



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

# *Thoroughfare Plan for the City of Reidsville*



September 2001

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# Thoroughfare Plan for Reidsville, North Carolina

Prepared by:

Statewide Planning Branch  
Division of Highways  
North Carolina Department of Transportation

In cooperation with:

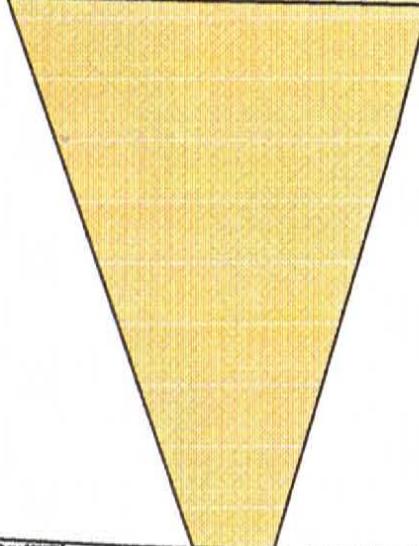
City of Reidsville  
The Federal Highway Administration  
The United States Department of Transportation

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# **GEOGRAPHIC LOCATION FOR REIDSVILLE NORTH CAROLINA**



# Executive Summary

This plan documents the findings of a thoroughfare study for the City of Reidsville. Recommendations for this study are listed below with a brief description. A more detailed discussion of these recommendations can be found in Chapter 2.

## Thoroughfare Recommendations

- **Freeway Drive Widening:** Widen Freeway Drive to multi-lanes from US 29 Business to NC 14. The five-lane section should be located where the existing commercial development is along Freeway Drive, between Port McCoy Road and West Harrison Street.
- **NC 87/NC 65 Widening West of Reidsville:** Widen NC 87 from its interchange with Freeway Drive to the NC 87/ NC 65 split.
- **US 29 Business Widening South of Reidsville:** Widen US 29 Business from its existing two lane cross-section to a five-lane cross-section from Flat Rock to its intersection with the southern connector.
- **Way Street Extension:** Extend Way Street to the southern connector. The extension should be a two-lane, 24-foot wide facility. This street is proposed to relieve congestion on Scales Street.
- **Vance Street Improvement:** Increase the lane widths to 12 feet from the present widths that vary from 10 feet to 12 feet along Vance Street.

## Multi-modal Recommendations

The City of Reidsville has developed a citywide greenway plan. These plans are listed below and should be included in any improvements where applicable. They are listed in order of priority.

- **Jaycee Park Trail:** This 1.6-mile trail will connect Reidsville Senior High School and Reidsville Middle School at the Jaycee Park located on South Scales Street.
- **Lake Trail:** The trail runs along Lawndale Drive for approximately 900 feet then turning southwesterly to Freeway Drive following the sewer outfall and creek to a junction with a branch near the Forrest Drive Pump Station.
- **Sherwood Trail:** This trail begins at Courtland Park and crosses Courtland Avenue and continues to Green Street. The trail should be a ten foot wide, asphalt-paved greenway that will be accessible for all user groups.
- **Lowes Trail:** The trail connects Lowes Ballfield and the Reidsville Recreation Center. The trail begins at the easterly edge of the ball field and follows a sewer line southeast to Sprinkle Street. It crosses Sprinkle Street and follows the sewer line and creek in an easterly direction, crossing the creek to Franklin Street in front of the Reidsville Parks and Recreation Center.

- **Club Trail:** The trail begins at Sherwood Trail and continues to the southern border of the Penrose Park County Club Golf Course. From there it follows an existing trail along the sewer line east to a point that cuts southeast through a small wooded area away from the golf fairway so that it intercepts a sewer outfall line. It crosses many streets and ties into the Jaycee Trail.

## **Roadway Improvements for Bicycles/Pedestrians**

The City of Reidsville and NCDOT worked cooperatively to target roadways which should be upgraded to accommodate bicycles or pedestrian traffic when improvements to existing roads or construction of a new road is initiated.

**Freeway Drive:** Improve Freeway Drive to include a sidewalk on the east side of the proposed facility. The sidewalk would also tie into the greenway system proposed by the City of Reidsville increasing the demand and opportunity for pedestrians to walk along Freeway Drive.

**South Park Drive:** South Park Drive, from Northop Street to Freeway Drive, should be striped for a bicycle lane and a sidewalk added on the south side of the existing facility. This project has a high volume of bicycle and pedestrian traffic in the area.

**Cypress Drive:** It is recommended that sidewalk is added to Cypress Drive from South Scales Street to Belmont Drive. The section of this recommendation from South Park Drive to Belmont Drive is not maintained by the state and would have to be constructed with City funds.

**Sherwood Drive:** Sherwood Drive should be striped for bicycle lanes and a sidewalk constructed to handle the existing pedestrian and bicycle traffic on the facility. In order to improve safety it is recommended that accommodations be made along this facility to handle the existing traffic.

**Belmont Drive:** Add a sidewalk to Belmont Drive between Sherwood Drive and Cypress Drive. This facility is maintained by the City, therefore improvements would have to be completed by the City of Reidsville.

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# Chapter 1

## Introduction

The economic and social well being of the City of Reidsville depends upon the quality of the transportation facilities that exist in the area. A well-planned transportation system allows for economic growth, while simultaneously providing safe and efficient travel throughout the City of Reidsville.

The contents of this report will provide answers to the City in regards to funding, plan implementation, and traffic conditions. It also includes details of how the plan was developed (data collection, modeling, public involvement). However, its major role is to provide answers to the City of Reidsville concerning the following questions:

*Why Plan in Reidsville?*

*What Present & Future Transportation Problems Do We Have?*

*How Can We Fix Them?*

*What Benefits Will These Improvements Provide Reidsville?*

*How Much Will It Cost?*

*How Can We Implement the Plan?*

This transportation plan is a joint effort by the North Carolina Department of Transportation and the City of Reidsville. This plan is intended to provide the City of Reidsville with the necessary roadway improvements to satisfy the anticipated transportation needs until the year 2025. The thoroughfare plan was developed based upon the current population, employment and travel trends in the area, as well as the city's anticipated growth. It is important to realize that this plan is not a rigid set of proposals, but is intended to be flexible enough to account for changes in future growth. In all likelihood, this plan will be revised approximately every 5-8 years in order to reevaluate the conditions in the City of Reidsville and to eliminate any possible adverse impacts of unnecessary transportation proposals.

Most of the improvements recommended in this report will be the responsibility of the Department of Transportation, but it is necessary for local officials, the local planning agency, developers, and citizens of Reidsville to assist in the implementation of this transportation plan. This plan should be used as a guide to protect areas in the city where new or improved facilities may be located in the future. The plan should be used in conjunction with the City's land use plan, zoning regulations, and subdivision regulations in order to facilitate all types of planning that concern the City of Reidsville.

As part of the development of the Reidsville Transportation Plan the city staff recommended that we incorporate their existing greenway plan into the thoroughfare plan. Also, additional bicycle and pedestrian facilities that would tie into the current city plans were developed as part of the

planning process. Recommendations for greenways, bike and pedestrian facilities are outlined in Chapter 2 of this report.

## **Why Plan & How**

One of the biggest influences in the development of the City of Reidsville is the effectiveness of the transportation facilities. How well are the different areas of the city connected to each other by roadways? Are these roads able to handle the traffic in Reidsville? For example, what impact will the new southern connector have on traffic volumes along existing Freeway Drive? Can NC 87 handle more traffic as Reidsville, Wentworth, and Rockingham County continue to grow? These impacts need to be examined to determine if changes to the transportation system are necessary in order to guide future development toward meeting the goals of the city. Planning is a necessity to control growth of the city while simultaneously achieving community goals. Transportation planning provides a wealth of benefits to small communities, larger regional areas, and ultimately to the State of North Carolina. A law established in 1959 requires that each municipality develop a comprehensive street network plan that will serve the citizens now and in the future. Some of the reasons for planning of transportation systems include:

- Minimize land required for street & highway purposes
- Each street can be designed for a purpose (bypass, neighborhood connector, etc.)
- Savings in construction and maintenance of the roadways
- Citizens will know what the roads will look like in the future and can plan accordingly
- Developers will be able to design residential/commercial areas that will not interfere with the transportation plan
- City officials will know when improvements are needed and can seek funding
- Minimization of damage to property owners and to the community appearance

We know why to plan. How do we develop a plan? In order to plan the future transportation network we must know everything possible about the community. The citizens of the city are the biggest players in the development of the plan. Talking to people about what problems exist and overall goals of the community is the biggest key to planning. If the citizens and officials know where they want to go in the future and what they want to happen to the local streets, then planning the transportation network is a lot easier.

A wealth of data is collected about the current roads, such as the travel patterns people use to get to their destinations (What type of traffic uses Freeway Drive? Does this consist of local traffic or people passing through the area?) Other types of data, such as the ones shown below are collected in the planning process:

*Road Inventory*

*Employment Data*

*Speeds*

*Socioeconomic Data*

*Accident locations*

*Population*

This information is used to build a "mini-city" version of Reidsville on the computer that will duplicate the real-world travel patterns and produce traffic volumes consistent with the 1995 counted volumes. The data can also be used to predict what is going to occur in Reidsville in the future. The computer model aids in planning by helping to determine what new improvements will "fix" or improve the transportation network. Ultimately, a plan is developed based on many different scenarios that are tested on the computer and developed by the citizens, the local officials and the Department of Transportation.

This section answered the "How to Develop a Plan". However, that is not where planning stops. Planning is a continuing process that involves corridor protection, development control, acquiring funding for roads and much more. All of these things together are planning. These topics are discussed later in this report.

## **Transportation Demand**

The transportation demand for this project focuses on both local traffic and through trip travelers. Freeway Drive is the major North/South facility through the City of Reidsville and the primary route for people living west of Reidsville to access NC 89 to the south. When the new southern connector opens (early 1999), the use of this route by through traffic will increase by having this direct connection to US 29 and Greensboro to the south. Freeway Drive is also the major commercial area for Reidsville. Fast food restaurants and shopping centers attract a large amount of local traffic along Freeway Drive. Traffic volumes along Freeway Drive range from 6,000 vehicles per day (vpd) on the north and south ends to 11,000 vpd between Port McCoy Road and West Harrison Street. When the southern connector opens these volumes are expected to increase to 10,000 vpd and 15,000 vpd respectively. Additionally, with the expected growth of the county and Reidsville over the next 30 years, traffic volumes along Freeway Drive are expected to increase to 30,000 vpd. This increases the need for additional capacity along this facility.

## **Chapter 2**

# **Recommended Transportation Plan**

A transportation plan study uncovers the need for new roadway facilities. The study identifies existing and future deficiencies in the transportation system, including pedestrian, bicycle and transit needs. The transportation plan is a representation of the existing transportation system, which includes highways by functional use (e.g., major thoroughfares, minor thoroughfares plus any new facilities that are needed as well as existing and proposed pedestrian, bicycle and transit systems).

This chapter makes recommendations based on the ability of the existing transportation system to serve present and future travel desires as Reidsville continues to grow. It discusses roadway improvement needs, identified by NCDOT and the Reidsville Planning Board, as well as, considerations for pedestrian and bicycle facilities developed by the Reidsville Planning Staff. Roadways in Reidsville are shown in Figure 1 as the mutually adopted thoroughfare plan. Pedestrian and bicycle recommendations are shown on Figure 3. As part of the understanding of the adoption of the thoroughfare plan, the minor thoroughfares are the responsibility of the City of Reidsville, while the maintenance and construction of the major thoroughfares is the responsibility of the North Carolina Department of Transportation. Figure 2, the recommended improvement map displays the number of lanes and roadway widths for each of the proposed improvements. These are the recommendations of how we think the road "should look" after widening or new construction is complete. These recommendations may change slightly after the actual design of the road is determined.

In Appendix B, you can see the specific details of each roadway in the plan. The right-of-way requirements, the length of each section, the volumes, the capacities and the cross sections are all listed in this appendix.

The recommendations for what the roadways should "look like" and what the need is for each project are described in priority order for the remainder of this section.

## **Highway Recommendations**

### ***Priority #1 – Freeway Drive Widening***

#### ***Description of Project***

It is recommended that Freeway Drive be widened to multi-lanes from US 29 Business to NC 14. The existing two-lane section should be improved to a combination of four-lane and five-lane sections. The five-lane section should be located where the existing commercial development is along Freeway Drive, between Port McCoy Road and West Harrison Street. The required right-of-way is approximately 90 feet.

### ***Transportation Demand***

Volumes along Freeway Drive range from 6,000 vehicles per day (vpd) on the north and south ends to 11,000 vpd between Port McCoy Road and West Harrison Street. When the southern connector opens, these volumes are expected to increase to 10,000 vpd and 15,000 vpd respectively. With the expected growth of the county and Reidsville over the next 30 years, traffic volumes along Freeway Drive are expected to increase to 30,000 vpd. This growth increases the need for additional capacity along this facility.

### ***Safety and Capacity of the Project***

The existing capacity of Freeway Drive is 12,000 vehicles per day. The capacity of Freeway Drive will be exceeded by 18,000 vehicles in the 2025 design year. As volumes increase and commercial development increases along Freeway Drive, the morning and afternoon peak periods will experience considerable delay due to left turning volumes onto and off of Freeway Drive. The safety issues associated with this section of roadway will be:

1. Increased number of accidents due to close proximity of vehicles on the overloaded roadway
2. A high number of left hand turns into this heavy traffic stream.

Widening to five lanes in the commercial area and a four lane divided facility with a raised median on the remainder of the facility will better protect and control left turning movements and improve traffic safety along Freeway Drive.

### ***Social Demands & Economic Development***

This route is becoming the primary location for residents of the City of Reidsville to do their grocery shopping, banking and other commercial activities. This trend is expected to continue as new restaurants and shopping centers are planned for the future.

In addition to these demands Freeway Drive is a major north south route that bypasses the central business district of Reidsville and connects NC 14, NC 87, and US 158 with US 29 and Greensboro. As residential growth continues in Rockingham County and Reidsville, this will continue to put a heavy demand on the roadway's ability to function at a high level of efficiency. Since there is no other parallel facility on the west side of the city, widening of this roadway is necessary.

### ***Relationship of Freeway Drive to Other Roadways in the Area***

The widening of Freeway Drive is very important to the connectivity of the transportation system in Reidsville. Freeway Drive serves as a major link between western Rockingham County, Reidsville, and US 29 to Greensboro. It connects NC 14, NC 87, US 158, US 29 Business, and US 29 to each other. Freeway Drive is the only loop facility in Reidsville.

Overall, Freeway Drive is the "hub" for traffic in Reidsville. It serves traffic from the north, (Eden), the west, (Wentworth), traffic from the south, (Greensboro), and local traffic. The widening of this facility is important to the overall success of the transportation system in Reidsville and can be completed with minimal impact to the community. It would positively impact residential and commercial development in Reidsville as well as surrounding Rockingham County.

## ***Priority # 2 - NC 87/NC 65 Widening West of Reidsville***

### ***Description of Project***

It is recommended that NC 87 be widened from its interchange with Freeway Drive to the NC 87/NC 65 split. The existing two-lane section should be widened to five lanes. The right-of-way required for this improvement is approximately 90 feet.

### ***Transportation Demand***

The transportation demand for this project focuses on primarily through trip travelers. NC 87 is a major north/south route in Reidsville that connects Eden to the north and Burlington to the south. It also picks up traffic from western Rockingham County via NC 704 and NC 65. The traffic then moves through Reidsville and on to the south. In addition to serving the through travelers, it serves citizens of Rockingham County in getting to the commercial shopping along Freeway Drive. The 1997 traffic volumes along this section of NC 87 are around 9,000 vehicles per day. By the year 2025, with residential and commercial growth in the City and County these volumes are expected to increase to 16,000 vehicles per day. The growth in traffic volumes increases the need for additional capacity along this facility.

### ***Safety and Capacity of the Project***

The existing capacity of NC 87/65 is around 12,500 vehicles per day. The capacity of NC 87/65 will be exceeded by 3,500 vpd in the 2025 design year. Adjacent to this facility is some commercial and industrial development. The safety issues associated with this section of roadway will be an increased number of accidents due to the close proximity of vehicles on the overloaded roadway. Widening this facility will increase the capacity of the facility and allow a safe lane for left turning traffic. The required right-of-way for a five-lane facility is 90 feet.

### ***Social Demands & Economic Development***

NC 87/65 is moderately developed between Reidsville and Wentworth. Wentworth is the County Seat of Rockingham County. Along this corridor is a NCDOT maintenance yard, a prison, a rock quarry, a school, as well as the county offices. This development causes the facility to serve two conflicting purposes: providing access to adjacent land use and moving through traffic. Since demand for both of these services is high, conflicts occur resulting in increased congestion, decreased safety, and increased delay. By upgrading NC 87/65 to a five-lane facility, a protected left turn lane will allow turning traffic to get out of the flow of traffic just passing through the area. This improvement will decrease the potential for accidents, and improve traffic flow along the route.

### ***Relationship of NC 87/65 to Other Roadways in the Area***

NC 87/65 is a connector facility that brings in traffic from across Rockingham County and moves it through Reidsville. It serves as a connector to the south and east for US 220 and the northern part of the state. Because of the role NC 87 plays for the cities in Rockingham County and the central part of the state, it is important that the highway be kept in good operating condition. Widening to five lanes would fulfill this need.

### ***PRIORITY # 3 - US 29 Business Widening South of Reidsville***

#### ***Description of Project***

It is recommended that US 29 Business be widened from its existing two lane cross-section to a five-lane cross-section from Flat Rock to its intersection with the southern connector. The anticipated right-of-way is 90 feet.

#### ***Transportation Demand***

US 29 Business provides access from southern Rockingham County to the central business district (CBD) of Reidsville. It is lined with light industrial and commercial development. Therefore, it serves commuters that work in the City of Reidsville and local traffic attracted to the light industrial and commercial development. The existing traffic volume on US 29 Business is 8,000 vpd. It has a capacity of 9,000 vpd. The volume using this roadway is expected to increase to around 15,000 vpd by design year 2025. With this high volume of traffic, left turns into developments along US 29 Business will create a stop delay for the traffic traveling into Reidsville since there is no left turn lane for turning vehicles to get out of the flow of traffic.

#### ***Safety and Capacity of the Project***

The existing capacity of US 29 Business is 9,000 vpd. It is a two-lane 22-foot wide facility. With the expected traffic growth over the next 30 years, this capacity will be exceeded by 6,000 vpd. Widening this facility to five lanes will improve the capacity and give left turning vehicles a protected area outside of the main flow of traffic, thus improving the safety of the facility.

#### ***Social Demands & Economic Development***

The south side of Reidsville is projected to receive the major amount of future growth, due to the City's ability to serve this area with water and sewer. This should spawn new residential and commercial growth, some of it along US 29 Business and in the area of the southern connector. This growth will increase the demand on the existing facility to serve the adjacent land use and move traffic into the area, thereby increasing the need for a facility with additional capacity.

#### ***Relationship of US 29 Business to Other Roadways in the Area***

US 29 Business is primarily a radial route providing access to the CBD for the southern portion of Rockingham County. It picks up traffic from secondary roads and moves it to Scales Street and Freeway Drive in Reidsville. It is the only route that accesses the CBD directly from the south of Reidsville, and it becomes the major route through the center of the City going to the north and ending at NC 14.

## ***PRIORITY #4 - WAY STREET EXTENSION***

### ***Description of Project***

It is recommended that Way Street be extended to the southern connector. The extension should be a two-lane, 24-foot wide facility. A version of this extension was shown on the previous thoroughfare plan and some right-of-way has been preserved for this extension.

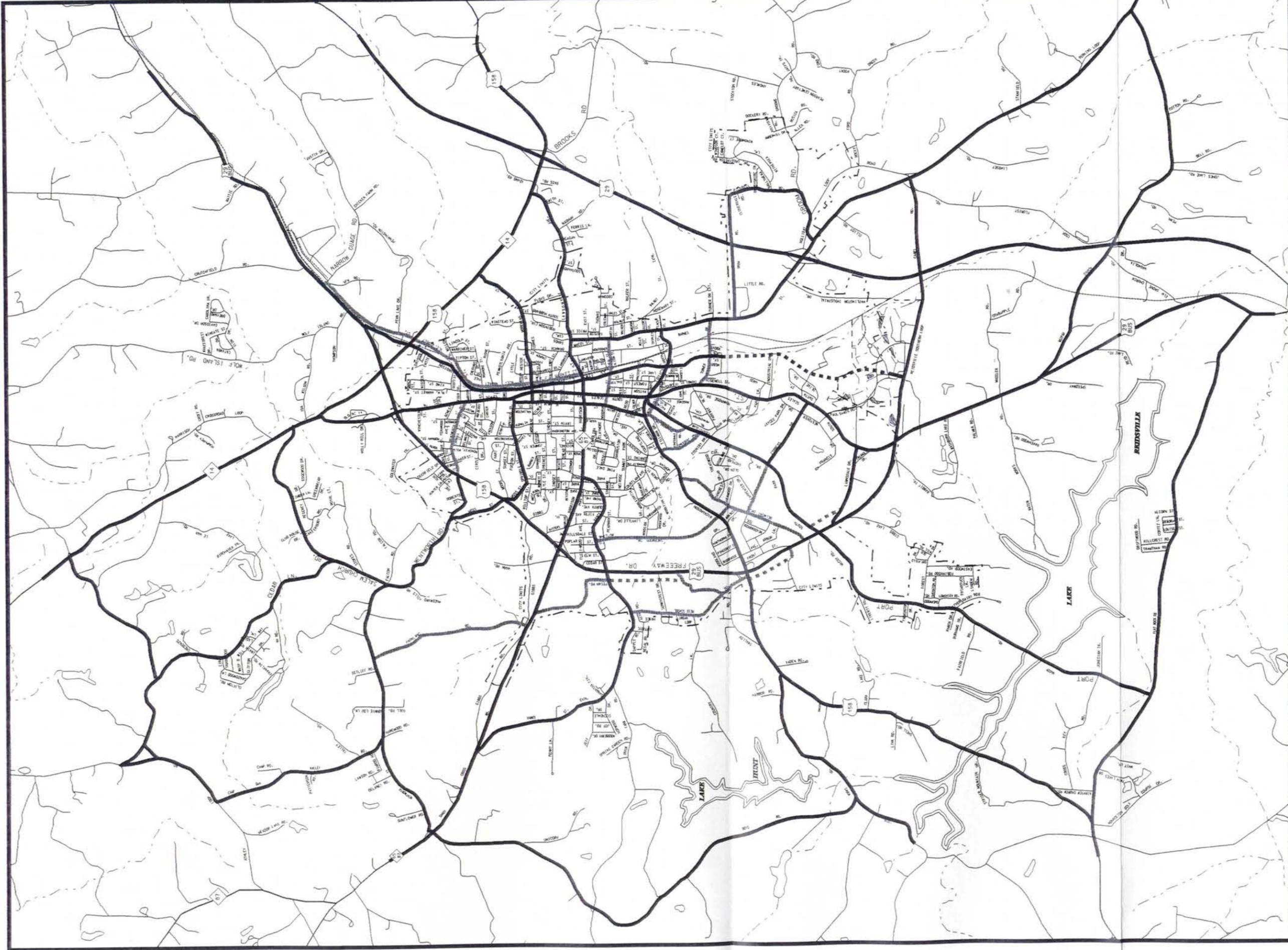
### ***Transportation Demand***

This street is proposed to relieve congestion on Scales Street. Scales Street is the main street into the central business district (CBD) of Reidsville. It is approaching capacity. The extension of Way Street to the southern connector will provide another option for traffic bound for downtown. The importance of this connector will increase as development in Reidsville expands to the south of town. Currently, the City is planning for major growth in this area and is providing water to the area to support future growth.

## ***PRIORITY #5 - VANCE STREET IMPROVEMENT***

### ***Description of Project***

It is recommended that Vance Street be widened to increase the lane widths to 12 feet from the present widths that vary from 10 feet to 12 feet. Additional right-of-way will be required to get the recommended 70 feet where possible.



**REIDSVILLE**

ROCKINGHAM COUNTY  
NORTH CAROLINA

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



**FIGURE 1**

**THOROUGHFARE PLAN**

**LEGEND**

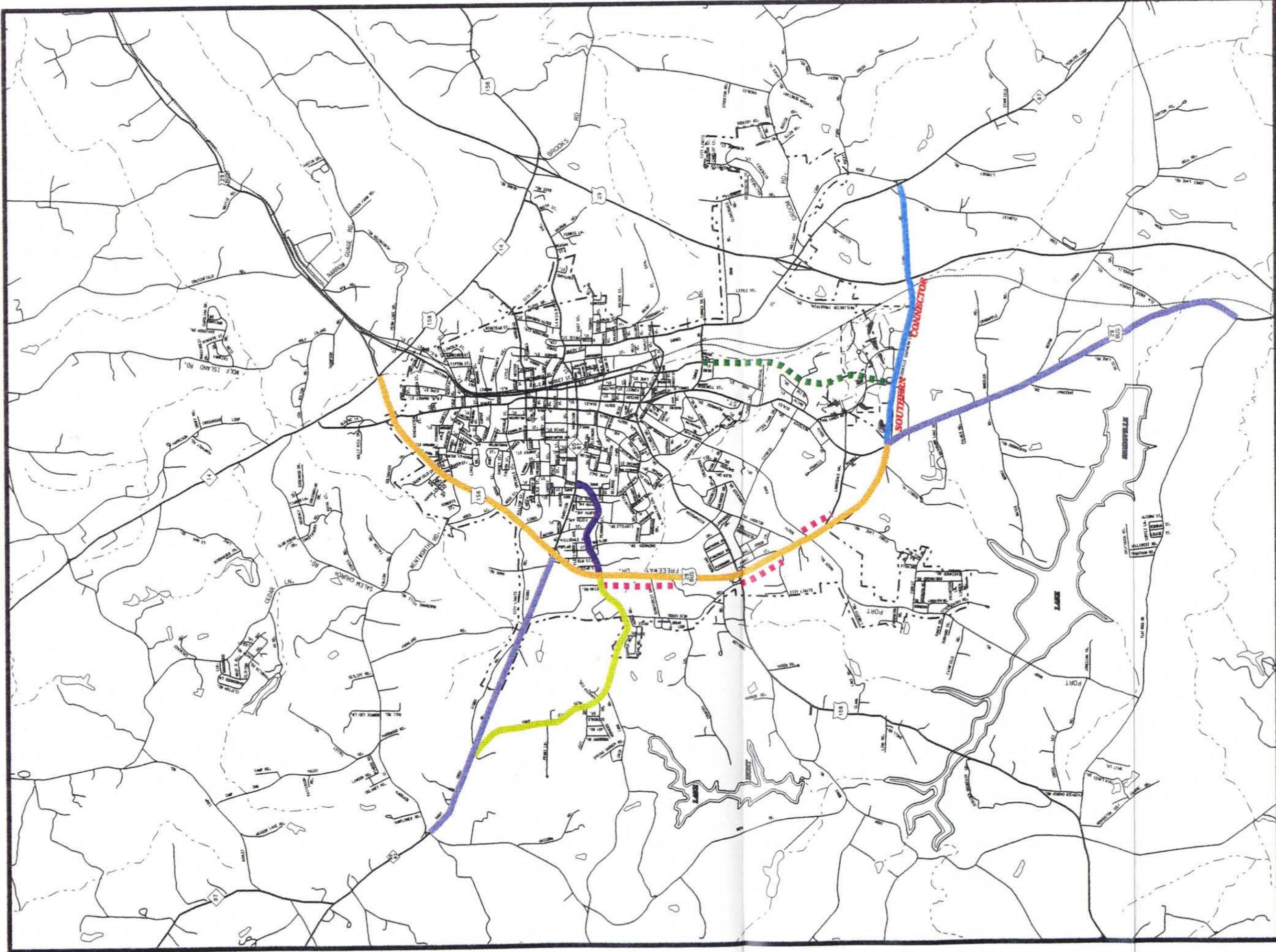
- MAJOR THOROUGHFARE ———
- MINOR THOROUGHFARE ———
- EXISTING ———
- PROPOSED - - - - -



**ADOPTED BY:**  
TOWN OF REIDSVILLE      JULY 21, 1999  
PUBLIC HEARINGS      JULY 21, 1999

**RECOMMENDED BY:**  
STATEWIDE PLANNING      AUGUST 15, 1999  
N.C. DEPARTMENT OF TRANSPORTATION      SEPTEMBER 24, 1999

JUNE 04, 1999



**REIDSVILLE**

ROCKINGHAM COUNTY  
NORTH CAROLINA

APPROVED BY  
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAY-STATEWAYS PLANNING BRANCH  
IN COOPERATION WITH THE  
U.S. DEPARTMENT OF TRANSPORTATION  
NORTH CAROLINA DIVISION



**FIGURE 2**

**RECOMMENDED IMPROVEMENTS**

**LEGEND**

-  ADD TURNING LANES AT MAJOR INTERSECTION & WIDEN TO 24'
-  5 LANE FACILITY
-  5 LANE FACILITY
-  2 LANE FACILITY
-  SOUTHERN CONNECTOR (UNDER CONSTRUCTION)
-  SERVICE ROADS
-  INTERCHANGE



JULY 27, 1999

## **Multi-modal Recommendations**

As part of the development of the Reidsville Transportation Plan, the City staff recommended that we incorporate their existing greenway plan into the Thoroughfare Plan. Also, additional bicycle and pedestrian facilities that would tie into the current city plans were developed as part of the planning process. Recommendations for greenways, bike and pedestrian facilities are outlined on the following pages.

### **Reidsville Greenway Recommendations**

The City of Reidsville has developed a citywide greenway plan (see Figure 4). When planning, the greenway/bike plan should be consulted to see if these recommendations could be incorporated in roadway improvements.

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 increased federal funds and broadens opportunities for states to enhance their transportation systems. One part of ISTEA provides federal funds for "transportation enhancements," activities which can creatively integrate transportation into our communities and the natural environment.

Pedestrian and bicycle facilities, scenic beautification and historic preservation are examples of enhancements. To be eligible for ISTEA enhancement funds activities must have a direct relationship to the intermodal transportation system, but not necessarily to a currently planned highway project. To qualify as a pedestrian or bicycle facility, which includes projects that are not routinely required or provided as part of the transportation system, the pedestrian or bicycle facility must primarily serve a transportation, rather than a recreational purpose. Some of the projects in the Reidsville Greenway Plan, which might meet these criteria, are listed below and show on Figure 4.

#### ***Greenway Priority #1: Jaycee Park Trail***

##### ***Description of Project***

This trail is recommend to be the first Greenway built in Reidsville. It is a 1.6-mile trail that will connect Reidsville Senior High School and Reidsville Middle School at the Jaycee Park located on South Scales Street. This trail should be a 10-foot wide, asphalt- paved path that is accessible to all user groups. This trial can be used in a variety of ways. It may be used by students to travel to and from school for educational purposes as well as for recreational purposes. It will be helpful in removing pedestrian traffic from Cypress Drive and South Park Drive by providing an alternate route from neighborhoods along South Scales Street and Cypress Drive to access the schools and recreational facilities.

##### ***Transportation Demand***

This project has been proposed by the City to move bike and pedestrian traffic from major thoroughfares to schools and recreational facilities in the area. This facility will serve bicyclist and pedestrians who travel from South Scales Street and Park Lane Area to Reidsville Middle School,

Reidsville High School and the Jaycee Park recreational area. With a safe off-road facility, students can travel to school and the recreational center without fear of cars. Bicycles and walking are the main sources of transportation for many students.

### ***Safety Issues***

At this time the main way to access the schools and recreational facility in the area is along the major thoroughfares of South Scales Street and South Park Drive. Both of these facilities serve heavy volumes of traffic accessing the downtown of Reidsville. With a safe off-road facility, students and individuals can travel to the schools and Jaycee Park without the fear of cars.

### ***Social Demand/Economic Development***

The area where this trail would be located is a very popular residential area in Reidsville. It is expected to continue to grow with future residential development, which will only increase the need for the facility

### ***System Linkage***

This facility connects to another proposed greenway, the Lake Trail, which will move pedestrian and bike traffic from the Middle School/ High School area to Lawndale Drive and Freeway Drive.

## ***Greenway Priority #2: Lake Trail***

### ***Project Description***

This trail picks up where the Jaycee Park Trail stops at Reidsville Middle School. It will proceed southwesterly along the creek and sewer line to Lawndale Drive. The trail runs along Lawndale Drive for approximately 900 feet then turning southwesterly to Freeway Drive following the sewer outfall and creek to a junction with a branch near the Forrest Drive Pump Station. At this point a connection can be made with Forrest Hills Subdivision by using the access road to the Pump Station, continuing with the junction southerly along the western bank of the creek and crossing the creek to the lake cove. Following the eastern edge of the cove until reaching Water Works Road, the trail then continues east along Water Works Road to the Park.

The trail from the Middle School to Lawndale and Freeway Drive should be a 10-foot wide, asphalt-paved path that is accessible to all user groups. From Freeway Drive to Forrest Hills Subdivision and Lake Park the trail should be a 10 foot wide gravel path that is accessible to walkers, bicyclist and senior citizens.

### ***Transportation Demand***

This trail, along with the proposed improvements to Freeway Drive, which should include sidewalks adjacent to the proposed multi-lane facility, provides an excellent opportunity to move a large amount of pedestrian and bicycle traffic. This trail will provide access to shopping along Freeway Drive, and to the schools along South Park Drive, and to neighborhoods along South Scales Street.

### ***Safety Issues***

This trail can serve pedestrians and bicyclist that want to access shopping along Freeway Drive, the schools or Lake Reidsville. This provides an alternate route to Port McCoy Road and South Park Drive for pedestrians/bikes thus reducing the conflict with automobiles.

### ***Social Demand/Economic Development***

Reidsville has targeted the southern side of the City for development. The area that this trail serves is expected to see both commercial and residential development in the future. This will increase the importance of the trail in the future by providing citizens an alternate to automobile travel to shopping, school or recreational facilities.

### ***Greenway Priority #3 Sherwood Trail***

#### ***Description of Project***

This trail starts at Courtland Park and crosses Courtland Avenue to Green Street. It follows the right-of-way west along Green Street to the end of that road. It continues westward along a sewer outfall line to Sherwood Drive and crosses Sherwood Drive. Then it follows the same outfall line to Freeway Drive. This trail should be a ten foot wide, asphalt-paved Greenway that will be accessible for all user groups.

#### ***Transportation Demand***

This is expected to be a heavily used Greenway as soon as it is constructed, due to the ability for many residential subdivisions to tie into it and its connection to Sherwood Drive, which has a large amount of pedestrian traffic, and Freeway Drive, with its shopping areas and restaurants.

#### ***Safety Issues***

Currently, if you want to bike or walk to the schools, lake or shopping areas, the only way to do it is along a major thoroughfare that is not designed to accommodate this type of traffic. These thoroughfares include Port McCoy Road, South Park Road and US 29 Business/South Scales Street. As the residential development grows on the south side of town, the desire to misuse thoroughfares are likely to increase. Providing an alternate route that separates these modes of travel will increase safety.

#### ***Social Demand/Economic Development***

Residential development is expected to continue on the south side of Reidsville. In addition the commercial development is growing along Freeway Drive. Also, the middle school and high school are expected to continue to attract trips from south of Freeway Drive. All of these factors should contribute to a high use of this trail when constructed. Furthermore, it is expected that the trail will make living along Port McCoy and south of Reidsville more desirable and may stimulate further growth.

### ***System Linkage***

This facility links into the greenway plan for Jaycee Park and the schools. It also connects Jaycee Park and local neighborhoods north of Freeway Drive to neighborhoods south of Freeway Drive and Lake Reidsville.

### ***Greenway Priority #4: Lowes Trail***

#### ***Description of Project***

This trail offers some of the most inviting scenery of all the Greenways and should be greatly used because of the two facilities it connects: Lowes Ballfield and the Reidsville Recreation Center. The trail begins at the easterly edge of the ball field and follows a sewer line southeast to Sprinkle Street. It crosses Sprinkle Street and follows the sewer line and creek in an easterly direction, crossing the creek to Franklin Street in front of the Reidsville Parks and Recreation Center. This trail will be a ten-foot wide, asphalt-paved path that will feature a relatively large wooden bridge crossing a creek and ravine in the wooded area near Franklin Street.

#### ***Transportation Demand***

This path will be assessable for all users but will be challenging for elderly or some handicapped persons because of the steepness of the slopes. It is sure to be used greatly by children that go to the facilities at both ends of the trails and should promote usage of both Lowes Field and the Recreation Center.

#### ***Safety Issues***

This trail will serve local neighborhood in the Sprinkle Street area and provide an alternate route to recreational facilities aside from the street itself. This will improve safety for motorist and pedestrians.

#### ***Social Demand/Economic Development***

This area of Reidsville is well developed residentially and lacks good pedestrian facilities. This trail will provide opportunities for local citizens to access recreational facilities in the area by another mode rather than car. This could enhance the area and make it more desirable for future development and residential growth.

### ***System Linkage***

This facility connects neighborhoods on each side of Sprinkle Street as well as recreational facilities at each end.

## ***Greenway Priority #5: Club Trail***

### ***Description of Project***

This path begins on the sewer outfall line on Sherwood Trail just west of the end of Green Street. It proceeds south following another sewer line and creek to Richardson Drive. It crosses Richardson Drive just east of Fairway Drive and follows the Richardson Drive right-of-way west to another sewer line. It then follows Belmont Drive east to a sewer line that goes around the southern border of the Pennrose Park County Club Golf Course. From there it follows an existing trail along the sewer line east to a point that cuts southeast through a small wooded area away from the golf fairway so that it intercepts a sewer outfall line. It follows this outfall line southeast to South Park Drive. It crosses South Park Drive, still following the outfall line several hundred feet until it reaches a point at the back of the property that faces South Park Drive. It follows the rear property line of a large tract of land in the southerly direction until it intercepts the Jaycee Trail in the wooded section of that trail. This trail will be a ten foot wide, asphalt-paved path that will be accessible for all user groups.

### ***Transportation Demand***

This trail should encourage a wide variety of users because of the many options it will present to the user regarding direction and end destinations. It will connect two other Greenways and will give the user the option of traveling over five miles on city greenways.

### ***Safety Issues***

This section of greenway connects two other greenways together providing an extensive system that give users an option to travel to several areas of the city. This has the potential to remove some traffic from city streets as well as keep pedestrians off of thoroughfare roads throughout Reidsville improving safety for both.

### ***Social Demand/Economic Development***

This section of greenway will serve neighborhoods in the central portion or Reidsville and will further connect greenway on the north and south ends of town, providing a complete system for use by many of Reidsville's residents. This will improve the livability of the city and make it an even more desirable place to live and do business.

### ***System Linkage***

This greenway connects two other greenways and gives the user the ability to travel over five miles on city greenways if they desire. It bisects the center of the city and will serve a large residential area making this facility an integral part of the whole system.

## **Roadway Improvements for Bicycles/Pedestrians**

The City of Reidsville and NCDOT worked cooperatively to target roadways which should be upgraded to accommodate bicycles or pedestrian traffic when improvements to existing roads or construction of a new road is initiated (see Figure 3). A detailed explanation on the purpose and need for each project is given below. The City and the State should use this information as a guideline to help determine where pedestrians or bicycles need to be accommodated on a particular thoroughfare.

### ***Bicycle/Pedestrian Priority #1: Freeway Drive***

#### ***Description of Project***

It is recommended that Freeway Drive be improved to include a sidewalk on the east side of the proposed facility. The sidewalk will serve pedestrian traffic traveling to shopping and residential areas located along Freeway Drive. The final cross-section for the widening of Freeway Drive has not been determined yet. It is recommended that the sidewalk only be built if driveway access is controlled and a raised grass median is constructed along, at a minimum, portions of Freeway Drive.

#### ***Transportation Demand***

The construction of a sidewalk along Freeway Drive provides an opportunity for local citizens to access shopping and residential areas along Freeway Drive without using an automobile. The sidewalk would also tie into the greenway system proposed by the City of Reidsville increasing the demand and opportunity for pedestrians to walk along Freeway Drive.

#### ***Safety Issues***

Currently, Freeway Drive is not designed to handle pedestrian traffic. Much of the commercial development has unrestricted driveway access. However, with the residential development located adjacent to it and the continuing growth of commercial development in the area and its proposed tie into the greenway system on the south end, it is recommend that a sidewalk be considered for the east side of the proposed facility. A sidewalk should only be considered if a controlled access and raised grass median (where feasible) type of facility is considered in the future.

#### ***Social Demand/Economic Development***

Freeway Drive has a close proximity to many residential developments on its east side and the proposed construction of a greenway that will cross the facility. With continued commercial growth planned in the area, the construction of a safe pedestrian facility adjacent to the highway could serve a significant amount of pedestrian traffic.

### ***System Linkage***

This project could be linked with the widening project for Freeway Drive currently scheduled in the TIP. It also links to the proposed Lake Trail Greenway system proposed by the City of Reidsville.

### ***Bicycle/Pedestrian Priority #2: South Park Drive***

#### ***Description of Project***

It is recommended that South Park Drive, from Northop Street to Freeway Drive, be striped for a bicycle lane and a sidewalk be added on the south side of the existing facility. The facilities will serve residential needs, schools and recreational facilities located along South Park Drive.

#### ***Transportation Demand***

This project has been proposed in response to the high volume of bicycle and pedestrian traffic in the area. This is a very important link to connect residential development on the north end of South Park Drive with the schools, recreational development and Freeway Drive to the south. Students traveling to and from the middle and high schools currently use the road.

#### ***Safety Issues***

The extra width needed to accommodate a bicycle lane already exists along South Park Drive. The pedestrian and bicycle traffic also exists. Therefore, to improve safety it is recommended that pavement stripes and a sidewalk be put in place. This facility serves several neighborhoods and social facilities that are conducive to bicycle and pedestrian traffic.

### ***System Linkage***

This project would serve as a link with the proposed sidewalk adjacent to Freeway Drive as well as the Jaycee Park greenway that is currently proposed to terminate at the middle school.

### ***Bicycle/Pedestrian Priority #3: Cypress Drive***

#### ***Description of Project***

It is recommended that sidewalk be added to Cypress Drive from South Scales Street to Belmont Drive. This facility will serve pedestrians accessing the high school and middle schools along South Park Drive, Jaycee Park along Cypress Drive, and residential development in the Belmont Drive area. The section of this recommendation from South Park Drive to Belmont Drive is not maintained by the state and would have to be constructed with City funds.

### ***Transportation Demand***

The proposed Cypress Drive sidewalk would connect the Jaycee Park Greenway with proposed sidewalks along South Park Drive and Freeway Drive, as well as proposed sidewalks along Belmont Drive and Sherwood Drive. This system would provide pedestrians access to commercial, social, and recreational facilities across Reidsville. This Cypress Drive section would be valuable in providing access to the system for adjacent residential developments.

### ***Safety Issues***

A sidewalk along Cypress Drive will provide a safe area for people to walk and avoid conflicts with automobile traffic. Cypress Drive is located between residential land use, recreational facilities, and schools. Many children are apt to walk in this area. A sidewalk will give them safe access to local recreational and educational facilities in the area.

### ***Social Demand/Economic Development***

The area along Cypress Drive is expected to continue to be highly residential. Therefore, demand from these areas to access the schools and recreational facilities are expected to continue into the future.

### ***System Linkage***

This project would link to proposed sidewalks on South Park Drive and Belmont Drive. It also would connect to the proposed Reidsville Jaycee Park Greenway. Cypress Drive would serve as an important link to bring an entire system of sidewalks and greenways together.

### ***Bicycle/Pedestrian Priority #4 Sherwood Drive***

#### ***Description of Project***

It is recommended that Sherwood Drive be striped for bicycle lanes and a sidewalk be constructed to handle the existing pedestrian and bicycle traffic on the facility. The existing two-lane facility is currently wide enough to accommodate bike lanes. This facility is maintained by the city and improvements would be the responsibility of the City of Reidsville.

### ***Transportation Demand***

This project is proposed in response to the high volume of bicycle and pedestrian traffic in the area. It will serve as a link in a greater system bringing the Sherwood Greenway Trail together with the sidewalk system that links to Belmont Drive, Cypress Drive, South Park Drive, Freeway Drive, Jaycee Greenway Trail and Lake Greenway Trail.

### ***Safety Issues***

Currently, heavy bike and pedestrian traffic exist along Sherwood Drive. In order to improve safety it is recommended that accommodations be made along this facility to handle the existing traffic.

### ***System Linkage***

Construction of a sidewalk along this facility would connect to a proposed sidewalk along Belmont Drive as well as the proposed Sherwood Greenway proposed by the City.

### ***Bicycle/Pedestrian Priority #5: Belmont Drive***

#### ***Description of Project***

It is recommended that a sidewalk be added to Belmont Drive between Sherwood Drive and Cypress Drive. This facility is maintained by the City, therefore improvements would have to be completed by the City of Reidsville.

#### ***Transportation Demand***

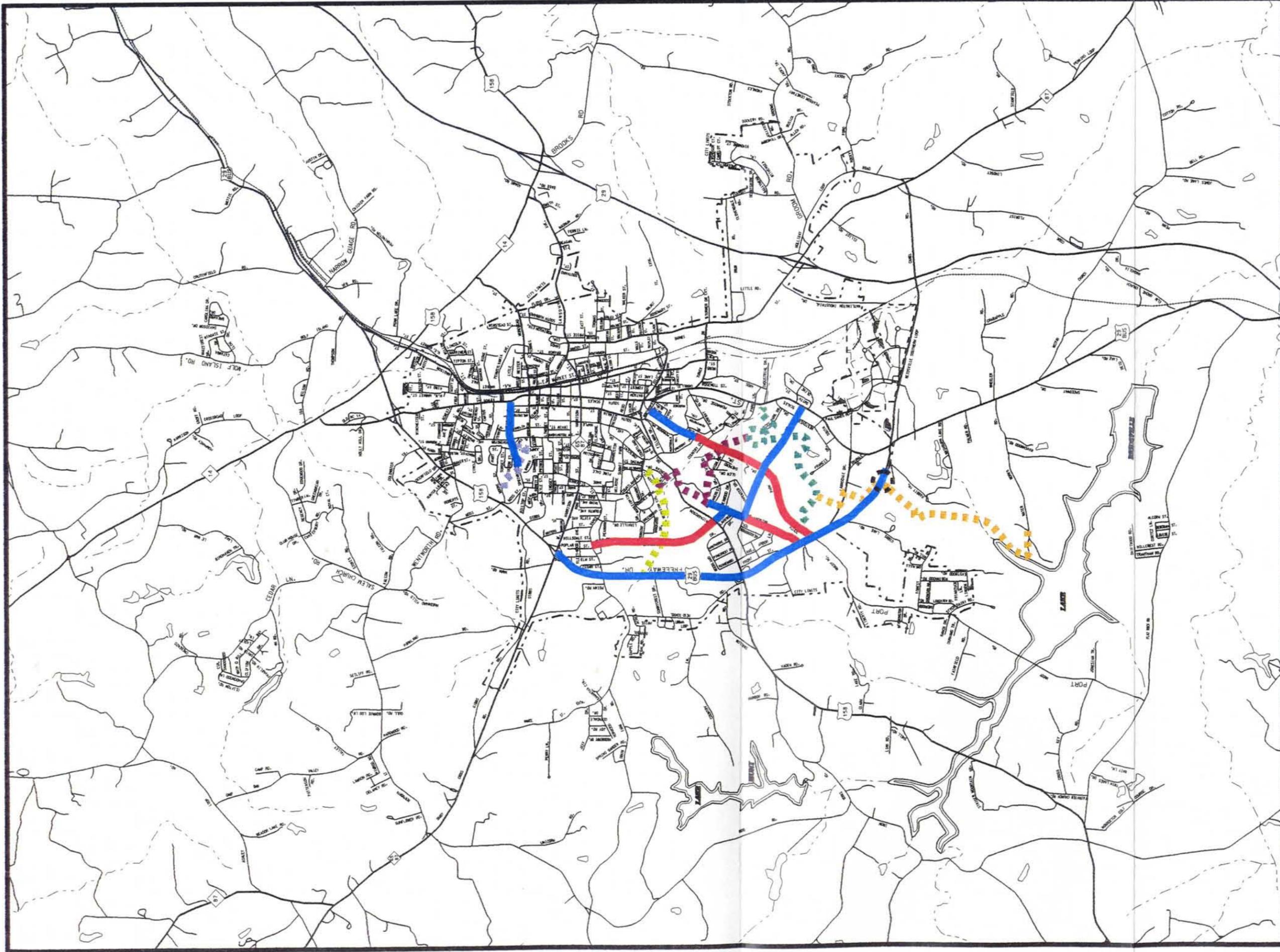
This section will serve as a major link to connect two high pedestrian traffic areas together. It will connect the areas along Sherwood Drive, Cypress Drive, and South Park Drive. It also serves to link the Sherwood Greenway with the Jaycee Park Greenway.

#### ***Safety Issues***

This link in the sidewalk system will serve as a safe area for pedestrians to travel and access residential areas along Sherwood Drive. It would allow people from this area to access the schools and recreational facilities located along South Park Drive and Cypress Drive. This reduces traffic on the highway and separates cars from pedestrians.

#### ***System Linkage***

This link is an important part of an overall sidewalk system for the City of Reidsville. It brings two heavy pedestrian areas (Sherwood Drive and South Park Drive) and two greenway systems together.



**REIDSVILLE**  
**ROCKINGHAM COUNTY**  
 NORTH CAROLINA  
PREPARED BY  
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAY-STATEWAY PLANNING BRANCH  
BY CONTRACT WITH THE  
 U.S. DEPARTMENT OF TRANSPORTATION  
 FEDERAL HIGHWAY ADMINISTRATION



**FIGURE 3**

**GREENWAY, BIKE AND PEDESTRIAN FACILITIES**

**LEGEND**

- ADD SIDEWALK AND BIKE FACILITIES
- ADD SIDEWALK
- LAKE TRAIL GREENWAY
- JAYCEE PARK TRAIL GREENWAY
- CLUB TRAIL GREENWAY
- SHERWOOD TRAIL GREENWAY
- LONES TRAIL GREENWAY
- PROPOSED GRADE SEPARATION



Map 6, 1999

## **Chapter 3**

# **Implementation of the Plan**

Implementing “the plan” that has been developed for the City of Reidsville is a challenging, but necessary part of the planning process. After all, if we do not try to build the new roads, improve intersections, or add sidewalks, there is not a need to develop a transportation plan. As discussed in Chapter 1 of this report, planning is a continuous process that is only successful if corridors are protected, development is controlled, and funding is obtained to fulfill the needs identified on the plan.

The primary function of the City of Reidsville’s transportation plan is to provide guidance to the governing bodies of the City in developing its transportation system. It is the responsibility of the City to provide citizens with the most effective transportation system possible by utilizing the legislative powers that are granted to the City of Reidsville and by maximizing all the resources that may be available. Problems in funding the highway needs of smaller cities are increasing due to the increase in construction costs and the amount of revenue available for highway projects. There are not sufficient funds in the state or local government budgets to undertake all of the projects in an area. Therefore the transportation plans are being scrutinized every day. By adopting this plan, the City now has the right to protect the existing and proposed highway corridors through a wide variety of controls. It is important that the City of Reidsville be aware of the different “resources” that will help protect the roadway corridors and generate funding possibilities that will ensure the successful completion of the plan.

The remainder of this chapter will answer two questions:

- What are the tools that Reidsville can use to implement their plan?
- Which tools can be used on what priority project?

### ***What are the tools that Reidsville can use to implement their plan?***

Below are the various tools that will aid the City of Reidsville in the protection of the corridors shown on the adopted thoroughfare plan. The description of each tool is followed by a "how to use this tool in Reidsville" section. The City should try and use each of these tools to their advantage when trying to implement "the plan".

### **State and Municipal Adoption of the Thoroughfare Plan**

Chapter 134, Article 3A, Section 136-66.2 of the General Statutes of North Carolina provides that after development of a Thoroughfare Plan, the plan may be adopted by the governing body of the municipality and the Department of Transportation to serve as the basis for future street and highway improvements. The General Statutes also requires that, as part of the plan, the governing body of the municipality and the Department of Transportation shall reach agreement on responsibilities for existing and proposed streets and highways included in the plan. Facilities that serve internal travel are designated as a municipal responsibility, and shall be constructed and maintained by the municipality (These are minor thoroughfares). Once a thoroughfare plan is

adopted, several other planning tools are available to assist in plan implementation. Use of these controls and methods can help to maximize expenditure of funds and minimize land disruption.

### *How to use this tool in Reidsville*

Since the City adopted the thoroughfare plan on July 12, 1999 and the NC Board of Transportation adopted the plan on September 24, 1999, the adoption tool has been used to the fullest extent.

## **Subdivision Regulations**

Subdivision regulations are locally adopted laws that govern how a developer may divide land into building sites. Each developer is required to submit a plat of the proposed subdivision to the municipality for approval before a building permit will be issued. Through this process, it is possible to reserve or protect the necessary right-of-way for streets, which are a part of the thoroughfare plan, and to require street construction in accordance with the plan. By requiring developers to construct subdivision roadways to minimum standards needed for the future proposed thoroughfare road, the maintenance cost is reduced and the transfer of streets to the State Highway System simplified.

Appendix D outlines the recommended subdivision design standards as they pertain to road construction.

### *How to use this tool in Reidsville*

The City of Reidsville already has subdivision regulations. When working with developers the City should encourage connectivity in developments to reduce the number of future streets that are a cul-de-sac. Problems handling travel and congestion in future neighborhood areas could be reduced by having multiple access points.

## **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". The roadway corridor official map, more commonly referred to as an official street map, is a document adopted by the legislative body of the community that pinpoints and preserves the location of proposed streets against encroachment. In effect, the official map serves notice on developers that the State or municipality intends to acquire certain specific property. The official map serves as a positive influence for sound development by reserving sites for public improvements in anticipation of actual need.

The NCDOT limits its use of official maps to large-scale fully controlled access facilities planned for developing areas outside of municipal jurisdictions. For projects within municipal jurisdictions, official maps should be prepared and adopted by the local government.

For cities contemplating the adoption of a Roadway Corridor Official Map, there are several issues to consider. First, it should be recognized that an Official Street Map designation places severe, but temporary, restrictions on private property rights. Issuance of building permits and/or the approval of subdivision plans within any property lying within an Official Street Map corridor is

prohibited for up to three years. This three-year prohibition period commences with the request for development approval. This authority should be used carefully and only in cases where less restrictive powers will be ineffective.

The Statute establishing the Official Street Map authority is fairly explicit in outlining the procedure 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 programmed in the State Transportation Improvement Program(TIP) or included in a locally adopted Capitol Improvements Program in addition to appearing on the adopted street system plan. The Statute states that the Capitol Improvements Program 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 Roadway Official Corridor Maps. Municipalities considering Official Street Map projects should contact this Branch for their "Guidelines for Municipalities Considering Adoption of Roadway Corridor Maps" at:

NC Department of Transportation  
Program Development Branch  
P.O. Box 25210  
Raleigh, NC 27611

### ***How to use this tool in Reidsville***

This particular tool is not very appropriate for any of the projects suggested on the current thoroughfare plan. Freeway Drive is in the city limits and is currently funded in the TIP. It is not on new location and right of way is preserved for improvements. In addition, this tool should only be used by the City if other methods are not successful in protecting a corridor.

### **Zoning Ordinance**

A zoning ordinance can be beneficial to thoroughfare planning by designating appropriate locations of various land uses and allowable densities of residential development. This provides a degree of stability by which future traffic projections can be made so that streets and highways can be planned.

Other benefits of a good zoning ordinance include the establishment of development standards. The standards aid traffic operations on major thoroughfares and minimize strip commercial developments that create traffic friction and increase the traffic accident potential.

### ***How to use this tool in Reidsville***

The City of Reidsville already has zoning ordinances that are used for planning purposes, so this tool has already been used. However, the City may want to look at their current ordinances and make sure that they compliment the recently adopted thoroughfare plan. For example, limiting driveway access along Freeway Drive may be a consideration due to the change of cross-section

of the road and the anticipated future high traffic volumes. Limited driveways will reduce conflict with adjacent land use and through traffic.

## **Density Credits**

Density credits are incentives for developers to dedicate right-of-way for planned roadways. By dedicating the right-of-way to the City or State the developer gets two things: (1) his/her plan approved by the City, (2) he/she is allowed to change the density of the development even though it is zoned as something else. This reduces the minimum lot size that a developer may have required for a development to the next level of zoning. If the current level of zoning is R20 (20,000-ft lot) and the right-of-way was dedicated, the developer could go to RIO (10,000-ft lot). The developer is not losing any sellable lots, and ultimately may benefit by being able to place more houses on the same piece of property.

## **Development Reviews**

Driveway access to a state-maintained street or highway is reviewed by the District Engineer's office prior to access being permitted. Any development expected to generate large volumes of traffic (i.e. shopping centers, fast food establishments, larger industries, etc.) may be comprehensively studied by staff from the Traffic Engineering, Statewide Planning and Roadway Design Branches of NCDOT. If completed at an early stage, it is often possible to significantly improve the development's accessibility at a minimal expense. Since the municipality is the first point of contact for the developer, it is important that the municipality advises them of this review requirement and cooperates in the review process.

### ***How to use this tool in Reidsville***

The City of Reidsville should work with a representative from the NCDOT District Engineer's office to review plans for development before giving them approval. New development should be studied carefully, particularly driveway locations or access points of these new developments, to insure that the proposed or exiting roadway will operate efficiently. Some details to look at would be: limiting cul-de-sacs in residential developments, the proximity of driveways near proposed intersection locations, having one access point for major commercial developments or a continuous right turn lane along the front of the development. If developments are located near a proposed roadway then the City should talk with the owner/developer to see if right-of-way could be donated or reserved. The development review process is an opportune time for the city to get land reserved or donated, ultimately reducing the roadway costs and improving the traffic flow in the future.

## **Urban Renewal**

Urban renewal is defined as the rehabilitation of city areas by demolishing, remodeling, or the rehabilitation of 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 municipality must first prepare a community development program. Urban areas compete throughout the State on the basis of demographic points, which considers such conditions as percent of substandard housing, people per square feet of housing, dwelling age, etc.

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

### ***How to use this tool in Reidsville***

Rehabilitation could be used by the City if an opportunity comes available, an example being along Vance Street. Urban renewal would give the City a chance to improve the setback along this facility thereby increasing the opportunity for widening the roadway and adding sidewalks.

### ***Capitol Improvement Program***

One of the tools, which make it easier to build a planned thoroughfare system, is a Capitol Improvements Program. It consists of two lists of projects. The first list is a list of highway projects that are designated as a municipal responsibility and are to be implemented with municipal funds. The second list is a list of local projects designated as the state's responsibility to be included in the Transportation Improvement Program.

## Chapter 4

# What Impact Does the Plan Have on Reidsville?

In previous sections we discussed the Reidsville Thoroughfare Plan Recommendations and how to implement them. However, previous sections did not answer the following questions:

1. *What environmental impacts will the plan have?*
2. *How many businesses or homes will be affected?*
3. *What economic development potential does the plan offer?*
4. *What are the benefits (travel time, safety costs, operating cost) of this plan?*

This section of the report will focus on the "impacts" that the thoroughfare plan will have on the residents, the land and the overall community atmosphere in the City of Reidsville.

### *What will the Plan do to the current environment in Reidsville?*

One of the major concerns with the development of a transportation plan is the effect the plan will have on the environment. Meaning, will it go through wetlands, cross-streams, historic districts or affect wildlife endangered species? Table 4-1 displays the actual impacts on an individual project basis. All of the main environmental, with the exception of the protected watershed areas which is already in NCDOT owned right-of-way, have zeros displayed in the chart; thus there will be no foreseen environmental impacts.

**Table 4-1**

Category	Projects				
	Freeway Drive	NC 87 (western section)	US 29 Business	Way Street Extension	Vance Street
Length (Miles)	5.82	2.77	3.5	1.09	2.48
Wetlands (Acres)	0	0	0	0	0
Protected/Critical Watershed (Acres)	10.59	4.23	4.23	0	0
High Quality Water Zones (Acres)	0	0	0	0	0
Nurseries/Spawning Areas	0	0	0	0	0
Hydrological Crossing					
<i>Normal</i>	1	1	1	1	0
<i>Trout</i>	0	0	0	0	0
Critical Habitats	0	0	0	0	0
Special Natural Areas	0	0	0	0	0
National Heritage Occurrences	0	0	0	0	0
Historic Sites (NR & Candidate)	0	0	0	0	0
Historic Districts	0	0	0	0	0
Archaeological Sites/ Areas	0	0	0	0	0

**Table 4-1 (Continued)**

Category	Projects				
	Freeway Drive	NC 87 (western section)	US 29 Business	Way Street Extension	Vance Street
Cultural Resources:					
<i>Schools</i>	0	0	0	0	0
<i>Parks/Community Facilities</i>	0	0	0	0	0
<i>Churches</i>	0	0	0	0	0
<i>Cemeteries</i>	0	0	0	0	0
Subdivisions	0	0	0	0	0
Superfund Sites/Landfills	0	0	0	0	0
Groundwater Incidents	0	0	0	0	0
NPDES Discharge	0	0	0	0	0
Non-discharge systems	0	0	0	0	0

***How many homes will be effected?***

Most citizens in a town are concerned about their property and what will happen to their house or land when a transportation plan is implemented. They want to know if it effects their property. If so, how much are they going to lose? Each of the top five priority projects on the thorough-fare plan was analyzed to see how many homes and businesses would be impacted. It is important to see that all of the commercial areas impacted are along existing highways and some such as Freeway Drive have additional right-of-way that NCDOT purchased in advance. The only project that doesn't use existing right-of-way is the extension of Way Street. With this project approximately thirty acres of open/wooded or unused property will be affected by the proposed projects. This reduces the impact on residential home sites and will ultimately reduce the cost of the projects and make justifying the protection of the corridor easier. No residential land is impacted and no houses will be taken with the completion of all five projects. This plan has very minimal affects to property owners in the City of Reidsville.

As with any new roadway facility there will also be proximity impacts to residents in the area. Houses may now be located within 50 to 100 feet of the right-of-way (ROW) of the new road. Although minimal, a resident located within 50' of the ROW will still be impacted by noise, congestion and it may not be aesthetically pleasing to see a major roadway from your front porch.

***How is " the plan" going to help economic development?***

Although roads are built to relieve congestion and to get people where they need to go, they also can impact the economic growth of an area by reducing transportation costs and providing access to land that has development potential. For the City of Reidsville, the roadway improvements that are proposed on the thoroughfare plan could have a major impact on economic development. Improving Freeway Drive to multi-lanes, along with the southern connector, and an interchange with US 29 will aid in increasing traffic volumes along this facility. This additional volume will increase the desirability of the area to commercial development prompting new businesses along Freeway Drive. The same can be said for NC 87 between Wentworth and Reidsville. Once this

facility is improved, development should be attracted to this area. These improved facilities will promote development and bring jobs to the area. The result is an increase in the tax base for the City.

***How Much Will the Project Save in Travel Time, Accident Cost, and Operating Cost?***

Each proposed project in the thoroughfare plan needs to be evaluated for the benefits that it will provide to the transportation system and its users. The benefits that are provided range from a reduction in the total number of miles or hours traveled by motorists to a reduction in accident costs and increases in speed. The benefits of the top priority projects are shown in Table 4-2.

The benefits are calculated by determining how many people are using existing roads and how many of them would "switch" and use a new facility or if improvement are made to an existing facility how safety and speed might be improved. The benefits listed in Table 4-2 are only benefits that the people using the listed road would experience. It is important to realize that other road in Reidsville will benefit from the proposed projects and that benefits on the other roads are not included in the table.

**TABLE 4-2  
Benefits of thoroughfare plan roads in Reidsville**

<b>Benefits Evaluation of Selected Thoroughfare Plan Projects</b>			
<b>Project Description</b>	<b>Total Length (Miles)</b>	<b>25-Year Accrued Benefits (\$Millions)</b>	<b>Project Cost (\$Construction) (\$R/W)</b>
Freeway Drive (US 29 Bus. To NC 14, 5 Lanes)	5.8	\$520.41	\$31.1 \$0.7
NC 87 (From Freeway Drive to Wentworth St., 5 Lanes)	2.8	\$118.90	\$7.8 \$0.3
Way Street Extension	1.1	\$7.17	\$2.4 \$0.1
US 29 Business (Flat Rock Road to Freeway Dr., 5 Lanes)	3.5	\$74.62	\$9.7 \$0.4
Vance Street Widening (NC 87 to Freeway Dr.)	2.5	\$24.96	\$2.2 \$0.0
Vance Street Improvements (Freeway Drive to NC 87)	0.9	\$2.02	\$0.3 \$0.0

A  
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# APPENDIX A

## Travel Forecast Model

### 1995 Travel Analysis

As part of the transportation study for Reidsville a computer model of the existing street system was made to help with the analysis. To produce trips on this model housing and employment data was collected. Housing data was used to generate the trips and the employment data for the attracted trips. Also, traffic counts were taken throughout the City and used to determine how many trips were entering the area from outside and traveling through Reidsville. The traffic count locations may be seen on Figure 5. These counts were also used to determine the accuracy of the overall model in reproducing actual traffic flow.

To develop the scope of our study and to have a systematic approach for collecting data, a study area was developed for Reidsville. A boundary was drawn around the city to reflect the area growth over the next 30 years. This "planning area boundary" was further subdivided into smaller traffic analysis zones (see Figure 4). In Reidsville 157 zones were developed, this number includes 22 external stations and 18 dummy zones (zones reserved for future use if needed). Housing and employment data was then collected in the field after zones were developed. Similar land uses were grouped together in the zone to make them as much of the same composition (homogeneous) as possible. This aids when trying to match the computer generated traffic to the traffic counts taken in the field. It also helps when trying to project the housing and employment data to the future year, 2025.

With the zones developed and data collected, the next step was generating trips. In this step traffic count data at the planning area boundary, housing data, and employment data are used to generate traffic volumes that duplicate the traffic volumes on the street network. This traffic has three main components: through trips, internal - external trips, and internal trips. Through trips are produced outside the planning area boundary and pass through en-route to a destination outside the planning area. Internal-external trips have one end of the trip outside of the planning area. Internal trips have both their origin and destination inside the planning area. For clarity the internal trips are further subdivided into trip purposes. These are home-based work, other-home based, and non-home based.

In the trip generation step, a regression equation is used to explain the employment attractions. The regression equations that NCDOT uses have been developed from origin and destination surveys for various cities throughout North Carolina. This historic data is reviewed and an equation is "borrowed" and calibrated to the new urban area. This was the method used in Reidsville. On the housing side, trip productions are based on the ability of a house to generate trips. There are five categories: excellent, above average, average, below average and poor. Generation rates are given to each category. The average housing generation rate was 9.09 for all categories. In addition to the housing productions trips produced by commercially used vehicles, and trips produced by taxis were also included. Trip generation rates for commercially owned vehicles and taxis were borrowed from the Thomasville internal traffic surveys. An estimated 6.7 trips per commercially owned vehicle and 40 trips per taxis were used. All of these rates were

adjusted during the calibration phase, where computer generated traffic volumes are matched to traffic counts taken in the field. As part of the calibration process, lines that bisect the planning area are developed and counts are taken at each location where they cross a street. These are called screenlines. Computer volumes are compared to the screenlines as a method of model validation.

The total trips generated internally by dwelling units, commercial vehicles, and taxis were summed to produce total internally generated trips. They were then reduced by a reduction factor to account for trips made by vehicles garaged inside the planning area that leave each day for a destination outside the planning area such as Greensboro to work. The adjusted internal travel was separated into the three purposes discussed above and assigned a percentage of the total internal travel. These percentages of the total internal trips were based on travel surveys and "borrowed" from other studies for use in Reidsville. They are: home-based work (HBW) 22%, other-home based (OHB) 54%, and non-home based (NHB) 24%. Added on top of these internally generated trips is another component of internal trips that are generated by vehicles that come from outside the planning area. This component is called a secondary non-home based (SNHB) trip. An example of this type trip might be someone that lives in Rockingham County, comes to Reidsville to work, and make a SNHB by going out to lunch or shopping after work before leaving the planning area to return to their home in the county. The total number of these type trips in Reidsville totaled to 16,813 in 1995. These trips are added to the internally produced NHB trips and distributed to each zone base on each zone's relative attractiveness as determined by the internal regression equation. Internal zone by zone travel productions and attractions are calculated using a program developed by the North Carolina Department of Transportation called Internal Data Summation (IDS).

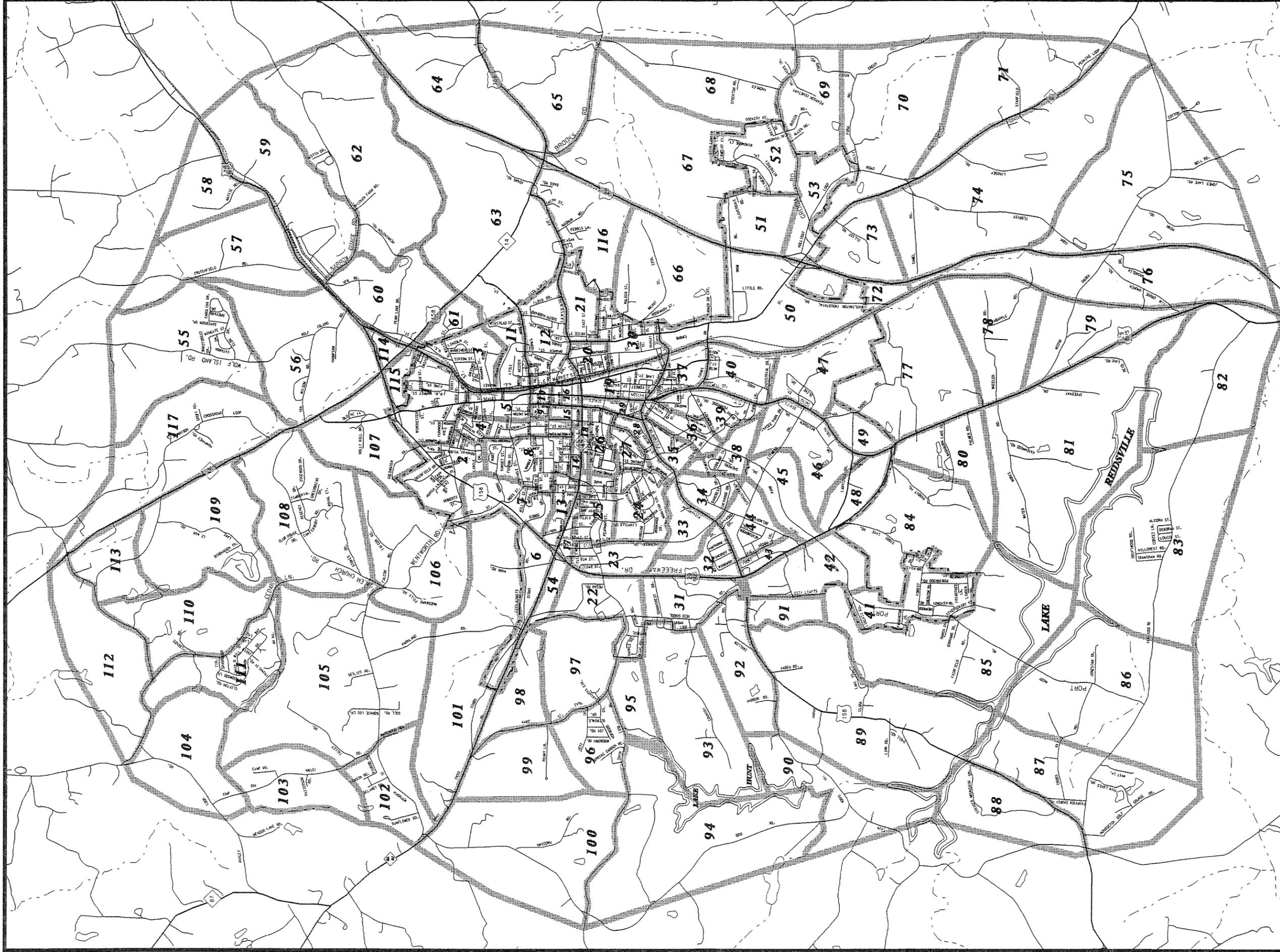
For the attraction side of the process regression equations are used. The HBW attraction factors were taken to be equal to the total employment within the zone. Factors for the other purposes, OHB, NHB and external-internal (EXT-INT) were developed using multiple regression equations "borrowed" from other study areas with characteristics similar to Reidsville. Total attractions were balanced to equal total productions by purpose in IDS.

As mentioned earlier, traffic counts were taken at all major roads where they entered into the planning area. The 1995 through and external-internal travel indices were developed for the external stations using the method to develop a synthesized through trip table for small urban areas developed by Dr. David G. Modlin, Jr. Then these trips are balanced using the fratar balancing method so that the total through trips are consistent with the total number of through trips at every other station. This analysis estimated external-internal and through trip crossings for an average week-day. The external-internal traffic volume at locations where these roads crossed the planning area boundary "stations" were treated as trip productions with the internal zones attracting these trips based on the previously mentioned regression equation.

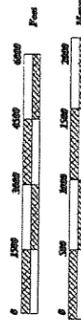
Once the total number of trips moving about the transportation network was determined, the next step was to distribute them from zone to zone. This was accomplished by using something called the gravity model. It is based on the equation that explains gravity and its attraction to objects based on size. This method was used for all trip types except through trips, which were assigned based on a minimum path basis. In order for the computer to include the value of time in the distribution of trips a trip length distribution curve is used and represented by travel time factors (friction factors). This factor is one of the variables in the gravity model formula and shown in

Table A-1. The final act in this process was to compare the synthetic traffic to real traffic counts taken in the field at established locations. The results of the accuracy checks (mentioned earlier as screenline checks) were felt to be within acceptable limits for our study. Traffic volumes for 1995 are shown in Figure 6.

<b>Table A-1</b>				
<b>Friction Factors</b>				
<b>Reidsville</b>				
<b>Time Interval</b>	<b>HBW</b>	<b>OHW</b>	<b>NHB</b>	<b>EXT-INT</b>
1	3,140	1,288	1,253	12,170
2	11,939	7,908	5,111	14,123
3	31,000	29,087	14,218	16,233
4	56,963	67,259	27,973	16,609
5	76,797	102,595	40,340	18,800
6	78,637	108,321	47,192	14,481
7	63,453	83,060	38,117	11,871
8	41,798	48,536	26,828	10,161
9	23,295	22,678	15,970	9,861
10	11,383	8,890	7,333	8,531
11	5,055	3,068	2,950	7,088
12	1,114	778	963	7,001
13	72	62	8	5,882
14	1	0	0	3,917
15	1	0	0	2,180
16	1	0	0	244
17	1	0	0	89
18	1	0	0	0
19	1	0	0	0
20	1	0	0	0
21	1	0	0	0



**REIDSVILLE**  
**ROCKINGHAM COUNTY**  
 NORTH CAROLINA  
 PREPARED BY  
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS-STATEWIDE PLANNING BRANCH  
 IN COOPERATION WITH THE  
 U.S. DEPARTMENT OF TRANSPORTATION  
 FEDERAL HIGHWAY ADMINISTRATION



**FIGURE 4**

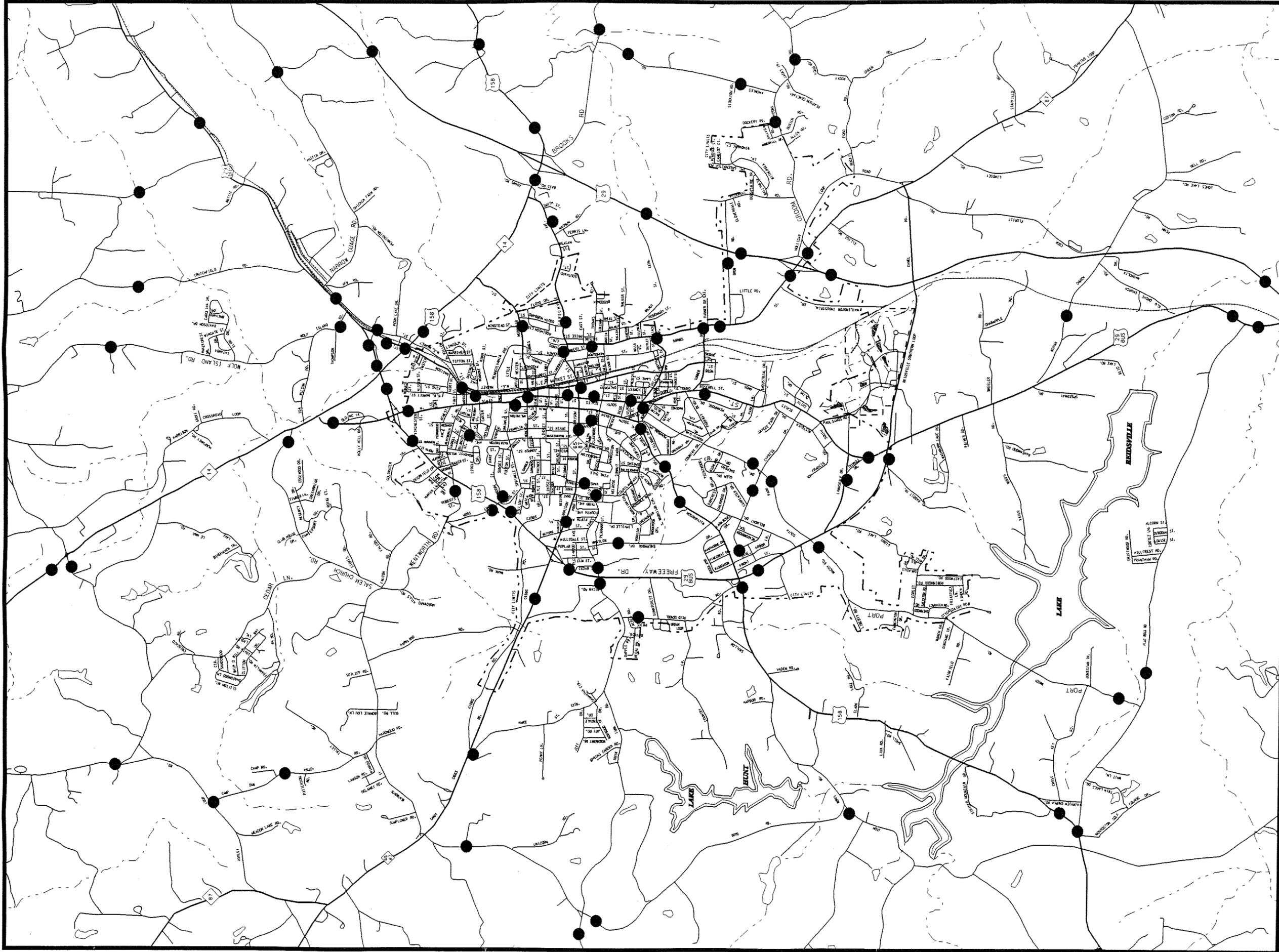


**ZONE MAP**

**LEGEND**

Zone Line  
 Zone Number

000



**REIDSVILLE**  
**ROCKINGHAM COUNTY**  
**NORTH CAROLINA**

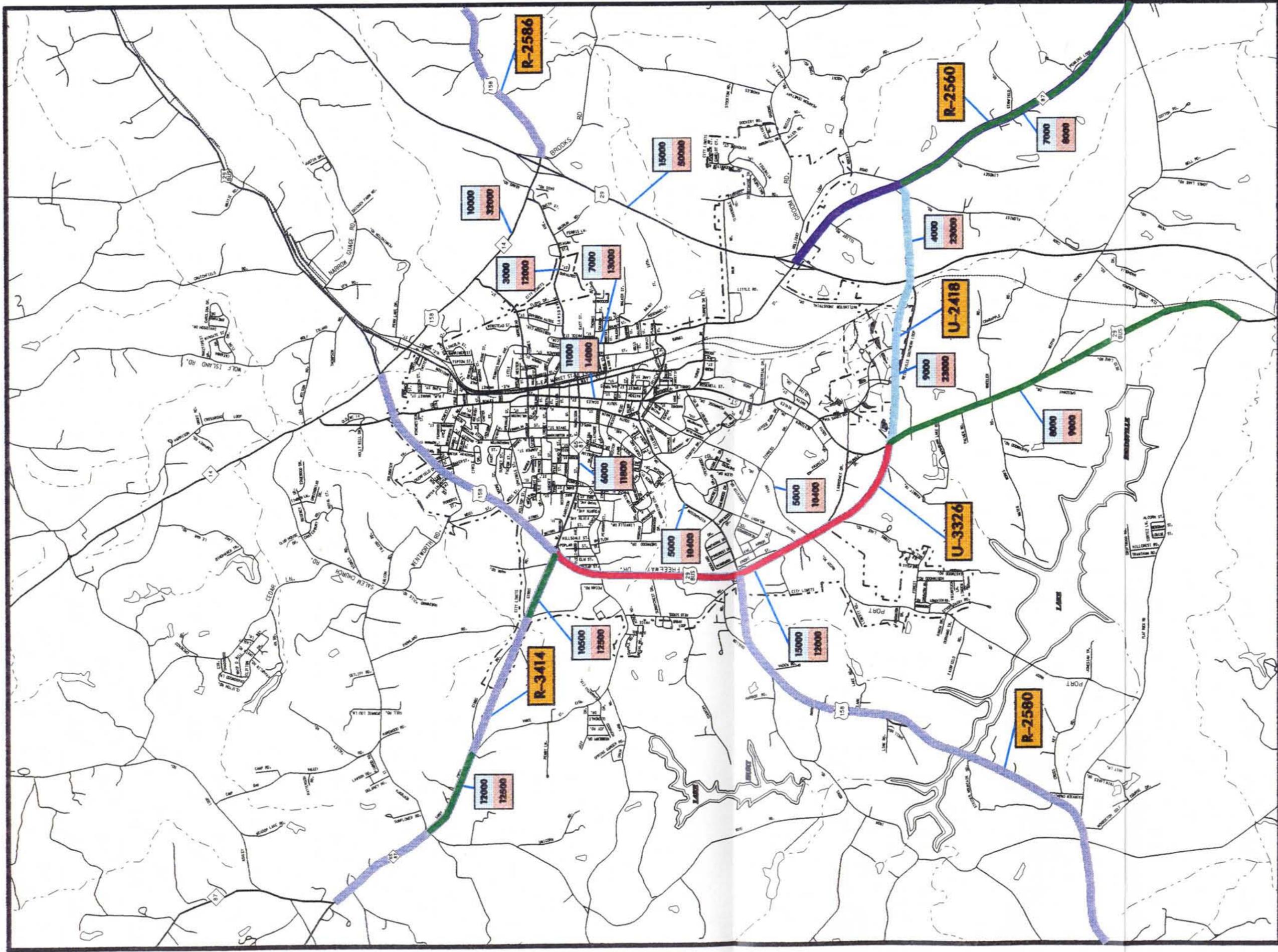
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**TRAFFIC COUNT LOCATION**

● **TRAFFIC COUNT LOCATION**

**FIGURE 5**



**REIDSVILLE**  
**ROCKINGHAM COUNTY**  
 NORTH CAROLINA

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 DEPARTMENT OF TRANSPORTATION  
 METROPLANS ADMINISTRATION

**1995 TRAFFIC ON THE EXISTING SYSTEM**



- LEGEND**
- 1995 VOLUME
  - CAPACITY
  - VC > 1.00
  - VC > 0.81
- TIP PROJECTS**
- ID FUTURE NEED
  - CONSTRUCTION PHASE
  - PLANNING AND DESIGN PHASE

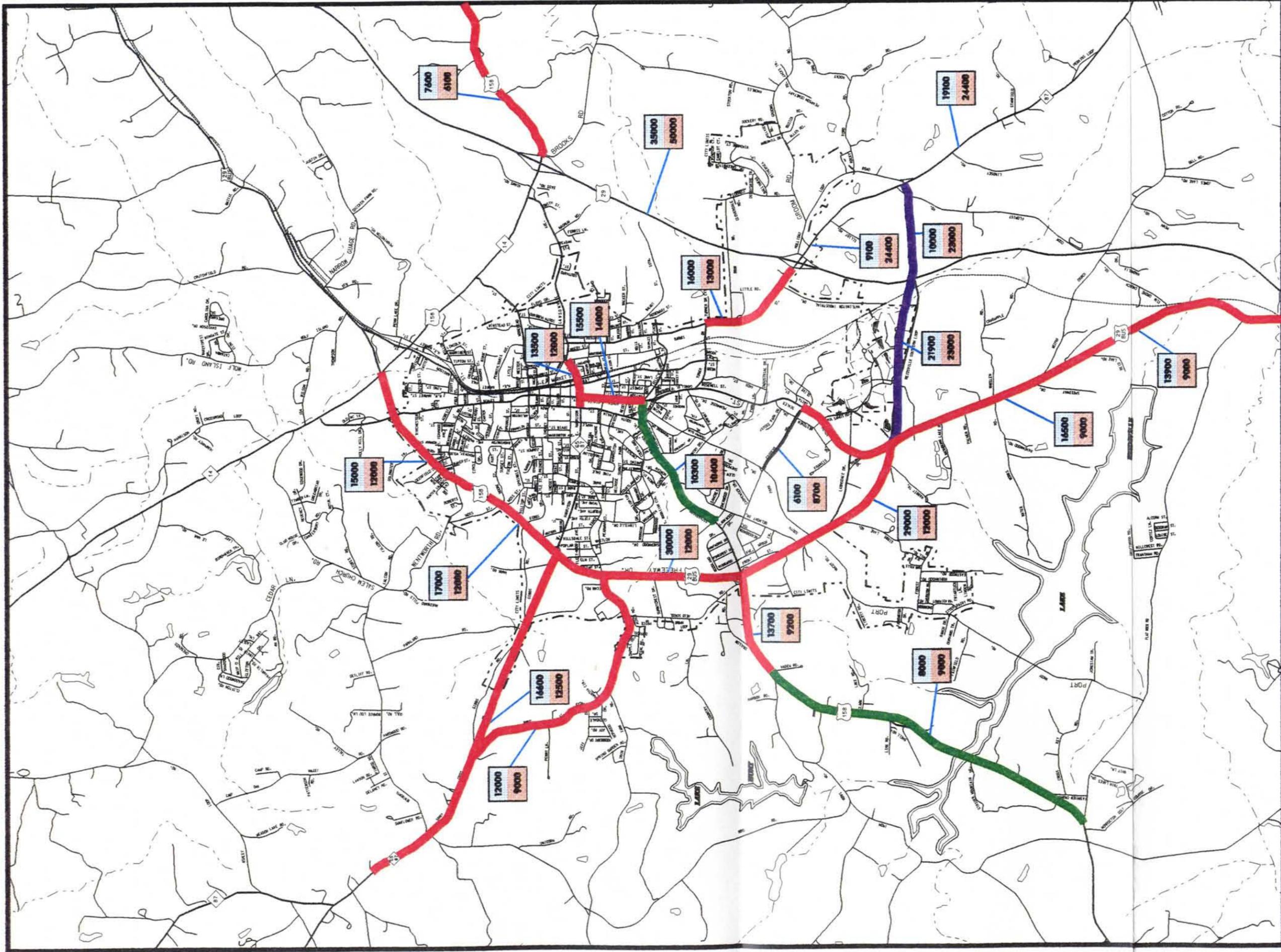


**FIGURE 6**

## **Future Year 2025 Travel**

The year 2025 travel was developed using the same techniques employed in developing the 1995 travel. The city planning staff, working in cooperation with the Planning Board and Statewide Planning Staff, projected and distributed the future year housing and employment data to the traffic analysis zones. The generation rates for the year 2025 were developed using an equation that takes into consideration vehicle ownership trends, persons per household trends, and a vehicle usage factor. The generation rate for 2025 was 9.19. The generation rates for commercially owned vehicles and taxis were held constant at 6.7 and 40 trips per vehicle, respectively. The 2025 attraction factors were developed using the same regression equations that were used for the 1995 analysis. The 2025 secondary NHB trips were estimated at 39,108. The 2025 productions for HBW, OHB, and NHB purposes were estimated using same Internal Data summation program used for 1995.

An analysis of traffic growth rates from historic traffic counts was used to project the traffic counts coming into the planning area to the future year 2025. These volumes were converted to EXT-INT and through trips. Through trips were distributed using the fratar trip end balancing program. The HBW, OHB, NHB and EXT-INT trips were distributed using the same gravity model procedures employed in the base year. The 2025 traffic volumes are shown in Figure 7.



**2025 TRAFFIC ON THE EXISTING SYSTEM**

**LEGEND**

- 0000
- 0000
- VC > 1.00
- VC > 0.81
- SOUTHERN CONNECTOR



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NATIONAL HIGHWAY ADMINISTRATION



**FIGURE 7**

## Existing Travel Patterns

An indication of the adequacy of the existing street system is a comparison of traffic volumes versus the ability of the streets to move traffic. In an urban area, a street's ability to move traffic is generally controlled by the spacing of the major intersections, access control, width of pavement, and the traffic control devices (such as signals) utilized.

Capacity is the maximum number of vehicles which has a "reasonable expectation" of passing over a given section of a roadway, during a given time period under prevailing roadway and traffic conditions. The relationship of traffic volumes to the capacity of the roadway will determine the level of service (LOS). Six levels of service identify the various levels of service. The LOS is described below in accordance with the 1994 Highway Capacity Manual.

Design requirements for thoroughfares vary according to the desired capacity and level of service provided. The recommended improvements and overall design of the Thoroughfare Plan were based on achieving a minimum of LOS D on existing facilities, and LOS C on new facilities. See Figure 8 for a visual representation of the levels of service.

### Level of Service

LOS A- describes primarily free flow conditions. The motorist experiences a high level of physical and psychological comfort. The effects of minor incidents or breakdowns are easily absorbed. On an urban arterial, LOS A corresponds to an average travel speed of 25 to 35 mph.

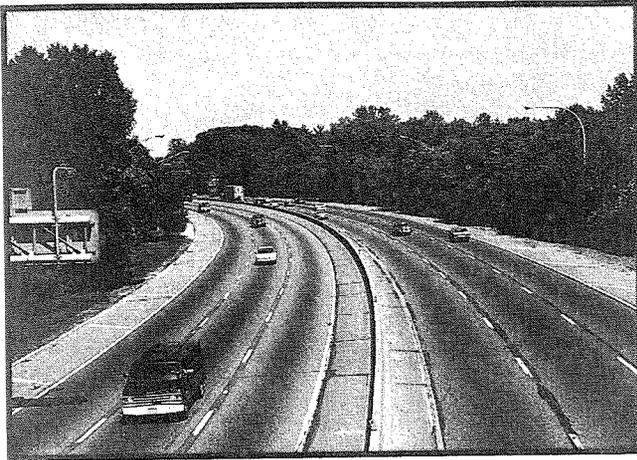
LOS B – also represents reasonably free flow conditions. The ability to maneuver within the traffic stream is only slightly restricted.

LOS C – Provides for stable operations, but flows approach the range in which small increases will cause substantial deterioration in service. Freedom to maneuver is noticeably restricted. Minor incidents may still be absorbed, but the local decline in service will be great. Queues may be expected to form behind any significant blockage.

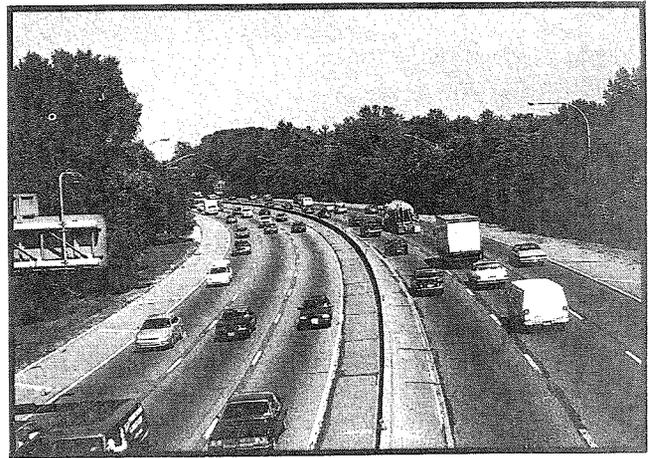
LOS D – borders on unstable flow. Small increases in flow can cause substantial deterioration in service. Freedom to maneuver is severely limited, and the driver experiences drastically reduced comfort levels. Minor incidents can be expected to create substantial queuing. On an urban arterial, LOS D corresponds to an average travel speed of 9 to 7 mph.

LOS E – The boundary between LOS D and LOS E describes operation at capacity. Operation at this level is extremely unstable, because there are virtually no usable gaps in the traffic stream. Any disruption to the traffic stream, such as a vehicle entering from a ramp, or changing lanes, requires the following vehicle to give way to admit the vehicle. This condition establishes a disruption wave which propagates through the upstream traffic flow. At capacity, the traffic stream has no ability to dissipate any disruption. Any incident can be expected to produce a serious breakdown with extensive queuing.

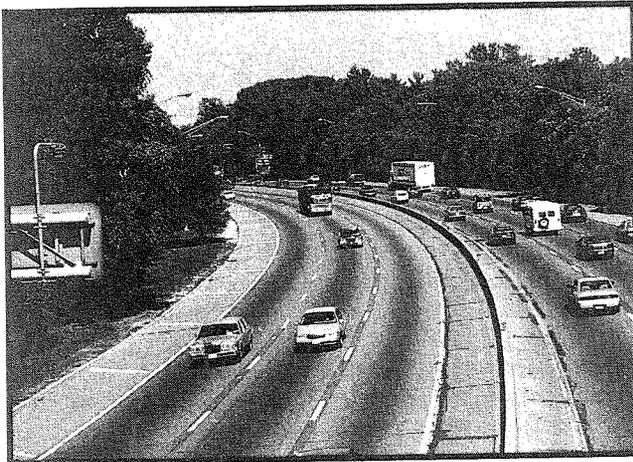
LOS F – describes forced or breakdown flow. Such conditions generally exist within queues forming behind breakdown points.



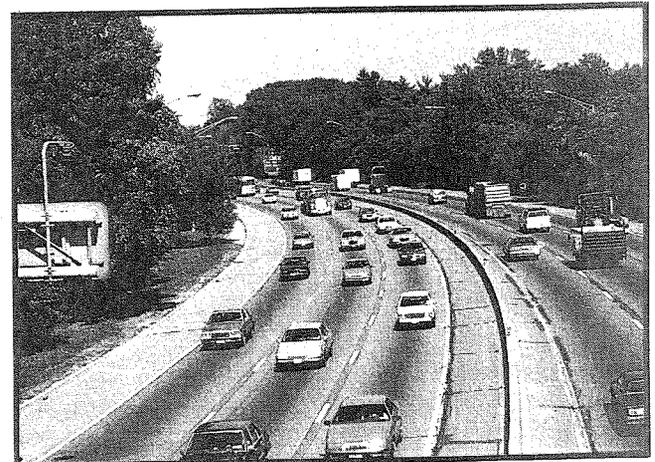
LOS A.



LOS D.



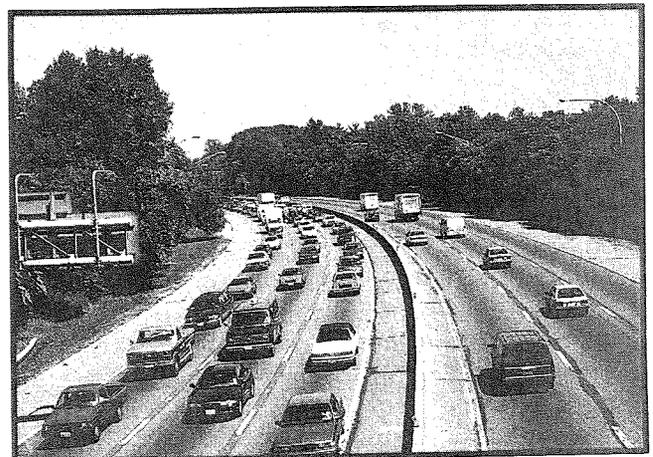
LOS B.



LOS E.



LOS C.



LOS F.

**LEVELS OF SERVICE**

**Figure 8**

## **Appendix B**

### **Street Tabulations for the City of Reidsville**

This appendix displays the details of the street network that has been proposed for the City of Reidsville in this thoroughfare plan. The chart describes the conditions that exist in 1995 and what the roadway should look like in the year 2025. It shows the recommended number of lanes, the right-of-way required for this type of roadway and a sketch showing the required dimensions for each type of roadway. In order for the city to know what right-of-way will be required in the future for some of these roads the column labeled X-section will give a letter representing the type of cross-section that is recommended for that roadway. That letter can then be found on the figures that follow to determine the right-of-way length in feet that needs to be reserved or protected.

The following index of terms may be helpful in interpreting the table:

ADQ- Adequate

CL- City Limits

EPB- Eastern Planning Boundary

NPB- Northern Planning Boundary

SPB- Southern Planning Boundary

WPB- Western Planning Boundary

# Thoroughfare Plan Street Tabulation and Recommendations

NOTE: Existing capacities computed using Florida DOT LOS 'D' Charts

	DIST (mi.)	EXISTING CONDITIONS				ADT		RECOMMENDATIONS		
		RDWY (ft)	ROW (ft)	# OF LANES	CAPACITY (vpd)	1995 (VPD)	2025 (VPD)	CROSS SECT.	ROW (FT)	CAPACITY (VPD)
<b>US 29 Business</b>										
NPB to Mattie Rd	0.13	24	60	2	7,000	2,700	4,900	H	60	14,000
Mattie Rd to .96 mi N of Crutchfield Rd	0.33	24	60	2	7,000	4,400	8,000	H	60	14,000
.96 mi N of Crutchfield Rd to Crutchfield Rd	0.96	24	60	2	7,000	4,700	8,200	H	60	14,000
Crutchfield Rd to .36 N of Wolf Island Rd	0.24	24	60	2	9,300	6,400	10,900	H	60	14,000
0.36 mi N of Wolf Island Rd to Wolf Island Rd	0.36	24	60	2	9,300	6,900	12,400	H	60	14,000
Wolf Island Rd to Madison St	0.12	24	60	2	9,300	7,900	12,400	H	60	14,000
Madison St to NC 14	0.49	24	60	2	9,300	3,700	7,600	H	60	14,000
NC 14 to N Scales Street	0.15	24	150	2	9,300	5,500	7,600	N	90	29,000
N Scales St to .34 mi N of Wentworth Rd	0.34	24	100	2	9,300	5,500	14,800	N	90	29,000
.34 mi N of Wentworth Rd to Wentworth Rd	0.34	24	150	2	9,300	7,400	15,400	N	90	29,000
Wentworth Rd to Moss St	0.46	24	150	2	12,300	9,100	17,800	N	90	29,000
Moss St to NC 65/87	0.68	24	150	2	9,300	9,200	17,300	N	90	29,000
NC 65/87 to Vance St	0.67	24	150	2	9,300	6,500	11,700	N	90	29,000
Vance St to US 158	1.24	24	150	2	12,000	10,200	29,900	N	90	29,000
US 158 to .16 mi S of US 158	0.16	24	150	2	9,300	11,600	24,900	N	90	29,000
.16 mi S of US 158 to Front St	0.21	24	150	2	9,300	11,000	33,400	N	90	29,000
Front St to Park Dr	0.27	24	150	2	9,300	10,200	33,500	N	90	29,000
Park Dr to Lawnsdale Dr	0.15	24	150	2	9,300	8,100	31,600	N	90	29,000
Lawnsdale Dr to .44 mi S of Lasnwdale Dr	0.44	24	150	2	9,300	7,600	30,900	N	90	29,000
.44 mi S of Lawnsdale Dr to S Scales St	0.55	24	150	2	9,300	5,200	28,600	N	90	29,000
S Scales St to .94 mi N of Mispah Ch Rd	0.48	24	150	2	8,800	8,300	19,500	N	90	29,000
.94 mi N of Mizpah Ch Rd to Mizpah Ch Rd	.94	24	150	2	8,800	7,700	15,900	N	90	29,000
Mizpah Ch Rd to Elm Grove Ch Rd	2.02		150	2	8,000	8,100	14,600	N	90	29,000
Elm Grove Ch Rd to Flat Rock Rd	0.8	24	150	2	8,000	7,800	13,900	N	90	29,000
Flat Rock Rd to SPB	0.09	24	150	2	8,000	7,200	13,900	N	90	29,000
<b>US 29 Bypass</b>										
1.75 mi N of US 158/ NC 14	1.75	48	0	4	50,000	2,300	9,400	H	60	14,000
US 158/ NC 14 to Barnes St	2.09	48	0	4	50,000	14,500	35,800	L	300	39,500
Barnes St to Poposed Interchange	0.90	48	0	4	50,000	19,900	31,300	L	300	39,500
Proposed Interchange to SPI	3.24	48	0	4	50,000	19,900	48,200	L	300	39,500

# Thoroughfare Plan Street Tabulation and Recommendations

NOTE: Existing capacities computed using Florida DOT LOS 'D' Charts

	DIST (mi.)	EXISTING CONDITIONS				ADT		RECOMMENDATIONS		
		RDWY (ft)	ROW (ft)	# OF LANES	CAPACITY (vpd)	1995 (VPD)	2025 (VPD)	CROSS SECT.	ROW (FT)	CAPACITY (VPD)
<b>NC 14/US 158</b>										
NPL to Harrison Crossroad Loop Rd	0.66	66	150	5	24,400	10,400	24,600	F	110	25,500
Harrison Crossroad Loop Rd to US 29 Bus	1.16	66	150	5	24,400	10,400	24,000	F	110	25,500
US 29 Bus to Morehead St	1.19	66	150	5	24,400	8,900	21,100	F	110	25,500
Morehead St to Lawsonville Ave	0.66	66	150	5	24,400	9,700	23,700	F	110	25,500
Lawsonville Ave to US 29	0.23	66	150	5	32,000	11,700	27,100	N	90	29,000
US 29 to .19 mi E of US 29	0.19	66	150	5	6,100	6,100	10,000	H	60	14,000
.19 mi E of US 29 to EPB					6,100	5,400	7,600	H	60	14,000
<b>NC 87/Barnes St</b>										
SPL to Holiday Loop Rd	2.46	24	100	2	7,800	7,000	19,200	E	90	25,500
Holiday Loop Rd to Drum Rd	0.74	36	100	3	20,900	13,400	12,900	E	90	25,500
Drum Rd to Turner Dr	0.24	36	100	3	13,000	17,800	18,300	E	90	25,500
Turner Dr to Truck Lane	0.46	36	60	3	10,400	8,000	9,600	H	60	14,000
Truck Lane to Lawsonville Ave	0.81	36	60	3	13,000	7,500	7,600	H	60	14,000
<b>NC 65/87 Lawsonville Rd</b>										
NPB to Wentworth St	0.24	24	60	2	8,800	12,900	31,400	N	90	29,000
Wentworth St to Vance St Ext	0.86	24	100	2	6,800	11,800	29,300	N	90	29,000
Vance St Ext to Parkland Rd	1.24	24	100	2	8,800	9,300	15,600	N	90	29,000
Parkland Rd to US 29 Bus	0.68	30	60	2	8,800	12,600	22,600	N	90	29,000
US 29 Bus to Maple Ave	0.98	20	50	2	9,200	10,300	8,900	ADQ		
Maple Ave to Market St	0.99	20	50	2	12,000	8,300	7,900	ADQ		
Market St to NC 14	1.76	24	60	2	20,000	3,100	4,800	ADQ		
<b>Ashley Loop Rd/ SR2203</b>										
Camp Dan Valley Rd to Berrymore Rd	1.12	22	60	2	10,800	1,900	4,200	ADQ		
<b>Berrymore Road/ SR1991</b>										
Ashley Loop Rd to NC 14	2.34	20	60	2	8,100	1,800	4,200	ADQ		
<b>Boyd Road/ SR2409</b>										
Iron Works Rd to Irvin Farm Rd	2.64	20	60	2	6,100	900	300	ADQ		
Irvin Farm Rd to Unicorn Rd	0.95	20	60	20	6,100	1,100	2,200	ADQ		
Unicorn Rd to Wentworth Rd	0.74	20	60	2	6,100	500	900	ADQ		

# Thoroughfare Plan Street Tabulation and Recommendations

NOTE: Existing capacities computed using Florida DOT LOS 'D' Charts

	DIST (mi.)	EXISTING CONDITIONS				ADT		RECOMMENDATIONS		
		RDWY (ft)	ROW (ft)	# OF LANES	CAPACITY (vpd)	1995 (VPD)	2025 (VPD)	CROSS SECT.	ROW (FT)	CAPACITY (VPD)
<b>Bradley Street</b>										
Carroll Lane to Washington Ave	0.14	34	40	2	8,400	1,300	2,200	ADQ		
<b>Brooks Road/ SR2650</b>										
EPB to 0.72 mi E of US 158	0.72	18	60	2	10,500	500	794	ADQ		
0.77 mi E of US 158 to Bayberry Rd	0.48	18	60	2	10,500	600	1,850	ADQ		
Bayberry Rd to US 158	0.29	18	60	2	10,500	1,200	2,725	ADQ		
<b>Camp Dan Valley Rd/SR2009</b>										
Ashley Loop Rd To Wentworth Rd	1.36	20	60	2	8,100	2,900	6,000	ADQ		
<b>Carroll Lane</b>										
Roach St to Bradley St	0.01	20	40	2	13,000	1,300	2,200	ADQ		
<b>Carter St /SR2545</b>										
Market St to Scales St	0.03	36	50	3	3,000	3,200	4,200	ADQ		
<b>Cedar Lane /SR1993</b>										
Berrymore Rd to Shadow Wood Lane	0.76	20	60	2	8,100	1,100	1,600	ADQ		
Shadow Wood Lane to Salem Ch Rd	1.33	20	60	2	8,100	2,000	2,800	ADQ		
<b>Cook Florist Rd/SR2598</b>										
NC 87 to 0.70 mi S of NC 87	0.70	21	60	2	9,300	1,800	400	ADQ		
0.70 mi S of NC 87 to Mizpah Church Rd	1.32	20	60	2	9,300	2,000	600	ADQ		
<b>Courtland Ave</b>										
Vance St to Crescent Dr	1.17	38	50	3	16,000	2,100	2,700	ADQ		
Crescent Dr to Maple Ave	0.25	38	50	3	16,000	2,200	3,100	ADQ		
<b>Crutchfield Rd /SR1941</b>										
NPB to 0.77 mi N of US 29	1.07	20	60	2	9,200	1,300	1,800	ADQ		
0.77 mi N of US 29 to US 29	0.77	20	60	2	9,200	1,800	2,900	ADQ		
<b>Cypress Drive/SR2663</b>										
Scales St to S Park Rd	0.64	43	50	3	15,000	800	1,400	ADQ		
S Park Rd to Ridgewood Ave	0.63	43	50	3	15,000	1,000	1,600	ADQ		
<b>Drum Road/SR2647</b>										
Barnes St to Pickerell Rd	1.09	20	60	2	12,500	1,500	1,700	ADQ		

# Thoroughfare Plan Street Tabulation and Recommendations

NOTE: Existing capacities computed using Florida DOT LOS 'D' Charts

	DIST (mi.)	EXISTING CONDITIONS				ADT		RECOMMENDATIONS		
		RDWY (ft)	ROW (ft)	# OF LANES	CAPACITY (vpd)	1995 (VPD)	2025 (VPD)	CROSS SECT.	ROW (FT)	CAPACITY (VPD)
<b>Flat Rock Rd/SR2432</b>										
US 158 to McCoy Rd	1.38	18	60	2	8,000	1,300	4,800	ADQ		
McCoy Rd to US 29 Bus	3.9	18	60	2	8,000	900	1,400	ADQ		
<b>Grooms Road/SR2571</b>										
EPB to Knowles Rd	0.52	20	60	2	8,000	2,100	2,800	ADQ		
Knowles Rd to Pickerell Rd	0.82	20	60	2	8,000	3,400	5,000	ADQ		
Pickerell Rd to Holiday Loop Rd	0.06	20	60	2	8,000	4,100	5,700	ADQ		
<b>Holiday Loop Rd/SR2597</b>										
NC 87 to Grooms Rd	0.5	20	60	2	8,000	4,100	5,700	ADQ		
Groom Rd to 0.38 mi E of Groom Rd	0.38	19	60	2	7,500	3,600	4,600	ADQ		
0.38 mi E of Groom Rd to NC 87	0.71	19	60	2	7,500	1,400	3,600	ADQ		
NC 14 to 0.41 to E of NC 14	0.41	22	60	2	9,000	1,200	2,300	ADQ		
0.41 mi E of NC 14 to NC87	0.38	22	60	2	9,000	800	1,800	ADQ		
<b>Ida Wilson Rd /SR1985</b>										
NC 14 to 0.41 to E of NC 14	0.41	22	60	2	9,000	1,200	2,300	ADQ		
0.41 mi E of NC 14 to Wolf Island Rd	0.38	22	60	2	9,000	800	1,800	ADQ		
<b>Iron Works Road /SR2406</b>										
Boyd Rd to 0.42 mi E of Boyd Rd	0.42	21	60	2	9,200	1,600	2,100	ADQ		
0.42 mi E of Boyd Rd to US 158	0.96	21	60	2	9,200	1,700	2,400	ADQ		
<b>Irvin Farm Road /SR2410</b>										
NPB to Boyd Road	0.27	20	60	2	9,000	800	1000	ADQ		
Boyd Rd to 1.19 mi E of Boyd Rd	1.19	20	60	2	9,000	500	600	ADQ		
1.19 mi E of Boyd Rd to 0.18 mi W of Vance St Ext	0.18	20	60	2	9,000	700	1,700	ADQ		
<b>Lawndale Drive /SR2500</b>										
US 29 Bus to S Scales St	0.73	20	60	2	8,600	500	800	ADQ		
<b>Lyle Street</b>										
Vance St to Moss St	0.13	33	40	2	11,000	1,500	2,800	ADQ		
<b>Madison Street /SR2671</b>										
US 29 Bus to NC 14	0.49	22	60	2	14,000	1,400	1,200	ADQ		

# Thoroughfare Plan Street Tabulation and Recommendations

NOTE: Existing capacities computed using Florida DOT LOS 'D' Charts

	DIST (mi.)	EXISTING CONDITIONS				ADT		RECOMMENDATIONS		
		RDWY (ft)	ROW (ft)	# OF LANES	CAPACITY (vpd)	1995 (VPD)	2025 (VPD)	CROSS SECT.	ROW (FT)	CAPACITY (VPD)
<b>Madison Street /SR2671 (CONT)</b>										
NC 14 to Scales St	0.38	22	60	2	14,000	4,400	5,900	ADQ		
<b>Main Street</b>										
Sprinkle St to Harrison St	0.68	40	60	3	8,400	2,900	3,600	ADQ		
Harrison St to Park Dr	0.48	36	50	3	8,400	4,000	5,600	ADQ		
<b>Maple Avenue</b>										
Courtland Ave to Piedmont St	0.13	20	40	2	16,000	10,200	12,400	ADQ		
<b>NE Market St</b>										
Narrow Guage Rd to NC 14	0.92	20	40	2	13,000	1,600	1,400	ADQ		
NC 14 to Roanoke St	0.8	20	60	2	12,400	600	1,200	ADQ		
Roanoke St to Harrison	1.14	20	40	2	8,400	1,600		ADQ		
<b>SE Market St</b>										
Carter St to Moorehead St	0.54	36	50	3	15,000	3,200	4,200	ADQ		
Morehead St to Harrison Street	0.45	40	50	3	15,000	1,200	1,900	ADQ		
Harrison St to Way St	0.58	37	50	3	15,000	2,300	3,400	ADQ		
<b>Mizpah Church Rd /SR2600</b>										
NC 87 to Bell Rd	1.50	20	60	2	8,800	1,300	1,600	ADQ		
Bell Rd to US 29	0.77	20	60	2	8,800	1,200	1,300	ADQ		
US 29 to Triangle	1.26	18	60	2	8,800	3,100	2,000	ADQ		
Triangle to US 29	0.29	18	60	2	8,800	2,800	1,500	ADQ		
<b>Morehead Street /SR2544</b>										
Main St to Scales St	0.42	40	50	2	15,000	2,100	2,900	ADQ		
Scales St to NC 14/158	0.99	30	50	2	15,000	1,400	2,300	ADQ		
<b>Moss Street</b>										
Wentworth Rd to US158	0.6	22	60	2	10,800	1,000	1,400	ADQ		
US 158 to Sprinkle St	0.42	27	40	2	10,800	2,500	4,300	ADQ		
<b>Narrow Guage Rd /SR2552</b>										
US 29 to 1.33 mi E of US 29 Bus	1.33	20	60	2	9,000	1,100	1,300	ADQ		
1.32 mi E of US 29 to EPB	1.07	20	60	2	9,000	200	300	ADQ		
<b>Oregan Hill Rd</b>										
NPB to US 29 Bus	0.90	20	60	2	8,200	1,800	3,100	ADQ		
<b>Park Drive /SR2512</b>										
Richardson Dr to Crescent Dr	1.57	24	60	2	10,400	3,700	6,000	ADQ		

# Thoroughfare Plan Street Tabulation and Recommendations

NOTE: Existing capacities computed using Florida DOT LOS 'D' Charts

	DIST (mi.)	EXISTING CONDITIONS				ADT		RECOMMENDATIONS		
		RDWY (ft)	ROW (ft)	# OF LANES	CAPACITY (vpd)	1995 (VPD)	2025 (VPD)	CROSS SECT.	ROW (FT)	CAPACITY (VPD)
<b>Park Drive /SR2512 (CONT)</b>										
Crescent Dr to Cypress Dr	0.41	36	60	3	11,000	5,400	7,800	ADQ		
<b>Parkland Road /SR2041</b>										
Wentworth St to Gibbs Road	1.05	20	60	2	9,000	2,900	4,200	ADQ		
Gibbs Road to NC 65/87	0.27	20	60	2	9,000	3,200	5,700	ADQ		
<b>Piedmont St</b>										
Ware St to Washington Ave	0.33	30	40	2	13,000	3,800	5,500	ADQ		
Washington Ave to Maple Ave	0.15	30	40	2	13,000	6,300	8,500	ADQ		
Maple Ave to Scales St	0.22	36	40	3	13,000	7,500	9,500	ADQ		
<b>Port McCoy Rd/SR2437</b>										
Flat Rock Rd to Cross Key Rd	0.5	24	60	2	20,000	900	4,300	ADQ		
Cross Key Rd to Fairfield Rd	1.2	24	60	2	11,000	1,100	6,000	ADQ		
<b>Reid School Rd /SR2414</b>										
Vance St Ext to Sunny Crest Rd	0.32	20	60	2	12,600	700	1,700	ADQ		
Sunny Crest Rd to US 158	0.78	20	60	2	12,600	1,700	3,500	ADQ		
<b>Richardson Drive/US 158</b>										
SPB to .74 mi N of Flat Rock Rd	0.74	24	60	2	8,800	4,300	6,700	ADQ		
.74 mi N of Flat Rock Rd to Clark Lake Rd	1.50	24	60	2	8,800	4,800	7,900	ADQ		
Clark Lake Rd to Iron Works Rd	0.88	24	60	2	7,200	5,600	10,800	ADQ		
Iron Works Rd to 0.25 mi N of Iron Works Rd	0.41	24	80	2	7,200	7,500	13,600	ADQ		
0.25 mi N of Iron Works Rd to Ried Sch Rd	0.21	24	80	2	10,400	7,600	14,400	ADQ		
Ried Sch Rd to Pinecrest Dr	0.35	24	80	2	10,400	5,200	8,000	ADQ		
Pinecrest Dr to 0.29 mi E of Sherwood Dr	0.55	24	40	2	10,400	5,700	8,900	ADQ		
0.29 mi E of Sherwood Dr to .17 mi N of Main St	0.83	36	40	3	12,400	6,900	10,400	ADQ		
.17 mi N of Main St to Main St	0.17	36	40	3	12,400	6,900	11,000	ADQ		
Main St to Scales St	0.24	52	60	4	24,400	6,900	11,000	ADQ		
Scales St to Way St	0.31	52	60	4	24,400	6,000	7,600	ADQ		
Way St to NC 87	0.34	52	60	4	24,400	7,000	5,600	ADQ		
<b>Ridgewood Ave</b>										
Cypress Dr to Richardson Dr	0.17	43	50	3	10,400	800	1,400	ADQ		

# Thoroughfare Plan Street Tabulation and Recommendations

NOTE: Existing capacities computed using Florida DOT LOS 'D' Charts

	DIST (mi.)	EXISTING CONDITIONS				ADT		RECOMMENDATIONS		
		RDWY (ft)	ROW (ft)	# OF LANES	CAPACITY (vpd)	1995 (VPD)	2025 (VPD)	CROSS SECT.	ROW (FT)	CAPACITY (VPD)
<b>Roach Ave /SR2118</b>										
Wentworth Rd to Carrol Lane	0.07	20	40	2	11,000	1,300	2,200	ADQ		
<b>Salem Church Rd /SR1987</b>										
Wentworth Rd to Cedar Lane	0.51	20	60	2	8,100	1,900	2,400	ADQ		
Cedar Lane to Canterbury Road	0.41	20	60	2	8,100	600	1,700	ADQ		
Canterbury Rd to NC 14	0.66	20	60	2	8,100	1,600	1,900	ADQ		
<b>SCALES ST /SR2670</b>										
NC 14 to 0.4 mi S of NC 14	0.4	25	60	2	10,400	4,500	8,000	ADQ		
0.4 mi S of NC 14 to US 29 Bus	0.25	25	60	2	10,400	4,700	8,800	ADQ		
US 29 Bus to Wentworth Rd	0.47	50	80	4	12,000	3,900	4,400	ADQ		
Wentworth Rd to 0.14 mi S of Wentworth Rd	0.14	50	80	4	12,000	7,900	8,200	ADQ		
0.14 mi S of Wentworth Rd to Morehead St	0.5	48	60	4	16,000	6,600	5,600	ADQ		
Morehead St to NC 65/87	0.37	36	50	3	22,000	1,200	1,800	ADQ		
NC 65/87 to Burton St	0.20	36	50	3	22,000	10,600	12,100	ADQ		
Burton St to 0.21 mi S of Burton St	0.21	36	50	3	22,000	12,700	15,500	ADQ		
0.21 mi S of Burton St to Richardson Dr	0.16	36	50	3	16,100	2,700	5,900	ADQ		
Richardson Dr to Cypress Dr	0.48	24	50	2	8,200	5,200	5,500	ADQ		
Cypress Dr to US 29 Bus	0.99	24	50	2	8,200	2,900	3,800	ADQ		
<b>Sherwood Drive</b>										
Vance St to Richardson Dr	1.15	38	50	3	15,000	500	1,800	ADQ		
Richardson Dr to Belmont Dr	0.13	20	40	2	15,000	800	800	ADQ		
<b>Sprinkle Street</b>										
Washington St to Moss St	0.34	27	30	2	10,400	1,100	1,400	ADQ		
<b>Turner Ave</b>										
Scales St to Way St	0.28	40	50	3	17,000	6,000	8,800	ADQ		
Way St to Barnes St	0.33	40	50	3	17,000	7,000	9,800	ADQ		
<b>Vance Street Ext /SR2413</b>										
NC 87 to Penny Lane	0.79	20	60	2	9,000	2,800	13,000	J	60	14,000
Penny Ln to Jett Dr	0.4	20	60	2	12,600	3,400	12,400	J	60	14,000
Jett Dr to Irvin Farm Rd	0.23	20	60	2	12,600	5,000	16,800	J	60	25,500
Irvin Farm Rd to Reidsville Sch Rd	0.69	20	60	2	12,600	5,000	16,800	J	60	25,500
Reidsville Sch Rd to 0.19 mi N of US 158	0.19	36	60	3	15,000	5,000	16,000	J	60	25,500
<b>Vance Street /SR2525</b>										
1.19 mi N of US 158 to US 158	0.11	22	60	2	15,000	5,000	16,800	H	60	16,000

# Thoroughfare Plan Street Tabulation and Recommendations

NOTE: Existing capacities computed using Florida DOT LOS 'D' Charts

	DIST (mi.)	EXISTING CONDITIONS				ADT		RECOMMENDATIONS		
		RDWY (ft)	ROW (ft)	# OF LANES	CAPACITY (vpd)	1995 (VPD)	2025 (VPD)	CROSS SECT.	ROW (FT)	CAPACITY (VPD)
US 158 to 0.06 mi E of US 158	0.06	28	60	2	10,400	5,000	5,400	H	60	16,000
0.06 mi E of US 158 to Cloverlane Dr	0.78	22	60	2	10,400	4,100	5,400	H	60	16,000
Cloverlane Dr Harrison St	0.32	24	40	2	12,600	5,800	7,300	H	60	16,000
Harrison St to Lyle St	0.37	36	50	3	10,800	1,600	2,800	H	60	16,000
<b>Washington Ave</b>										
Bradley St to Sprinkle St	0.28	34	40	3	13,000	2,300	3,000	ADQ		
<b>Sprinkle St to Piedmont St</b>										
Sprinkle St to Piedmont St	0.56	36	40	3	13,000	3,100	3,600	ADQ		
Harrison St (NC 87) to Turner Dr	0.58	47	80	4	3,000	2,800	3,400	ADQ		
<b>Wentworth Street /SR1998</b>										
NC 87 to Delancey Rd	0.57	20	60	2	12,600	1,500	4,200	ADQ		
Delancey Rd to Parkland Rd	1.29	20	60	2	12,600	2,800	5,000	ADQ		
Parkland Rd to Salem Ch Rd	0.75	20	60	2	8,400	1,000	1,600	ADQ		
Salem Ch Rd to US 29	1.40	20	60	2	8,400	1,800	2,000	ADQ		
US 29 Bus to Scales St	0.69	28	50	3	10,400	3,700	4,600	ADQ		
<b>Wolf Island Road /SR1982</b>										
NPB to Wake Forest Rd	1.16	20	60	2	8,200	900	1,200	ADQ		
Wake Forest Rd to Ida Wilson Rd	0.99	20	60	2	8,200	1,900	2,800	ADQ		
Ida Wilson Rd to US 29 Bus	0.35	20	60	2	8,200	2,200	3,400	ADQ		
<b>Woodrow St</b>										
Scales St to Barnes St	0.49	18	40	2	7,000	2,800	2,400	ADQ		

# Appendix C

## 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 intrastate and intercounty service at relatively high overall travel speeds with minimum interference to through movement.
3. *Major Collector* - A road that serves major intracounty travel corridors and traffic generators and provides access to the Major Collector system.
4. *Minor Collector* - A road that provides service to small local communities and traffic generators and provides access to the Major Collector system.
5. *Local Road* - A road that 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 multi-lane 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 for non-commercial traffic, with full or partial control of 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 2500 feet in length, or streets less than 1 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. (Also includes "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. The following shall not be included within this definition nor subject to these regulations:

- the combination or re-combination 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
- the division of land into parcels greater than four hectares where no street right-of-way dedication is involved
- the public acquisition, by purchase, of strips of land for the widening or the opening of streets
- the division of a tract in single ownership, whose entire area is no greater than 2 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 compensation being given for the transfer. The dedication is made by written instrument and 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.

# Appendix D

## Design Standards

### Streets and Roads

The design of all roads within the planning area 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. 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 in the Thoroughfare Plan.

The subdivider will only be required to dedicate a maximum of 100 feet of ROW. In cases where over 100 feet of ROW is desired, the subdivider will be required only to reserve the amount in excess of 100 feet. In all cases in which ROW 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, principal and minor arterials and major collectors be avoided. Direct property access to minor thoroughfares is also undesirable.

**Table D-1**

Minimum Right-of-Way Requirements		
RURAL	Principal Arterial	Freeways:350 feet Others:200 feet
	Minor Arterial	100 feet
	Major Collector	100 feet
	Minor Collector	80 feet
URBAN	Major Thoroughfare	90 feet
	Minor Thoroughfare	70 feet
	Local Street	60feet <sup>1</sup>
	Cul-de-sac	variable <sup>2</sup>

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

<sup>2</sup>The ROW dimension will depend on the radius used for vehicular turn around. Distance from edge of pavement of turn around to ROW should not be less than distance from edge of pavement to ROW on street approaching turn around.

A partial width ROW, not less than 60 feet in width, may be dedicated when adjoining undeveloped property that is owned or controlled by the subdivider. This is approved as long as the width of a partial dedication is 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 ROW 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. Local Residential*

- Curb & Gutter section: 26 feet, face to face of curb
- Shoulder section: 20 feet to edge of pavement, 4 feet for shoulders

*2. Residential Collector*

- Curb & Gutter section: 34 feet to the edge of pavement, face to face of curb
- Shoulder section: 20 feet to edge of pavement, 6 meters for 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 10 km/h (5 mph) greater than the posted speed limit. The design speeds for subdivision type streets are shown in Table D-2.

*2. 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 parameters set forth in Table D-3.

*3. Superelevation* - Table D-4 shows the minimum radius and the related maximum superelevation for design speeds. The maximum rate of roadway superelevation (e) for rural roads with no curb and gutter is 0.08. The maximum rate of superelevation for urban streets with curb and gutter is 0.06, with 0.04 being desirable.

*4. Maximum and Minimum Grades*

- the maximum grades in percent are shown in Table D-5
- minimum grade should not be less than 0.5%
- grades for 100 feet each way from intersections (measured from edge of pavement) should not exceed 5%

**Table D-2**

Design Speeds (in mph)			
Facility Type	Desirable	Minimum	
		Level	Rolling
<b>Rural</b>			
Minor Collector Roads	60	50	40
Local Roads <sup>1</sup>	50	*50	*40
<b>URBAN</b>			
Major Thoroughfares <sup>2</sup>	60	50	40
Minor Thoroughfares	40	30	30
Local Streets	30	**30	**20

<sup>1</sup>Local Roads include Residential Collectors and Local Residential

<sup>2</sup>Major Thoroughfares other than Freeways or Expressways

NOTE \*Based on ADT of 400-750. Where Roads serve a limited area and small numbers of units can reduce minimum design speed.

\*\*Based on projected ADT of 50-250. (Reference NCDOT Roadway Design Manual page 1-1B)

**Table D-3**

Sight Distance					
Design Speed (mph)	Stopping Sight Distance (ft)		Minimum K <sup>1</sup> Values (ft)		Passing Sight Distance (m) for 2-lanes
	Desirable	Minimum	Crest Curve	Sag Curve	
30	200	200	30	40	1100
40	325	275	60	60	1500
50	475	400	110	90	1800
60	650	525	190	120	2100

Note: General practice calls for vertical curves to be multiples of 50 ft. Calculated lengths shall be rounded up in each case. (Reference NCDOT Roadway design Manual page 1-12T-1) Sight distance provided for stopped vehicles at intersections should be in accordance with "A Policy on Geometric Design of Highways and Streets, 1990".

<sup>1</sup> K is a coefficient by which the algebraic difference in grade may be multiplied to determine the length of the vertical curve, which will provide the desired sight distance.

**Table D-4**

Superelevation Table			
Design Speed (mph)	Minimum Radius of Maximum e <sup>1</sup>		
	e=0.04	e=0.06	e=0.08
30	302	273	260
60	573	521	477
80	955	955	819
100	1637	1432	1146

e<sup>1</sup> = value of roadway superelevation, foot per foot.

Note: Reference NCDOT Roadway design Manual page 1-12 T-6 thru T-8

**Table D-5**

<b>Maximum Vertical Grade</b>					
<b>Facility Type</b>	<b>Design Speed (km/h)</b>	<b>Minimum Grade in Percent</b>			
		<b>Flat</b>	<b>Rolling</b>	<b>Mountainous</b>	
<b>Rural</b>					
Minor Collector Roads*	20	7	10	12	
	30	7	9	10	
	40	7	8	10	
	50	6	7	9	
	60	5	6	8	
	70	4	5	6	
	Local Roads* <sup>1</sup>	20	-	11	16
		30	7	10	14
		40	7	9	12
		50	6	8	10
60		5	6	--	
<b>URBAN</b>					
Major Thoroughfares <sup>2</sup>	30	8	9	11	
	40	7	8	10	
	50	6	7	9	
	60	5	6	8	
Minor Thoroughfares*	20	9	12	14	
	30	9	11	12	
	40	9	10	12	
	50	7	8	10	
	60	6	7	9	
	70	5	6	7	
Local Streets*	20	--	11	16	
	30	7	10	14	
	40	7	9	12	
	50	6	8	10	
	60	5	6	--	

\*For streets and roads with projected annual average daily traffic less than 250 or short grades less than 500 ft long, grades may be 2% steeper than the values in the above table (Reference NCDOT Roadway Metric Design Manual, page 1-12 T-3)

<sup>1</sup>Local Roads including Residential Collectors and Local Residential

<sup>2</sup>Major Thoroughfares other than Freeways or Expressways

## **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. Offset intersections are to be avoided. A minimum length of 200 feet should separate intersections, which cannot be aligned, between survey centerlines.

## **E. Cul-de-sacs**

Cul-de-sacs shall not be more than one hundred and fifty (150) meters in length. The distance from the edge of pavement on the vehicular turn around 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 turn around. 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 provisions are 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 20 feet.
3. Dead-end alleys shall be avoided where possible, but if unavoidable, shall be provided with adequate turn around facilities at the dead-end 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 NC 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 two-lane, two-way traffic are as follows:

Shoulder section approach:

- under 800 ADT design year - minimum 28 feet width, face to face of parapets or rails, or pavement width plus 10 feet, whichever is greater.
- 800 - 2000 ADT design year - minimum 34 feet width, face to face of parapets or rails, or pavement width plus 12 feet, whichever is greater.
- over 2000 ADT design year - minimum width of 40 feet, desirable width of 44 feet width face to face of parapets or rails

Curb and gutter approach:

- under 800 ADT design year - minimum 24 feet face to face of curbs.
- 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 curbs, and in crown drop. The distance from face of curb to face of parapet or rail shall be a minimum of 1.5 feet, 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:

- shoulder section approach - width of approach pavement plus width of usable shoulders on the approach left and right (shoulder width 8 feet minimum, 10 feet desirable).
- curb and gutter approach - width of approach pavement measured face to face of curbs.

# Appendix E

## 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, much care and foresight is needed in its development. Thoroughfare planning is the process public officials use to assure the development of the most appropriate street system that will meet 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 the changing traffic patterns. A thoroughfare plan will enable street improvements to be made as traffic demands increase, and it helps eliminate unnecessary improvements so needless expense can be averted. By developing the urban street system to keep pace with increasing traffic demands, a maximum utilization of the system can be attained, requiring 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 and the commercial and industrial development 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. providing for the orderly development of an adequate major street system as land development occurs,
2. reducing travel and transportation costs,
3. reducing the cost of major street improvements to the public through the coordination of the street system with private action,
4. enabling private interests to plan their actions, improvements, and development with full knowledge of public intent,
5. minimizing disruption and displacement of people and businesses through long range advance planning for major street improvements,
6. reducing environmental impacts, such as air pollution, resulting from transportation, and
7. increasing travel safety.

Thoroughfare planning objectives are achieved through both improving the operational efficiency of thoroughfares, and 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 more vehicular traffic and people. In terms of vehicular traffic, a street's capacity is defined by 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 lanes more than doubles the capacity of the street by providing additional maneuverability for traffic. This reduces the impedances to traffic flow caused by slow moving or turning vehicles and the adverse effects of horizontal and vertical alignments.

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 width and number.
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 lane* - 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.
6. *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:

- A) 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.
- B) Encourage the use of transit and bicycle modes.
- C) Encourage industries, businesses, and institutions to stagger work hours or establish variable work hours for employees. This will spread peak travel over a longer time period and thus reduce peak hour demand.

D) Plan and encourage land use development or redevelopment in a more travel efficient manner.

## **System Efficiency**

Another means for 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 to the user. 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 service, 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 leads to intolerable traffic flow friction and congestion.

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

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 of the streets could be served. Local streets may be further classified as residential, commercial, and/or industrial depending upon the type of land use, which they serve.

Minor Thoroughfares are more important streets on the city system. They collect traffic from local access streets and carry it to the major thoroughfares. They may in some instances supplement the major thoroughfare system by facilitating minor through traffic movements. A third function that 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 principle 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 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.

## Typical Cross Sections

Cross section requirements for thoroughfares vary according to the desired capacity and level of service to be provided. Universal standards in design of thoroughfares are not practical. Each section of road must be individually analyzed and its cross section requirements determined on the basis of amount and type of projected traffic, existing capacity, desired level of service, and available right-of-way. Typical cross sections recommended by the Statewide Planning Branch are shown in Figure A-1. These cross sections are typical for facilities at new locations and where right-of-way constraints are not critical. For widening projects and urban projects with limited right-of-way, special cross-sections should be developed that meet the needs of the project.

The recommended typical cross sections shown in Table A-1 were derived on the basis of projected traffic, existing capacities, desirable levels of service, and available right-of-way.

On all existing and proposed major thoroughfares delineated on the thoroughfare plan, adequate right-of-way should be protected or acquired for the ultimate cross sections. Ultimate desirable cross sections for each of the thoroughfares are listed here. Recommendations for "ultimate" cross sections are provided for the following:

1. thoroughfares which may require widening after the current planning period;
2. thoroughfares which are borderline adequate, where accelerated traffic growth could render them deficient; and
3. thoroughfares where an urban curb and gutter cross section may be locally desirable because of urban development or redevelopment.

### *A - Four Lanes Divided with Median, Freeway*

This cross section 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 14 m (46 feet), but a wider median is desirable.

### *B - Seven Lanes, Curb & Gutter*

This cross section is not recommended for new projects. When the conditions warrant six lanes, cross section "D" should be recommended. Cross section "B" should be used only in special situations such as widening from a five lane section when right-of-way is limited. Even in these situations, consideration should be given to converting the center turn lane to a median so that cross section "D" is the final cross section.

### *C - Five Lanes, Curb & Gutter*

Typical for major thoroughfares, this cross section is desirable where frequent left turns are anticipated as a result of abutting development or frequent street intersections.

***D - Six Lanes Divided with Raised Median, Curb & Gutter***

***E - Four Lanes Divided with Raised Median, Curb & Gutter***

These cross sections are typically used on major thoroughfares where left turns and intersection streets are not as frequent. Left turns would be restricted to a few selected intersections. The 4.8 m (16 ft) median is the minimum recommended for an urban boulevard type cross section. In most instances, monolithic construction should be utilized due to greater cost effectiveness, ease and speed of placement, and reduced future maintenance requirements. In special cases, grassed or landscaped medians may be used in urban areas. However, these types of medians result in greatly increased maintenance costs and an increased danger to maintenance personnel. Non-monolithic medians should only be recommended when the above concerns are addressed.

***F - Four Lanes Divided, Boulevard, Grass Median***

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 7.3 m (24 ft) is recommended with 9.1 m (30 ft) being desirable.

***G - Four Lanes, Curb & Gutter***

This cross section 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. This cross section should be used only if the above criteria is met. If right-of-way is not restricted, future strip development could take place and the inner lanes could become de facto left turn lanes.

***H - Three Lanes, Curb & Gutter***

In urban environments, thoroughfares which are proposed to function as one-way traffic carriers would typically require this cross section.

***I - Two Lanes, Curb & Gutter with Parking on Both Sides***

***J - Two Lanes, Curb & Gutter with Parking on One Side***

Cross sections "I" and "J" are usually recommended for urban minor thoroughfares since these facilities usually serve both land service and traffic service functions. Cross section "I" would be used on those minor thoroughfares where parking on both sides is needed as a result of more intense development.

***K - Two Lanes, Paved Shoulder***

This cross section 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. For areas that are growing and future widening will be necessary, the full right-of-way of 30 m (100 ft) should be required. In some instances, local ordinances may not allow the full 30 m. In those cases, 21 m (70 ft) should be

preserved with the understanding that the full 30 m will be reserved by use of building setbacks and future street line ordinances.

***L - Six Divided with Grass Median, Freeway***

Cross section "L" is typical for controlled access freeways. The 14 m (46 ft) grassed median is the minimum desirable median width, but there could be some variation from this depending upon design considerations. Right-of-way requirements would typically vary upward from 70 m (228 ft) depending upon cut and fill requirements.

***M - Eight Lanes Divided with Raised Median, Curb & Gutter***

Also used for controlled access freeways, this cross section may be recommended for freeways going through major urban areas or for routes projected to carry very high volumes of traffic.

***N - Five Lanes, Curb & Gutter, Widened Curb Lanes***

***O - Two Lanes, Shoulder Section***

***P - Four Lanes Divided with Raised Median, Curb & Gutter, Widened Curb Lanes***

If there is sufficient bicycle travel along the thoroughfare to justify a bicycle lane or bikeway, additional right-of-way may be required to contain the bicycle facilities. The North Carolina Bicycle Facilities Planning and Design Guidelines should be consulted for design standards for bicycle facilities.

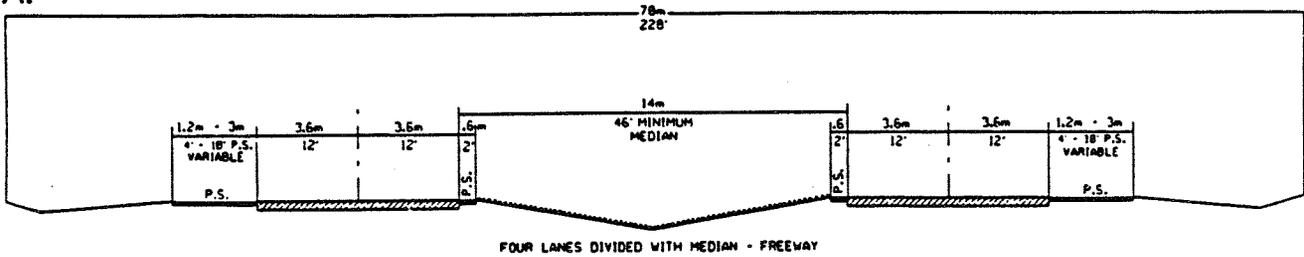
***Other General Information***

The urban curb & gutter cross sections 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 the sidewalk is moved farther away from the street to provide additional separation for pedestrians or for aesthetic reasons, additional right-of-way must be provided to insure adequate setback for utility poles.

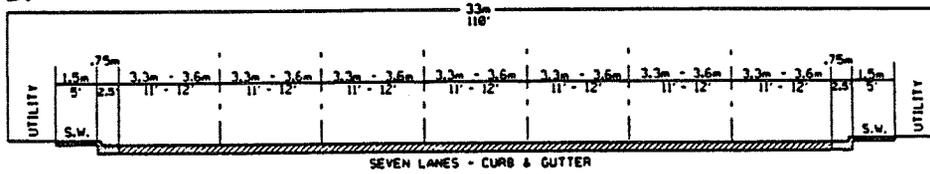
The rights-of-way shown for the typical cross sections are the minimum required to contain the street, sidewalks, utilities, and drainage facilities. Additional cut and fill may require either additional right-of-way or construction easements. Obtaining construction easements is becoming the more common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

# TYPICAL THOROUGHFARE CROSS SECTIONS

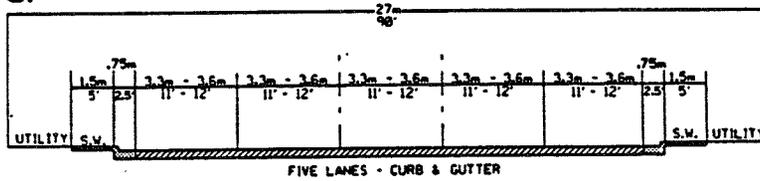
A.



B.



C.



D.

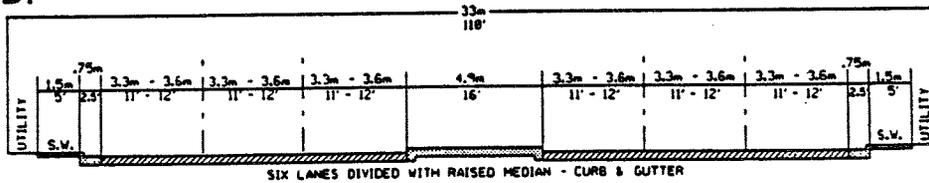


Figure E-1

# TYPICAL THOROUGHFARE CROSS SECTIONS

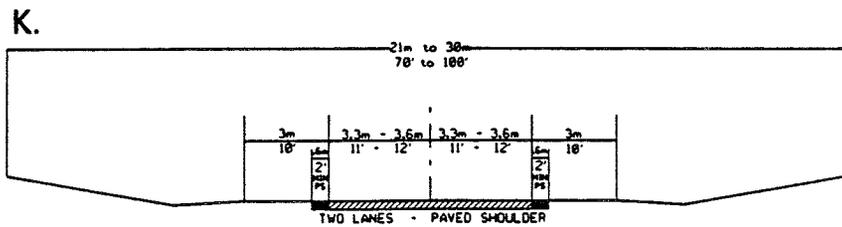
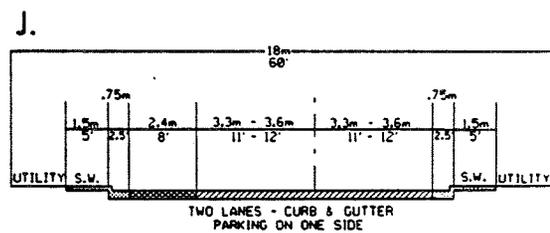
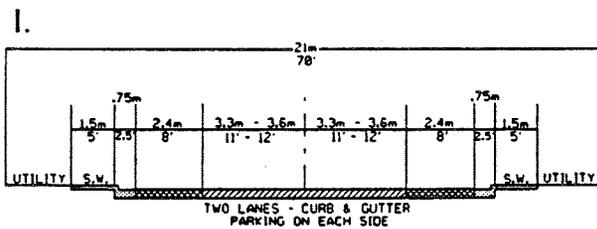
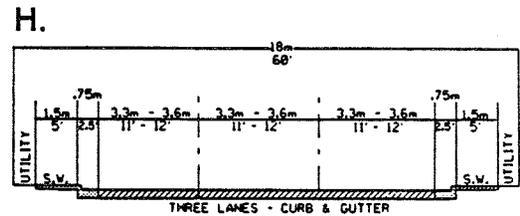
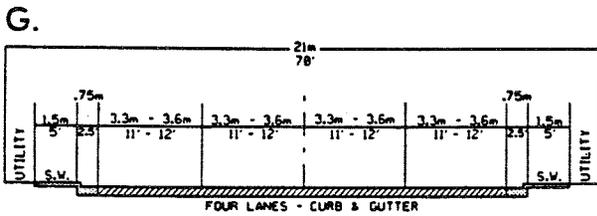
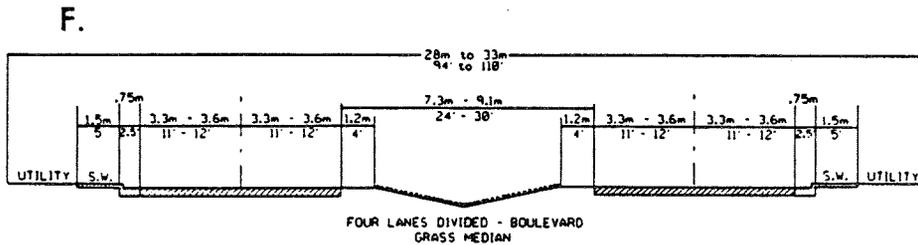
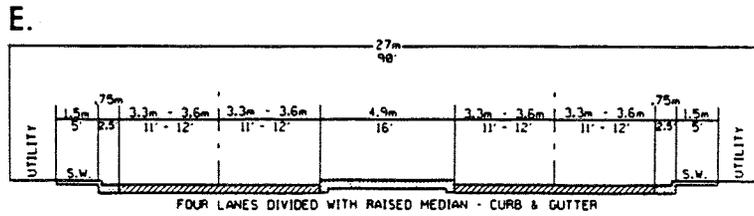
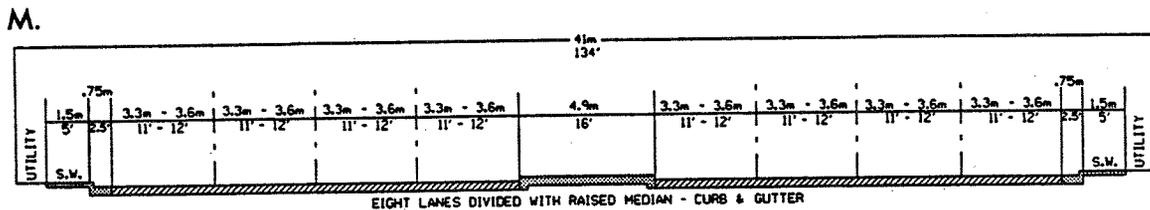
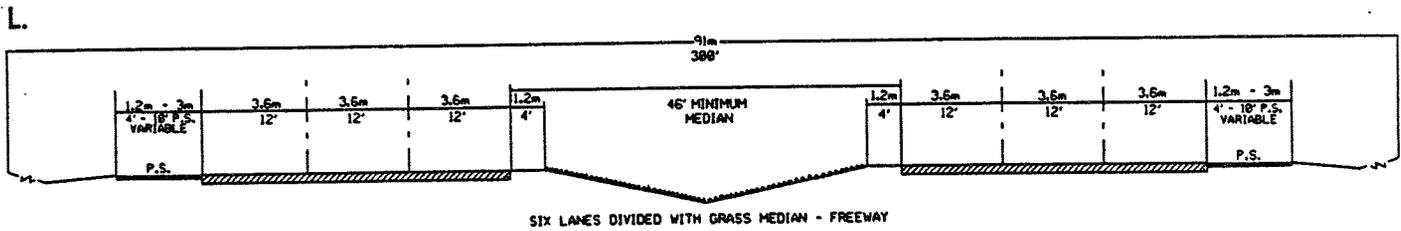


Figure E-1 CONTINUED

# TYPICAL THOROUGHFARE CROSS SECTIONS



## TYPICAL THOROUGHFARE CROSS SECTIONS FOR ACCOMMODATING BICYCLES

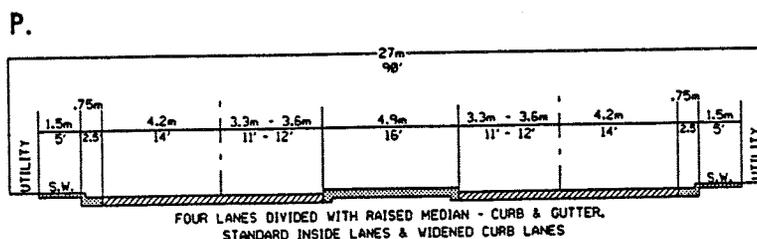
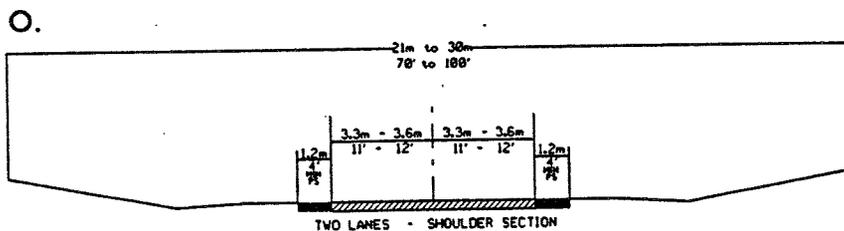
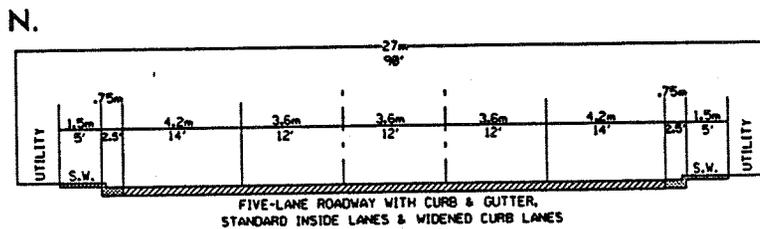


Figure E-1 CONTINUED

## **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 desired lines of travel within an urban area, is the radial-loop system. It permits movement between various areas of the city within maximum directness. This system consists of several functional elements: radial streets, cross-town streets, loop system streets, and bypasses (Figure E-2).

Radial streets provide for traffic movement between points located on 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. 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 cross-town 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 side to follow the area's border. It also allows central area traffic to circle and then enter the area near a given destination. The effect of a good cross-town street system is to free the central area of cross-town traffic, thus permitting the central area to function more adequately in its role as a business or 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 help relieve central areas. There may be one or more loops, depending on the size of the urban area. They are generally spaced one-half mile to one mile apart, depending on the intensity of 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 traffic that has no desire to be in the city. Bypasses are usually designed to 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.

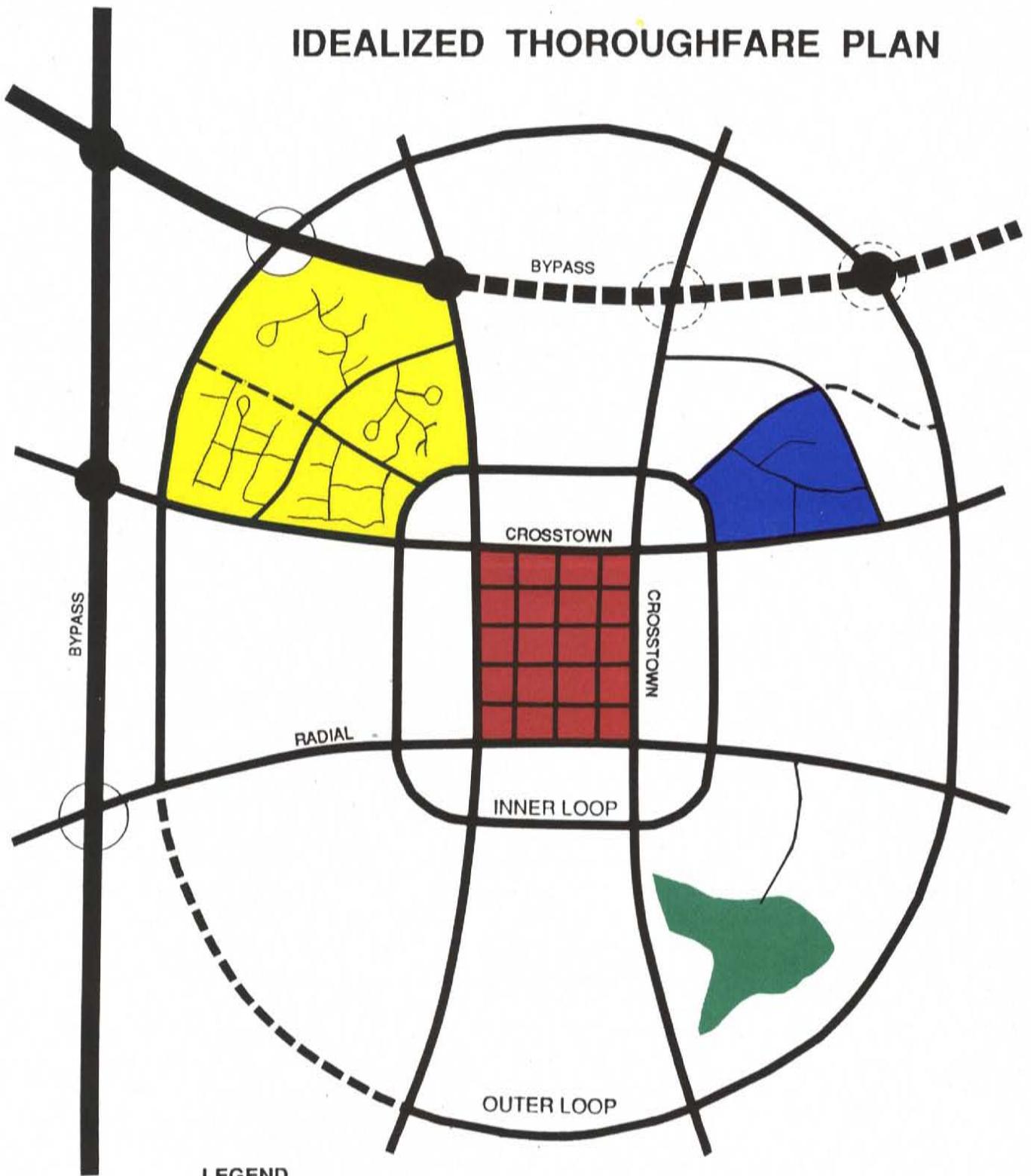
## **Application of Thoroughfare Planning Principles**

The concepts presented in the discussion of operational efficiency, functional classification, and idealized major thoroughfare system are the conceptual tools available to the transportation planner in developing a thoroughfare plan. In actual practice, a thoroughfare plan is developed for established urban areas and is constrained by the 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 constraints 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 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 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. In outlying or sparsely developed areas, which have development potential, it is necessary to designate thoroughfares on a long-range planning basis to protect right-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.

# IDEALIZED THOROUGHFARE PLAN



## LEGEND

	EXISTING	PROPOSED	LAND USES	
MAJOR THOROUGHFARE FREEWAY				COMMERCIAL/BUSINESS
MAJOR OTHER				RESIDENTIAL
MINOR THOROUGHFARE				INDUSTRIAL
LOCAL ROAD				PUBLIC/INSTITUTIONAL
INTERCHANGE				
GRADE SEPERATION				

Figure E-2