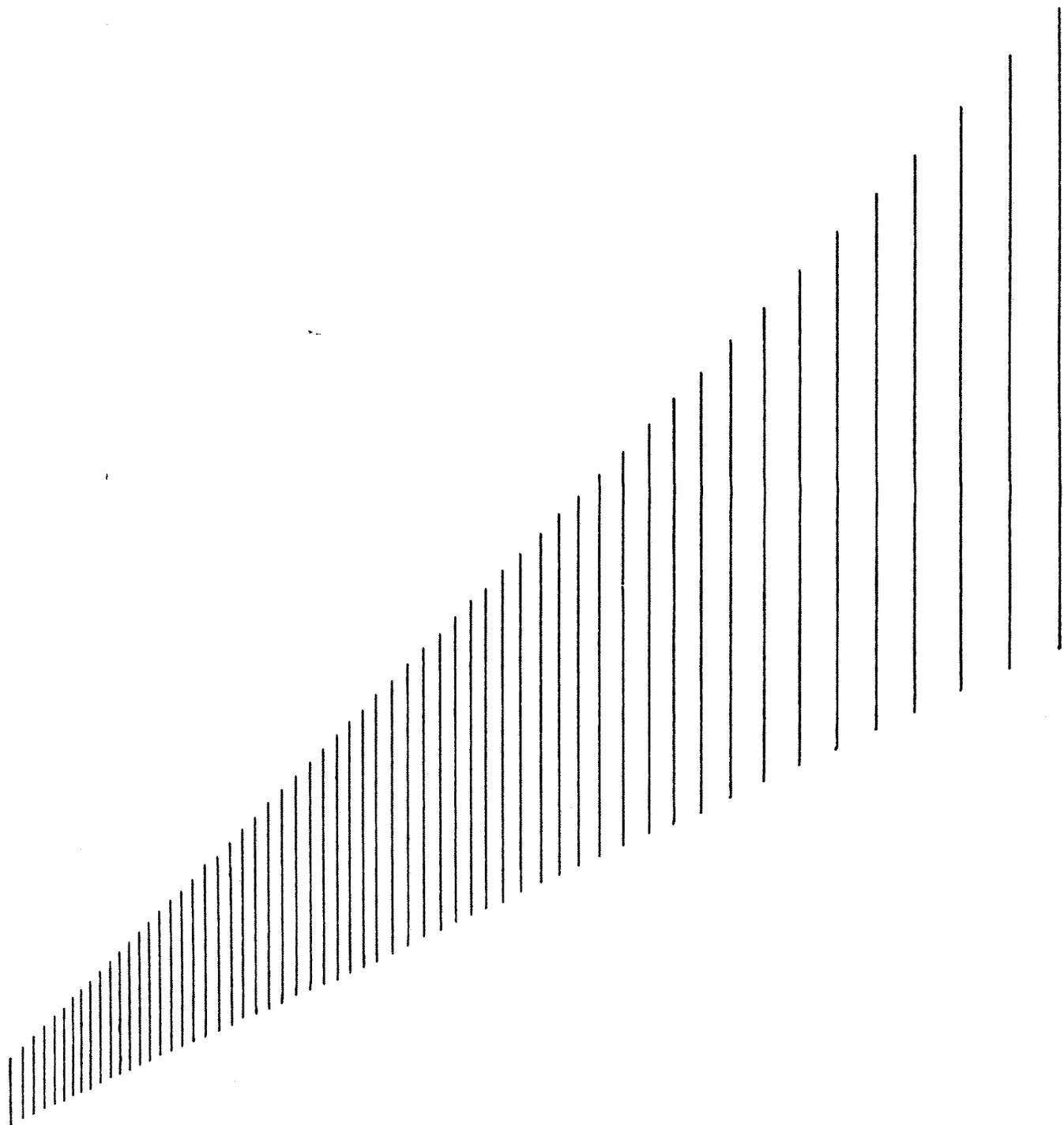
Other Funding Sources

1. Assess user impact fees to fund transportation projects. These fees, called "facility fees" in the legislation, are to be based upon "reasonable and uniform considerations of capital costs to be incurred by the town as a result of new construction. The facility fee must bear a direct relationship to additional or expanded public capital costs of the community service facilities to be rendered for the inhabitants, occupants of the new construction, or those associated with the development process."
2. Enact a bond issue to fund street improvements.
3. Continue to work with NCDOT to have local projects included in the Transportation Improvement Program (TIP).
4. Consider the possibility of specific projects qualifying for federal demonstration project funds.
5. Adopt a collector street plan that would assess buyer or property owners for street improvement.
6. Charge a special assessment for utilities; for example, increase water and sewer bills to cover cost of street improvements.

TABLE 5

FUNDING SOURCES & METHODS RECOMMENDED FOR IMPLEMENTATION OF PROJECTS												
PROJECT	FUNDING SOURCES					METHODS OF IMPLEMENTATION						
	Local Funds	TIP Funds	Indust. Access	Small Urban	Secondary Roads	T-fare Plan	Subdiv. Ord.	Zoning Ord.	Future Street Lines	Development Review		
Southern Loop:												
Entire Facility		x		x	x	x	x	x	x			
Or												
Built in Sections												
Section 1		x				x						
Section 2	x			x	x	x	x	x				
Section 3		x			x	x						x
Settle Bridge Rd Extension	x			x	x	x			x			
Stone St Extension	x			x	x	x			x			
Duncan/Taylor Sts Improvement	x					x						
Widenings:												
SR 2145			x			x						x
SR 2154			x			x						x
SR 1515			x			x						x
SR 1518			x			x						x
US 220 Bus	x				x	x						x

APPENDICES



APPENDIX A

TYPICAL CROSS SECTIONS

Typical cross sections recommended by the Statewide Planning Branch are shown in the following diagrams of **Figure 7**.

Cross section "A" is illustrative for controlled access freeways. The 46 foot grassed median is the least desirable median width, but there could be some variation from this depending upon design considerations. Slopes of 8:1 into 3 foot drainage ditches are desirable for traffic safety. Right-of-way requirements would typically vary upward from 250 feet depending upon cut and fill requirements.

Cross section "B" is typical for four lane divided highways in rural areas which may have only partial or no control of access. The minimum median width for this cross section is 30 feet, but a wider median is desirable. Design requirements for slopes and drainage would be similar to cross section "A", but there may be some variation from this depending upon right-of-way constraints.

Cross section "C", seven lane urban, and **cross section "D"**, five lane urban, are typical for major thoroughfares where frequent left turns are anticipated as a result of abutting development or frequent street intersections.

Cross sections "E" and **"F"** are used on major thoroughfares where left turns are anticipated as a result of abutting development or frequent street intersections.

Cross section "G" is recommended for urban boulevards or parkways to enhance the urban environment and to improve the compatibility of major thoroughfares with residential areas. A minimum median width of 24 feet is recommended with 30 feet being desirable.

Typical **cross section "H"** is recommended for major thoroughfares where projected travel indicates a need for four travel lanes but traffic is not excessively high, left turning movements are light, and right-of-way is restricted. An additional left turn lane would probably be required at major intersections.

Thoroughfares which are proposed to function as one-way traffic carriers would typically require **cross section "I"**. **Cross section "J"** and **"K"** are usually recommended for minor thoroughfares since these facilities usually serve both land service and traffic service functions. **Cross section "J"** would be used on those minor thoroughfares where parking on both sides is needed as a result of more concentrated development. **Cross section "L"** is used in rural areas or for

staged construction of a wider multi-lane cross section. On some thoroughfares projected traffic volumes may indicate that two travel lanes will adequately serve travel for a considerable period of time.

The curb and gutter urban cross sections all illustrate the sidewalk adjacent to the curb with a buffer or utility strip between the sidewalk and the minimum right-of-way line. This permits adequate setback for utility poles. If it is desired to move the sidewalk further away from the street to provide added separation for pedestrians or for aesthetic reasons, additional right-of-way must be provided to insure adequate setback for utility poles.

Right-of-way shown for the typical cross sections are the minimum rights-of-way required to contain the street, sidewalks, utilities, and drainage facilities. Cut and fill requirements may require either additional right-of-way or construction easements. Obtaining construction easements is becoming the more common practice for urban thoroughfare construction.

If there is sufficient bicycle facilities. The North Carolina Bicycle Facility and Program Handbook should be consulted for design standards for bicycle facilities.

Recommended typical cross sections for thoroughfares were derived on the basis of projected traffic, existing capacities, desirable levels of service, and available right-of-way.

TYPICAL THOROUGHFARE CROSS SECTIONS

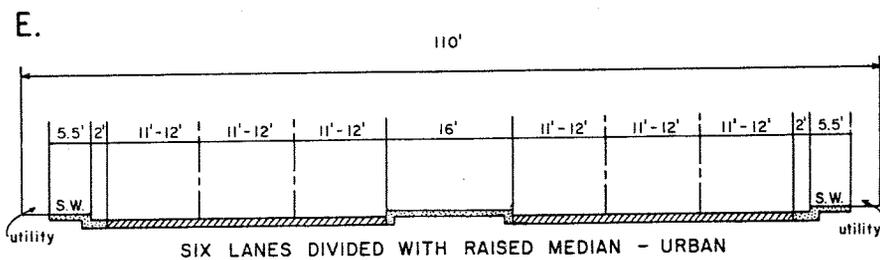
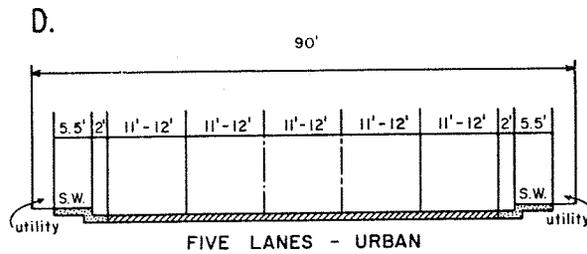
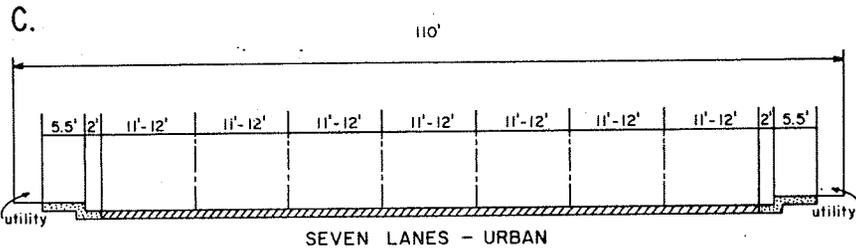
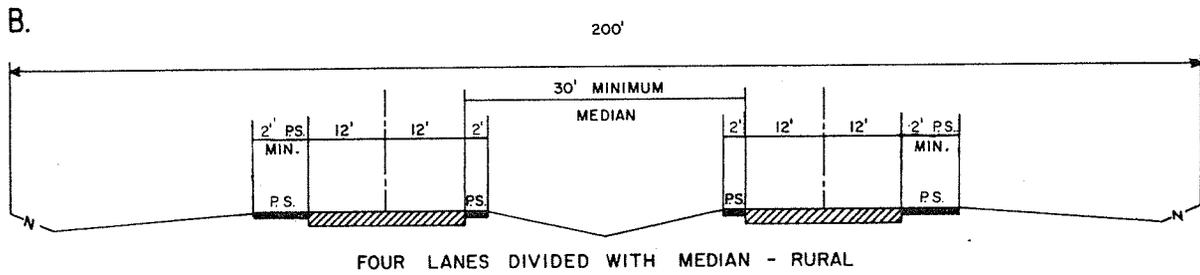
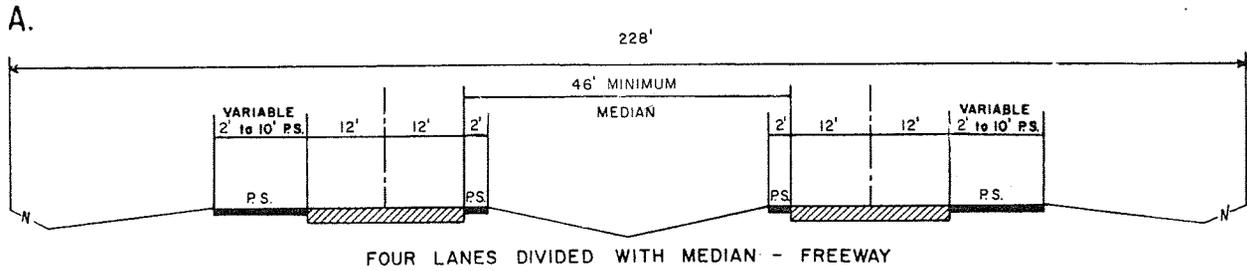
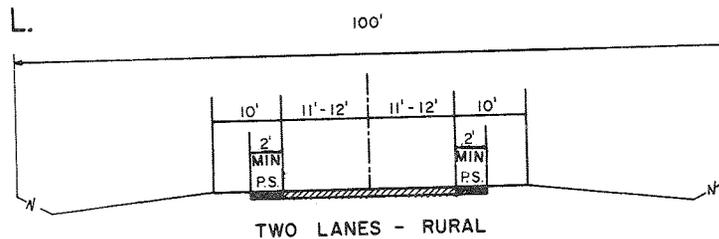
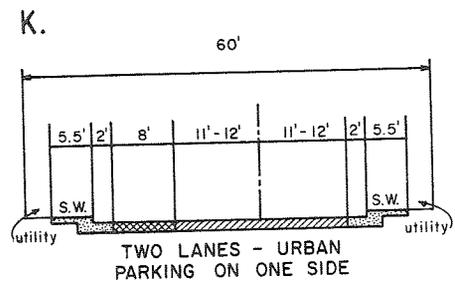
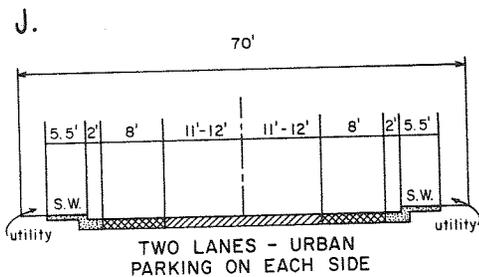
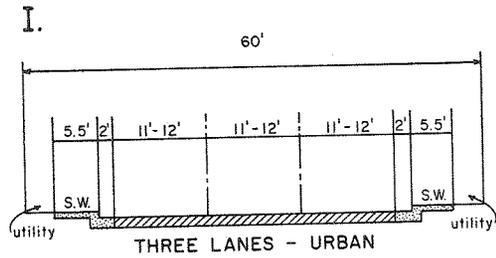
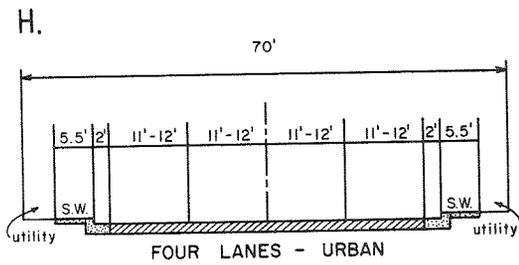
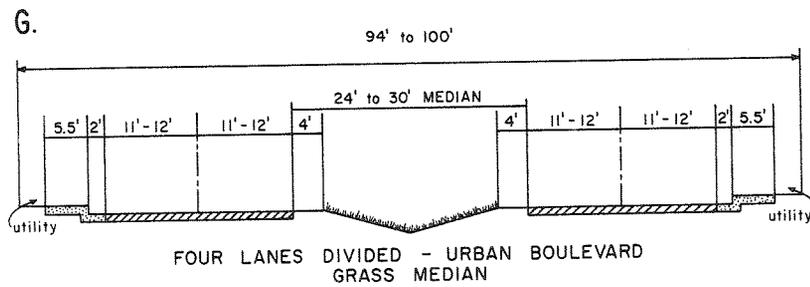
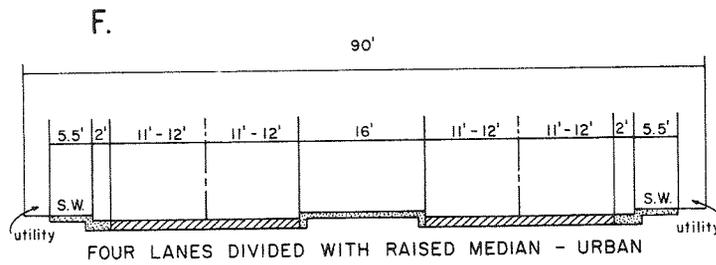


FIGURE 7

TYPICAL THOROUGHFARE CROSS SECTIONS (CONTINUED)



**TABLE 6
THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS**

FACILITY & SECTION	EXISTING X - SECTION			CAPACITY CURRENT (FUTURE)	1989 ADTS	2020 ADTS	RECOMMENDED X - SECTION	
	DIST MI	RDWY FT	ROW FT				RDWAY (ULT)	ROW (ULT)
US 220 BYPASS								
US 220 BUS - NC 770	1.46	24	200	(32000)	6500	10300	A	228
NC 770 - SR 1360	2.69	24	200	(32000)	8300	13200	A	228
US 220 BUSINESS								
Mayo River - US 220 Bypass	0.70	24	60	(12000)	3400	5400	L	100
US 220 Bypass - RR Crossing	0.15	24	60	(12000)	3300	5200	L	100
RR Crossing - Southern Ip.	0.17	24	60	(12000)	3300	5200	L	100
Southern Ip. - Mebane St	0.28	28	60	7000	5500	8700	NC	NC
Mebane St - NC 770	0.24	36	60	7000	5500	8700	NC	NC
NC 770 - MP 9.44	0.10	36	60	7000	3000	4800	ADQ	ADQ
MP 9.44 - Thomas St	0.30	30	60	(12000)	3000	4800	ADQ	ADQ
Thomas St - SR 1516	0.31	22	60	(12000)	3000	4800	L	100
SR 1516 - US 220 Bypass	3.99	24	60	10000	600	700	ADQ	ADQ
NC 770								
Mayo River - US 220 Bypass	2.57	24	150	9500	1500	2400	ADQ	ADQ
US 220 Bypass - WCL	0.74	24	150	9500	3700	5900	ADQ	ADQ
WCL - US 220 Business	0.55	24	80	9500	3700	5900	ADQ	ADQ
US 220 Business - SR 1518	0.19	36	80	9500	6800	10800	NC	NC
SR 1518 - King Street	0.22	28	80	9500	5500	8700	ADQ	ADQ
King Street - ECL	0.82	24	80	9500	5100	8100	ADQ	ADQ
ECL - SR 2141	1.28	24	150	9500	3300	5200	ADQ	ADQ
Ponderosa Rd (SR 2157)								
SR 2154 -Southern Loop	0.63	20	--	9000	400	1300	ADQ	ADQ
Southern Loop - SR 2222	0.38	20	--	(12000)	400	1300	L	60
SR 2222 - NC 770	0.11	--	--	(12000)	--	1300	L	100
Settle Bridge Rd (SR 2145)								
NC 770 - SR 1594	0.14	--	--	(12000)	--	1600	L	100
SR 1594 - NC 135	1.80	18		(12000)	1400	1600	L	100
Simpson Rd (SR 1518)								
NC 770 - Taylor St	0.54	18	--	(12000)	1100	1700	L	100
Taylor St - SR 1516	2.20	18	--	(12000)	900	1100	L	100
PAB - PLANNING AREA BOUNDARY ADQ - ADEQUATE MP - MILE POST NC - NO CHANGE								

**TABLE 6
THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS**

FACILITY & SECTION	EXISTING X - SECTION			CAPACITY CURRENT (FUTURE)	1989 ADTS	2020 ADTS	RECOMMENDED X - SECTION	
	DIST MI	RDWY FT	ROW FT				RDWY (ULT)	ROW (ULT)
Southern Loop								
NC 770 - Price St	0.26	--	--	(12000)	--	--	L	100
Existing Price St	0.28	18	--	(12000)	--	--	L	100
S. Glenn St - S. Henry St	0.26	--	--	(12000)	--	--	L	100
S. Henry St - Stone St Ext	0.09	--	--	(12000)	--	--	L	100
Stone St Ext - Stone Mt Rd	0.14	--	--	(12000)	--	--	L	100
Stone Mt Rd - Ponderosa Rd	0.43	--	--	(12000)	--	--	L	100
Smith Rd (SR 1360)								
US 220 Bus -US 220 Byp	0.10	18	--	8000	500	600	NC	NC
US 220 Byp -SR 1376	0.20	24	--	9500	800	950	ADQ	ADQ
SR 1376 - SR 1397	0.30	18	--	8000	800	950	NC	NC
Snead Rd (SR 1515)								
NC 770 -SR 1516	2.03	20	60	(12000)	150	175	L	100
Stone Mt Rd (SR 2154)								
NC 770 -SCL	0.56	22	--	(12000)	3600	4200	L	100
SCL - NC 135	2.50	20	60	(12000)	450	525	L	100
Bryant St (SR 1371)								
N. Glenn St - Leslie St	0.10	24	--	9500	400	470	ADQ	ADQ
Leslie St - WCL	0.35	36	--	10000	400	470	ADQ	ADQ
WCL - MP 0.76	0.26	18	60	8000	400	470	NC	NC
MP 0.76 - NC 770	0.09	24	100	9500	400	470	ADQ	ADQ
Comer Rd (SR 2155)								
SR 2154 - SR 2145	2.30	18	60	8000	100	150	NC	NC
Duncan St & Taylor St								
US 220 Bus - Simpson St	0.57	16	--	(7500)	--	--	PAVE	NC
Mebane St								
S. Henry St - Stone St	0.09	18	--	8000	--	--	NC	NC
Stone St - Church St	0.16	18	--	8000	--	--	NC	NC
North Glenn St / Price Grange Rd (SR 1516)								
US 220 Bus - SR 1518	2.70	20	--	8500	450	530	NC	NC
PAB - PLANNING AREA BOUNDARY ADQ - ADEQUATE MP - MILE POST NC - NO CHANGE								

**TABLE 6
THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS**

FACILITY & SECTION	EXISTING X - SECTION			CAPACITY CURRENT (FUTURE)	1989 ADTS	2020 ADTS	RECOMMENDED X - SECTION	
	DIST MI	RDWY FT	ROW FT				RDWY (ULT)	ROW (ULT)
Smith Mill Rd (SR 1397) SR 1360 - NC 770	2.20	20	--	9500	500	700	NC	NC
South Glenn St (SR 1405) US 220 Bus - SCL	0.07	18	--	8000	1100	1300	NC	NC
SCL - Price St	0.03	36	50	9500	1100	1300	ADQ	ADQ
Price St - MP 0.58	0.48	36	--	9500	1100	1300	ADQ	ADQ
MP 0.58 - NC 770	0.08	24	--	9500	1100	1300	ADQ	ADQ
Stone St NC 770 - Mebane St	0.26	42	--	13000	--	--	ADQ	ADQ
Mebane St -Price St Ext	0.36	16	--	(12000)	--	--	L	100
<p>PAB - PLANNING AREA BOUNDARY ADQ - ADEQUATE MP - MILE POST NC - NO CHANGE</p>								

APPENDIX B
RECOMMENDED SUBDIVISION ORDINANCES

DEFINITIONS

I. Streets and Roads:

A. Rural Roads

1. Principal Arterial - A rural link in a highway system serving travel, and having characteristics indicative of substantial statewide or interstate travel and existing solely to serve traffic. This network would consist of Interstate routes and other routes designated as principal arterials.
2. Minor Arterial - A rural roadway joining cities and larger towns and providing intra-state and inter-county service at relatively high overall travel speeds with minimum interference to through movement.
3. Major Collector - A road which serves major intra-county travel corridors and traffic generators and provides access to the Arterial system.
4. Minor Collector - A road which provides service to small local communities and traffic generators and provides access to the Major Collector system.
5. Local Road - A road which serves primarily to provide access to adjacent land, over relatively short distances.

B. Urban Streets

1. Major Thoroughfares - Major thoroughfares consist of Interstate, other freeway, expressway, or parkway roads, and major streets that provide for the expeditious movement of high volumes of traffic within and through urban areas.
2. Minor Thoroughfares - Minor thoroughfares perform the function of collecting traffic from local access streets and carrying it to the major thoroughfare system. Minor thoroughfares may be used to supplement the major thoroughfare system by facilitating minor through-traffic movements and may also serve abutting property.
3. Local Street - A local street is any street not on a higher order urban system and serves primarily to provide direct access to abutting land.

C. Specific Type Rural or Urban Streets

1. Freeway, expressway, or parkway - Divided multilane roadways designed to carry large volumes of traffic at high speeds. A freeway provides for continuous flow of vehicles with no direct access to abutting property and with access to selected crossroads only by way of interchanges. An expressway is a facility with full or partial control of access and generally with grade separations at major intersections. A parkway is a for non-commercial traffic, with full of partial control or access.
2. Residential Collector Street - A local street which serves as a connector street between local residential streets and the thoroughfare system. Residential collector streets typically collect traffic from 100 to 400 dwelling units.
3. Local Residential Street - Cul-de-sacs, loop streets less than 2,500 feet in length, or streets less than one mile in length that do not connect thoroughfares, or serve major traffic generators, and do not collect traffic from more than 100 dwelling units.
4. Cul-de-sac - A short street having only one end open to traffic and the other end being permanently terminated and a vehicular turn-around provided.
5. Frontage Road - A road that is parallel to a partial or full access controlled facility and provides access to adjacent land.
6. Alley - A strip of land, owned publicly or privately, set aside primarily for vehicular service access to the back side of properties otherwise abutting on a street.

II. Property

- A. Building Setback Line - A line parallel to the street in front of which no structure shall be erected.
- B. Easement - A grant by the property owner for use by the public, a corporation, or person(s), of a strip of land for a specific purpose.
- C. Lot - A portion of a subdivision, or any other parcel of land, which is intended as a unit for transfer of ownership or for development or both. The word "lot" includes the words "plat" and "parcel".

III. Subdivision

- A. Subdivider - Any person, firm, corporation or official agent thereof, who subdivides or develops any land deemed to be a subdivision.

- B. Subdivision - All divisions of a tract or parcel of land into two or more lots, building sites, or other divisions for the purpose, immediate or future, of sale or building development and all divisions of land involving the dedication of a new street or change in existing streets; provided, however, that the following shall not be included within this definition nor subject to these regulations: (1) the combination or recombination of portions of previously platted lots where the total number of lots is not increased and the resultant lots are equal to or exceed the standards contained herein; (2) the division of land into parcels greater than ten acres where no street right-of-way dedication is involved, (3) widening of opening of streets; (4) the division of a tract in single ownership whose entire area is no greater than two acres into not more than three lots, where no street right-of-way dedication is involved and where the resultant lots are equal to or exceed the standards contained herein.
- C. Dedication - A gift, by the owner, of his property to another party without any consideration being given for the transfer. The dedication is made by written instrument and is completed with an acceptance.
- D. Reservation - Reservation of land does not involve any transfer of property rights. It constitutes an obligation to keep property free from development for a stated period of time.

DESIGN STANDARDS

I. Streets and Roads

The design of all roads within Plymouth shall be in accordance with the accepted policies of the North Carolina Department of Transportation, Division of Highways, as taken or modified from the American Association of State Highway Officials' (AASHTO) manuals.

The provision of street rights-of-way shall conform and meet the recommendations of the Thoroughfare Plan, as adopted by the Town of Plymouth.

The proposed street layout shall be coordinated with the existing street system of the surrounding area. Normally the proposed streets should be the extension of existing streets if possible.

- A. Right-of-way Widths - Right-of-way (ROW) widths shall not be less than the following and shall apply except in those cases where ROW requirements have been specifically set out the Thoroughfare Plan.

1.	Rural	Min. ROW
	a. Principle Arterial	
	Freeways	350 ft.
	Other	200 ft.
	b. Minor Arterial	100 ft.
	c. Major Collector	100 ft.
	d. Minor Collector	80 ft.
	e. Local Road	60 ft. ¹
2.	Urban	
	a. Major Thoroughfare other than Freeway and Expressway	90 ft.
	b. Minor Thoroughfare	70 ft.
	c. Local Street	60 ft. ¹
	d. Cul-de-sac	Variable ²

The subdivider will only be required to dedicate a maximum of 100 feet of right-of-way. In cases where over 100 feet of right-of-way is desired, the subdivider will be required only to reserve the amount in excess of 100 feet. On all cases in which right-of-way is sought for a fully controlled access facility, the subdivider will only be required to make a reservation. It is strongly recommended that subdivisions provide access to properties from internal streets, and that direct property access to major thoroughfares, principle and minor arterials, and major collectors be avoided. Direct property access to minor thoroughfares is also undesirable.

A partial width right-of-way, not less than sixty feet in width, may be dedicated when adjoining undeveloped property that is owned or controlled by the subdivider; provided that the width of a partial dedication be such as to permit the installation of such facilities as may be necessary to serve abutting lots. When the said adjoining property is subdivided, the remainder of the full required right-of-way shall be dedicated.

- B. Street Widths - Widths for street and road classifications other than local shall be as recommended by the Thoroughfare Plan. Width of local roads and streets shall be as follows:

¹ The desirable minimum right-of-way (ROW) is 60 ft. If curb and gutter is provided, 50 feet of ROW is adequate on local residential streets.

² The ROW dimension will depend on radius used for vehicular turnaround. Distance from edge of pavement of turnaround to ROW should not be less than distance from edge of pavement to ROW on street approaching turnaround.

1. Local Residential
Curb and Gutter section: 26 feet, face to face of curb
Shoulder section: 20 feet to edge of pavement, 4 foot
shoulders
2. Residential Collector
Curb and Gutter section: 34 feet, face to face of curb
Shoulder section: 20 feet to edge of pavement, 6 foot
shoulders

C. Geometric Characteristics - The standards outlined below shall apply to all subdivision streets proposed for addition to the State Highway System or Municipal Street System. In cases where a subdivision is sought adjacent to a proposed thoroughfare corridor, the requirements of dedication and reservation discussed under Right-of-Way shall apply.

1. Design Speed - The design speed for a roadway should be a minimum of 5 mph greater than the posted speed limit. The design speeds for subdivision type streets shall be:

DESIGN SPEEDS			
Facility Type	<u>Design Speed</u>		
	Desirable	Minimum Level	Rolling
RURAL			
Minor Collector Roads	60	50	40
Local roads including Residential Collectors and Local Residential	50	50	40
URBAN			
Major Thoroughfares other than Freeway or Expressway	60	50	50
Minor Thoroughfares	60	50	40
Local Streets	40	40	30

2. Maximum and Minimum Grades

a. The maximum grades in percent shall be:

MAXIMUM VERTICAL GRADE		
Design Speed	Terrain	
	Level	Rolling
60	4	5
50	5	6
40	6	7
30		9

b. Minimum grade should not be less than 0.5% .

c. Grades for 100 feet each way from intersections (measured from edge of pavement) should not exceed 5%.

d. For streets and roads with projected annual average daily traffic less than 250, short grades less than 500 feet long, may be 150% of the value in the above table.

3. Minimum Sight Distance - In the interest of public safety, no less than the minimum sight distance applicable shall be provided. Vertical curves that connect each change in grade shall be provided and calculated using the following parameters:

SIGHT DISTANCE				
Design Speed	30	40	50	60
Stopping Sight Distance				
Minimum (ft.)	200	275	400	525
Desirable Minimum (ft.)	200	325	475	650
Minimum K Value for:				
Crest curve	30	80	160	310
Sag curve	40	70	110	160

(General practice calls for vertical curves to be multiples of 50 feet. Calculated lengths shall be rounded up in each case.)

* K is a coefficient by which the algebraic difference in grade may be multiplied to determine the length in feet of the vertical curve which will provide the desired sight distance.

Sight distance provided for stopped vehicles at intersections should be in accordance with "A Policy on Geometric Design of Highways and Streets, 1984".

4. The "Superelevation Table" below shows the maximum degree of curve and related maximum superelevation for design speeds. The maximum rate of roadway superelevation (e) for rural roads with no curb and gutter of 0.08. The maximum rate of superelevation for urban streets with curb and gutter is 0.06, with 0.04 being desirable.

SUPERELEVATION TABLE			
Design Speed	Maximum e	Minimum Radius ft.	Max. Deg. of Curve.
30	0.04	302	19 00'
40	0.04	573	10 00'
50	0.04	955	6 00'
60	0.04	1,528	3 45'
30	0.06	273	21 00'
40	0.06	509	11 15'
50	0.06	849	6 45'
60	0.06	1,380	4 15'
30	0.08	252	22 45'
40	0.08	468	12 15'
50	0.08	764	7 30'
60	0.08	1,206	4 45'

e = rate of roadway superelevation, foot per foot

D. Intersections

1. Streets shall be laid out so as to intersect as nearly as possible at right angles, and no street should intersect any other street at an angle less than sixty-five (65) degrees.
2. Property lines at intersections should be set so that the distance from the edge of pavement, of the street turnout, to the property line will be at least as great as the distance from the edge of pavement to the property line along the intersecting streets. This property line can be established as a radius or as a sight triangle. Greater offsets from the edge of pavement to the property lines will be required, if necessary, to provide sight distance for the stopped vehicle on the side street.
3. Off-set intersections are to be avoided. Intersections which cannot be aligned should be separated by a minimum length of 200 feet between survey centerlines.

E. Cul-de-sacs

Cul-de-sacs shall not be more than five hundred (500) feet in length. the distance from the edge of pavement on the vehicular turnaround to the right-of-way line should not be less than the distance from the edge of pavement to right-of-way line on the street approaching the turnaround. Cul-de-sacs should not be used to avoid connection with an existing street or to avoid the extension of an important street.

F. Alleys

1. Alleys shall be required to serve lots used for commercial and industrial purposes except that this requirement may be waived where other definite and assured provision is made for service access. Alleys shall not be provided in residential subdivisions unless necessitated by unusual circumstances.
2. The width of an alley shall be at least twenty (20) feet.
3. Deadend alleys shall be avoided where possible, but if unavoidable, shall be provided with adequate turnaround facilities at the deadend as may be required by the Planning Board.

G. Permits For Connection To State Roads

An approved permit is required for connection to any existing state system road. This permit is required prior to any construction on the street or road. The application is available at the office of the District Engineer of the Division of Highways.

H. Offsets To Utility Poles

Poles for overhead utilities should be located clear of roadway shoulders, preferably a minimum of at least 30 feet from the edge of pavement. On streets with curb and gutter, utility poles shall be set back a minimum distance of 6 feet from the face of curb.

I. Wheel Chair Ramps

All street curbs being constructed or reconstructed for maintenance purposes, traffic operations, repairs, correction of utilities, or altered for any reason, shall provide wheelchair ramps for the physically handicapped at intersections where both curb and gutter and sidewalks are provided and at other major points of pedestrian flow.

J. Horizontal Width on Bridge Deck

1. The clear roadway widths for new and reconstructed bridges serving 2 lane, 2 way traffic should be as follows:

a. Shoulder section approach

i. Under 800 ADT design year

Minimum 28 feet width face to face of parapets of rails or pavement width plus 10 feet, whichever is greater.

ii. 800 - 2000 ADT design year

Minimum 34 feet width face to face of parapets of rails or pavement width plus 12 feet, whichever is greater.

iii. Over 2000 ADT design year

Minimum width of 40 feet, desirable width of 44 feet width face to face of parapets or rails.

b. Curbs and gutter approach

i. Under 800 ADT design year

Minimum 24 feet face to face of curbs.

ii. Over 800 ADT design year

Width of approach pavement measured face to face of curbs.

Where curb and gutter sections are used on roadway approaches, curbs on bridges shall match the curbs on approaches in height, in width of face to face of curbs, and in crown drop. The distance from face of curb to face of parapet or rail shall be 1'6" minimum, or greater if sidewalks are required.

2. The clear roadway widths for new and reconstructed bridges having 4 or more lanes serving undivided two-way traffic should be as follows:

a. Shoulder section approach - Width of approach pavement plus width of usable shoulders on the approach left and right. (Shoulder width 8' minimum, 10' desirable.)

b. Curb and gutter approach - Width of approach pavement measured face to face of curbs.