NCDOT TPB
TRANSPORTATION PLANNING BRANCH

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

Comprehensive Transportation Plan for

The Town of Troy

March 2008

Town of Troy
Comprehensive Transportation Plan
Technical Report

Prepared by the:

Transportation Planning Branch
Division of Highways
North Carolina Department of Transportation

In Cooperation with:

The Town of Troy
Piedmont Triad Rural Planning Organization
The Federal Highway Administration
U.S. Department of Transportation

March, 2008

Scott Walston, P.E.

Acknowledgements

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1. Introduction

An area's transportation system is its lifeline, contributing to its economic prosperity and social well being. The importance of a safe and efficient transportation infrastructure cannot be overstressed. This system provides a means of transporting people and goods from one place to another quickly, conveniently, and safely. A well-planned system will meet the existing travel demand, as well as keep pace with the growth of the region.

Officials from the town of Troy, with assistance from the Piedmont Triad Rural Planning Organization (RPO), requested that the North Carolina Department of Transportation's (NCDOT) Transportation Planning Branch cooperatively develop a Transportation Plan for town of Troy.

Troy is located in Montgomery County in the Piedmont Region of North Carolina. The geographical location of the county is shown in **Figure 1**.

This report documents the development of the 2005 Comprehensive Transportation Plan (CTP) for the town of Troy as shown in **Figure 2, Sheets 1-4**. In addition, this report presents recommendations for each mode of transportation.

CTP

CTP stands for Comprehensive Transportation Plan. The CTP replaces the thoroughfare plan as the official document mutually adopted by the local areas (municipality, MPO, RPO or county) and the Department of Transportation.

A CTP is developed to ensure that the progressively developed transportation system will meet the needs of the town. The CTP will serve as an official guide in providing a well-coordinated, efficient, and economical transportation system utilizing all modes of transportation. This document may be utilized by local officials to ensure that planned transportation facilities reflect the needs of the public, while minimizing the disruption of local residents, businesses, and the environment.

The purpose of this study is to examine present and future transportation needs of the town and to develop a CTP that meets these needs. The CTP recommends those improvements that are necessary to provide an efficient transportation system within the 2005-2030 planning period.

Initiative for the implementation of the CTP rests predominately with the policy boards and citizens of the town. The town of Troy and the North Carolina Department of Transportation share the responsibility for any proposed construction. The needs throughout the state exceed available funding; therefore, it is imperative that the town aggressively pursues funding for desired projects.

The proposed CTP is based on the projected growth for the town as coordinated with the town officials. It is possible that actual growth patterns will differ from those logically anticipated. As a result, it may be necessary to accelerate or delay the development of some recommendations found on the plan. Some portions of the Plan may require revisions in order to accommodate unexpected changes in urban development. The best use of this plan is to make sure that any changes made to one mode of the Plan are consistent with the other modes.

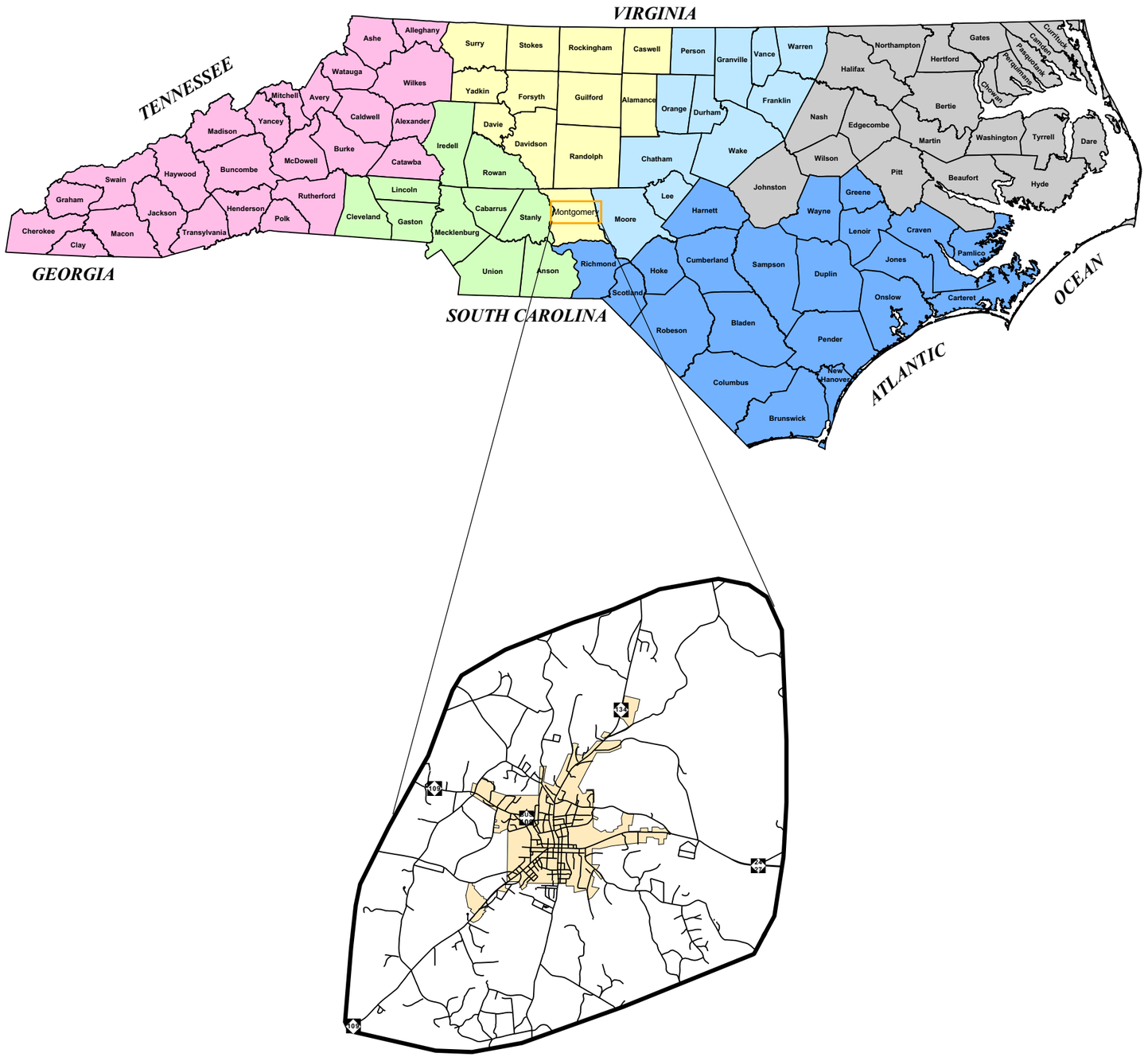

FIGURE 1
GEOGRAPHIC LOCATION

LEGEND

Planning Regions

- METROLINA
- MOUNTAINS
- NORTHEAST
- SOUTHEAST
- TRIAD
- TRIANGLE

TOWN OF
TROY

MONTGOMERY COUNTY
NORTH CAROLINA

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION PLANNING BRANCH

IN COOPERATION WITH THE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

BASE MAP DATE: DECEMBER 2004

Adopted by:

Town of Troy
Date: December 19, 2005

NCDOT
Date: February 2, 2006

Endorsed by:

Piedmont-Triad RPO
Date: December 21, 2005

Recommended by

Transportation Planning Branch
Date: January 6, 2006

NOTES:

Format for Sheet 5 Pedestrian map is pending.

Town of Troy

Montgomery County
North Carolina

Comprehensive Transportation Plan

Plan date: November 9, 2005

Legend

- Schools
- Rivers and Streams
- Railroads
- Lakes and Ponds
- Town Boundary
- Planning Boundary

0 0.25 0.5 0.75 1 Miles

Base map date: January, 2005

Refer to CTP document for more details

Figure 2, Sheet 1

Highway Map

Town of Troy

Comprehensive Transportation Plan

Plan date: November 9, 2005

Freeways
- Existing
- Needs Improvement
- Recommended

Expressways
- Existing
- Needs Improvement
- Recommended

Boulevards
- Existing
- Needs Improvement
- Recommended

Other Major Thoroughfares
- Existing
- Needs Improvement
- Recommended

Minor Thoroughfares
- Existing
- Needs Improvement
- Recommended

- Existing Interchange
- Proposed Interchange
- Existing Grade Separation
- Proposed Grade Separation

0 0.25 0.5 0.75 1 Miles

Base map date: January, 2005

Refer to CTP document for more details

Schools
Railroad
Rivers and Streams
Lakes and Ponds
Town Boundary
Planning Boundary

NC 24/27 Bypass under study.

Figure 2, Sheet 2

Public Transportation and Rail Map

Town of Troy

Comprehensive Transportation Plan

Plan date: November 9, 2005

Bus Routes
- Existing
- Needs Improvement
- Recommended

Fixed Guideway
- Existing
- Needs Improvement
- Recommended

Operational Strategies
- Existing
- Needs Improvement
- Recommended

Rail Corridor
- Active
- Inactive
- Recommended

High Speed Rail Corridor
- Existing
- Recommended

Rail Stops
- Existing
- Recommended

Intermodal Connector
- Existing
- Recommended

Park and Ride Lot
- Existing
- Recommended

Miles
0 0.25 0.5 0.75 1

Base map date: January, 2005

Refer to CTP document for more details

Schools
Railroad
Rivers and Streams
Lakes and Ponds
Town Boundary
Planning Boundary

N W E S

Aberdeen Carolina & Western Railroad (ACWR)

Hughs Creek
Denson Creek
Little River
Smith Branch

109
109 BUS
24 27

Figure 2, Sheet 3

Bicycle Map

Town of Troy

Comprehensive Transportation Plan

Plan date: November 9, 2005

On Road
- Existing
- Needs Improvement
- Recommended

Off Road
- Existing
- Needs Improvement
- Recommended

Schools
Railroad
Rivers and Streams
Lakes and Ponds
Town Boundary
Planning Boundary

N W E S

0 0.25 0.5 0.75 1 Miles

Base map date: January, 2005

Refer to CTP document for more details

Figure 2, Sheet 4

2. Recommendations

This chapter contains recommended improvements based on the ability of the existing system to serve current and anticipated travel desires as the area continues to grow. The recommended plan represents a system of transportation elements including highway, public transportation and rail, bicycle, and pedestrian, which will serve the anticipated traffic and land development needs for the town. The primary objective of this plan is to reduce traffic congestion and improve safety by eliminating both existing and projected deficiencies in the transportation system.

2.1 Highway Map

The recommended highway improvements are illustrated in **Figure 2, Sheet 2.** The plan includes roadways within the planning area that fall into five categories: freeways, expressways, boulevards, other major thoroughfares, and minor thoroughfares. See **Appendix B** for a more detailed description of each category and **Appendix C** for an inventory of the highway recommendations.

Capacity

Capacity is the number of vehicles that can pass a given point during a specified period under prevailing roadway, traffic, and control conditions. This assumes that there is no influence from downstream traffic operation, such as a backing up of traffic into the analysis point. *(Highway Capacity Manual, 2000)*

The process of determining and evaluating recommendations for the roads in the plan involves many considerations including the goals and objectives survey of the public in the area, existing roadway properties, identified roadway capacity deficiencies, environmental impacts, and existing and anticipated land development. Consideration of these factors led to the cooperative development of the recommended improvements. A description of each recommendation is given below.

2.2 Primary Route Improvements

Strategic Highway Corridors

The Strategic Highway Corridors (SHC) represents a timely effort to preserve and maximize the mobility and connectivity on a core set of highway corridors within the state. More information is available on the Internet at: http://www.ncdot.org/~SHC/

NC 24/27

As part of the Intrastate Highway System and being designated as a Strategic Highway Corridor, NC 24/27 plays a significant role in providing mobility and access for the area. A NC 24/27 bypass around the town of Troy has already been planned for and is programmed in the 2007-2013 Transportation Improvement Program (TIP) as project R-0623. Planning and Design work for this project is already underway. The most recent Transportation Improvement Program should be consulted for the most current schedule. In addition to the bypass, a new-location project, there are plans to

widen NC 24/27 at both ends of the bypass, providing a 4-lane divided highway throughout the planning area. The eastern portion of this widening is included in project R-0623, and the western end is noted as project R-2527 in the 2007-2013 TIP program.

Existing Conditions

Currently NC 24/27 runs through the central part of Troy and often acts as both a local and through route. Current cross sections vary from 2 to 3 lanes and carry traffic volumes ranging from 8,000-15,000 vehicles per day (vpd).

Future Conditions

When the Troy Bypass is complete, significant changes will occur to the traffic volumes on the existing NC 24/27. Those volumes will range from 6,800-24,000 vpd. The most notable of these changes is the reduction of through trips and truck traffic through town on the existing NC 24/27.

NC 109

Summary of Need

NC 109 is classified as a major thoroughfare. There is a need to improve NC 109 to provide access to the planning area from areas like Mt. Gilead and Wadesboro to the south, as well as Lexington and Thomasville to the north. This route provides an important connection for the timber industry, as well as providing access to the Uwharrie National Forest for tourists.

Summary of Purpose

The primary purpose of this recommendation is to improve NC 109 to provide a safer and more efficient roadway, and to provide an improved entrance into Troy from the south.

Recommendation

It is recommended that NC 109 be improved, from NC 24/27 northward to the planning area boundary, by widening the existing two travel lanes to a minimum of 12-feet wide. Other improvements should include the addition of paved shoulders along the route and the addition of turn lanes where warranted.

Roadway Conditions

- **Existing Characteristics**
  NC 109 runs south to north throughout the planning area. The speed limit varies from 35 mph to 55 mph. The roadway is a 2-lane undivided cross-section, passing through a mix of industrial and residential areas.

- **Existing Conditions**
  The 2002 average daily traffic ranged from 5,300 vpd southwest of Troy to 2,600 vpd west of Troy. The practical capacity of the existing roadway at Level of Service D is approximately 11,000 vpd.

- **Projected Conditions**
  Growth in the area is expected to increase through the year 2030, resulting in increased travel within and through the area. By the year 2030, traffic along NC 109 is projected to range from 5,500 vpd to 10,600 vpd, which will be near the current capacity.

- **Safety Analysis**
  The latest safety data was collected during the period from January 1, 1999 to December 1, 2002. During this period, there were no intersections with more than 20 crashes over a three-year period within this section.

System Linkages

- **Existing Road Networks**
  NC 109 acts as a connection between areas south of Troy and the larger urban areas of Lexington and High Point to the north.

Social, Economic, and Environmental Conditions

- **Demographics**
  Based on 2000 US Census data, the minority population along most of NC 109 is similar to the town average.

- **Economic Data**
  Future economic growth along this roadway will be predominately industrial and commercial developments, resulting in residential growth.

Environmental

There are no known environmental impacts to threatened and endangered species, historic sites, archeological sites or educational facilities in the vicinity of the proposed improvements.

Cost Estimates

The cost estimate for the proposed improvements is based on widening the existing facility to NCDOT standards, widening the existing bridges, mitigating for possible wetland impacts, right-of-way (ROW) costs, and utility relocation costs. The 2005 cost estimate for this project is $ 2,547,000.

NC 109 Business

Existing Characteristics

NC 109 Business is a major thoroughfare, providing access to the downtown business district and county offices located just south of NC 24/27. Currently, NC 109 Business is a two-lane facility, with a two-way left turn lane in place from NC 24/27 north to NC 134, and has pavement widths from 26-36 feet.

Existing and Projected Conditions

Current volumes on this facility range from 2,300 vpd west of downtown to 10,800 vpd in the downtown area. Existing traffic volumes on this facility are well below the roadway's practical capacity level of 13,900 vpd, however 2030 projections suggest that volumes could increase to exceed 14,000 vpd.

Recommendation

While the projected future volumes would put the roadway in a state of being slightly over capacity, the physical dimensions and close proximity of the commercial properties adjacent to NC 109 Business will place severe limitations on what type of improvements can be accomplished. Possible solutions could include the coordination of traffic signals, or possibly removing on-street parking in the area. Further study of those options may need to be explored should this facility experience severely congested conditions.

Secondary Route Improvements

The facilities listed below are recommended to be widened to improve safety and capacity. Each of the roadway sections listed currently has lane widths less than 12 feet and it is recommended widen these facilities to two 12-foot lanes. Prior to any roadway improvements, the NCDOT Division of Bicycle and Pedestrian should be consulted on the most appropriate cross-section.

SR 1005 (South Main Street/ Pekin Road)

SR 1005 (South Main Street/ Pekin Road) is expected to see a significant increase in its traffic volumes due to its intersection with the NC 24/27 Bypass. Currently volumes on SR 1005 (South Main Street/ Pekin Road) range from 750-1,000 vpd. With the addition of the NC 24/27 Bypass, and the connection provided by Pekin Road to downtown businesses and to the county offices, traffic volumes are expected to increase to around 9,000 vpd. As a result of this traffic growth and the fact that this facility runs through a primarily residential area, it is recommended that SR 1005 (South Main Street/ Pekin Road) be widened to a two-lane facility with 12-foot travel lanes (24 feet total) paved shoulders, from SR 1596 (Horne Road) to the NC 24/27 Bypass. It is also recommended that sidewalks be added to this facility from existing NC 24/27 to the NC 24/27 Bypass at the time of the widening. These sidewalks are needed to provide a pedestrian connection from the residential area along Pekin Road to the businesses and offices located downtown. The expected cost for widening this facility and the construction of sidewalks on both sides is $756,000.

SR 1132 (Page Street)

As part of the project level planning for the NC 24/27 Bypass, project planners met with local lumber businesses and trucking companies. The main purpose of the meetings was to find an alternate way for trucks carrying loads of lumber to travel from NC 24/27 to the lumberyard on NC 134 north of the downtown area. At present, these trucks travel through the downtown business district, creating safety concerns for downtown travelers, residents, and merchants. Through these discussions, an agreement was reached for the truckers to use the bypass and its eastern intersection with SR 1132 (Page Street) to reach the lumber facilities. Consequently, it is recommended that SR 1132 (Page Street) be widened to include 12-foot lanes and 2 feet of paved shoulder. Because of the agreement with local industry and growth in the area, traffic volumes on SR 1132 (Page Street) will be near 4,000-5,000 vpd, with a significant portion of that volume being truck traffic. Every effort should be made to ensure the safety of the traveling public, including the consideration of turn-lanes at major intersections and at the Page Street Elementary School.

Other facilities recommended for minor widening (to 12-foot lanes) to improve safety and capacity:

SR 1138 (Shiloh/ Dairy Road)
SR 1139 (Vestal/ Warner Road)
SR 1324 (Glenn Road)
SR 1554 (Taft Street/ Troy-Candor Road)

2.3 Public Transportation and Rail Map

The Public Transportation and Rail Element of the Plan (see **Figure 2, Sheet 3**) is a way to consider other modes of transportation and to give the public other options of traveling from one place to another.

Rail Recommendations

Railroads were the backbone of the transportation system in the United States in the early 1800s. In the 1920s, society moved toward utilizing automobile as their primary source of transportation. Today, there is more of an interest in utilizing the railroad as an alternative mode of transportation for commuting to work and to facilitate the movement of freight.

The planning area currently has an active rail freight corridor. The Aberdeen Carolina and Western Railroad (ACWR) owns 160 miles of track running from Charlotte (Mecklenburg County) through Midland (Cabarrus County) and Stanfield (Stanly County) to Star (Montgomery County) and continuing northwest and southwest from Star as seen in **Figure 2, Sheet 3.**

The NCDOT Rail Division completed a study documenting potential NC Commuter Rail Corridors in January 1999. This study included a corridor from Charlotte to Albemarle that would have passed through Troy. This corridor was eliminated for further consideration once discussions began about providing improved passenger service from Charlotte to Raleigh. According to Charlotte Area Transit planners, the ACWR line was studied, but determined to not have enough commuter ridership within the Charlotte area prior to the year 2025.

2.4 Bicycle and Pedestrian Map

The NCDOT envisions that all citizens of North Carolina and visitors to the state should be able to walk and bicycle safely and conveniently to their chosen destinations with reasonable access to roadways. Information on events, funding, maps, policies, projects, and processes dealing with these modes of transportation can be accessed at the Division of Bicycle and Pedestrian Transportation's web site.

The Bicycle Element of the town of Troy Comprehensive Transportation Plan is shown in **Figure 2, Sheet 4**. In late 2004, the Piedmont-Triad RPO completed their RPO Bicycle Study for the region, including the CTP study area. The facilities identified by the Bicycle Study were incorporated as part of the Bicycle Plan for the town of Troy CTP. Before any improvements are made to those facilities, the Division of Bicycle and Pedestrian Transportation should be consulted.

The process of determining and evaluating recommendations for the bicycle element of the transportation plan involves many considerations including the goals and objectives survey of the area, existing properties, environmental impacts, and existing and anticipated land development.

The format for the Pedestrian Map is still under development; therefore no map was included.

More Information on Web

More information about the NCDOT Bicycle and Pedestrian division can be found at: **http://www.ncdot.org/transit/bicycle**
For more information about the Piedmont-Triad RPO, and its regional bicycle plan, visit: **http://www.ptcog.org/rpobicycle.html**

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3. Population, Land Use, and Traffic

In order to fulfill the objectives of an adequate thirty-year transportation plan, reliable forecasts of future travel patterns must be achieved. Such forecasts depend on careful analysis of the following items: historic and potential population changes; significant economic trends, character and intensity of land development; and the ability of the existing transportation system to meet existing and future travel demand. Secondary items that influence forecasts include the effects of legal controls such as zoning ordinances and subdivision regulations, availability of public utilities and transportation facilities, and topographic and other physical features of the urban area.

3.1 Population

Since the volume of traffic on a roadway is related to the size and distribution of the population that it serves, population data is used to aid the development of the transportation plan. Future population estimates typically rely on the observance of past population trends and counts. **Figure 3** presents the population trends for the town of Troy, Montgomery County, and North Carolina.

Figure 3: Population Growth*

Location	1970	1980	1990	2000	2003	2030
North Carolina	5,082,059	5,881,766	6,628,637	8,046,485	8,408,414	12,447,597
Montgomery County	19,237	22,469	23,346	26,822	27,332	36,921
Town of Troy	2,429	2,702	3,387	3,430	4,230	4,910[1]
Planning Area	N/A	N/A	N/A	N/A	4,860[1]	5,760[1]

Figure 3: Town of Troy Population Growth

*This data, unless otherwise noted, was provided by the North Carolina State Data Center.

[1]Estimate provided by the Transportation Planning Branch.

3.2 Land Use

Land use refers to the physical patterns of activities and functions within an area. The use of a particular road and the use of varying modes of transportation on that particular road are related to the land uses adjacent to that facility, and the intensity of land use effects the traffic patterns for multi-modal facilities. For example, a shopping center generates larger traffic volumes than a residential area. The spatial distribution of varying land uses is the predominant determinant of when, where, and why congestion occurs. The attraction between different land uses and their association with travel varies with the size, type, intensity, and spatial separation of each land use.

When dealing with transportation planning, land use is divided into the following classifications:

- Residential – All land is devoted to the housing of people, with the exception of hotels and motels.

- Commercial – All land is devoted to retail trade including consumer and business services and their offices; this may be further stratified into retail and special retail classifications. Special retail would include high-traffic establishments, such as fast-food restaurants and service stations; all other commercial establishments would be considered retail.

- Industrial – All land is devoted to the manufacturing, storage, warehousing, and transportation of products.

- Public – All land is devoted to social, religious, educational, cultural, and political activities; this would include the office and service employment establishments.

3.3 Existing Transportation System

An important stage in the development of a transportation plan is the analysis of the existing roadway system and its ability to serve the area's travel desires. Emphasis is placed not only on detecting the existing deficiencies, but also on understanding the causes of these deficiencies. Travel deficiencies may be localized, resulting from problems with inadequate pavement width, intersection geometry, or intersection controls. Travel deficiencies may also result from system problems, such as the need to construct missing travel links, bypass routes, loop facilities, or additional radial routes.

An analysis of the roadway system looks at both current and future travel patterns and identifies existing and anticipated deficiencies. This is usually accomplished through a traffic crash analysis, roadway capacity deficiency analysis, and a system deficiency analysis. This information is used to analyze factors that will impact the future system, including population growth, economic development potential, and land use trends.

3.4 Traffic Crash Analysis

Traffic accidents or "crashes" are often used as an indicator for locating congestion problems. While often the result of drivers or vehicle performance, crashes may also be a result of the physical characteristics of the roadway. Roadway conditions and obstructions, traffic conditions, and weather may all lead to a crash. While some crashes are the fault of the driver, others may be prevented with physical design changes or traffic control changes such as the installations of stop signs or traffic signals.

Crash data for the period from January 1999 to December 2002 was studied as part of the development for this plan. The crash analysis considered both frequency and severity. Frequency is the total number of reported crashes, while severity is based upon injuries and property damage incurred. These two factors help to determine high crash intersections; fortunately, no intersections within the planning area met the qualifications (frequency and severity) to be deemed high-accident locations.

To request a more detailed analysis for any of the locations or intersections of concern, the town should contact the Division 8 Traffic Engineer. Contact information for the Division 8 Traffic Engineer is included in **Appendix A**.

3.5 Existing and Projected Capacity Deficiencies

Roadway capacity deficiencies occur wherever the travel demand volume of a roadway is close to or more than the capacity of that roadway. Travel demand volume is the total number of vehicles that wish to use a roadway on a daily basis. The existing travel demand volumes for the town are based upon traffic count data taken annually by the NCDOT Traffic Surveys Unit. Volume to capacity ratios (V/C) have been calculated for the 2003 plan year and are shown in **Figure 4**.

A Travel Demand Model developed for Troy was used to estimate 2030 traffic demand. It was based on historic and anticipated population, economic growth patterns, and land use trends. The projected 2030 travel demand volume to capacity ratios, based on Troy's Travel Demand Model, are shown in **Figure 5**.

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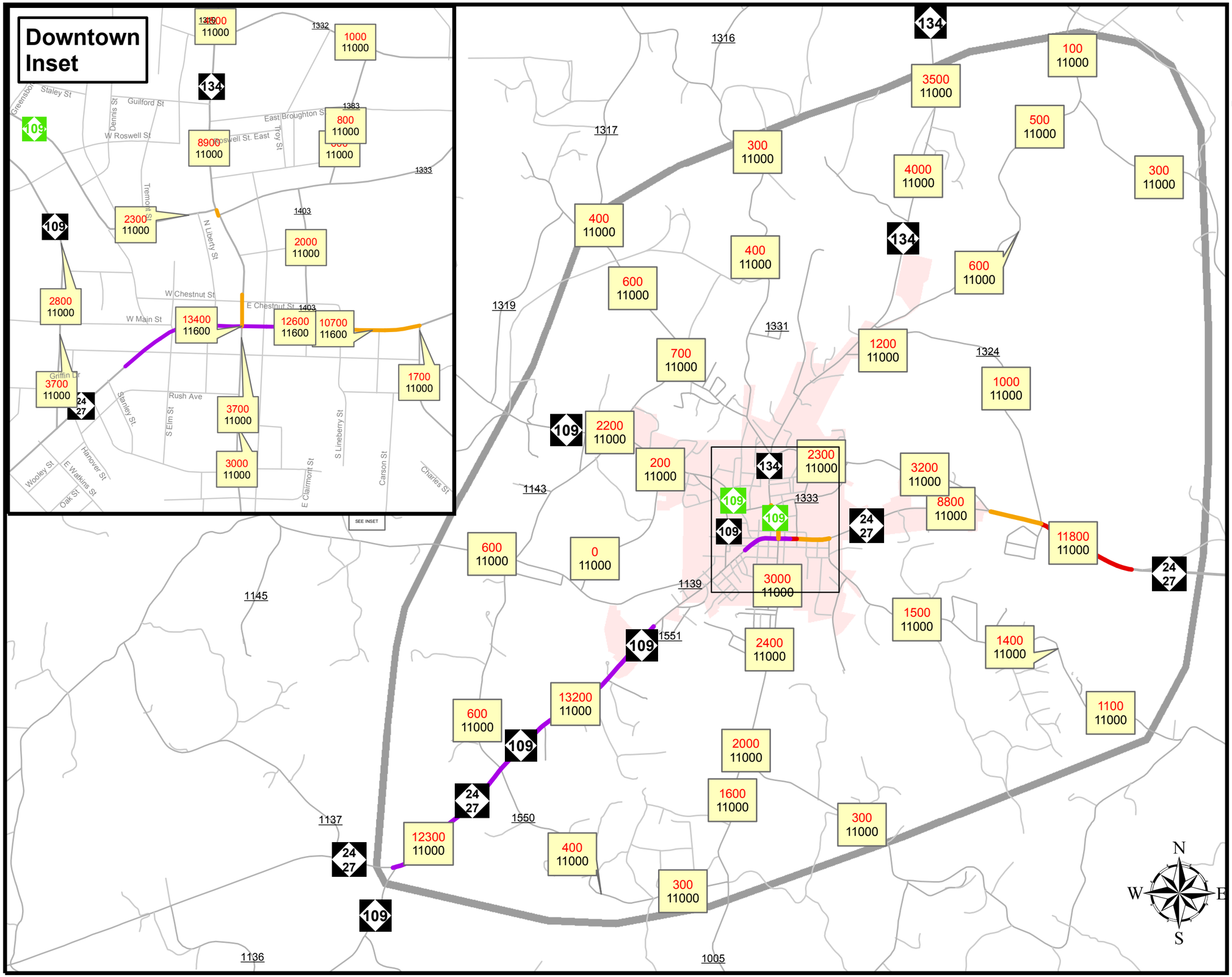
Figure 4: Base Year Travel Conditions

Town of Troy Comprehensive Transportation Plan



2003 Volume
2003 Capacity

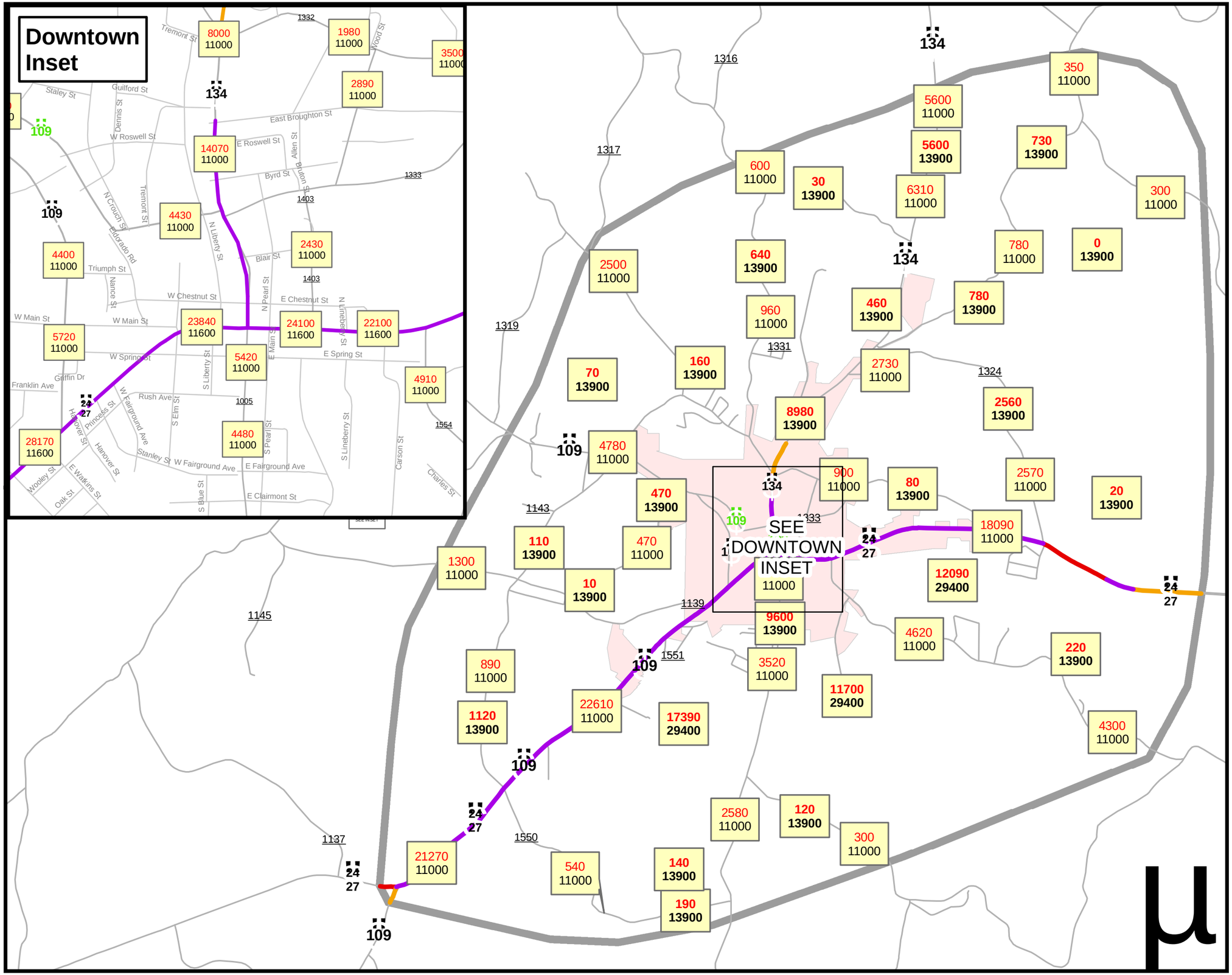
Legend

- No Congestion
- Nearing Congestion
- Slight Congestion
- Severe Congestion
- TroyCityLimits
- Planning Area Boundary

0 0.4 0.8 1.6
Miles

Figure 5: Future Year Travel Conditions with no Improvements

Town of Troy Comprehensive Transportation Plan



Capacity is the maximum number of vehicles that can pass over a given section of roadway during a given time period under prevailing roadway and traffic conditions. Many factors contribute to the capacity of a roadway, including:

- Geometry of the road, including number of lanes, horizontal and vertical alignment, and proximity of perceived obstructions to safe travel along the road;
- Typical users of the road, such as commuters, recreational travelers, and truck traffic;
- Access control, including streets and driveways, or lack thereof, along the roadway;
- Development of the road, including residential, commercial, and industrial developments;
- Number of traffic signals along the route;
- Peaking characteristics of the traffic on the road;
- Characteristics of side-roads feeding into the road; and
- Directional split of traffic or the percentages of vehicles traveling in each direction along a road at any given time.

The relationship of travel demand volume to roadway capacity determines the level-of-service (LOS) of a roadway. Six distinct levels-of-service are possible, with letter designations ranging from LOS A, which represents the best operating conditions, to LOS F, which represents the worst operating conditions. LOS D indicates “practical capacity” of a roadway, or the capacity at which the public begins to express dissatisfaction. The six levels-of-service are illustrated in **Figure 6**.

Figure 6: Level of Service Descriptions

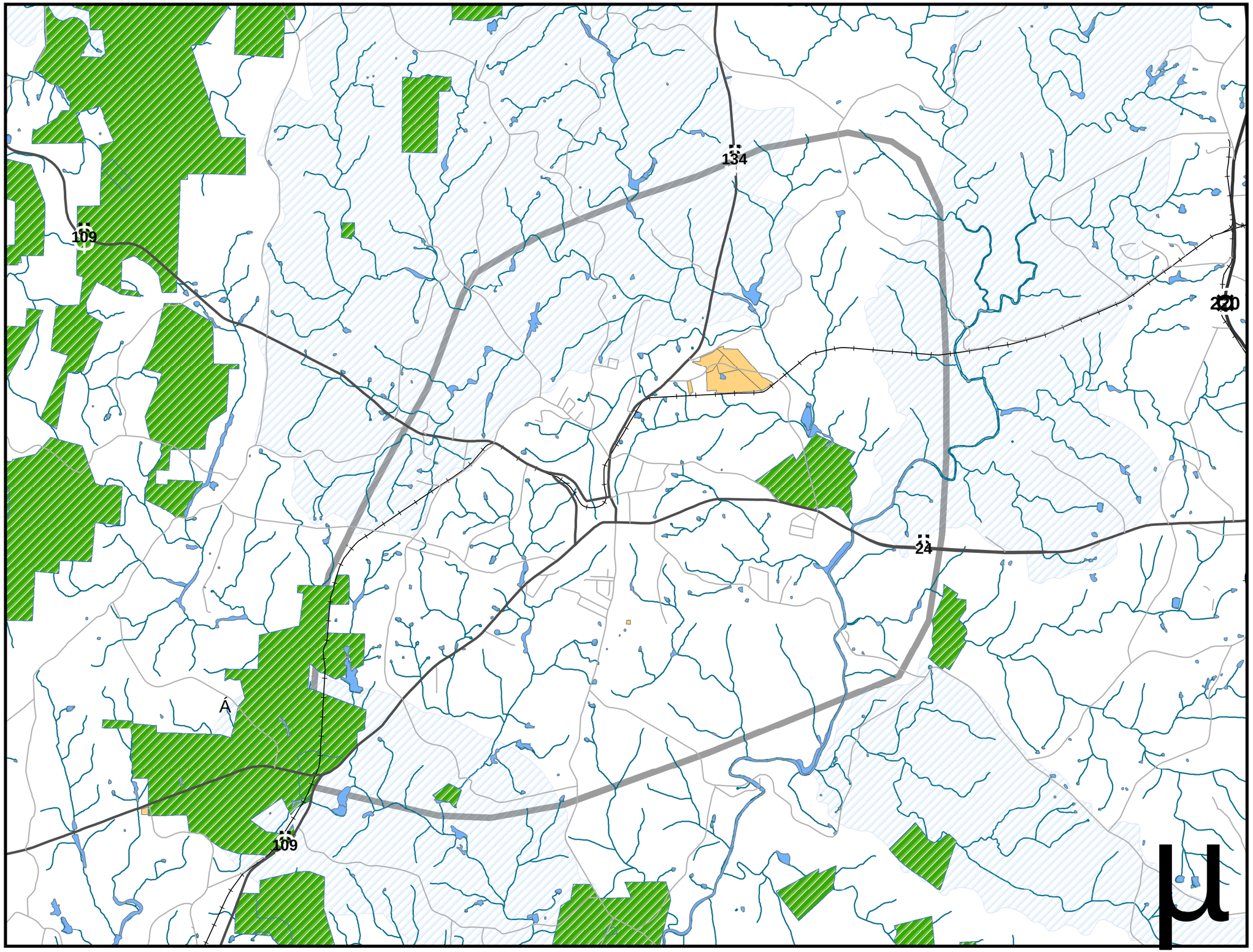
Design requirements for roadways vary according to the desired capacity and level-of-service. Recommended improvements and overall design of the Transportation Plan were based upon achieving a minimum LOS D on existing facilities and a LOS C on new facilities.

3.6 Environmental Screening

In recent years, the environmental considerations associated with transportation construction have come to the forefront of the planning process. Section 102 of the National Environmental Policy Act (NEPA) requires the completion of an Environmental Impact Statement (EIS) for projects that have a significant impact on the environment. The EIS includes impacts on wetlands, wildlife, water quality, historic properties, and public lands. While this report does not cover the environmental concerns in as much detail as an EIS would, consideration for many of these factors was incorporated into the development of the Comprehensive Transportation Plan. These factors were also incorporated into the recommended improvements. Environmental features found in the study area are shown in **Figure 7.**

Figure 7: Environmental Data

Town of Troy Comprehensive Transportation Plan



Legend

- SurfaceWaterIntakes

RoadsStateSystem

- Interstate
- US Highway
- NC Route
- SR Road
- Railroads
- Helicopter Pad
- HazardousSubstanceDisposalSites
- SolidWasteFacilities
- AnadromousFishSpawningAreas
- Hydro24k
- NationalWetlandInventory
- NationalWetlandInventory
- Gamelands
- HighQualityOutstandingResourceWatersDWQ
- HazardousSubstanceDisposalSites
- LandTrustConservationProperties
- StateOwnedComplexes
- FederalLandOwnership
- Hydro24k
- Planning Boundary
- County_Boundary

0 0.5 1 2

Miles

3.6.1 Wetlands

Wetlands are those lands where saturation with water is the dominant factor in determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface. Wetlands are crucial ecosystems in our environment. They help regulate and maintain the hydrology of our rivers, lakes, and streams by storing and slowly releasing floodwaters. Wetlands help maintain the quality of water by storing nutrients, reducing sediment loads, and reducing erosion. They are also critical to fish and wildlife populations by providing an important habitat for approximately one-third of the plant and animal species that are federally listed as threatened or endangered.
The National Wetland Inventory shows several wetlands throughout the study area. See **Figure 7** for more information.

3.6.2 Threatened and Endangered Species

The Threatened and Endangered Species Act of 1973 allows the U. S. Fish and Wildlife Service to impose measures on the Department of Transportation to mitigate the environmental impacts of a transportation project on endangered animal and plant species, as well as critical wildlife habitats. Locating any rare species that exist within the study area during this early planning stage will help to avoid or minimize impacts.

A preliminary review of the Federally Listed Threatened and Endangered Species in the town study area was completed to determine what effects, if any, the recommended improvements may have on wildlife. Mapping from the N.C. Department of Environment and Natural Resources revealed occurrences of threatened or endangered plant and/or animal species in the study area, which are summarized in **Figure 8**. These species are not impacted by any recommendations found in the Comprehensive Transportation Plan.

Figure 8 Threatened or Endangered Species				
Species	**Common Name**	**Major Group**	**Status***	
			NC	**Federal**
Alasmidonta undulata	Triangle Floater	Mollusk	T	-
Helianthus schweinitzii	Schweinitz's Sunflower	Vascular Plants	E	E
Lampsilis cariosa	Yellow Lampmussel	Mollusk	E	FSC
Lampsilis radiata consipicua	Carolina Fatmucket	Mollusk	T	-
Strophitus undulatus	Creeper	Mollusk	T	
Toxolasma Pullus	Savannah Lilliput	Mollusk	E	FSC
Villosa Constricta	Notched Rainbow	Mollusk	SC	
Villosa vaughaniana	Carolina Creekshell	Mollusk	E	FSC

Figure 8: Threatened or Endangered Species

* See appendix E for definitions and further information.

3.6.3 Historic Sites

Section 106 of the National Historic Preservation Act requires the Department of Transportation to identify historic properties listed in, as well as eligible for, the National Register of Historic Places (NRHP). The NCDOT must consider the impacts of transportation projects on these properties and consult with the Federal Advisory Council on Historic Preservation. N.C. General Statute 121-12(a) requires the NCDOT to identify historic properties listed on the National Register, but not necessarily those that are eligible to be listed. The NCDOT must consider the impacts and consult with the N.C. Historical Commission, but is not bound by their recommendations.

The location of historic sites within the study area was investigated to determine any possible impacts resulting from the recommended improvements. The only historic site in the study area was the Montgomery County Courthouse, located in downtown Troy. No recommendations in the Town of Troy Comprehensive Plan impact this historic site.

3.6.4 Archaeological Sites

The location of recorded archaeological sites was researched to determine the possible impacts of proposed roadway projects. This initial investigation identified no current archaeological sites.

However, archaeological sites are often difficult to identify without actual field excavation. As a result, possible sites may not be identified during the initial planning process; therefore, each proposed project should be evaluated individually prior to construction.

3.6.5 Educational Facilities

The location of educational facilities in the planning area was considered during the development of the transportation plan. No proposed facilities or improvements shall displace any school or other educational facility.

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4. Public Involvement

4.1 Overview

Since the passage of the Federal Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), the emphasis on public involvement in transportation has taken on a new role. Although public participation has been an element of long range transportation planning in the past, these regulations call for a much more proactive approach. The NCDOT's Transportation Planning Branch has a long history of making public involvement a key element in the development of any long-range transportation plan, no matter the size of the area. This chapter is designed to provide an overview of the public involvement elements implemented into the development of the transportation plan for the town.

4.2 Study Initiation

The Town of Troy CTP study was requested on January 2, 2003 by a letter from the town's Planning Director. The Transportation Planning Branch met with the Town Manager on May 28, 2003 to identify the primary transportation concerns and to define the scope of the study.

4.3 Public Hearings

November 21, 2005

A public hearing was held in the town hall during a regularly scheduled meeting of the commissioners. The town sent out notice of public hearing for the CTP through their standard procedures, which included posted flyers and newspaper listings. At this meeting, the CTP plan was presented to the town commissioners who had a few concerns, mainly about the NC 24/27 Bypass, and they asked for more time to consider the plan documents.

The commissioners adopted the Town of Troy CTP plan by a vote of 5-0 at the December 19, 2005 meeting.

The Piedmont Triad RPO endorsed the plan on December 21, 2005 at their regularly scheduled meeting.

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5. Conclusion

The Town of Troy is a growing community that will require improvements to their transportation systems over the next thirty years. It is the responsibility of the town to take the initiative for the implementation of the Comprehensive Transportation Plan. It is imperative that the local area aggressively pursues funding for desired projects. Questions regarding funding, projects, planning, and modes of transportation should be addressed to the appropriate branch within NCDOT. **Appendix A** includes contact information for these branches. If changes are required for any element of the Comprehensive Transportation Plan, then all other elements must be reviewed for resulting impacts.

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Appendix A: DOT Contacts

Customer Service Office

1-877-DOT4YOU
(1-877-368-4968)

Secretary of Transportation

1501 Mail Service Center
Raleigh, NC 27699-1501
(919) 733-2520

Board of Transportation Member

Contact Information for the current Board of Transportation member may be accessed from the NCDOT homepage on the Internet at:
http://www.ncdot.org/board/ or by calling 1-800-DOT4YOU.

Highway Division 8

Division Engineer
Contact the Division Engineer with general questions concerning NCDOT activities within Division 8.

902 N Sandhills Blvd.
PO Box 1067
Aberdeen, NC 28315
(910) 944-2344

Division Construction Engineer
Contact the Division Construction Engineer for information concerning major roadway improvements under construction.

902 N Sandhills Blvd.
PO Box 1067
Aberdeen, NC 28315
(910) 944-2344

Division Traffic Engineer
Contact the Division Traffic Engineer for information concerning high-collision locations.

902 N Sandhills Blvd.
PO Box 1067
Aberdeen, NC 28315
(910) 944-2344

District Engineer
Contact the District Engineer for information regarding Driveway Permits, Right of Way Encroachments, and Development Reviews.

219 Clemmer Road
Rockingham, NC 28379
(910) 582-7075

County Maintenance Engineer
Contact the County Maintenance Engineer with any maintenance activities, such as drainage, repaving, dead animals, or roadway conditions.

304 Glen Road
PO Box 11
Troy, NC 27371
(910) 576-3667

NCDOT Centralized Personnel

Transportation Planning Branch
Contact the Transportation Planning Branch with long-range planning questions.

1554 Mail Service Center
Raleigh, NC 27699-1554
(919) 733-4705

Secondary Roads Office
Contact the Secondary Roads office for information regarding the Industrial Access Funds Program, information about paving priorities, or how to get a road added to the state maintained system.

1535 Mail Service Center
Raleigh, NC 27699-1535
(919) 733-3520

Program Development Branch
Contact the Program Development Branch for information about current TIP projects, or the current Roadway Official Corridor Maps.

1534 Mail Service Center
Raleigh, NC 27699-1534
(919) 733-2039

Geographic Information Systems Unit (GIS)
Contact GIS to order County Road maps and for other available maps. Online ordering available at: http://www.ncdot.org/it/gis/

New Hope Center
4101 Capital Blvd.
Raleigh, NC 27604
(919) 707-2152

Appendix B: Comprehensive Transportation Plan Category Definitions

Definitions for Categories

Highway Map

Freeways

- Functional purpose – high mobility, high volume, high speed
- Posted speed – 55 mph or greater
- Cross section – minimum four lanes with continuous median
- Multi-modal elements – High Occupancy Vehicles/High Occupancy Transit lanes, busways, truck lanes, park-and-ride facilities at/near interchanges, adjacent shared use paths (separate from roadway and outside ROW)
- Type of access control – full control of access
- Access management – interchange spacing (urban – one mile; non-urban – three miles); at interchanges on the intersecting roadway , full control of access for 1,000 feet or for 350 feet plus 650 feet island or median; use of frontage roads, rear service roads
- Intersecting facilities – interchange or grade separation (no signals or at-grade intersections)
- Driveways – not allowed

Expressways

- Functional purpose – high mobility, high volume, medium-high speed
- Posted speed – 45 to 60 mph
- Cross section – minimum four lanes with median
- Multi-modal elements – High Occupancy Vehicle lanes, busways, very wide paved shoulders (rural), shared use paths (separate from roadway but within ROW)
- Type of access control –limited or partial control of access
- Access management – minimum interchange/intersection spacing 2,000 feet; median breaks only at intersections with minor roadways or to permit U-turns; use of frontage roads, rear service roads; driveways limited in location and number; use of acceleration/deceleration or right turning lanes
- Intersecting facilities – interchange; at-grade intersection for minor roadways; right-in/right-out and/or left-over or grade separation (no signalization for through traffic)
- Driveways – right-in/right-out only; direct driveway access via service roads or other alternate connections

Boulevards

- Functional purpose – moderate mobility; moderate access, moderate volume, medium speed
- Posted speed – 30 to 55 mph
- Cross section – two or more lanes with median (median breaks allowed for U-turns per *Driveway Manual*)
- Multi-modal elements – bus stops, bike lanes (urban) or wide paved shoulders (rural), sidewalks (urban - local government option)
- Type of access control – limited control of access, partial control of access, or no control of access
- Access management – two-lane facilities may have medians with crossovers, medians with turning pockets or turning lanes; use of acceleration/deceleration or right turning lanes is optional; for abutting properties, use of shared driveways, internal out parcel access and cross-connectivity between adjacent properties is strongly encouraged
- Intersecting facilities – at grade intersections and driveways; interchanges at special locations with high volumes
- Driveways – primarily right-in/right-out, some right-in/right-out in combination with median leftovers; major driveways may be full movement when access is not possible using an alternate roadway

Other Major Thoroughfares

- Functional purpose – balanced mobility and access, moderate volume, low to medium speed
- Posted speed – 25 to 55 mph
- Cross section – four or more lanes without median
- Multi-modal elements – bus stops, bike lanes/wide outer lane (urban) or wide paved shoulder (rural), sidewalks (urban)
- Type of access control – no control of access
- Access management – continuous left turn lanes; for abutting properties, use of shared driveways, internal out parcel access and cross-connectivity between adjacent properties is strongly encouraged
- Intersecting facilities – intersections and driveways
- Driveways – full movement on two lane with center turn lane sections (as permitted by the *Driveway Manual*)

Minor Thoroughfares

- Functional purpose – balanced mobility and access, moderate volume, low to medium speed
- Posted speed – 25 to 45 mph
- Cross section – ultimately three lanes (no more than one lane per direction) or less without median
- Multi-modal elements – bus stops, bike lanes/wide outer lane (urban) or wide paved shoulder (rural), sidewalks (urban)
- ROW – no control of access
- Access management – continuous left turn lanes; for abutting properties, use of shared driveways, internal out parcel access and cross-connectivity between adjacent properties is strongly encouraged
- Intersecting facilities – intersections and driveways
- Driveways – full movement on two lane with center turn lane as permitted by the *Driveway Manual*

Definitions

- Existing – Roadway facilities that are not recommended to be improved.
- Needs Improvement – Roadway facilities that need to be improved for capacity, safety, or system continuity. The improvement to the facility may be widening, other operational strategies, increasing the level of access control along the facility, or a combination of improvements and strategies. "**Needs improvement" does not refer to the maintenance needs of existing facilities.**
- Recommended – Roadway facilities on new location that are needed in the future.
- Interchange – Through movement on intersecting roads is separated by a structure. Turning movement area accommodated by on/off ramps and loops.
- Grade Separation – Through movement on intersecting roads is separated by a structure. There is no direct access between the facilities.
- Full Control of Access – Connections to a facility provided only via ramps at interchanges. No private driveway connections allowed.
- Limited Control of Access – Connections to a facility provided only via ramps at interchanges (major crossings) and at-grade intersections (minor crossings and service roads). No private driveway connections allowed.
- Partial Control of Access – Connections to a facility provided via ramps at interchanges, at-grade intersections, and private driveways. Private driveway connections shall be defined as a maximum of one connection per parcel. One connection is defined as one ingress and one egress point. These may be combined to form a two-way driveway (most common) or separated to allow for better traffic flow through the parcel. The use of shared or consolidated connections is highly encouraged.

- No Control of Access – Connections to a facility provided via ramps at interchanges, at-grade intersections, and private driveways.

Public Transportation and Rail Map

- Bus Routes – The primary fixed route bus system for the area. Does not include demand response systems.
- Fixed Guideway – Any transit service that uses exclusive or controlled rights-of-way or rails, entirely or in part. The term includes heavy rail, commuter rail, light rail, monorail, trolleybus, aerial tramway, also includes plane, cable car, automated guideway transit, and ferryboats.
- Operational Strategies – Plans geared toward the non-single occupant vehicle. This includes but is not limited to High Occupancy Vehicle (HOV) lanes or express bus service.
- Rail Corridor – Locations of railroad tracks that are either active or inactive tracks. These tracks were used for either freight or passenger service.
  - Active – rail service is currently provided in the corridor; may include freight and/or passenger service.
  - Inactive – right-of-way exists; however, there is no service currently provided; tracks may or may not exist.
- Recommended – It is desirable for future rail to be considered to serve an area.
- High Speed Rail Corridor – Corridor designated by the U.S. Department of Transportation as a potential high-speed rail corridor.
  - Existing – Corridor where high-speed rail service is provided (there are currently no existing high-speed corridors in North Carolina).
  - Recommended – Proposed corridor for high-speed rail service.
- Rail Stop – A railroad station or stop along the railroad tracks.
- Intermodal Connector – A location where more than one mode of public transportation meets such as where light rail and a bus route come together in one location or a bus station.
- Park and Ride Lot – A strategically located parking lot that is free of charge to anyone who parks a vehicle and commutes by transit or in a carpool.

Bicycle Map

On-Road

- Existing – Conditions for bicycling on the highway facility are adequate to safely accommodate cyclists.
- Needs Improvement – At the systems level, it is desirable for the highway facility to accommodate bicycle transportation; however, highway improvements are necessary to create safe travel conditions for the cyclists.
- Recommended – At the systems level, it is desirable for a recommended highway facility to accommodate bicycle transportation. The highway should be designed and built to safely accommodate cyclists.

Off-Road

- Existing – A facility that accommodates bicycle transportation (may also accommodate pedestrians, i.e. a greenway) and is physically separated from a highway facility usually on a separate right-of-way.
- Needs Improvement – A facility that accommodates bicycle transportation (may also accommodate pedestrians, e.g. greenways) and is physically separated from a highway facility usually on a separate right-of-way that will not adequately serve future bicycle needs. Improvements may include but are not limited to widening, paving (not re-paving), and improved horizontal or vertical alignment.
- Recommended – A facility needed to accommodate bicycle transportation (may also accommodate pedestrians, e.g. greenways) and is physically separated from a highway facility usually on a separate right-of-way. This may also include greenway segments that do not necessarily serve a transportation function but intersect recommended facilities on the highway map or public transportation and rail map.

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Appendix C: Road Inventory

Appendix C: Road Inventory

		2003 CONDITIONS					2030 CONDITIONS					
				NUMBER	CURRENT	2003			NUMBER	PROPOSED	2030	Rec.
FACILITY & SECTION	DIST	RDWY	ROW	OF	CAPACITY	AADT	RDWY	ROW	OF	CAPACITY	AADT	Cross
	MI	FT	FT	LANES	(VPD)	(VPD)	FT	FT	LANES	(VPD)	(VPD)	Section
NC 24/27 Bypass (New Routing)												
Western Planning Boundary(WPB) to NC 109	0.13	24	130	2	13900	5600	48		4	29400	11600	A*
NC 109 to SR 1138 (Dairy Rd)	1.12	22	100	2	12600	10000	48		4	29400	22000	A*
SR 1138 (Dairy Rd.) to SR 1613	0.53	22	100	2	12600	10000	48		4	29400	22100	A*
SR 1613 to NC 24/27 Business	0.39	N/A					48		4	29400	22100	A*
NC 24/27 Bus. to SR 1005 (Pekin Rd.)	1.25	N/A					48		4	29400	17400	A*
SR 1005(Pekin Rd.) to SR 1554 (Troy-Candor Rd.)	1.33	N/A					48		4	29400	11700	A*
SR 1554 (Troy-Candor Rd.) to NC 24/27 Bus.	1.41	N/A					48		4	29400	12100	A*
NC 24/27 Bus. to Little River Bridge	0.57	48	60	4	29400	8000	48		4	29400	23900	A*
Little River Bridge to Eastern Planning Boundary	1.10	48	60	4	29400	8000	48		4	29400	23800	A*
							*Designed as a Superstreet					
NC 24/27 (Existing)												
NC 24/27 Bypass to SR 1615(Dogwood Ave)	0.14	N/A					24	60	2	13900	6300	I
SR 1615(Dogwood Ave.) to NC 109 (Bilhen St.)	1.06	44	100	3	15000	12900	44	100	3	15000	11200	H
NC 109 (Bilhen St.) to Elm St.	0.27	44	100	3	15000	12900	44	100	3	15000	10200	H
Elm St. to NC 109 Business(N.Main St.)	0.20	40	60	3	15000	14600	40	60	3	15000	9400	H
NC 109 Business to SR 1554 (Troy-Candor Rd.)	0.39	44	60	3	15000	14600	44	60	3	15000	11400	H
SR 1554 (Troy-Candor Rd.) to SR 1332 (Page St.)	1.01	24	60	2	13900	10700	24	60	2	13900	7400	K
SR 1332 (Page St.) to NC 24/27	0.15	N/A					24	60	2	13900	11200	K
NC 109												
WPB to NC 24/27	0.15	24	60	2	13900	5300	24	60	2	13900	10600	K
NC 24/27 to NC 24/27	2.04	Common with NC 24/27 Bypass										
NC 24/27 Bypass to Bilhen St.	1.20	Common with NC 24/27										
NC 24/27 to NC 109 Bus.	0.82	20	60	2	11400	3700	24	60	2	13900	3300	K
NC 109 Bus. To Northern City Limits(NCL) of Troy	0.72	20	60	2	11400	3400	24	60	2	13900	5500	K
Troy NCL to WPB	0.85	20	60	2	11400	2600	24	60	2	13900	5100	K
NC 134												
NC 109 Business to SR 1332 (Page St.)	0.39	46	65	2	13900	9200	46	65	2	13900	13700	ADQ
SR 1332 tp Pavement Change	0.32	34	60	2	13900	6700	34	60	2	13900	10000	ADQ
Pavement Change to Troy NCL	0.65	24	65	2	13900	4700	24	65	2	13900	6800	ADQ
Troy NCL to Northern Planning Boundary (NPB)	2.41	24	100	2	13900	3000	24	100	2	13900	6300	ADQ
NC 109 Business												
NC 109 to NC 24/27		Common with NC 24/27										
NC 24/27 to NC 134	0.28	36	40	2	13900	10800	36	40	2	13900	14100	ADQ
NC 134 to NC 109	0.73	26	40	2	13900	2300	26	40	2	13900	4400	ADQ
SR 1005 (S.Main St.)												
NC 24 to Rush Ave.	0.14	42	65	2	13900		42	65	2	13900	9500	ADQ
Ruse Ave. to SCL of Troy	0.36	34	65	2	13900	800	34	65	2	13900	9600	ADQ
SR 1005 (Pekin Rd.)												
SCL of Troy to SR 1598 (Horne Rd.)	0.79	34	60	2	13900	800	34	60	2	13900	8800	K
SR 1598 (Horne Rd.) to NC 24/27 Bypass	0.48	18	60	2	10200	800	24	60	2	13900	8800	K
NC 24/27 Bypass to SPB	1.59	18	60	2	10200	800	24	60	2	13900	3000	K
SR 1138 (Shiloh Road)												
SR 1310 (Lovejoy Rd.) to NC 109	1.29	20	60	2	11600		24	60	2	13900	3300	K
SR 1138 (Dairy Rd.)												
NC 109 to SR 1139	1.30	20	60	2	11600	2700	22	60	2	11600	1500	K
SR 1139 to NC 24	1.73	20	60	2	11600	2700	22	60	2	11600	1300	K

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FACILITY & SECTION	DIST	RDWY	ROW	OF	CAPACITY	AADT	RDWY	ROW	OF	CAPACITY	AADT	Cross
	MI	FT	FT	LANES	(VPD)	(VPD)	FT	FT	LANES	(VPD)	(VPD)	Section
SR 1139 (Vestal Rd.)												
WPB to SR 1138 (Dairy Rd.)	0.61	20	60	2	11600	3400	22	60	2	11600	1300	K
SR 1139 (Warner Rd.)												
SR 1138(Dairy Rd.) to SR 1140 (Poole Rd.)	0.57	20	60	2	11600		22	60	2	11600	1500	K
SR 1140 to Troy WCL	0.75	22	60	2	12600		22	60	2	12600	1900	K
Troy WCL to NC 24	0.25	22	60	2	12600		24	60	2	12600	2000	K
SR 1140 (Poole Rd.)												
NC 109 to Troy NCL	0.07	20	60	2	11600	780	20	60	2	11600	500	ADQ
Troy NCL to SR 1139 (Warner Rd.)	1.28	20	60	2	11600		20	60	2	11600	100	ADQ
SR 1141 Lemonds-Drywall Rd.)												
SR 1138 (Dairy Rd.) to NC 109	0.30	22	70	2	12600	420	22	60	2	12600	600	ADQ
SR 1310 (Lovejoy Rd.)												
NC 134 to Pavement Change	0.09	26	55	2	13900	1400	26	55	2	13900	4400	ADQ
Pavement Change to SR 1138(Shiloh Rd.)	0.25	18	65	2	10200	1400	18	65	2	13900	4400	ADQ
SR 1138 (Shiloh Rd.) to Troy NCL	0.30	18	60	2	10200	1100	18	60	2	11600	1200	ADQ
Troy NCL to Northern Planning Boundary	2.10	20	60	2	11600	350	20	610	2	11600	1000	ADQ
SR 1317 (Beamon Rd.)												
	0.22	20	60	2	11600	70	20	60	2	13900	2500	ADQ
SR 1318 (Shiloh Rd.) to NPB												
SR 1318 (Shiloh Ch. Rd.)												
SR 1138(Shiloh Rd) to SR 1317	1.27	20	60	2	11600	400	20	60	2	13900	2500	ADQ
SR 1323 (Troy-Okeewemee Rd.)												
NC 134 to SR 1340 (Okeewemee Rd.)	2.79	18	60	2	10200	750	18	60	2	11600	850	ADQ
SR 1324 (Glenn Rd.)												
NC 134 to Troy ECL	0.42	20	60	2	11600	1500	24	60	2	13900	2700	K
Troy ECL to Pavement Change	0.30	20	60	2	11600	700	24	60	2	13900	2900	K
Pavement Change to NC 24/27	1.90	22	60	2	12600	1200	24	60	2	13900	2600	K
SR 1332 (Page St.)												
NC 134 to SR 1383 (Wood St.)	0.37	24	40	2	13900	2600	24	60	2	13900	4400	K
SR 1383 (Wood St.) to SR 1333 (Bruton St.)	0.27	22	60	2	12600	2600	24	60	2	13900	3500	K
SR 1333(Bruton St.) to New Pavement	0.10	22	60	2	12600	3300	24	60	2	13900	3700	K
New Pavement to End of Widening	0.85	36	60	3	13900	3300	36	60	3	15000	3700	ADQ
End of Widening to NC 24	0.28	22	60	2	12600	3300	24	60	2	13900	4600	K
SR 1333 (Bruton St.)												
SR 1332 (Page St.) tp ECL Troy	0.03	22	60	2	12600	750	22	60	2	12600	900	ADQ
ECL Troy to New Pavement	0.46	22	60	2	12600	750	22	60	2	12600	900	ADQ
New Pavement to NC 109 Bus.	0.30	26	40	2	13900	600	26	40	2	13900	1300	ADQ
SR 1340(Okeewemee Rd.)												
Northern Planning Boundary	0.51	18	60	2	10200	250	18	60	2	10200	400	ADQ
to SR 1323 (Troy-Okeewemee Rd.)												
SR 1340 (Okeewemee-Star Rd.)												
SR 1323 (Troy-Okeewemee Rd.) to EPB	1.27	18	60	2	10200	290	18	60	2	10200	300	ADQ

Appendix C: Road Inventory

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FACILITY & SECTION	DIST	RDWY	ROW	OF	CAPACITY	AADT	RDWY	ROW	OF	CAPACITY	AADT	Cross
	MI	FT	FT	LANES	(VPD)	(VPD)	FT	FT	LANES	(VPD)	(VPD)	Section
SR 1384 (Wood St.)												
SR 1333 (Bruton St.) to Broughton St.	0.16	36	40	2	13900		36	40	2	13900	1100	ADQ
Broughton St. to SR 1332 (Page St.)	0.15	26	40	2	13900	1400	26	40	2	13900	2900	ADQ
SR 1403 (Russell St.)												
SR 1333 (Bruton St.) to Blair St.	0.13	36	50	3	13900		36	50	3	13900	1200	ADQ
Blair St. to NC 24/27	0.18	24	50	2	13900	2200	24	50	2	13900	1700	ADQ
SR 1519 (Capelsie Rd.)												
SPB to SR 1005 (Pekin Rd.)	1.33	18	60	2	10200	400	18	60	2	10200	450	ADQ
SR 1550 (Saunders Rd.)												
NC 24/27 to Pavement Type Change	1.00	20	60	2	11600	130	20	60	2	11600	250	ADQ
Pavement Type Change to SR 1005 (Pekin Rd.)	1.40	20	60	2	11600		20	60	2	11600	250	ADQ
SR 1554 (Taft St.)												
NC 24/27 to Troy ECL	0.32	40	60	2	13900	2200	40	60	2	13900	3700	ADQ
SR 1554 (Troy-Candor Rd.)												
Troy ECL to Eastern Planning Boundary	2.07	22	60	2	12600	1200	24	60	2	13900	4500	K

Appendix D.
Typical Transportation Cross Sections

Cross section requirements for roadways vary according to the capacity and level of service to be provided. Universal standards in the design of roadways are not practical. Each roadway section must be individually analyzed and its cross section determined based on the volume and type of projected traffic, existing capacity, desired level of service, and available right-of-way. Certain cross sections are typical for facilities on new location 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.

On all existing and proposed roadways delineated on the comprehensive transportation plan, adequate right-of-way should be protected or acquired for the recommended cross sections. In addition to cross section and right-of-way recommendations for improvements, **Appendix D** may recommend ultimate needed right-of-way for the following situations:

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

Recommended design standards relating to grades, sight distances, degree of curve, superelevation, and other considerations for roadways are given in **Appendix C**. The typical cross sections are described below and are shown on **pages 59 through 66.**

A: Four Lanes Divided with Median

Cross section "A" is recommended for freeways/expressways in rural areas. The minimum median width for this cross section is 46 feet, but a wider median is desirable. This cross section could apply to freeways or expressways.

B: Seven Lanes - Curb & Gutter

Cross section "B" is typically 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 when widening from a five-lane section where 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. This cross section applies to other major thoroughfares.

C: Five Lanes - Curb & Gutter
Typical for other major thoroughfares, cross section "C" 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 and Gutter
Cross sections "D" and "E" are typically used on expressways/boulevards where left turns and intersecting streets are not as frequent. Left turns would be restricted to a few selected intersections. The 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 certain cases, grass or landscaped medians result in greatly increased maintenance costs and an increase danger to maintenance personnel. Non-monolithic medians should only be recommended when the above concerns are addressed.

F: Four Lanes Divided – Grass Median
Cross section "F" is typically recommended for expressways/boulevards to enhance the urban environment and to improve the compatibility of expressways/boulevards with residential areas. A minimum median width of 24 ft is recommended, with 30 ft being desirable.

G: Four Lanes - Curb and Gutter
Cross section "G" is recommended for other 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 likely be required at major intersections. This cross section should be used only if the above criteria are 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 and Gutter
In urban environments, minor thoroughfares that are proposed to function as one-way traffic carriers would typically require cross section “H”.

I: Two Lanes – Curb and Gutter, Parking both sides
J: Two Lanes – Curb and Gutter, Parking one side
Cross section “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

Cross section "K" is used in rural areas or for staged construction of a wider multilane cross section. On some minor thoroughfares or US/NC routes, 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 that will require future widening, the full right-of-way of 100 ft should be required. In some instances, local ordinances may not allow the full 100 ft. In those cases, 70 ft should be preserved with the understanding that the full 70 ft will be preserved by use of building setbacks and future street line ordinances.

L: Six Lanes Divided with Grass Median

Cross section “L” is typical for controlled access freeways/expressways. The 46-ft grass median is the minimum desirable width, but variation from this may be permissible depending upon design considerations. Right-of-way requirements are typically 228 ft or greater, depending upon cut and fill requirements.

M: Eight Lanes Divided with Raised Median - Curb and Gutter

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

Bicycle Cross Sections

Cross sections B-1, B-2, B-3, B-4, and B-5 are typical bicycle cross sections. Contact the NCDOT Division of Bicycle and Pedestrian Transportation for more information regarding these cross sections.

B-1: Four Lanes Divided with Wide Outside Lanes
B-2: Five Lanes with Wide Outside Lanes

A widened outside lane is an effective way to accommodate bicyclists riding in the same lane with motor vehicles. With a wide outside lane, motorists do not have to change lanes to pass a bicyclist. The additional width in the outside lane also improves sight distance and provides more room for vehicles to turn onto the roadway. Therefore, on roadways with bicycle traffic, widening the outside lane can improve the capacity of that roadway. Also, by widening the outside lane by a few extra feet both motorists and bicyclists have more space in which to maneuver. This facility type is generally considered for use in urban, suburban, and occasionally rural conditions on roadways where there is a curb and gutter. Wide outside lanes can be applied to several different roadway cross sections.

B-3: Bicycle Lanes on Collector Streets

Bicycle lanes may be considered when it is desirable to delineate road space for preferential use by cyclists. Streets striped with bicycle lanes should be part of a

connected bikeway system rather than being an isolated feature. Bicycle lanes function most effectively in mid-block situations by separating bicyclists from overtaking motor vehicles. Integrating bicyclists into complicated intersection traffic patterns can sometimes be problematic. Strip development areas, or roadways with a high number of commercial driveways, tend to be less suitable for bicycle lanes due to frequent and unpredictable motorist turning movements across the path of straight-through cyclists. Striped bike lanes can be effective as a safety treatment, especially for less-experienced bicyclists. Two-lane residential/collector streets with lower traffic volume, low-posted speed limit, adequate roadway width for both bike lanes and motor vehicle travel lanes, and an absence of complicated intersections. A median-divided multi-lane roadway with lower traffic volumes and a low volume of right and left turning traffic would be a more appropriate location for bicycle lanes than a high traffic volume undivided multi-lane roadway with a continuous center turn lane. Most bicyclists will choose a route that combines direct access with lower traffic volumes. An origin and destination of less than 4 miles is desirable to generate usage on a facility.

B-4: Wide Paved Shoulders

On urban streets with curb and gutter, wide outside lanes and bicycle lanes are usually the preferred facilities. Shoulders for bicycle use are not typically provided on roadways with curb and gutter. On rural roadways where bicycle travel is common, such as roads in coastal resort areas, wide paved shoulders are highly desirable. On secondary roadways without curb and gutter where there are few commercial driveways and intersections with other roadways, many bicyclists prefer riding on wide, smoothly paved shoulders.

B-5: Multi-use Pathway

When properly located, multi-use pathway can be a safer type of facility for novice and child bicyclists because they do not have to share the path with motor vehicles. The design standards used for this cross section provides adequate width for two-directional use by both cyclists and pedestrians, provisions of good sight distance, avoidance of steep grades and tight curves, and minimal cross-flow by motor vehicles. A multi-use pathway can serve a variety of purposes, including recreation and transportation. This pathway should not be located immediately adjacent to a roadway because of safety considerations at intersections with driveways and roads. Sidewalks should never be used as a multi-use pathway.

General

The urban curb and gutter cross sections all illustrate the sidewalk adjacent to the curb with a buffer such as a utility strip or landscaping between the sidewalk and the minimum right-of-way line. This permits adequate setbacks for the safety of the pedestrians while providing locations for utilities. If it is desired to move the sidewalk 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 setbacks for the pedestrian's safety was accomplished while providing locations for utilities.

The right-of-way shown for each typical cross section is the minimum amount required containing the street, sidewalks, utilities, and drainage facilities. Cut and fill requirements may require either additional right-of-way or construction easements. Obtaining construction easements is becoming the more common practice for urban transportation construction.

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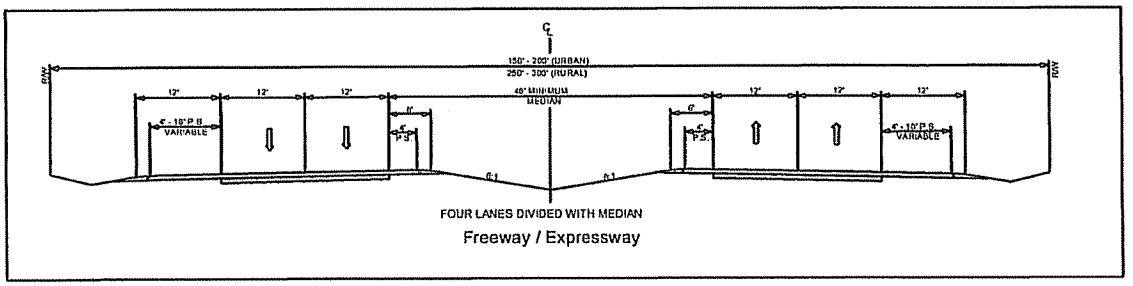
Appendix D

TYPICAL HIGHWAY CROSS SECTIONS

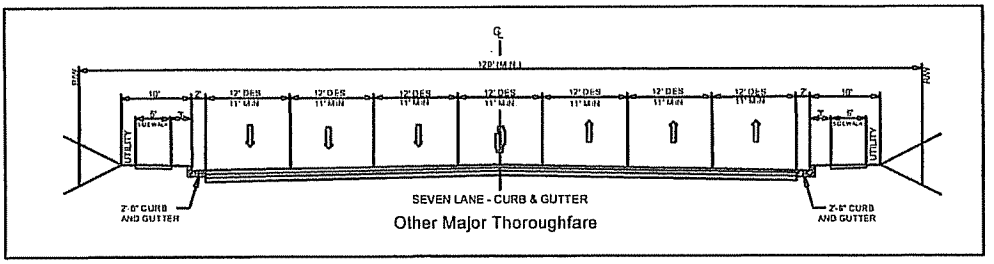
A



FOUR LANES DIVIDED WITH MEDIAN

Freeway / Expressway

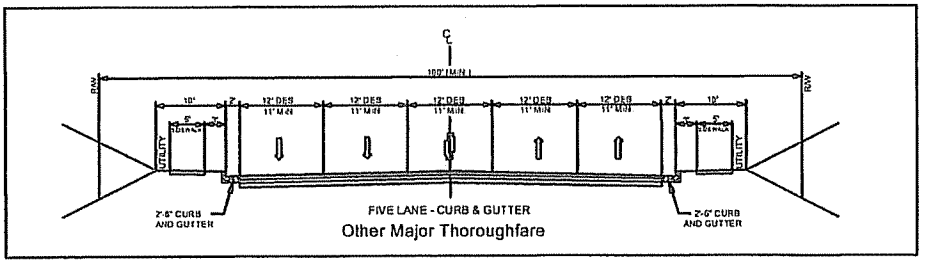
B



SEVEN LANE - CURB & GUTTER

Other Major Thoroughfare

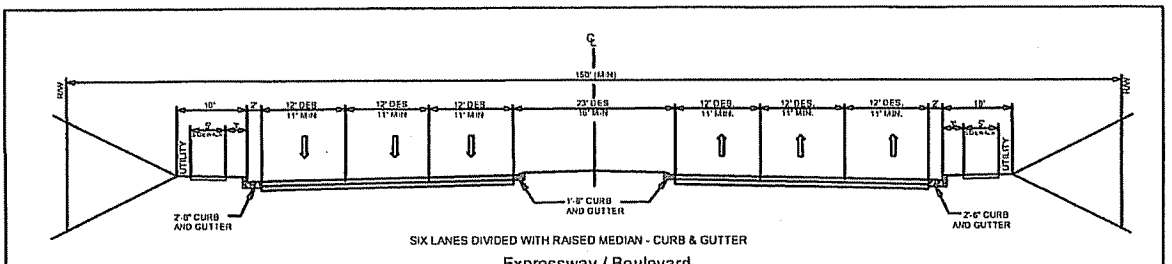
C



FIVE LANE - CURB & GUTTER

Other Major Thoroughfare

D



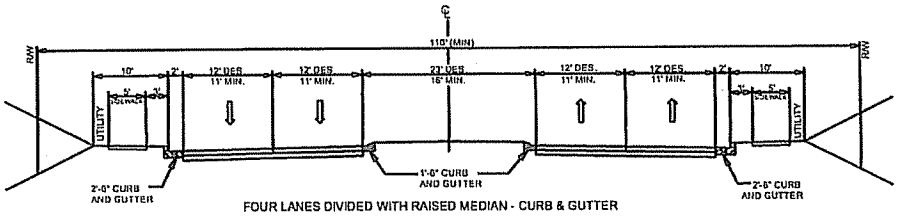
SIX LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER

Expressway / Boulevard

revised 04-01-05

TYPICAL HIGHWAY CROSS SECTIONS

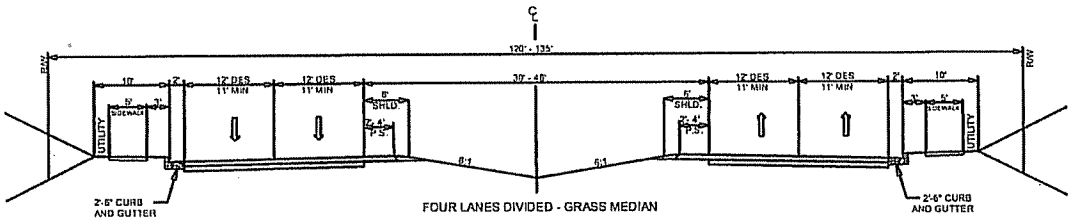
E



FOUR LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER

Expressway / Boulevard

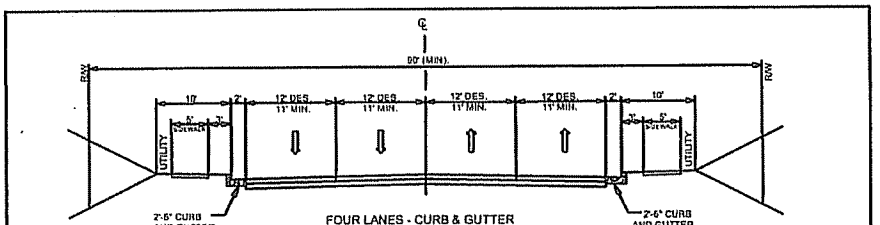
F



FOUR LANES DIVIDED - GRASS MEDIAN

Expressway / Boulevard

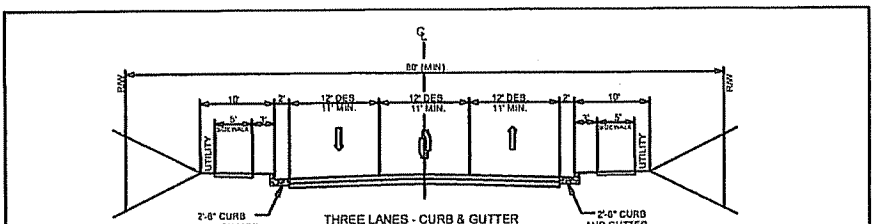
G



FOUR LANES - CURB & GUTTER

Other Major Thoroughfare

H

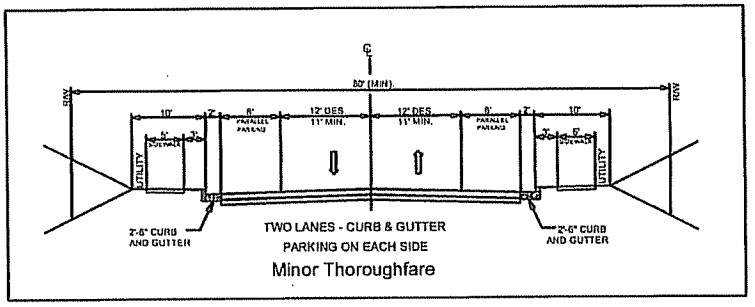


THREE LANES - CURB & GUTTER

Other Major Thoroughfare

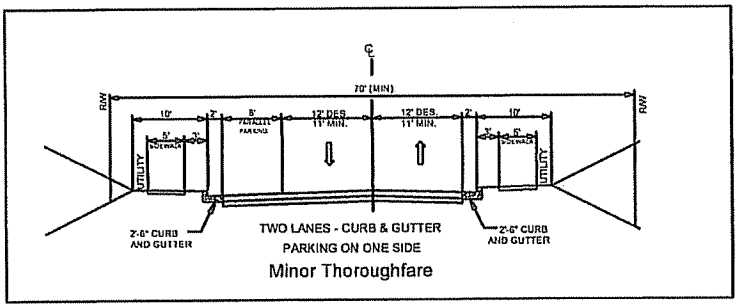
TYPICAL HIGHWAY CROSS SECTIONS

I



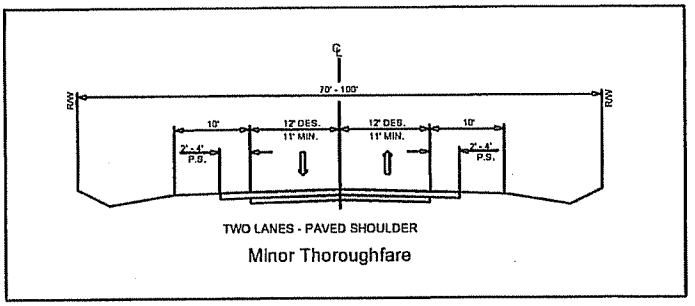
Minor Thoroughfare

J



Minor Thoroughfare

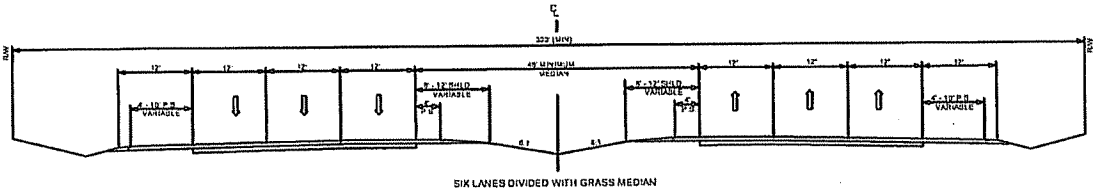
K



Minor Thoroughfare

TYPICAL HIGHWAY CROSS SECTIONS

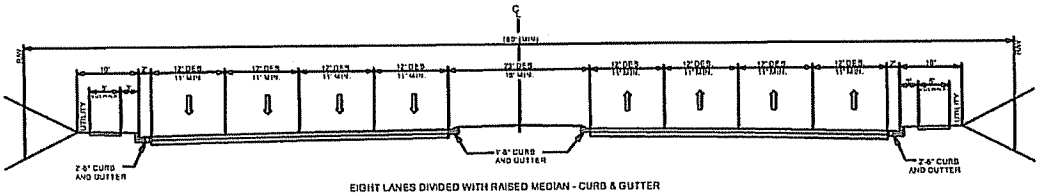
L



SIX LANES DIVIDED WITH GRASS MEDIAN

Freeway / Expressway

M



EIGHT LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER

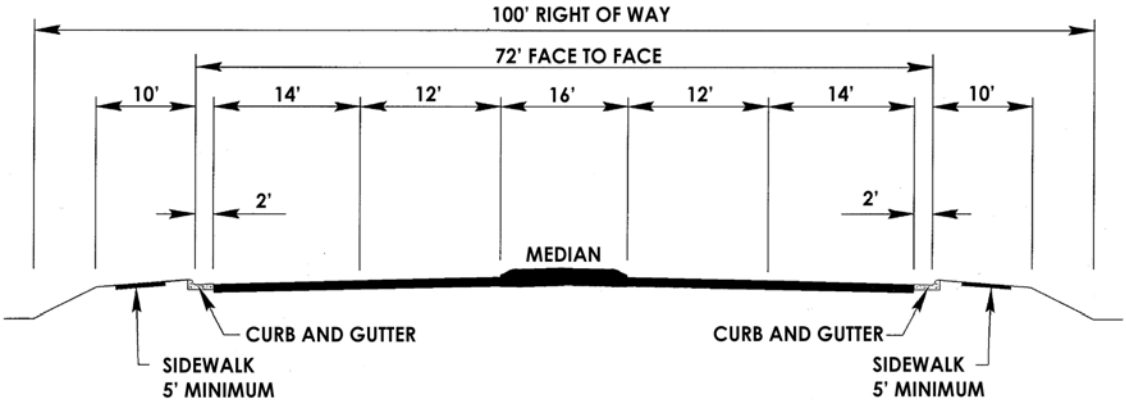
Expressway / Boulevard

Typical Bicycle Cross Sections

WIDE CURB LANES

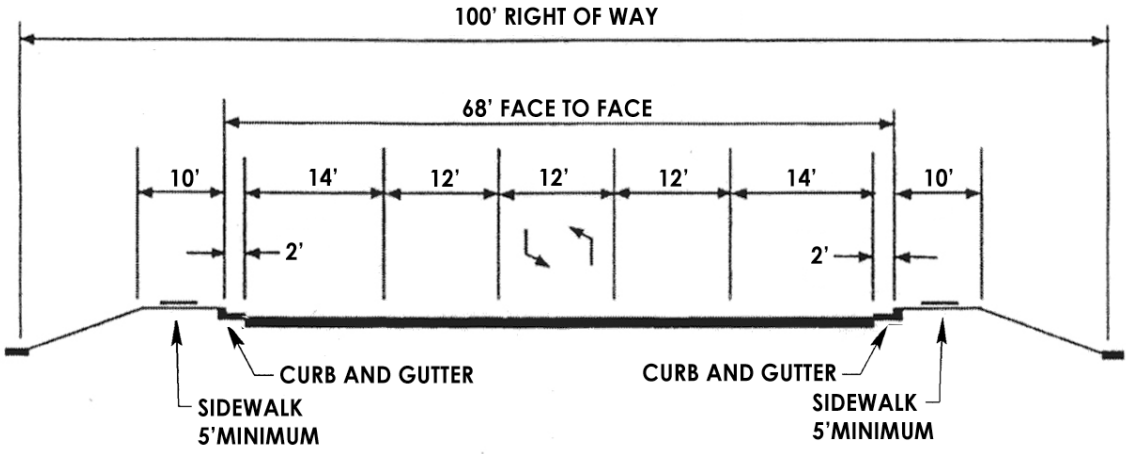
B-1 4-LANE MEDIAN DIVIDED TYPICAL SECTION

With Wide Outside Lanes



B-2 5-LANE TYPICAL SECTION

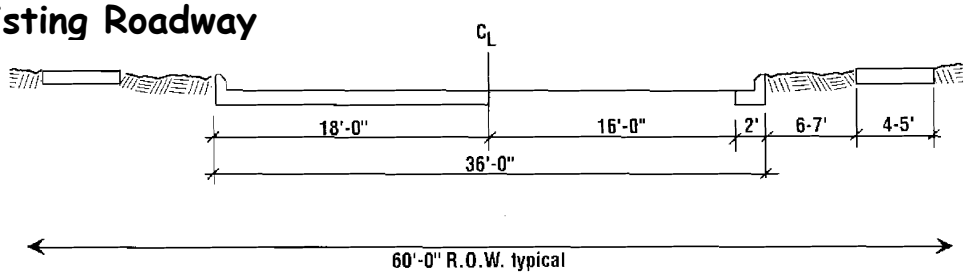
With Wide Outside Lanes



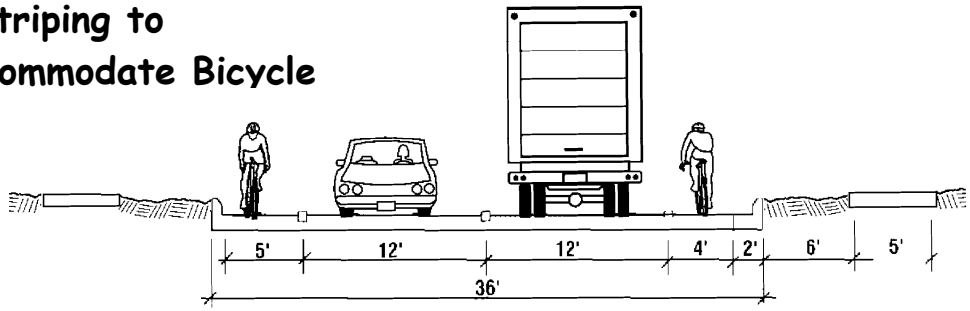
Typical Bicycle Cross Sections

B-3 BICYCLE LANES ON COLLECTOR STREETS

Existing Roadway



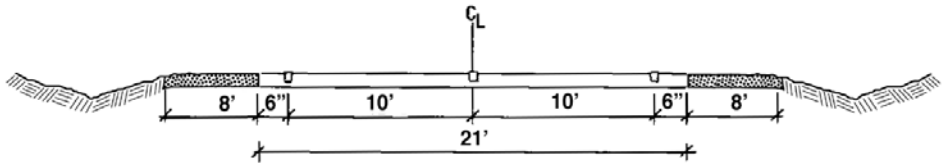
Restriping to Accommodate Bicycle



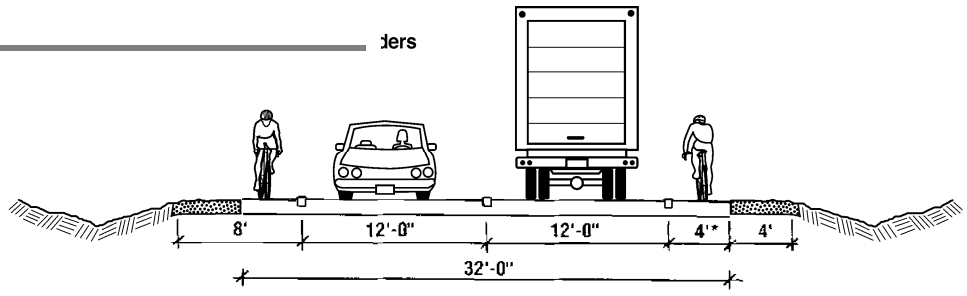
Typical Bicycle Cross Sections

B-4 WIDE PAVED SHOULDERS

Existing Roadway



Roadway Retrofitted with
4-Ft Paved Shoulders



* If speeds are higher than 40 mph, shoulder widths greater than 4' are recommended.

Appendix E: Definitions of Environmental Status Codes

Definitions of Environmental Status Codes: Natural Heritage Program Plant List*

North Carolina Status		Description
E	**Endangered**	"Any species or higher taxon of plant whose continued existence as a viable component of the States flora is determined to be in jeopardy" (GS 19B 106: 202.12). (Endangered species may not be removed from the wild except when a permit is obtained for research, propagation, or rescue that will enhance the survival of the species).
T	**Threatened**	"Any resident species of plant which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (GS 19B 106: 202.12). (Regulations are the same as for Endangered Species).
SC	**Special Concern**	"Any species of plant in North Carolina which requires monitoring but which may be collected and sold under regulations adopted under the provisions of [the Plant Protection and Conservation Act]" (GS 19B 106: 202.12). (Special Concern species which are not also listed as Endangered or Threatened may be collected from the wild and sold under specific regulations. Propagated material only of Special Concern species which are also listed as Endangered or Threatened may be traded or sold under specific regulations.)
C	**Candidate**	Species which are very rare in North Carolina, generally with 1-20 populations in the state, generally substantially reduced in numbers by habitat destruction (and sometimes also by direct exploitation or disease). These species are also either rare throughout their ranges (fewer than 100 populations total) or disjunct in North Carolina from a main

* Natural Heritage Program List of the Rare Plants of North Carolina. U. S. Fish and Wildlife Service 1990 (with amendments 1993).

		range in a different part of the country or world. Also included are species which may have 20-50 populations in North Carolina, but fewer than 50 populations worldwide. These are species which have the preponderance of their distribution in North Carolina and whose fate depends largely on their conservation here. Also included are many species known to have once occurred in North Carolina but with no known extant occurrences in the state (historical or extirpated species); if these species are relocated in the state, they are likely to be listed as Endangered or Threatened. If present land use trends continue, candidate species are likely to merit listing as Endangered or Threatened.
SR	**Significantly Rare**	Species which are very rare in North Carolina, generally substantially reduce in numbers by habitat destruction (and sometimes also by direct exploitation or disease). These species are generally more common somewhere else in their ranges, occurring in North Carolina peripherally to their main ranges, mostly in habitats which are unusual in North Carolina. Also included are some species with 20-100 populations in North Carolina, if they also have only 50-100 populations rangewide and are declining.
W	**Watch List**	Any other species believed to be rare and of conservation concern in the state but warranting active monitoring at this time.
P	**Proposed**	A species which has been formally proposed for listing as Endangered, Threatened, or Special Concern, but has not yet completed the legally mandated listing process.
United States Status		**Description**
E	**Endangered**	A taxon "which is in danger of extinction throughout all or a significant portion of its range" (Endangered Species Act, Section 3).
T	**Threatened**	A taxon "which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (Endangered Species Act, Section 3).
C1	**Candidate 1**	"Taxa for which the [Fish and Wildlife] Service has on file

		enough substantial information on biological vulnerability and threat(s) to support proposals to list them as Endangered or Threatened. Development and publication of proposed rules on these taxa are anticipated; however, because of the large number of Category 1 taxa, it will take several years to clear the backlog."
C2	**Candidate 2**	"Taxa for which there is some evidence of vulnerability, but for which there are not enough data to support listing proposals at this time... Further biological research and field study usually will be necessary to ascertain the status of [these taxa]... It is likely that some category 2 candidates will not warrant listing, while others will be found to be in greater danger of extinction than some taxa in category 1."
3A	**Candidate 3a**	"Taxa for which the Fish and Wildlife Service has persuasive evidence of extinction. If rediscovered, such taxa might acquire high priority for listing."
3B	**Candidate 3b**	"Names that, on the basis of current taxonomic understanding ... do not represent distinct taxa..."
3C	**Candidate 3c**	"Taxa that have proven to be more abundant or widespread than previously believed and/or those that are not subject to any identifiable threat. If further research or changes in habitat indicate a significant decline in any of these taxa, they may be reevaluated for possible inclusion in categories 1 or 2.
P	**Proposed**	"Taxa already proposed to be listed as" endangered or threatened. Taxa formally proposed as endangered or threatened receive some legal protection. Species listed as proposed candidates are species which are in the process of being added to the federal candidate list.
*****	**Possibly Extinct**	Taxa with no known extant occurrences.