North Carolina Department of Transportation
Transportation Planning Branch

Comprehensive Transportation Plan

Stokes County

November 2009

Comprehensive Transportation Plan Study Report

Stokes County

Prepared by the: Transportation Planning Branch
North Carolina Department of Transportation

In Cooperation with: Stokes County
Northwest Piedmont Rural Planning Organization
The Federal Highway Administration
U.S. Department of Transportation

November 2009

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Triad Planning Group Supervisor

Acknowledgements

Persons responsible for this report:

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Triad Planning Group Supervisor:	Wayne Davis, Ph.D., PE
Western Planning Unit Head:	Earlene Thomas, PE
Transportation Planning Branch Manager:	Mike Bruff, PE

Executive Summary

In March 2005, the Transportation Planning Branch of the North Carolina Department of Transportation and Stokes County entered into an agreement to cooperatively develop the Stokes County Comprehensive Transportation Plan. This multi-modal transportation plan is a product of this cooperative effort.

This report documents the findings of this study, along with the recommendations for improvements that were developed. In addition, this report presents cross-section recommendations, roadway conditions, land use information, and environmental features found in the study area.

The recommendations for major improvements are listed below. A more detailed discussion of these recommendations can be found in Chapter 2.

- US 311

  US 311 is recommended to be improved from NC 89 to NC 65 by widening the existing three-lane facility to a four-lane facility with a median.

- US 52 (Future I-74)

  US 52 is a Strategic Highway Corridor (SHC) and is recommended to be widened from four to six-lanes and upgraded to Interstate standards from the Winston Salem Urban Area to the Surry County Line. These improvements will increase capacity and improve safety.

- NC 65

  NC 65 is recommended to be improved from US 311 to the Winston Salem Urban Area. The recommended improvements include:

  - Widening from two-lanes to a four-lane divided major thoroughfare facility from the Winston Salem Urban Area to US 311.

  - Constructing a new two-lane facility from SR 1921 (Martin Luther King Jr Rd) to NC 65. The existing section of NC 65 from SR 1921 (Martin Luther King Jr Rd) to US 311 should then be rerouted onto the new facility. This will provide a more direct route for NC 65 traffic.

- Southern Connector (proposed)

  It is recommended that a new two lane minor thoroughfare be constructed between US 311 and SR 1974 (Mountain View Rd). This proposed project will continue onto SR 1973 (Mountain View Rd) and will end in the Winston Salem Urban Area. This proposed connector will provide an east to west route that will

connect Walnut Cove to the Winston Salem Urban Area. This new route will drastically reduce travel time between the eastern and western parts of the county.

Stokes County's Comprehensive Transportation Plan and technical report are a result of a coordinated effort between the Stokes County staff and the citizens of Stokes County. The plan was adopted by Danbury Town Officials on February 27, 2008, Walnut Cove Town Officials on March 4, 2008, and the Stokes County Commissioners on April 1, 2008; the Northwest Piedmont RPO endorsed the Plan on June 17, 2008; and the North Carolina Department of Transportation adopted the plan on September 4, 2008.

Prioritization and implementation of this plan lies primarily with Stokes County and its citizens. The County should work with the Northwest Piedmont Rural Planning Organization to prioritize their transportation needs. This organization is responsible for presenting regional transportation needs to the North Carolina Department of Transportation. Throughout the State, transportation needs exceed available funding; therefore, local areas should aggressively pursue funding for the projects they desire.

Adopted by:

Stokes County
Date: April 1, 2008

Town of Danbury
Date: February 27, 2008

Town of Walnut Cove
Date: March 4, 2008

NCDOT
Date: September 4, 2008

Endorsed by:

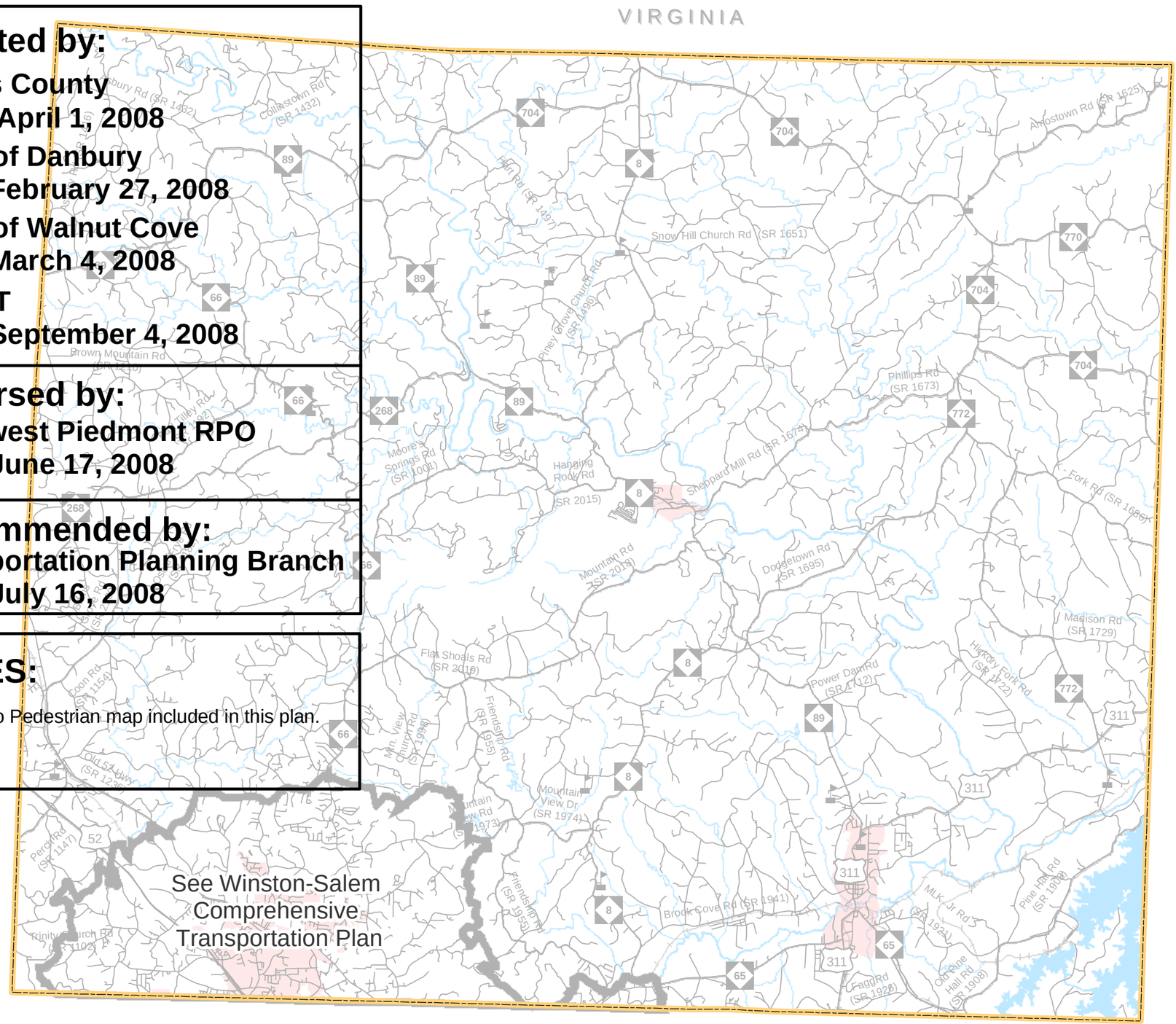
Northwest Piedmont RPO
Date: June 17, 2008

Recommended by:

Transportation Planning Branch
Date: July 16, 2008

NOTES:

There is no Pedestrian map included in this plan.



Stokes County

North Carolina

Comprehensive Transportation Plan

Plan date: March 4, 2008

Legend

- Schools
- Roads
- Railroads
- Rivers and Streams
- Lakes
- Planning Boundary
- County Boundary
- City Limits

0 0.5 1 2 3 Miles

N W E S

Figure 1 (Sheet 1 of 5)

Base map date: August 2007

Refer to CTP document for more details

VIRGINIA

SURRY COUNTY

ROCKINGHAM COUNTY

FORSYTH COUNTY

Asbury Rd (SR 1432)
Collinstown Rd (SR 1432)
Asbury Rd (SR 1416)
Hart Rd (SR 1497)
Amostown Rd (SR 1625)
Snow Hil Church Rd (SR 1651)
Piney Grove Church Rd (SR 1496)
Brown Mountain Rd (SR 1210)
Bud Tilley Rd (SR 1192)
Moore's Springs Rd (SR 1001)
Hanging Rock Rd (SR 2015)
Phillips Rd (SR 1673)
Sheppard Mill Rd (SR 1674)
K - Fork Rd (SR 1686)
Brims Grove Rd (SR 2109)
Oscar Frye Rd (SR 1182)
Mountain Rd (SR 2018)
Dodgetown Rd (SR 1695)
Madison Rd (SR 1729)
Coon Rd (SR 1154)
Flat Shoals Rd (SR 2019)
Power DamRd (SR 1712)
Hickory Fork Rd (SR 1722)
Mtn. View Church Rd (SR 1998)
Friendship Rd (SR 1955)
Old 52 Hwy (SR 1236)
Mountain View Dr (SR 1974)
Mountain View Rd (SR 1973)
Proposed Southern Connector
Perch Rd (SR 1147)
Pine Hall Rd (SR 1908)
Brook Cove Rd (SR 1941)
MLK Jr Rd (SR 1921)
Old Pine Hall Rd (SR 1908)
FaggRd (SR 1926)
Trinity Church Rd (SR 1102)

See Winston-Salem Comprehensive Transportation Plan

Highway Map

Stokes County
Comprehensive Transportation Plan

Plan date: March 4, 2008

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 0.5 1 2 3 Miles

N W E S

Figure 1 (Sheet 2 of 5)

Base map date: August 2007

Refer to CTP document for more details

VIRGINIA

SURRY COUNTY

ROCKINGHAM COUNTY

FORSYTH COUNTY

Asbury Rd (SR 1462)
Asbury Rd (SR 1416)
Collinstown Rd (SR 1432)
Horn Rd (SR 1497)
Snow Hill Church Rd (SR 1651)
Anostown Rd (SR 1625)
Brown Mountain Rd (SR 1210)
Bud Tilley Rd (SR 1192)
Piney Grove Church Rd (SR 1496)
Phillips Rd (SR 1673)
Moore's Springs Rd (SR 1004)
Hanging Rock Rd (SR 2015)
Sheppard Mill Rd (SR 1674)
Fork Rd (SR 1686)
Oscar Cove Rd (SR 1382)
Mountain Rd (SR 2018)
Doggetown Rd (SR 1695)
Bring Grove Rd (SR 2109)
Flat Shoals Rd (SR 2019)
Power Dam Rd (SR 1702)
Madison Rd (SR 1729)
Hickory Fork Rd (SR 1722)
Coon Rd (SR 1154)
Mtn. View Church Rd (SR 1998)
Friendship Rd (SR 1955)
Old 52 Hwy (SR 1236)
Mountain View Dr (SR 1974)
Perch Rd (SR 1141)
Brock Cove Rd (SR 1941)
Pine Hall Rd (SR 1908)
MLK Jr Rd (SR 1974)
Old Pine Hall Rd (SR 1908)
Fagg Rd (SR 1926)
Trinity Church Rd (SR 1102)

See Winston-Salem Comprehensive Transportation Plan

Public Transportation and Rail Map

Stokes County
Comprehensive Transportation Plan

Plan date: March 4, 2008

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

0 0.5 1 2 3 Miles

N W E S

Figure 1 (Sheet 3 of 5)

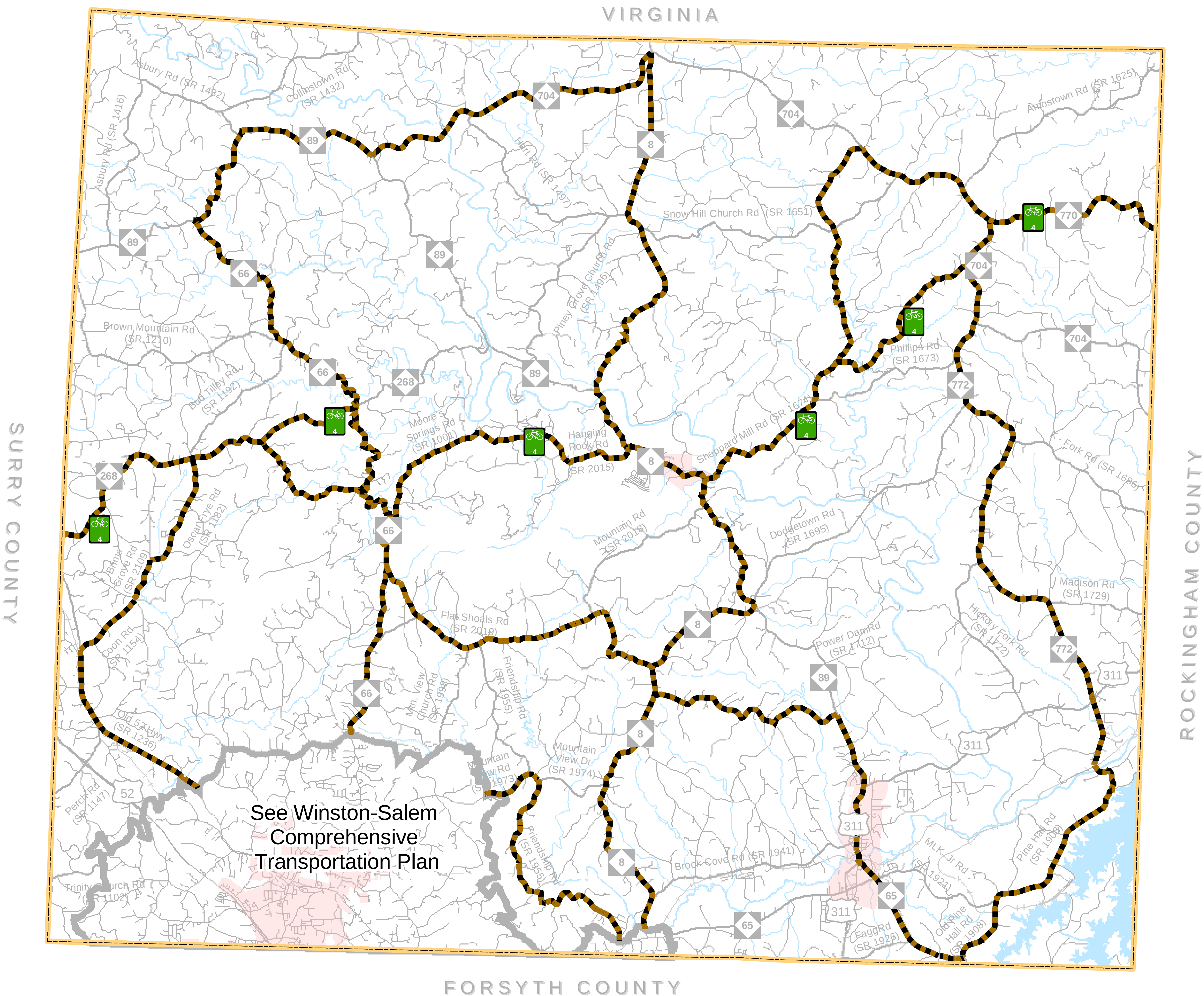
Base map date: August 2007

Refer to CTP document for more details

Bicycle Map

Stokes County
Comprehensive Transportation Plan

Plan date: March 4, 2008



VIRGINIA
FORSYTH COUNTY
SURRY COUNTY
ROCKINGHAM COUNTY
See Winston-Salem Comprehensive Transportation Plan
Asbury Rd (SR 1492)
Collinstown Rd (SR 1432)
Asbury Rd (SR 1416)
Amostown Rd (SR 1625)
Hart Rd (SR 1497)
Snow Hill Church Rd (SR 1651)
Piney Grove Church Rd (SR 1496)
Brown Mountain Rd (SR 1210)
Bud Tilley Rd (SR 1192)
Moore's Springs Rd (SR 1001)
Hanging Rock Rd (SR 2015)
Sheppard Mill Rd (SR 1674)
Phillips Rd (SR 1673)
Fork Rd (SR 1686)
Oscar Lyle Rd (SR 1182)
Mountain Rd (SR 2018)
Dodgetown Rd (SR 1695)
Flat Shoals Rd (SR 2016)
Madison Rd (SR 1729)
Hickory Fork Rd (SR 1722)
Power Dam Rd (SR 1712)
Coon Rd (SR 1154)
Old 52 Hwy (SR 1236)
Friendship Rd (SR 1955)
Mtn. View Church Rd (SR 1958)
Mountain View Dr (SR 1974)
Perch Rd (SR 1147)
Trinity Church Rd (SR 1102)
Brook Cove Rd (SR 1941)
MLK Jr Rd (SR 1921)
Pine Hall Rd (SR 1908)
Old Pine Hall Rd (SR 1908)
Fagg Rd (SR 1926)
704
89
8
770
66
268
772
311
52
65

On-road
- Existing
- Needs Improvement
- Recommended

Off-road
- Existing
- Needs Improvement
- Recommended

Multi-Use Paths
- Existing
- Needs Improvement
- Recommended

Rivers and Streams

Existing Grade Separation

Proposed Grade Separation

0 0.5 1 2 3 Miles

Figure 1 (Sheet 4 of 5)

N S E W

Base map date: August 2007

Refer to CTP document for more details

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I. 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 demands, as well as keep pace with the growth of the region. Stokes County recognized the importance of planning for future transportation needs and requested transportation planning assistance from the Transportation Planning Branch of the North Carolina Department of Transportation (NCDOT).

Stokes County is located in northwest North Carolina and is bordered by Surry, Forsyth, and Rockingham County; with its northern border along the Virginia State Line. The geographic location of Stokes County is illustrated in Figure 2.

This report documents the development of the 2009 Stokes County Comprehensive Transportation Plan (CTP) shown in Figure 1. In addition, this report presents recommendations for each relevant mode of transportation in the County. A CTP is developed to ensure that the transportation system will be progressively enhanced to meet the needs of the planning area. This will serve as an official guide, providing a well-coordinated, efficient, and economical transportation system that utilizes all modes of transportation. This document will be used by local officials to ensure that planned transportation facilities reflect the needs of the public, while minimizing the disruption to local residents, businesses, and the environment.

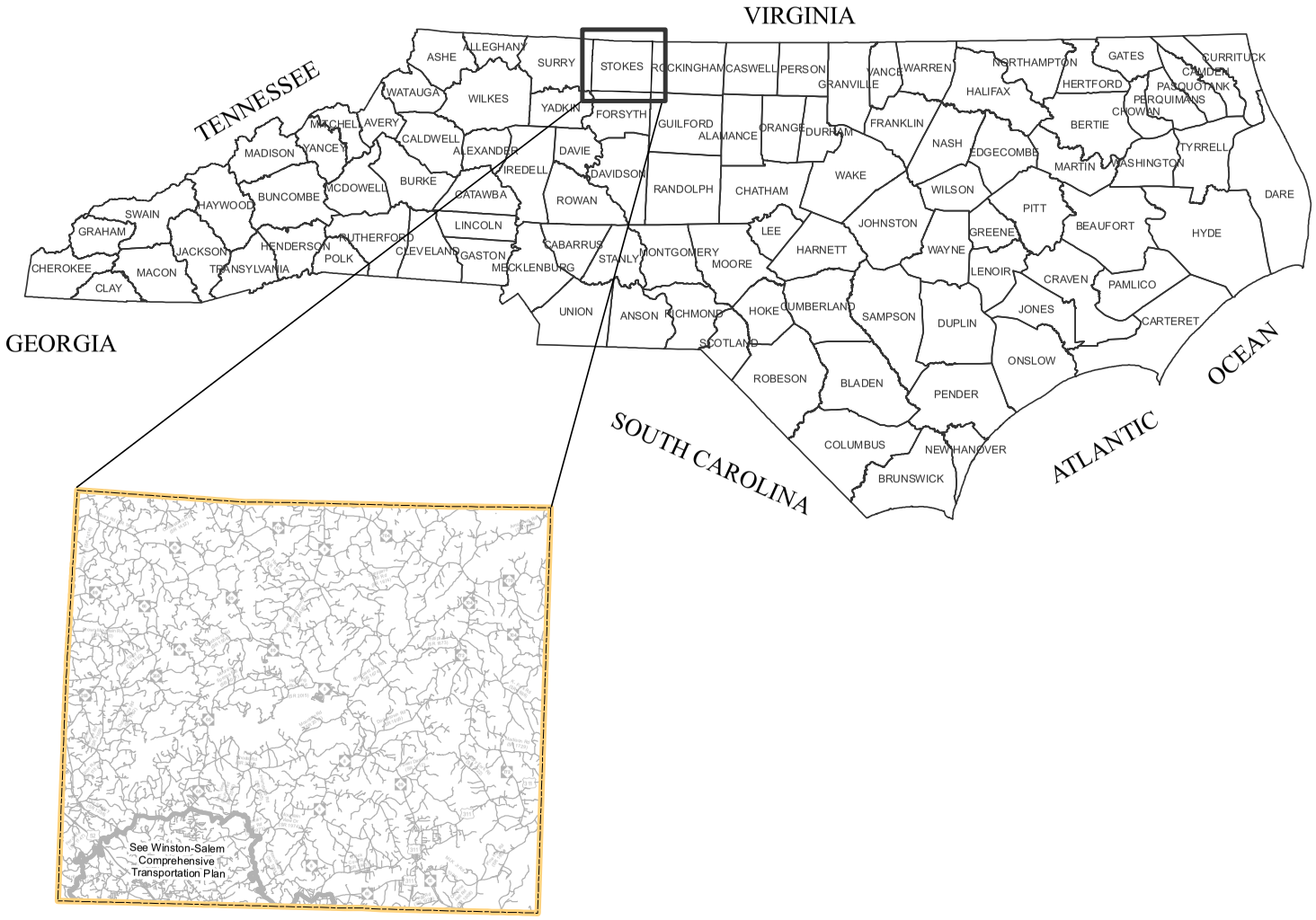
The purpose of this study is to examine present and future transportation needs of the area and develop a transportation plan to meet these needs. The plan recommends those improvements that are necessary to provide an efficient transportation system within the 2006-2035 planning period. The recommended cross-sections outlined in Appendix D for these improvements are based on existing and projected conditions.

The CTP is based on the projected growth for the planning area as coordinated with the County Planners. 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 within this plan. Some portions of the plan may require revisions in order to accommodate unexpected changes in development. Therefore, any changes made to one element of the CTP should be consistent with the other elements.

During the development of this CTP, every effort was made to enhance the integration and connectivity of the transportation system, across and between modes, for people and freight. It was emphasized, by the citizens, to preserve the existing

transportation system. Local officials may use the CTP to expand policies and guidelines to facilitate a coordinated approach to land use and transportation planning. The overall goal is to provide a better transportation system for the future and to minimize the harmful effects of transportation on public health, air and water quality, land use and other natural resources.

The initiative for the implementation of the CTP rests predominately with the policy boards and citizens of the county. Stokes County, its municipalities and the North Carolina Department of Transportation share the responsibility for implementation of the recommended projects. The needs throughout the state exceed available funding; therefore, it is imperative that the County aggressively pursues funding for desired projects.



NCDOT TPB
TRANSPORTATION PLANNING BRANCH

Figure 2: Geographic Location

Stokes County

North Carolina

Pepared By The
North Carolina Department of Transportation
Transportation Planning Branch

In Cooperation With The
U.S. Department of Transportation
Federal Highway Administration

N
W E
S

Miles
0 12.525 50 75 100

Base map date: August 2007

II. Recommendations

This chapter contains recommendations that are based on the ability of the area's roadway system to serve existing and anticipated travel demands. The objective is to reduce congestion and improve safety by eliminating both existing and projected deficiencies in the transportation system. The adopted plan represents a transportation system that will address anticipated traffic and land development needs.

Highway Map

The CTP Highway Map for the county is presented in Figure 1, Sheet 2. This plan includes roadways within the county that fall into five facility types. They include freeways, expressways, boulevards, major thoroughfares, and minor thoroughfares. See Appendix B for a more detailed description of each facility type and Appendix D for detailed descriptions and figures for each recommended cross section.

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

Major Improvements

US 311

- Project Recommendation: US 311 is recommended to be improved from NC 89 to NC 65 by widening the existing three-lane facility to a four-lane facility with a median. Improving US 311 enables the roadway to accommodate existing and projected traffic volumes.

- Transportation Demand: US 311 is functionally classified as a minor arterial and serves intrastate travel. Within this study area US 311 is a two-lane major thoroughfare with the center turning lane, and a posted speed limit between 35 to 55 miles per hour (mph).

- Roadway Capacity: 2006 Annual Average Daily Traffic (AADT) volumes along the NC 89/Main St. section of US 311 were in the range of 11,200 to 13,200 vehicles per day (vpd). The current capacity along this corridor is approximately 12,600 vpd. 2035 projected traffic volumes on US 311 will be in the range of 17,200 to 20,300 vpd, which will exceed capacity. US 311 is currently operating between Level of Service (LOS) C and D. Without improvements, portions of this facility will be operating at LOS E by the year 2035.

- Safety Issues: For the period from January 1, 2004 to December 31, 2006, there were 5 crashes reported at the intersection of US 311 and NC 8 and 6 crashes were reported at the intersection of US 311 and NC 65. Refer to the traffic crash analyses in Chapter IV for further details.

- System Linkages: US 311 runs north-south in the southeast part of Stokes County, connecting the Forsyth and Rockingham Counties. It runs concurrent with NC 89 and NC 65 within the City Limits of Walnut Cove.

- Public/Stakeholder Involvement: The Town of Walnut Cove Commissioners adopted the CTP with the provision that there be no widening of the 3-lane section of the road between 2nd and 9th Street. Officials have indicated their desire to keep on street parking.

US 52 (Future I-74)

- Project Recommendation: It is recommended that US 52 be widened from four to six-lanes and upgraded to interstate standards from the Winston Salem Urban Area to the Surry County Line. Improving US 52 will enable the roadway to accommodate existing and projected traffic volumes.

- Transportation Demand: US 52 is functionally classified as a principal arterial and serves both intrastate and interstate travel. US 52 within the study area is a four-lane divided freeway with a posted speed limit of 65 mph.

- Roadway Capacity: 2006 AADT volume along US 52 is in the range of 31,000 vpd. The current capacity along this corridor is approximately 52,500 vpd. 2035 projected traffic volumes on US 52 will be in the range of 60,000 vpd, which will exceed its capacity. Currently US 52 is operating at LOS D, and with no improvements US 52 will be operating between LOS E and F by year 2035.

- Safety Issues: For the period from January 1, 2004 to December 31, 2006, there were 7 crashes reported at the intersection of US 52 and SR 1147 (Perch Rd). Refer to the traffic crash analysis in Chapter IV for further details.

- System Linkages: US 52 runs southeast-to-northwest in the southwest part of Stokes County, connecting the Winston Salem Urban Area to Surry County. US 52 is a part of Strategic Highway Corridor (Corridor 30: Wytheville, VA to Myrtle Beach, SC).

- Relationship to other Plans: The recommendation to upgrade US 52 is included in the 2009 Winston Salem CTP which is in the process of being adopted, the Strategic Highway Corridor Report adopted in 2004, and the 2003 Surry County Thoroughfare Plan. This recommendation is included in the 2009-2015 Transportation Improvement Program (TIP) as project I-4404.

NC 65

- Project Recommendation: NC 65 is recommended to be improved from US 311 to the Winston Salem Urban Area. The recommended improvements include:

  - Widening from two-lanes to a four-lane divided major thoroughfare facility from the Winston Salem Urban Area to US 311.

  - Constructing a new two-lane facility from SR 1921 (Martin Luther King Jr Rd) to NC 65. The existing section of NC 65 from SR 1921 (Martin Luther King Jr Rd) to US 311 should then be rerouted onto the new facility. This will provide a more direct route for NC 65 traffic.

  Improving NC 65 will enable the roadway to accommodate existing and projected traffic volumes and provide a safer and more efficient roadway.

- Transportation Demand: NC 65 is functionally classified as a major collector and serves intrastate travel. NC 65 within the study area is a two-lane major thoroughfare with a posted speed limit of 55 mph.

- Roadway Capacity: 2006 AADT along this section of NC 65 is in the range of 5,800 vpd. The current capacity along this corridor is approximately 12,600 vpd. 2035 projected traffic volumes on NC 65 will be in the range of 9,100 vpd resulting in this section of roadway operating near its capacity.

- Safety Issues: There is a Norfolk Southern Railways (NS) railroad crossing near the NC 65 and US 311 intersection that is both poorly designed and placed. At this railroad crossing the vertical clearance causes problems for tractor-trailers. Additionally the crossing is in close proximity to the intersection, and at times, traffic becomes backed up causing traffic to stop on the railroad tracks.

  For the period from January 1, 2004 to December 31, 2006, there were 6 crashes reported at the intersection of US 311 and NC 65. Refer to the traffic crash analysis in Chapter IV for further details.

- System Linkages: NC 65 connects the Winston Salem Urban Area to the Walnut Cove Area and US 311.

Proposed Southern Connector (New Construction)

- Project Recommendation: It is recommended that a new two lane minor thoroughfare with 12-foot lanes and paved shoulder be constructed starting at the US 311 and NC 89 intersection and extending west 5.6 miles to connect with SR 1974 (Mountain View Rd).

- Transportation Demand: The proposed Southern Connector will be functionally classified as a minor collector and serve intrastate travel.

- Roadway Capacity: Traffic volumes for this facility will be in the range of 6,000 vpd, with a capacity of 12,600 vpd.

- System Linkages: This connector will run through the southern portion of Stokes County, and serve as an east to west connector between the northern Walnut Cove area and the Winston Salem Urban Area.

- Relationship to other Plans: The 2035 Winston Salem LRTP references this proposed project as the Stokes County Connector. This recommendation is included in the 2009-2015 TIP as project R-3823.

Minor Widening Improvements

NC 89

- Project Recommendation: It is recommended that NC 89 be improved from SR 1712 (Power Dam Rd) to US 311, by widening the existing roadway to 12-foot wide lanes. Improving NC 89 will enable the roadway to accommodate existing and projected traffic volumes.

- Transportation Demand: NC 89 is functionally classified as a minor arterial and serves intrastate travel. NC 89 within the study area is a two-lane major thoroughfare with a posted speed limit of 55 mph.

- Roadway Capacity: 2006 AADT along this section of NC 89 is in the range of 7,300 vpd. The current capacity along this corridor is around 10,100 vpd. 2035 projected traffic volumes on NC 89 will be in the range of 11,200 vpd which will exceed capacity.

- Safety Issues: For the period from January 1, 2004 to December 31, 2006, there were 7 crashes reported at the intersection of NC 89 and SR 1715. Refer to the traffic crash analyses in Chapter IV for further details.

- System Linkages: NC 89 runs through the center of Stokes County and serves as a connector between US 311, Walnut Cove, and the Surry County Area. This is a part of the main travel corridor across Stokes County.

SR 1236 (Old Hwy 52)

- Project Recommendation: It is recommended that Old Hwy 52 be widened from two 10-foot lanes to two 12-foot lanes from SR 1154 (Coon Rd) to Winston-Salem Urban Area Boundary.

- Transportation Demand: SR 1236 is functionally classified as a minor collector and serves intrastate travel. SR 1236 within the study area is a two-lane major thoroughfare with a posted speed limit of 55 miles per hour.

- Roadway Capacity: 2006 AADT along this section of SR 1236 is in the range of 6,200 vpd. 2035 projected traffic volumes will be approximately 10,400 vpd which will be near capacity. SR 1236 is currently operating at LOS C. Without improvements this facility will be operating between LOS D and E by 2035.

- Safety Issues: For the period from January 1, 2004 to December 31, 2006, there were 8 crashes reported at the intersection of SR 1236 and SR 1147; and 5 crashes reported at the intersections of SR 1236 and SR 1139. Refer to the traffic crash analysis in Chapter IV for further details.

- System Linkages: SR 1236 runs southeast-to-northwest in the southwest part of Stokes County, connecting the Winston Salem Urban Area to Surry County.

Additionally, the following routes do not have capacity issues, but are recommended to be upgraded to two 12-foot lanes with 2-foot paved shoulders to improve safety.

- NC 772: It is recommended that NC 772 be widened from the existing 10-foot lanes to 12-foot lanes from NC 704 to SR1690 (Dillard Rd).

- NC 704: It is recommended that NC 704 be widened from the existing 10-foot lanes to 12-foot lanes from NC 8 to NC 770 and then from NC 772 to the Rockingham County Line.

- NC 268: It is recommended that NC 268 be widened from two 9-foot lanes to two 12-foot lanes from the Surry County Line to NC 66.

- NC 66: It is recommended that NC 66 be widened from two 9-foot lanes to two 12-foot lanes from NC 89 to the Winston Salem UAB.

- NC 8: It is recommended that NC 8 be widened from two 10 or 11-foot lanes to two 12-foot lanes from the Virginia State Line to the Winston Salem UAB. (Note: NC 8 from Dodgetown Rd to the Winston Salem UAB has been completed at the time of this documentation)

- SR 2109 (Brims Grove Rd): It is recommended that Brims Grove Rd be widened from two 9.5-foot lanes to two 12-foot lanes from SR 1182 (Oscar Frye Rd) to SR 1157 (Volunteer Rd)

- SR 1974 (Mountain View Rd): It is recommended that Mountain View Rd be widened from two 8.5-foot lanes to two 12-foot lanes from SR 1955 (Friendship Rd) to NC 8.

- SR 1955 (Friendship Rd): It is recommended that Friendship Rd be widened from two 9-foot lanes to two 12-foot lanes from SR 2019 (Flat Shoals Rd) to SR 1974 (Mountain View Rd).

- SR 1926 (Fagg Rd): It is recommended that Fagg Rd be widened from two 10 foot lanes to two 12-foot lanes from US 311 to NC 65.

- SR 1921 (Martin Luther King Jr. Rd): It is recommended that Martin Luther King Jr. Rd be widened from two 10-foot lanes to two 12-foot lanes from NC 65 to SR 1908 (Pine Hall Rd).

- SR 1722 (Hickory Fork Rd): It is recommended that Hickory Fork Rd be widened from two 9-foot lanes to two 12-foot lanes from NC 772 to US 311.

- SR 1695 (Dodgetown Rd): It is recommended that Dodgetown Rd be widened from two 10-foot lanes to two 12-foot lanes from NC 8/NC 89 to NC 772.

- SR 1674 (Sheppard Mill Rd): It is recommended that Sheppard Mill Rd be widened from two 10-foot lanes to two 12-foot lanes from NC 8/NC 89 to SR 1673 (Phillips Rd).

- SR 1651 (Snow Hill Church Rd): It is recommended that Snow Hill Church Rd be widened from two 9-foot lanes to two 12-foot lanes from NC 8 to NC 704.

- SR 1496 (Piney Grove Church Rd): It is recommended that Piney Grove Church Rd be widened from two 11-foot lanes to two 12-foot lanes from NC 89 to NC 8.

- SR 1432 (Collinstown Rd): It is recommended that Collinstown Rd Be widened from two 10-foot lanes to two 12-foot lanes from SR 1413 (Ashbury Rd) to Virginia State Line.

- SR 1416 (Asbury Rd): It is recommended that Asbury Rd be widened from two 9-foot lanes to two 12-foot lanes from SR 1416 (Flippin Rd.) to NC 89

- SR 1182 (Oscar Frye Rd): It is recommended that Oscar Frye Rd be widened from two 10-foot lanes to two 12-foot lanes from NC 268 to SR 2109 (Brims Grove Rd)

- SR 1154 (Coon Rd): It is recommended that Coon Rd be widened from two 10-foot lanes to two 12-foot lanes from SR 2109 (Brims Grove Rd) to SR 1236 (Old HWY 52)

- SR 1147 (Perch Rd): It is recommended that Perch Rd be widened from two 11-foot lanes to two 12-foot lanes from Surry County Line to SR1236 (Old HWY 52).

- SR 1102 (Trinity Church Rd): It is recommended that Trinity Church Rd be widened from two 9-foot lanes to two 12-foot lanes from Surry County Line to Winston-Salem UAB.

Public Transportation and Rail Map

The Public Transportation and Rail Map of the CTP for Stokes County is presented in Figure1, Sheet 3.

Public Transportation: The Piedmont Authority for Regional Transportation (PART) operates a public bus route that originates in Surry County, and travels along US 52 through Stokes County with final destinations at the Winston Salem Transportation Center and Forsyth Medical Center. Currently Stokes County has several private transit companies that handle the growing demand for special need transportation like the elderly and disabled.

Rail Transportation: Currently Norfolk Southern Railways (NS) operates two rail lines in Stokes County. One transverses the southwestern corner of the county while the other transverses the southeastern corner.

The rail line that transverses the southwestern corner of Stokes County is leased to a short line railroad operator named the Yadkin Valley Railroad (YVRR). This portion of the rail line is known as the CF-line. The CF-line runs from Rural Hall to Mount Airy. Approximately eleven miles of the Rural Hall to Mt. Airy CF-line is located in Stokes County. The YVRR hauls general freight over this rail line at train speeds up to 30 mph with 2 to 3 trains per day. The right-of-way width varies from 130 feet to 200 feet wide.

The segment of rail line that transverses the southeastern corner of Stokes County runs from Winston Salem to Martinsville/Roanoke, VA and is known as NS' R-line. Approximately twelve miles of the R-line is located in Stokes County. Up to eight trains per day operate over the R-line at speeds up to 35 mph. NS hauls general freight and coal over this rail line. The right-of-way width on this line is a minimum of 80 feet wide.

There are currently no passenger rail services in Stokes County on either of the two segments of the rail lines. Also, there are no crossing closures planned for Stokes County.

Bicycle Map

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. Refer to Appendix A for contact information.

The recommended bicycle element of the Comprehensive Transportation Plan (CTP) for Stokes County is presented on Figure 1, Sheet 4. Before any improvements are made to these facilities, the Division of Bicycle and Pedestrian Transportation should be consulted.

The following on-road network bicycle facilities have been identified as needing improvement in the Stokes Count CTP.

- US 311 from SR 1928 (Stokesburg Rd) to NC 89
- NC 772 from NC 704 to US 311
- NC 770 from NC 704 to the Rockingham County Line (NC Bicycle Route 4)
- NC 704 from SR 1674 (Delta Church Rd) to NC 772 (NC Bicycle Route 4)
- NC 704 from NC 89 to NC 8
- NC 268 from the Surry County line to NC 66 (NC Bicycle Route 4)
- NC 89 from US 311 to SR 1937 (East Rd) and from NC 66 to NC 704
- NC 66 from NC 89 to Winston Salem UAB (NC Bicycle Route 4)
- NC 65 from SR 1923 (Fisherman's Rd) to SR 1928 (Stokesburg Rd)
- NC 8 from Winston-Salem UAB to NC 704 (NC Bicycle Route 4)
- SR 2113 (Capella Rd) from NC 66 to SR 2008 (Covington Rd)
- SR 2109 (Brims Grove Rd) from SR 1154 (Coon Rd) to SR 1182 (Oscar Frye Rd)
- SR 2019 (Flat Shoals Rd) from SR 2008 (Covington Rd) to NC 8
- SR 2015 (Hanging Rock Road) from SR 1001 (Moore's Spring Rd) to NC 8/89 (NC Bicycle Route 4)
- SR 2008 (Covington Rd) from SR 2113 (Capella Rd) to SR 2019 (Flat Shoals Rd)
- SR 1955 (Friendship Rd) from SR 1973 (Mountain View Rd) to Winston-Salem UAB
- SR1973 (Mountain View Rd) from Winston-Salem UAB to SR 1955 (Friendship Rd)
- SR 1937(East Rd) from SR 1935 (Piney Mountain Rd) to NC 89
- SR 1935 (Piney Mountain Rd) from NC 8 to SR 1937 (East Rd)
- SR 1923 (Fisherman's Rd) from SR 1908 (Pine Hall Rd) to NC 65
- SR 1908 (Pine Hall Rd) from US 311 to SR 1923 (Fisherman's Rd)
- SR 1674 (Delta Church Rd) from SR 1674 (Sheppard Mill Road) to NC 704 (NC Bicycle Route 4)
- SR 1674(Sheppard Mill Road) from NC 8/89 to SR 1674(Delta Church Rd) (NC Bicycle Route 4)

- SR 1652 (Moir Farm Rd) from SR 1674 (Sheppard Mill Rd) to NC 704
- SR 1236 (Old Hwy 52 Rd) from Winston-Salem UAB to SR 1154 (Coon Rd)
- SR 1187 (Rockhouse Rd) from NC 268 to SR 1175 (Taylor Rd)
- SR 1182 (Oscar Frye Rd) from SR 2109 (Brims Grove Rd) to NC 268
- SR 1175 (Taylor Rd) from SR 1187 (Rockhouse Rd) to NC 66
- SR 1154 (Coon Rd) from SR 1236 (Old Hwy 52 Rd) to SR 2109 (Brims Grove Rd)
- SR 1001(Moore's Spring Road) from NC 66 to SR 2015 (Hanging Rock Road) (NC Bicycle Route 4)

These recommended bicycle improvements should be incorporated as roadway improvements are implemented and as funding is available.

Pedestrian Map

The Pedestrian Map was not developed as a part of the plan.

III. Implementation

Implementation is one of the most important aspects of the comprehensive transportation plan. If implementation is not an integral part of this process, the effort and expense associated with developing the plan will be lost. There are several tools available for use by the County to assist in the implementation of the CTP. They are described in detail in this chapter.

State-County Adoption of the CTP

Stokes County and the North Carolina Department of Transportation have mutually adopted the CTP shown in Figure 1. The mutually adopted plan can now serve as a guide for the Department of Transportation in the development of the transportation system for the County. The approval of this plan by the County also enables standard road regulations and land use controls to be used effectively in the implementation of this plan. As part of the plan, the County and Department of Transportation shall reach agreement on the responsibilities for existing and proposed streets and highways. Facilities which are designated a State responsibility will be constructed and maintained by the Division of Highways.

Methods Used to Protect the Adopted CTP

Subdivision Regulations

Subdivision regulations require every subdivider to submit a plan of any proposed subdivision to the Stokes County Planning Department and any municipal government as appropriate. It also requires that subdivisions be constructed to meet certain standards. Through this process, it is possible to require the subdivision streets to conform to the CTP and to reserve or protect necessary right-of-way for proposed roads and highways that are a part of the CTP.

The construction of subdivision streets to adequate standards reduces maintenance costs and simplifies the transfer of streets to the State Highway System. Appendix E outlines the recommended subdivision design standards as they pertain to road construction.

Zoning Ordinances

A zoning ordinance can be beneficial to transportation planning by designating appropriate locations of various land use and allowable densities of residential development. This provides a degree of stability on which to make future traffic projections and to plan streets and highways.

minimization of strip commercial development which creates traffic friction and increases the traffic accident potential.

Future Street Line Ordinances

A municipality with legislative approval may amend its charter to be empowered to adopt future street line ordinances. This ordinance, enacted for selected streets, is particularly beneficial for planned future improvements, such as roadway widening. Through a metes-and-bounds description of a street's future right-of-way requirements, the municipality may prohibit new construction or reconstruction of structures within the future right-of-way. This approach requires specific design hearings to be held as an opportunity for affected property owners to obtain information about what to expect and to make necessary adjustments without undue hardship.

Roadway Corridor Official Maps

A Roadway Corridor Official Map (Official Map) is a document adopted by the North Carolina Board of Transportation which allows the reservation of roadway corridors as provided by General Statutes 136-44.50 through 136-44.54. Official Maps place temporary restrictions on private property rights by prohibiting the issuance of a building permit or the approval of a subdivision on property within an adopted alignment, for up to a three-year period beginning when a request for development is denied. The Official Map in effect serves as notice to developers that the State or Municipality intends to acquire specific property. This process is a beneficial tool in directing development so those sites can be reserved for public improvements in anticipation of actual need.

Development Reviews

The District Engineer's Office and the Traffic Management Unit of the North Carolina Department of Transportation review driveway access to any state-maintained road. In addition, any development expected to generate large volumes of traffic (e.g., shopping centers, fast food restaurants, or large industries) should be comprehensively studied by the Traffic Management Unit, the Project Development and Environmental Analysis Branch, and/or the Roadway Design Unit of NCDOT. If reviewed at an early stage, it is often possible to significantly improve the development's accessibility while preserving the integrity of the CTP.

Funding Sources

Capital Improvements Program

A capital improvement program makes it easier to build a planned transportation system. It consists of two lists of projects. The first is a list of highway projects that are designated as a municipal responsibility and are to be implemented with

municipal funds. The second is a list of local projects designated as State responsibility to be included in the State's Transportation Improvement Program.

Transportation Improvement Program

North Carolina's Transportation Improvement Program (TIP) is a document that lists all major transportation projects, and their funding sources, planned by the NCDOT for a seven-year period. Every two years, when the TIP is updated, completed projects are removed, programmed projects are advanced, and new projects are added.

Local areas should work within their respective Rural Planning Organization (RPO) to develop local and regional project priorities. The RPO submits these regional needs to the NCDOT's Strategic Planning Office of Transportation (SPOT). Refer to Appendix A for contact information for NCDOT's SPOT office.

In addition to highway construction and widening, TIP funds are available for bridge replacement, highway safety projects, public transit projects, railroad projects and bicycle facilities.

Industrial Access Funds

If certain economic conditions are met, Industrial Access Funds are available for construction of access roads for industries that plan to develop property that does not have access to any state-maintained road. The NCDOT Secondary Roads Office should be contacted for information on Industrial Access Funds.

Small Urban Funds

Small Urban Funds are annual discretionary funds that are made available to municipalities with qualifying projects on the state system. The maximum amount is one million dollars per year per highway division. Requests for Small Urban Fund assistance should be directed to the Division Engineer or to the Program Development Branch of NCDOT.

Implementation Recommendations

The following table gives recommendations for the most suitable funding sources and methods of implementation for the major project proposals of the Stokes County CTP.

Table 1: Funding Sources and Recommended Methods of Implementation

Projects	Funding Sources				Methods of Implementation				
	Local Funds	TIP Funds	Indust. Access	Small Urban	CTP	Subdiv. Ord.	Zoning Ord.	Future Street Lines	Develop Review
US 311		X			X		X	X	X
US 52		X			X			X	X
NC 65		X			X			X	X
Proposed Southern Connector		X			X			X	X

IV. Population, Land Use, and Roadway System

In order to develop an adequate CTP, reliable forecasts of future travel patterns must be achieved. These forecasts depend on careful analysis of the following items:

- Historic as well as potential population changes
- Significant economic trends
- Character and intensity of land development
- The ability of the existing transportation system to meet existing and future travel demand

Secondary items that influence forecasts include the following items:

- Effects of legal controls such as zoning ordinances and subdivision regulations
- Availability of public utilities and transportation facilities
- Topographic and other physical features of the area

Population

The volume of traffic on a roadway is related to the size and distribution of the population that it serves; hence, 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. Table 2 presents the population trends for Stokes County and North Carolina.

Table 2: Stokes County Population Growth

Location	1980	1990	2000	2006	2035
North Carolina	5,881,766	6,628,637	8,046,485	8,408,414	12,447,597
Stokes County	33,086	37,223	44,711	49,789	70,367
Danbury	150	119	108	106	137
King	N/A	4,059	5,952	5,791	7,479
Walnut Cove	N/A	1,088	1,465	1,569	2,026

Source: U.S. Census and NC State Data Center

Land Use

Land use refers to the physical patterns of activities and functions within an area. The generation and attraction of trips created by the land use along a particular transportation facility are related to the types of land use adjacent to the facility and the intensity of land use affects the traffic patterns for multi-modal facilities. For instance, a shopping center generates larger traffic volumes than does a residential neighborhood. 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.

For transportation planning purposes, land use is typically divided into the following categories:

- 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.
- Agricultural: All land is devoted to the use of buildings or structures for the raising of non-domestic animals and/or growing of plants for food and other production.

Stokes County: A Land Development Guide was used in the development of the Stokes County CTP to help determine the type and location of transportation facilities that will be needed to serve the area. The Stokes County Land Development Guide divides land use into the following classifications:

- Developed: The purpose of the Developed class is to provide for continued intensive development and redevelopment of existing cities, towns and their urban environment. Areas meeting the intent of the Developed classification are currently urban in character where minimal undeveloped land remains and that have in place, or are scheduled for the timely provision of, the usual municipal or public services.

- Urban Transition: The purpose of the Urban Transition class is to provide for future intensive urban development on land that are suitable and that will be provided with the necessary urban services to support intense urban development. Areas meeting the intent of Urban Transition classification are presently being developed for urban purposes or will be developed in the next five to ten years to accommodate anticipate population and urban growth.

- Limited Transition: The purpose of the Limited Transition class is to provide for development in areas that will have some services but that are only suitable for lower densities that those associated with the Urban Transition class and/or areas that are geographically remote from existing towns and municipalities. Areas meeting the intent of the Limited Transition classification will experience increased development during the planning period. They will be in a state of development necessitating some municipal type services such as community water and sewage systems.

- Community: The purpose of the Community class is to provide for clustered, mixed land uses at low densities to help meet the housing, shopping and employment needs of rural areas. Areas meeting the intent of the Community classification are presently developed at low densities that are suitable for private septic tank use. Municipal type services should be anticipated only to correct existing or projected public health hazards.

- Rural: The purpose of the Rural class is to provide for agriculture, forestry, mineral extraction and other allied land uses. Areas meeting the intent of the Rural classification are appropriate for or presently used for agriculture, forestry, mineral extraction and other uses due to their hazardous or noxious nature should be located in a relative isolated and undeveloped area. Very low density dispersed single family residential uses are appropriate within Rural class.

- Conservation: The purpose of the Conservation class is to provide for the effective long-term management and protection of significant, limited or irreplaceable areas. Management is needed due to the natural, cultural, recreational, scenic or natural productive values of both local and more than local concern.

Figures 3 and 4 show the existing and future land use for Stokes County.

Existing Land Use

Legend

- Single-Family Residential
- Multi-Family Residential
- Commercial
- Industrial
- Institutional
- Agricultural/Residential
- Conservation
- County Boundary
- Corporate Limits
- Hanging Rock State Park
- State & U.S. Hwys
- Local Roads
- Rivers or Creeks

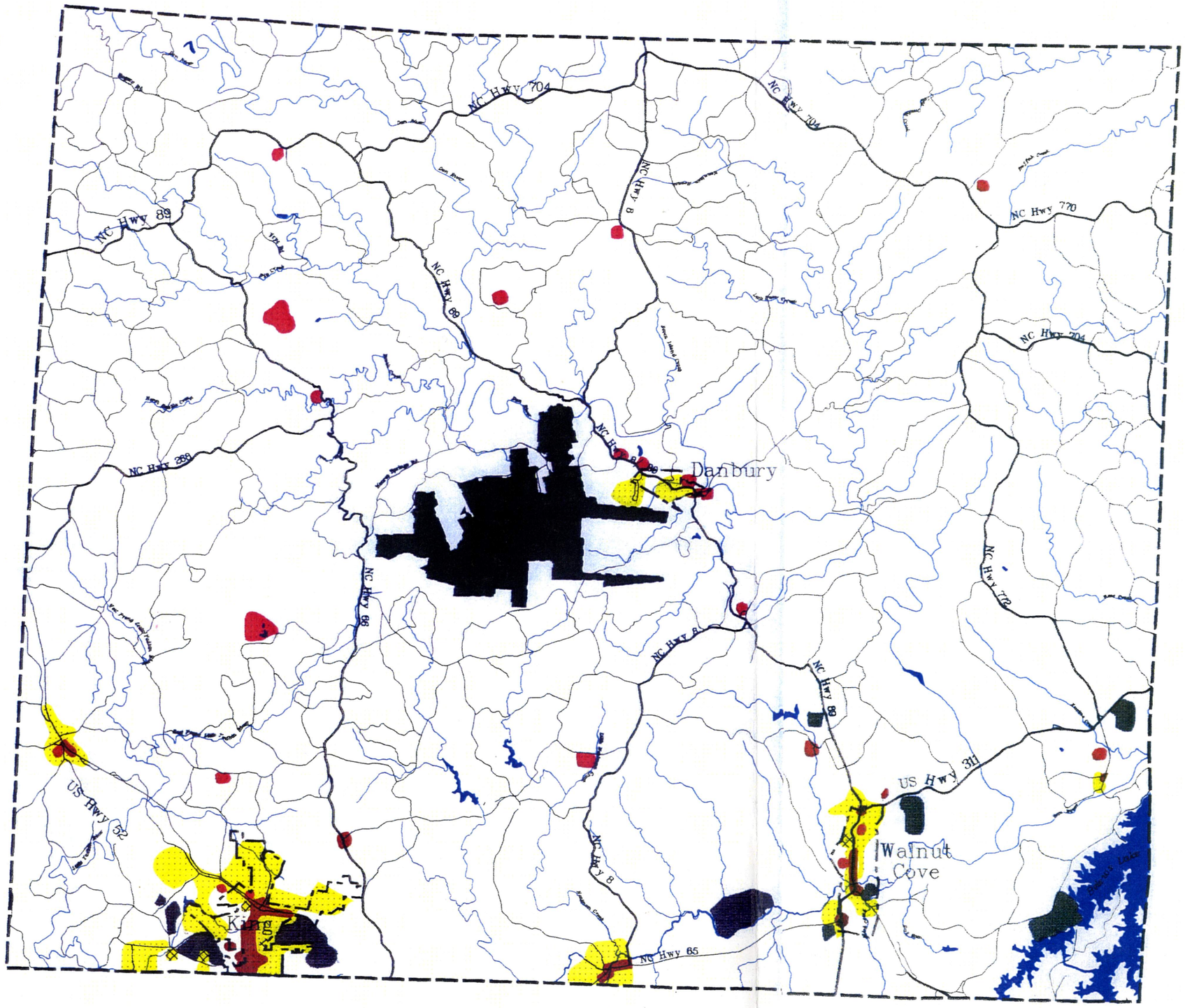


Figure 3

SCALE 1:140,000

0 10000 20000 30000 40000 FEET

Map produced by The North Caroline Division of Community Assistance

Future Land Use

Legend

- Developed
- Urban Transition
- Limited Transition with Public Services
- Limited Transition with Private Services
- Community
- Conservation - Water
- Conservation - Land
- Future Planning Areas
- Future Interstate Highway
- Proposed Minor Arterials
- Scenic Corridor
- County Boundary
- Corporate Limits
- Hanging Rock State Park
- State & U.S. Hwys
- Local Roads
- Rivers or Creeks

Figure 4

SCALE 1:140,000

0 10000 20000 30000 40000 FEET

Map produced by The North Carolina Division of Community Assistance

Roadway System

An important stage in the development of a CTP 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. Roadway deficiencies may be localized, resulting from problems with inadequate pavement width, intersection geometry, or intersection controls. 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 examines 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, along with population growth, economic development potential, and land use trends, is used to analyze factors that will impact the future system.

Traffic Crash Analysis

Traffic collisions or "crashes" are often used as an indicator for locating congestion and roadway problems. Crashes may be a result of the driver, or vehicle performance or 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 1, 2004 to December 31, 2006 was studied as part of the development of the CTP. The crash analysis considered both crash frequency and severity. Crash frequency is the total number of reported crashes, while the severity index is based on a series of weighting factors developed by the NCDOT. These factors define a fatal or incapacitating crash as 47.7 times more severe than one involving only property damage, and a crash resulting in minor injury as 11.8 times more severe than one with only property damage. In general, a higher severity index indicates more severe crashes. Listed below are levels of severity for various severity index ranges.

Table 3 : Severity Index

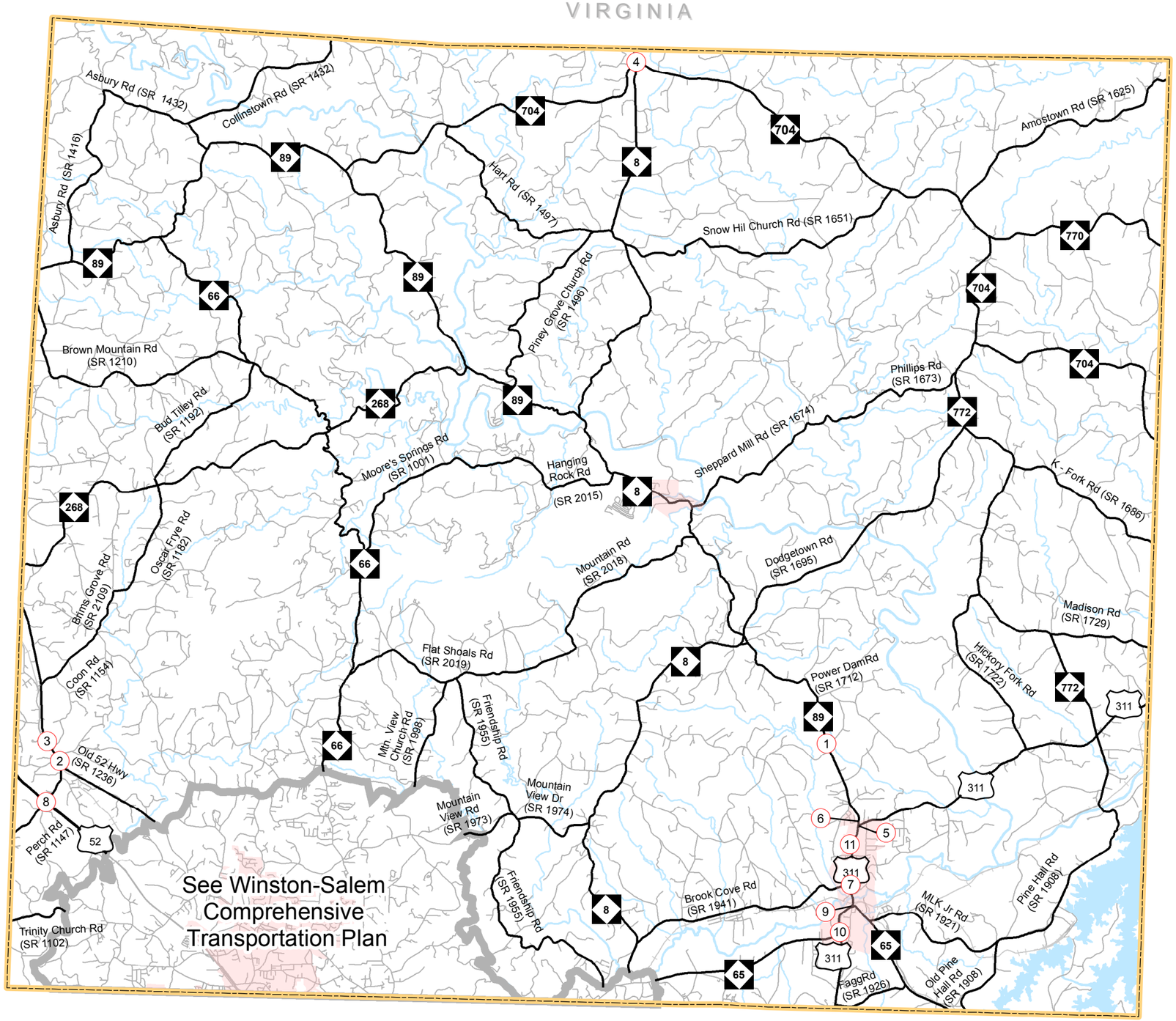
Severity	Severity Index
Low	< 6.0
Average	6.0 to 7.0
Moderate	7.0 to 14.0
High	14.0 to 20.0
Very High	> 20.0

Table 4 depicts a summary of the crashes occurring in the planning area between January 1, 2004 and December 31, 2006. The data represents locations with 5 or more crashes and/or a severity average greater than that of the state's 4.87 index. The "Total" column indicates the total number of crashes reported within 150-ft of the intersection during the study period. The severity listed is the average crash severity for that location. Crash locations are displayed is Figure 5.

Table 4: Crash Locations				
Location of Crash*			Average Severity	Total no. of Crashes
Map Index	Road A	Road B		
1	NC89	Rothrock Rd SR1715	26.89	7
2	Perch Rd SR1147	Old Hwy 52 SR1236	15.10	8
3	Old VFW Rd SR1152	Old Hwy 52 SR1236	5.44	5
4	NC8	NC704	5.44	5
5	NC89	Main	5.44	5
6	US311	NC89	3.96	5
7	Main	Third	3.11	7
8	US52	Perch Rd SR1147	2.06	7
9	Main	Stokesburg	2.48	5
10	US311	NC65	2.23	6
11	Main	Smith	1.00	5
	Totals			**65**

* Please refer to the Crash Location Map

NCDOT is actively involved with investigating and improving many of these locations. To request a more detailed analysis for any of the locations listed in Table 4, or other intersections of concern, contact the Division Traffic Engineer. Contact information for the Division Traffic Engineer is included in Appendix A.



NCDOT TPB
TRANSPORTATION PLANNING BRANCH

FIGURE 5

CRASH LOCATIONS

January 1, 2004 to December 31, 2006

- # Crash Locations
- Roads
- Railroads
- Planning Boundary
- County Boundary
- City Limits

STOKES COUNTY

N W E S

0 0.5 1 2 3 Miles

Base map date: August 2007

Refer to CTP document for more details

Bridge Conditions

Bridges are a vital element of a highway system. They represent the highest unit investment of all elements of the system. Second, any inadequacy or deficiency in a bridge reduces the value of the total investment. Third, a bridge presents the greatest opportunity of all potential highway failures for disruption of community welfare. Finally, and most importantly, a bridge represents the greatest opportunity of all highway failures for loss of life. For these reasons, it is imperative that bridges be constructed to the same design standards as the system of which they are a part.

The Transportation Improvement Program (TIP) development process for bridge projects involves consideration of several evaluation methods in order to prioritize needed improvements. A sufficiency index is used to determine whether a bridge is sufficient to remain in service, or to what extent it is deficient. The index is a percentage in which 100 percent represents an entirely sufficient bridge and zero represents an entirely insufficient or deficient bridge. Factors evaluated in calculating the index are listed below:

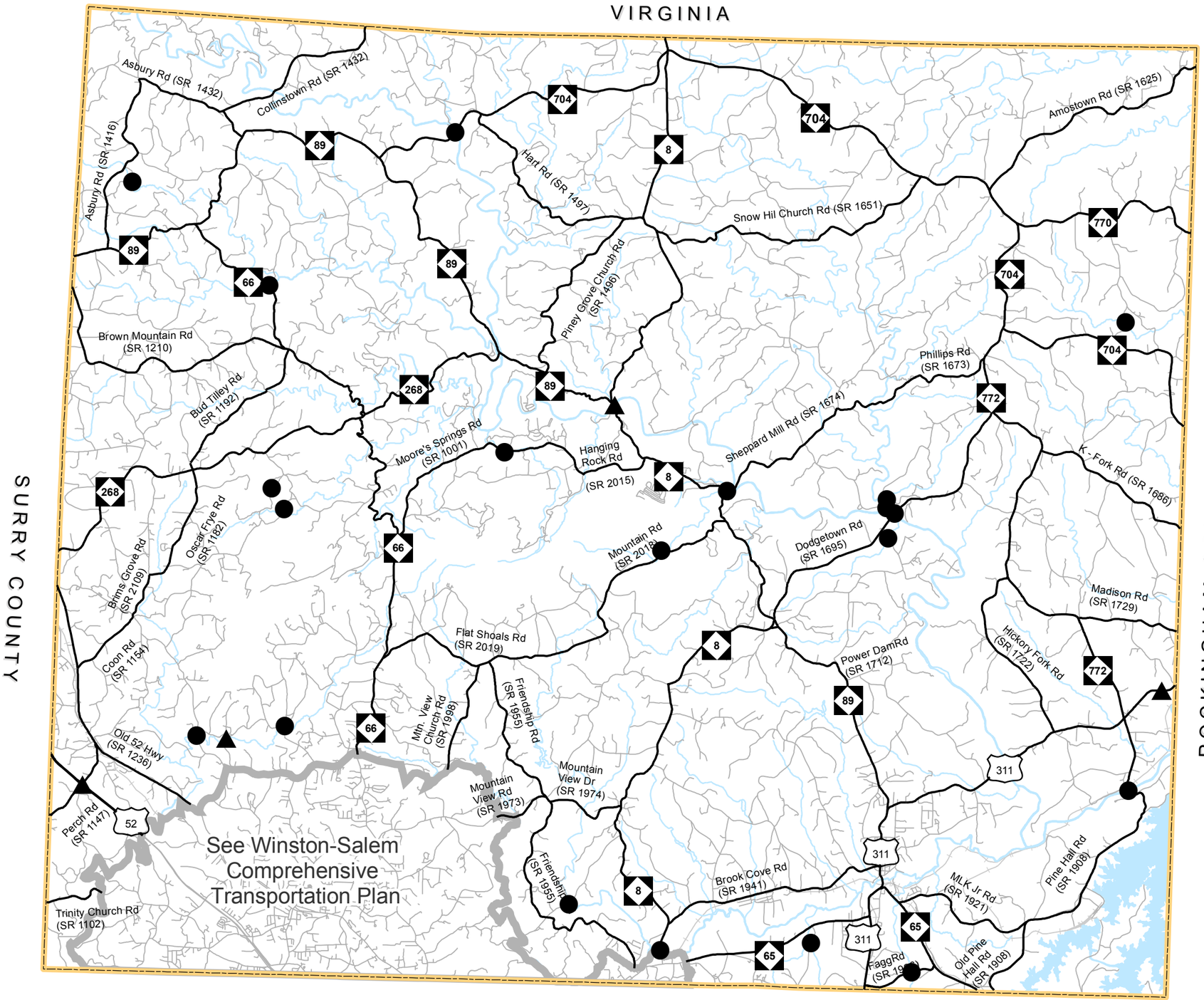
- structural adequacy and safety
- serviceability and functional obsolescence
- essentiality for public use
- type of structure
- traffic safety features

The NCDOT Bridge Maintenance Unit inspects all bridges in North Carolina at least once every two years. A sufficiency rating for each bridge is calculated and establishes the eligibility and priority for replacement. Bridges having the highest priority are replaced as Federal and State funds become available.

A bridge is considered deficient if it is either structurally deficient or functionally obsolete. A bridge that is at least ten years old is considered structurally deficient if it is in relatively poor structural condition or has an insufficient load-carry capacity due to either the original design or to deterioration. A bridge is considered functionally obsolete if it is narrow, has inadequate under-clearances, has insufficient load-carrying capacity, is poorly aligned with the roadway, and/or can no longer adequately serve existing traffic.

A bridge must be classified as deficient in order to quality for Federal replacement funds. Additionally, the sufficiency rating must be less than 50% to qualify for replacement or less than 80% to qualify for rehabilitation under federal funding. Deficient bridges within the planning area are listed in Table 5.

Table 5: Deficient Bridges				
Bridge Number	Route	Feature	Condition	CTP/TIP Project
8	NC704	DAN RIVER	Structurally Deficient	
11	SR1166	EAST PRONG CREEK	Structurally Deficient	B-5172
13	SR1136	LITTLE YADKIN CREEK	Structurally Deficient	
44	NC8	TOWN FORK CREEK OVERFLOW	Structurally Deficient	B-4280
52	SR1147	US52	Functionally Obsolete	
54	NC66	PINCH GUT CREEK	Structurally Deficient	B-4282
58	US311	RICKERS BRANCH	Functionally Obsolete	
60	NC8,NC89	DAN RIVER	Functionally Obsolete	B-4281
62	SR1961	NEATMAN CREEK	Structurally Deficient	
82	SR1674	DAN RIVER	Structurally Deficient	
103	SR1707	BRANCH OF DAN RIVER	Structurally Deficient	
104	SR1695	DAN RIVER	Structurally Deficient	
105	SR1697	SNOW CREEK	Structurally Deficient	B-4819
107	SR1696	SNOW CREEK	Structurally Deficient	
115	SR1908	DAN RIVER	Structurally Deficient	
119	SR1636	CREEK	Structurally Deficient	
153	SR1001	CREEK	Structurally Deficient	
174	SR1933	BRANCH S.FORK TOWN CREEK	Structurally Deficient	
176	SR1926	LICK CREEK	Structurally Deficient	
184	SR1175	CREEK	Structurally Deficient	
212	SR1224	EAST PRONG CREEK	Functionally Obsolete	
220	SR2017	CREEK	Structurally Deficient	
251	SR1185	CREEK	Structurally Deficient	
253	SR1402	BIG CREEK	Structurally Deficient	



NCDOT TPB
TRANSPORTATION PLANNING BRANCH

FIGURE 6

DEFICIENT BRIDGES

- Functionally Obsolete Bridges
- Structurally Deficient Bridges
- Roads
- Railroads
- Planning Boundary
- County Boundary
- City Limits

STOKES COUNTY

N W E S

0 0.5 1 2 3 Miles

Base map date: August 2007

Refer to CTP document for more details

Roadway Capacity Deficiencies

Capacity deficiencies occur when the traffic volume of a roadway is eighty percent or more of roadway's capacity. Travel volumes are based on the total number or vehicles that use a roadway on a typical day. These volumes are based on annual average daily traffic (AADT) counts taken annually by the NCDOT Traffic Survey Group.

Capacity is the maximum number of vehicles which have a "reasonable expectation" of passing 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 the following:

- 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.

2006 Roadway Capacity Analysis

A comparison of the 2006 travel demand volumes and their respective capacities for the major roadways in the planning area identified two small deficiencies. Table 6 and Figure 7 present 2006 volumes and capacities.

2035 Roadway Capacity Analysis

The capacity deficiency analysis for the 2035 design year is based upon a "no build" scenario. This analysis revealed several roadways within the planning area will be near or exceed capacity by the design year. Table 7 and Figure 8 present the

capacity deficiencies for the design year. Complete recommendations for these facilities are included in Chapter 2 of this report.

Table 6 - 2006 Capacity Deficiencies	
Roadway / Description	Deficiency
US 311 From SR 1941 (Brook Cove Road) to 1st Street	Over Capacity
US 311 From 1st Street to SR 1928 (Stokesburg Rd)	Near Capacity

Table 7 - 2035 Capacity Deficiencies	
Roadway / Description	Deficiency
US 311 From NC Highway 89 to NC Highway 65	Over Capacity
US 52 From Winston Salem Planning Area to Surry County	Over Capacity
NC 89 From Power Dam Road (SR 1712) to US 311	Over Capacity
NC 65 From Winston Salem Planning Area to US 311	Near Capacity
Old 52 Hwy (SR 1236) From Old Winston Road (SR 1152) to Mill Street (SR 1221)	Over Capacity

VIRGINIA

SURRY COUNTY

ROCKINGHAM COUNTY

FORSYTH COUNTY

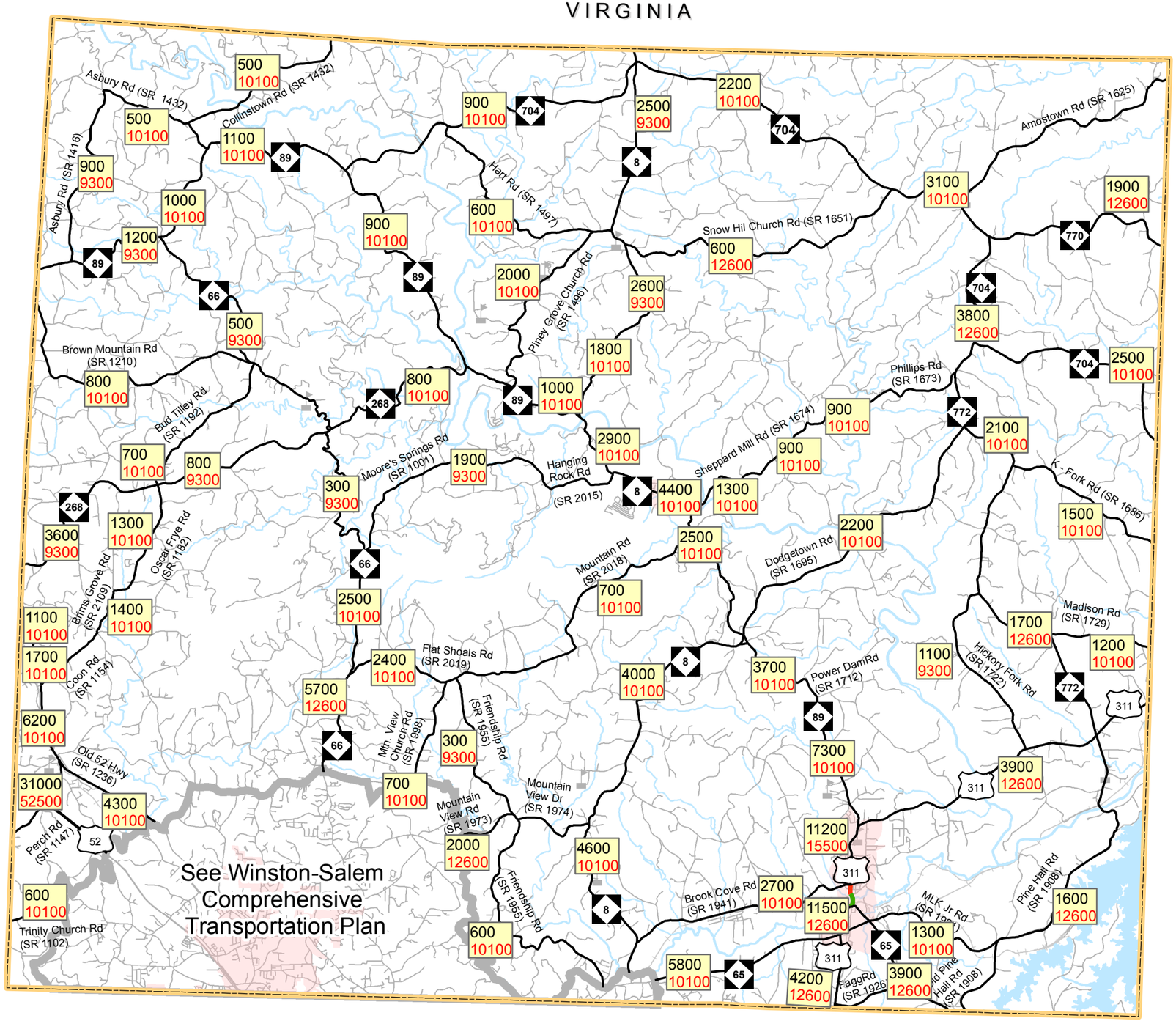


FIGURE 7

2006 VOLUMES AND ROADWAY DEFICIENCIES

- Near Capacity
- Over Capacity
- 000 / 000 — 2006 AADT / Existing Capacity
- Network Roads
- Railroads
- Planning Boundary
- County Boundary
- City Limits

STOKES COUNTY

N W E S

0 0.5 1 2 3 Miles

Base map date: August 2007

Refer to CTP document for more details

VIRGINIA

SURRY COUNTY

ROCKINGHAM COUNTY

FORSYTH COUNTY

See Winston-Salem Comprehensive Transportation Plan

NCDOT TPB
TRANSPORTATION PLANNING BRANCH

FIGURE 8

2035 VOLUMES AND ROADWAY DEFICIENCIES

- Near Capacity
- Over Capacity
- 000 / 000 — 2035 AADT / Existing Capacity
- Network Roads
- Railroads
- Planning Boundary
- County Boundary
- City Limits

STOKES COUNTY

N W E S

0 0.4 0.8 1.6 2.4 Miles

Base map date: August 2007

Refer to CTP document for more details

Level of Service (LOS)

The relationship of travel demand compared to the roadway capacity determines the level of service (LOS) of a roadway. Six levels of service identify the range of possible conditions. Designations range from LOS A, which represents the best operating conditions, to LOS F, which represents the worst operating conditions.

Design requirements for roadways vary according to the desired capacity and level of service. LOS D indicates "practical capacity" of a roadway, or the capacity at which the public begins to express dissatisfaction. 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. The six levels of service are described below and illustrated in Figure 9.

- **LOS A**: LOS A describes free-flow operations. Free-flow speeds prevail. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream. The effects of incidents or point breakdowns are easily absorbed at this level.

- **LOS B**: represents reasonably free flow, and free-flow speeds are maintained. The ability to maneuver within the traffic stream is only slightly restricted, and the general level of physical and psychological comfort provided to drivers is still high. The effects of minor incidents and point breakdowns are still easily absorbed.

- **LOS C**: provides for flow with speeds at or near the free flow speed of the freeway. Freedom to maneuver within the traffic stream is noticeably restricted, and lane changes require more care and vigilance on the part of the driver. Minor incidents may still be absorbed, but the local deterioration in service will be substantial. Queues may be expected to form behind any significant blockage.

- **LOS D**: is the level at which speeds begin to decline slightly with increasing flows and density begins to increase somewhat more quickly. Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort levels. Even minor incidents can be expected to create queuing, because the traffic stream has little space to absorb disruptions.

- **LOS E**: describes operation at capacity. Operations at this level are volatile, because there are virtually no usable gaps in the traffic stream. Vehicles are closely spaced, leaving little room to maneuver within the traffic stream. Any disruption of the traffic stream, such as vehicles entering from a ramp or a vehicle changing lanes, can establish a disruption wave that propagates throughout the upstream traffic flow. At capacity, the traffic stream has no ability to dissipate even the most minor disruption, and any incident can be expected to produce a serious breakdown with extensive queuing. Maneuverability within the traffic stream is extremely limited, and the level of physical and psychological comfort afforded the driver is poor.

- **LOS F**: describes breakdowns in vehicular flow; and with such stop-and-go conditions, it is difficult to predict a flow rate. These conditions generally exist within queues forming behind breakdown points. Breakdowns occur when the ratio of existing demand to actual capacity or of forecast demand to estimated capacity exceeds 1.00. The various reasons for these breakdowns (as identified in the HCM) include traffic incidents, which can cause a temporary reduction in the capacity of a short segment; and points of recurring congestion, such as merge or weaving segments and lane drops.

Figure 9 - Level of Service Illustrations

Level of Service A

Driver Comfort: High

Maximum Density:

12 passenger cars per mile per lane

Level of Service B

Driver Comfort: High

Maximum Density:

20 passenger cars per mile per lane

Level of Service C

Driver Comfort: Some Tension

Maximum Density:

30 passenger cars per mile per lane

Level of Service D

Driver Comfort: Poor

Maximum Density:

42 passenger cars per mile per lane

Level of Service E

Driver Comfort: Extremely Poor

Maximum Density:

67 passenger cars per mile per lane

Level of Service F

Driver Comfort: The lowest

Maximum Density:

More than 67 passenger cars per mile per lane

Source: 2000 Highway Capacity Manual

V. 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 in to the development of the CTP. These factors were also incorporated into the recommended improvements. Environmental features found in the study area are shown in Figure 10.

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 showed several wetlands throughout the study area. See Figure 10 for more information.

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 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 Table 8.

Table 8: Endangered Species	
Common Name	Scientific name
Vertebrate:	
Orangefin madtom	Noturus gilberti
Rustyside sucker	Thoburnia hamiltoni
Invertebrate:	
Diana fritillary (butterfly)	Speyeria diana
Green floater	Lasmigona subviridis
James Spinymussel	Pleurobema collina
Margarita River skimmer	Macromia margarita
Vascular Plant:	
Butternut	Juglans cinerea
Cuthbert turtlehead	Chelone cuthbertii
Schweinitz's sunflower	Helianthus schweinitzii
Small-anthered bittercress	Cardamine micranthera
Sweet pinesap	Monotropsis odorata

Updated: 05-10-2007 *

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). 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. 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. There are currently nine properties and two districts listed on the National Register in Stokes County.

Structures:

- Christ Episcopal Church
- Jessups Mill
- Matthew Moore House
- Moratock Iron Furnace
- Pine Hall
- Rock House
- Spencer Mill
- Stokes County Courthouse
- Walnut Cove “Colored” School

District:

- Hanging Rock State Park (Bath House)
- Danbury Historic District

Of the historic sites, there are none that will be impacted by the recommended improvements of this plan.

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.

Educational Facilities

The locations of educational facilities in Stokes County were considered during the development of this transportation plan. No proposed facilities or improvements shall displace any school or other educational facility.

VIRGINIA

SURRY COUNTY

ROCKINGHAM COUNTY

See Winston-Salem Comprehensive Transportation Plan

FORSYTH COUNTY

NCDOT TPB
TRANSPORTATION PLANNING BRANCH

FIGURE 10

ENVIRONMENTAL FEATURES

- Air Quality Pollution Discharge Sites
- Benthic Monitoring Result Sites
- NPDES Major Sites
- NPDES Minor Sites
- Unverified Stream Gaging Stations
- Stream Gaging Stations
- National Wetland Inventory
- Significant Aquatic Endangered Species Habitats
- High Quality Outstanding Resource Waters
- Groundwater Recharge and Discharge Areas
- Water Supply Watershed
- Rivers and Streams
- Lakes
- Roads
- Railroads
- Planning Boundary
- County Boundary
- City Limits

STOKES COUNTY

N
W E
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0 0.5 1 2 3 Miles

Base map date: August 2007

Refer to CTP document for more details

VI. Public Involvement

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, regardless the size of the area. This chapter is designed to provide an overview of the public involvement process implemented for development of the transportation plan for the county.

The Stokes County Comprehensive Transportation Plan was requested in January of 2005 by the County Planning Director. The Transportation Planning Branch met with the Planning Director on July 20, 2005 to identify the primary transportation concerns and to define the scope of the study.

On October 19, 2005, a meeting was held with various public officials and staff. These included: Planning, Economic Development, School Board, EMS, City of King, Town of Walnut Cove, and YVEDDI Transportation. CTP presentations were also made at Planning Board and County Commissioner Meetings to further discuss the transportation concerns.

One public drop-in session was held on March 1, 2006. This meeting was held in the County Commissioner's Meeting Room in Danbury. The Northwest Piedmont RPO published an advertisement in the news paper and it was posted on Stokes County and NWPRPO's website.

As part of a public involvement process, in October 2006, the Stokes County Transportation Survey was made available. The survey could be obtained from the town hall (Danbury and Walnut Cove), various public libraries, and the County Commissioner's office. The survey was also made available online and was sent via postal mail to 800 randomly selected households. Approximately 100 responses were received and analyzed.

Public hearings were held during County Commissioners and Town Officials meetings to discuss the plan recommendations and to solicit further input from the public. The plan was adopted by Danbury Town Officials on February 27, 2008, Walnut Cove Town Officials on March 4, 2008, and the Stokes County Commissioners on April 1, 2008.

The Town of Walnut Cove Commissioners adopted the CTP with the provision that there be no widening of the road between the intersection of NC 89/US 311 and US 311/US 65, and that the section of road be maintained as a two-lane highway. Officials have indicated their desire to keep on street parking.

The Northwest Piedmont RPO endorsed the CTP on June, 17, 2008. The North Carolina Department of Transportation adopted the Stokes County CTP on September 4, 2008.

APPENDICES

Appendix A

Resources and Contacts

North Carolina Department of Transportation

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**
Current contact information for the Board of Transportation may be accessed from the NCDOT homepage below or by calling the Customer Service Office.
https://apps.dot.state.nc.us/dot/directory/authenticated/UnitPage.aspx?id=30

Highway Division Engineers
Division specific contact information can be found at
https://apps.dot.state.nc.us/dot/directory/authenticated/ToC.aspx

Division Engineer
Contact the Division Engineer with general questions concerning NCDOT activities within each Division; information on Small Urban Funds.

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

Division Traffic Engineer
Contact the Division Traffic Engineer for information concerning high crash locations.

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

County Maintenance Engineer
Contact the County Maintenance Engineer regarding any maintenance activities, such as drainage.

Transportation Planning Branch (TPB)
Contact the Transportation Planning Branch with long-range planning questions.
1554 Mail Service Center
Raleigh, NC 27699-1554
(919) 733-4705
https://apps.dot.state.nc.us/dot/directory/authenticated/UnitPage.aspx?id=3234

Secondary Roads Office
Contact the Secondary Roads Office for information regarding the Industrial Access Funds Program.
P.O. Box 25201
Raleigh, NC 27699
(919) 733-3250
https://apps.dot.state.nc.us/dot/directory/authenticated/UnitPage.aspx?id=135

Program Development Branch
Contact the Program Development Branch for information concerning Roadway Official Corridor Maps and the Transportation Improvement Program (TIP).
1534 Mail Service Center
Raleigh, NC 27699-1534
(919) 733-2039
https://apps.dot.state.nc.us/dot/directory/authenticated/UnitPage.aspx?id=632

Project Development & Environmental Branch (PDEA)
Contact PDEA for information on environmental studies for projects that are included in the TIP.
1548 Mail Service Center
Raleigh, NC 27699-1548
(919) 733-3141
https://apps.dot.state.nc.us/dot/directory/authenticated/UnitPage.aspx?id=3212

Highway Design Branch
Contact the Highway Design Branch for information regarding alignment for projects that are included in the TIP.
1584 Mail Service Center
Raleigh, NC 27699-1584
(919) 250-4001
https://apps.dot.state.nc.us/dot/directory/authenticated/UnitPage.aspx?id=659

Public Transportation Division
Contact the Public Transportation Division for information public transit systems.
1550 Mail Service Center
Raleigh, NC 27699-1550
(919) 733-4713
https://apps.dot.state.nc.us/dot/directory/authenticated/UnitPage.aspx?id=3366

Other NCDOT Departments

Contact information for other departments within the NCDOT not listed here are available by calling the Customer Service Office or by visiting the NCDOT homepage at https://apps.dot.state.nc.us/dot/directory/authenticated/ToC.aspx

Other State Government Offices

Division of Community Assistance

Contact the Division of Community Assistance for information regarding the Community Planning Program. You may find their contact information at:
http://www.nccommerce.com/en/CommunityServices/

Strategic Planning Office (SPOT)

Contact SPOT for information regarding the project prioritization.
1501 Mail Service Center
Raleigh, NC 27699-1501
(919) 715-0951
https://apps.dot.state.nc.us/dot/directory/authenticated/UnitPage.aspx?id=11054

Division of Bicycle and Pedestrian Transportation (DBPT)

Contact DBPT for information regarding Bicycle and Pedestrian planning
1552 Mail Service Center
Raleigh, NC 27699-1552
(919)807-0777
http://www.ncdot.org/transit/bicycle

Piedmont Authority for Regional Transportation (PART)

7800 Airport Center Drive, Suite 102
Greensboro, NC 27409
(336) 662-0002
http://www.partnc.org

Division 9, District 2 Contacts (Stokes County)

District II Engineer
Mr. John P. Rhyne, PE
375 Silas Creek Parkway
Winston Salem, NC 27127
(336)703-6600
jprhyne@ncdot.gov

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Mr. Ralph H. Womble
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Raleigh, NC 27699-1554
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ewthomas@ncdot.gov

NW Piedmont RPO Planner
Mr. Marc Allred
400 West Fourth St, Ste 400
Winston Salem, NC 27101
(336)761-2111
mallred@nwpcog.org

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Ms. Vernia Wilson
1554 Mail Service Center
Raleigh, NC 27699-1554
(919) 733-4705
vrwilson1@ncdot.gov

Appendix B

Comprehensive Transportation Plan Definitions

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' or for 350' plus 650' 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 2000 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 as permitted by the NCDOT *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 NCDOT *Driveway Manual*

- **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, included plane, cable car, automated guide way 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 corridor 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 meet 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.
- **On-Road 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.
- **On-Road 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.
- **Off Road 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.
- **Off Road 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.

Pedestrian Map

Definitions for the pedestrian map are under development.

Appendix C
Street Tabulation and Recommendations

This appendix includes a detailed tabulation of all streets identified as elements of the Stokes County Comprehensive Transportation Plan. The table includes a description of the roads by sections, as well as the length, cross section, and right-of-way for each section. Also included are the existing and projected average daily traffic volumes, roadway capacity, and the recommended ultimate lane configuration. Due to space constraints, these recommended cross sections are given in the form of an alphabetic code. A detailed description of each of these codes and an illustrative figure for each can be found in Appendix D.

FACILITY & SECTION	2006 CONDITIONS						2035 CONDITIONS		
	DIST Mi.	ROW (Ft.)	LANES	SURF WIDTH (Ft)	2006 AADT	CAPACITY	2035 AADT	PROPOSED CAPACITY	REC Cross SECTION
US 311									
Rockingham County Line to Walnut Cove City Limit	6.48	100	2	24	3900	12600	5800	12600	ADQ
Walnut Cove City Limit(East) to NC 89	0.43	60	2	24	4400	12600	7000	12600	ADQ
NC 89 to 7th St.	0.91	60	2	24	11200	12600	17200	24700	E
7th St. to 5th St	0.25	60	3	40	11200	15500	17200	24700	E
5th St. to SR 1941	0.12	60	3	34	13200	15500	20300	24700	E
SR 1941 to 1st St.	0.19	100	2	24	13200	12600	20300	24700	E
1st St. to SR 1928	0.25	60	2	22	13200	12600	20300	24700	E
SR 1928 to NC 65	0.69	60	2	24	11500	12600	18200	24700	G
NC 65 to Forsyth County Line	1.54	100	2	24	4200	12600	7400	12600	ADQ
US 52									
Surry County Line to Winston Salem UAB	2.38	200	4	48	31000	52500	60000	75100	L
NC Highway 772									
SR 1690 to US 311	5.52	60	2	24	1700	12600	3100	12600	ADQ
NC 704 to SR 1690	4.90	60	2	20	2100	10100	3600	12600	K
NC Highway 770									
NC 704 to Rockingham County Line	4.31	60	2	24	1900	12600	3400	12600	ADQ
NC Highway 704									
NC 89 to NC 8	7.26	100	2	20	900	10100	1500	10100	ADQ
NC 8 to SR 1651	6.15	60	2	20	2200	10100	3400	12600	K
SR 1651 to NC 770	2.58	60	2	20	3100	10100	5800	12600	K
NC 770 to NC 772	2.47	60	2	24	3800	12600	6600	12600	ADQ
NC 772 to Rockingham County Line	5.39	100	2	20	2500	10100	4400	12600	K
NC Highway 268									
Surry County Line to SR 1182	3.93	60	2	18	3600	9300	6400	12600	K
SR 1182 to NC 66	4.01	60	2	18	800	9300	1500	12600	K
NC 66 to NC 89	3.86	60	2	20	800	10100	1500	10100	ADQ
NC Highway 89									
Surry County Line to NC 66	2.90	60	2	18	1200	9300	1900	9300	ADQ
NC 66 to SR 1432	2.42	60	2	18	1000	9300	1700	9300	ADQ
SR 1432 to NC 704	3.28	100	2	20	1100	10100	1800	10100	ADQ
NC 704 to NC 268	5.33	100	2	20	900	10100	1400	10100	ADQ
NC 268 to NC 8	2.75	100	2	20	1000	10100	1700	10100	ADQ

FACILITY & SECTION	2006 CONDITIONS						2035 CONDITIONS		
	DIST Mi.	ROW (Ft.)	LANES	SURF WIDTH (Ft)	2006 AADT	CAPACITY	2035 AADT	PROPOSED CAPACITY	REC Cross SECTION
NC 8 to SR 1712	2.24	100	2	22	3700	10100	5800	10100	ADQ
SR 1712 to US 311	2.84	100	2	22	7300	10100	11200	12600	K
NC Highway 66									
NC 89 to NC 268	6.44	60	2	18	500	9300	800	12600	K
NC 268 to SR 1001	3.95	60	2	18	300	9300	500	12600	K
SR 1001 to SR 2019	2.77	60	2	20	2500	10100	4400	12600	K
SR 2019 to Winston Salem UAB	2.23	60	2	24	5700	12600	9000	12600	ADQ
NC Highway 65									
US 311 to Forsyth County Line	3.13	100	2	24	3900	12600	6300	12600	ADQ
US 311 to SR 1928	.025	100	2	24	5900	12600	9000	12600	ADQ
Winston Salem UAB to US 311	4.12	100	2	22	5800	12600	9100	24700	F
NC 65 Re-route (Proposed)									
US 311 to MLK Jr. Rd.	0.66	N/A	N/A	N/A	N/A	N/A	4500	12600	K
NC Highway 8									
Virginia State Line to SR 1496	3.87	70	2	20	2500	9300	4500	12600	K
SR 1496 to SR 1655	1.85	70	2	20	2600	9300	4100	12600	K
SR 1655 to NC 89	2.97	70	2	20	1800	10100	3000	12600	K
NC 89 to SR 2015	1.50	70	2	23	2900	10100	4600	12600	K
SR 2015 to Danbury City Limit (North)	.600	60	2	23	4000	10100	7200	12600	K
Danbury City Limit (North) to SR 1674	1.22	70	2	23	4400	10100	7000	12600	K
SR 1674 to SR 1695	3.14	70	2	23	2500	10100	3900	12600	K
SR 1695 to Winston Salem UAB	9.38	60	2	23	4600	10100	8400	12600	K
State Road 2109 (Brims Grove Rd)									
SR 1182 to SR 1157	0.94	60	2	19	1400	10100	2700	12600	K
State Road 2019 (Flat Shoals Rd)									
NC 66 to SR 2018	5.24	60	2	22	2400	10100	1500	10100	ADQ
State Road 2018 (Mountain Rd)									
SR 2019 to NC 8	4.11	60	2	20	700	10100	1200	10100	ADQ
State Road 2015 (Hanging Rock Rd)									
SR 1001 to NC 8/89	5.24	60	2	22	2400	10100	1500	10100	ADQ

FACILITY & SECTION	2006 CONDITIONS						2035 CONDITIONS		
	DIST Mi.	ROW (Ft.)	LANES	SURF WIDTH (Ft)	2006 AADT	CAPACITY	2035 AADT	PROPOSED CAPACITY	REC Cross SECTION
State Road 1998 (Mtn View Church Rd)									
SR 2019 to Winston Salem UAB	2.86	60	2	20	700	10100	1200	10100	ADQ
State Road 1974 (Mountain View Rd)									
SR 1955 to NC 8	1.75	60	2	17	700	9300	1100	12600	K
State Road 1973 (Mountain View Rd)									
Winston Salem UAB to SR 1955	1.20	60	2	24	2000	12600	3700	12600	ADQ
State Road 1955 (Friendship Rd)									
SR 2019 to SR 1974	3.52	60	2	18	300	9300	600	12600	K
SR 1974 to Winston Salem UAB	5.51	60	2	20	600	10100	1200	10100	ADQ
State Road 1941 (Brook Cove Rd)									
NC 8 to US 311	4.84	60	2	22	2700	10100	4800	10100	ADQ
State Road 1926 (Fagg Rd)									
US 311 to NC 65	1.51	60	2	20	600	10100	1200	12600	K
State Road 1921 (MLK Jr Rd)									
NC 65 to SR 1908	3.23	60	2	20	1300	10100	1900	12600	K
State Road 1908 (Pine Hall Rd)									
US 311 to Forsyth County Line	7.89	60	2	24	1600	12600	2200	12600	ADQ
State Road 1747 (GW Southern Rd)									
NC 8 to NC 89	0.16	60	2	20	1100	10100	1700	10100	ADQ
State Road 1729 (Madison Rd)									
NC 772 to Rockingham County Line	2.13	60	2	20	1200	10100	2000	10100	ADQ
State Road 1722 (Hickory Fork Rd)									
NC 772 to US 311	4.08	60	2	18	1100	9300	1700	12600	K
State Road 1695 (Dodgetown Rd)									
NC 8 to NC 772	6.94	60	2	20	2200	10100	4200	12600	K

FACILITY & SECTION	2006 CONDITIONS						2035 CONDITIONS		
	DIST Mi.	ROW (Ft.)	LANES	SURF WIDTH (Ft)	2006 AADT	CAPACITY	2035 AADT	PROPOSED CAPACITY	REC Cross SECTION
State Road 1686 (K. Fork Rd)									
NC 770 to Rockingham County Line	3.63	60	2	22	1500	10100	2000	10100	ADQ
State Road 1674 (Sheppard Mill Rd)									
SR 1670 to SR 1673	1.07	40	2	22	900	10100	1500	12600	K
NC 8 to SR 1670	2.23	40	2	20	1300	10100	2500	12600	K
State Road 1673 (Phillps Rd)									
SR 1674 to NC 772	2.10	60	2	20	900	10100	1500	10100	ADQ
State Road 1651 (Snow Hill Church Rd)									
NC 8 to NC 704	6.66	60	2	18	600	9300	1000	12600	K
State Road 1625 (Amostown Rd)									
NC 704 to Rockingham County line	5.62	60	2	22	1500	10100	2500	10100	ADQ
State Road 1497 (Hart Rd)									
NC 704 to SR 1496	5.63	60	2	20	600	10100	1000	10100	ADQ
State Road 1496 (Piney Grove Church Rd)									
NC 8 to NC 89	4.97	60	2	22	2000	10100	3200	12600	K
State Road 1432 (Collinstown Rd)									
Virginia State Line to SR 1432	3.96	60	2	20	500	10100	700	12600	K
State Road 1416 (Ashbury Rd)									
SR 1416 to NC 89	4.10	60	2	18	900	9300	1600	12600	K
State Road 1413 (Ashbury Rd)									
SR 1432 to NC 89	2.63	60	2	20	500	10100	700	10100	ADQ
State Road 1236 (Old Hwy 52 Rd)									
Surry County Line to SR 1154	1.8	60	2	20	1100	10100	2400	10100	ADQ
SR 1154 to SR 1152	1.17	60	2	20	1700	10100	6100	12600	K
SR 1152 to SR 1221	.77	60	2	20	6200	10100	10400	12600	K
SR 1221 to Winston Salem UAB	2.29	60	2	20	4300	10100	6500	12600	K
State Road 1210 (Brown Mountain Rd)									
Surry County Line to NC 66	6.26	60	2	20	800	10100	1300	10100	ADQ

FACILITY & SECTION	2006 CONDITIONS						2035 CONDITIONS		
	DIST Mi.	ROW (Ft.)	LANES	SURF WIDTH (Ft)	2006 AADT	CAPACITY	2035 AADT	PROPOSED CAPACITY	REC Cross SECTION
State Road 1192 (Bud Tilley Rd)									
NC 268 to NC 66	.94	60	2	20	700	10100	1200	10100	ADQ
State Road 1182 (Oscar Frye Rd)									
SR 2109 to NC 268	.94	60	2	20	1300	10100	2700	12600	K
State Road 1157 (Volunteer Rd)									
SR 1154 to SR 2109	.04	60	2	18	1400	9300	2700	9300	ADQ
State Road 1154 (Coon Rd)									
SR 1157 to SR 1236	1.61	60	2	20	1700	10100	3000	12600	K
State Road 1147 (Perch Rd)									
Surry County Line To US 52	0.86	60	2	22	3100	10100	6000	12600	K
US 52 to SR 1236	1.07	60	2	24	5500	12600	9700	12600	ADQ
State Road 1102 (Trinity Church Rd)									
Surry County Line to Winston Salem UAB	0.47	60	2	18	600	9300	1000	12600	K
State Road 1001 (Moore's Spring Rd)									
NC 66 to NC 8	6.92	30	2	18	1900	9300	2600	9300	ADQ
Southern Connector (Proposed)									
Winston Salem UAB to US 311	5.6	N/A	N/A	N/A	N/A	N/A	6000	12600	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. These 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 CTP, 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 C 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 E. The typical cross sections are described below.

A: Four Lanes Divided with Median - Freeway

Cross section "A" is typical for four-lane divided highways in rural areas that may have only partial or no control of access. The minimum median width for this cross section is 46 feet, but a wider median is desirable.

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.

C: Five Lanes - Curb & Gutter

Typical for 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 major thoroughfares where left turns and intersection 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 - Boulevard, Grass Median

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

G: Four Lanes - Curb and Gutter

Cross section "G" 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 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, 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 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 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 - Freeway

Cross section “L” is typical for controlled access freeways. 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 freeways going through major urban areas or for routes projected to carry very high volumes of traffic.

N: Five Lanes with 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. Cross sections “N”, “O” and “P” are typically used to accommodate bicycle travel.

General

The urban curb and gutter cross sections all illustrate the sidewalk adjacent to the curb with a buffer or utility strip between the sidewalk and the minimum right-of-way line. This permits adequate setback for utility poles. If it is desired to move the sidewalk 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 right-of-way shown for each typical cross section is the minimum amount required encompassing 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 roadway construction.

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.

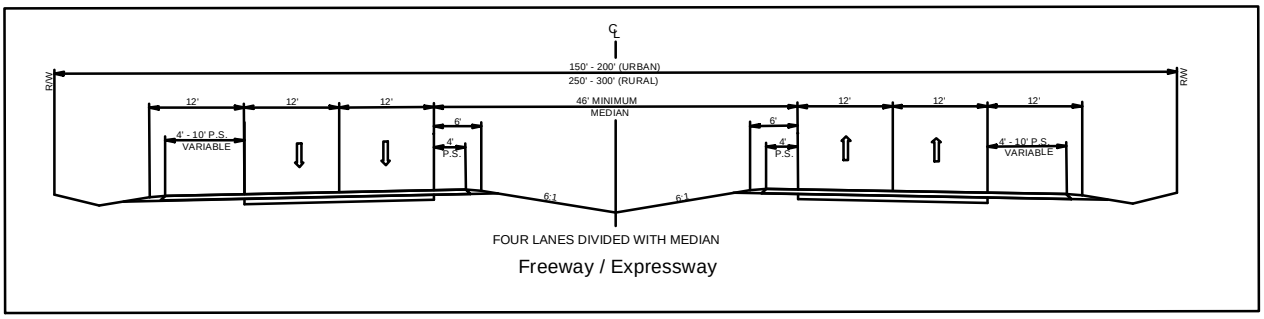
B-5: Multi-use Pathway

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.

Appendix D

TYPICAL HIGHWAY CROSS SECTIONS

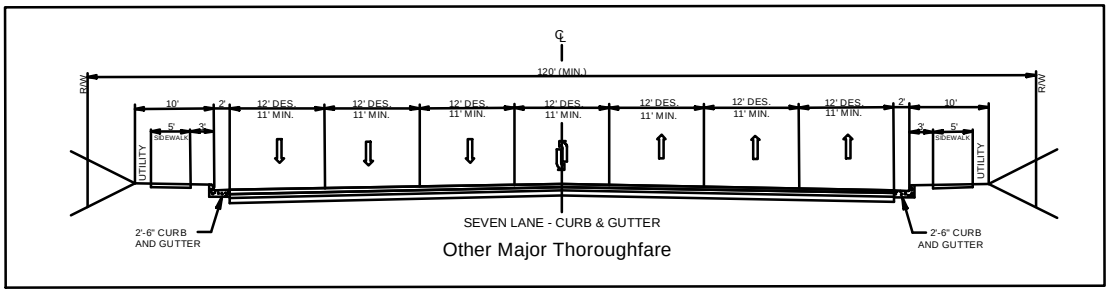
A



FOUR LANES DIVIDED WITH MEDIAN

Freeway / Expressway

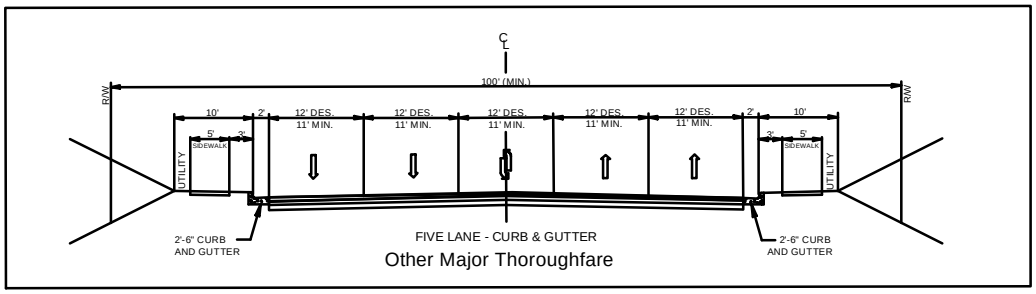
B



SEVEN LANE - CURB & GUTTER

Other Major Thoroughfare

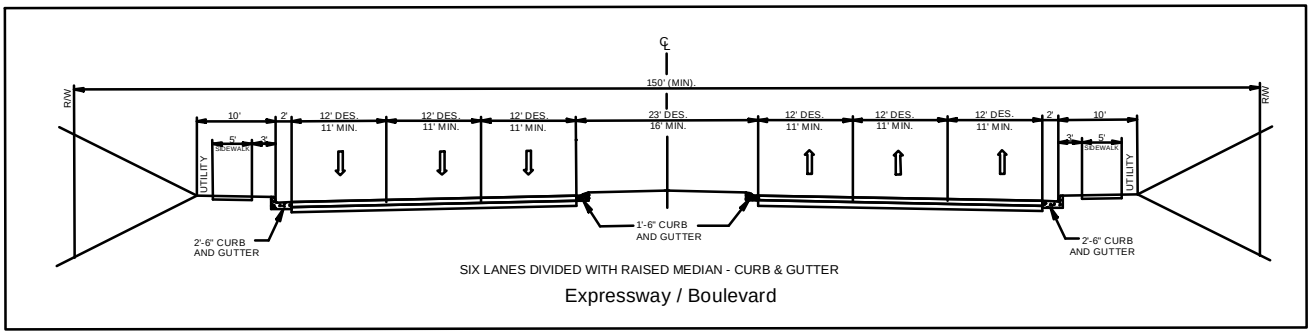
C



FIVE LANE - CURB & GUTTER

Other Major Thoroughfare

D



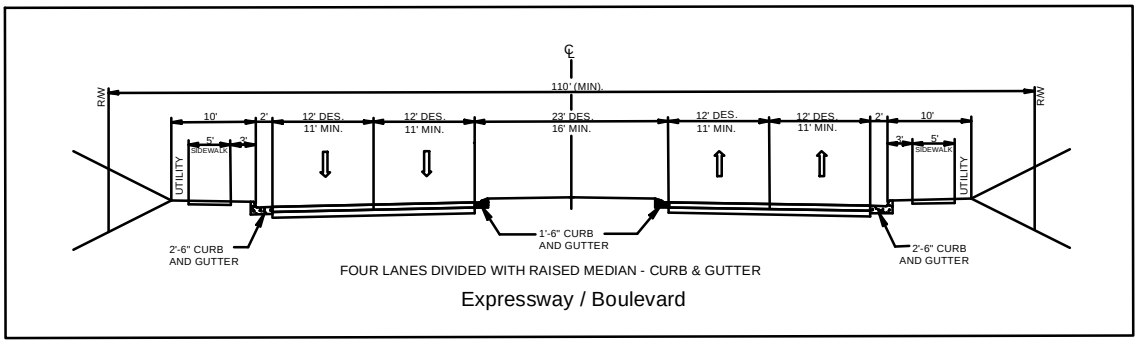
SIX LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER

Expressway / Boulevard

revised 04-01-05

TYPICAL HIGHWAY CROSS SECTIONS

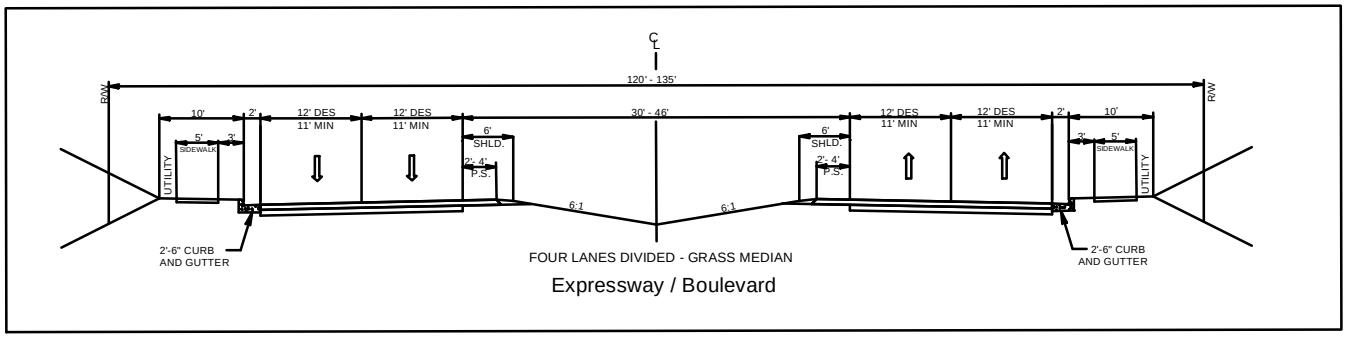
E



FOUR LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER

Expressway / Boulevard

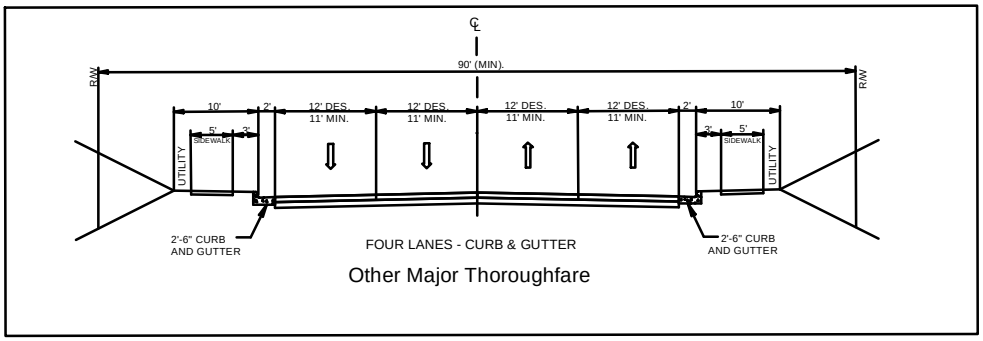
F



FOUR LANES DIVIDED - GRASS MEDIAN

Expressway / Boulevard

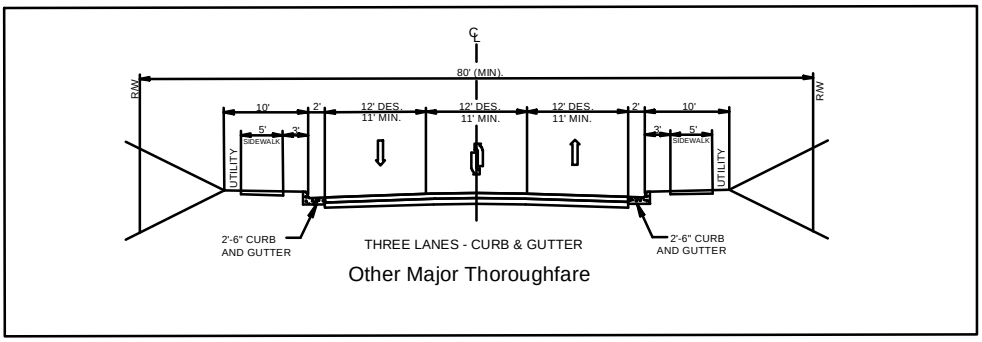
G



FOUR LANES - CURB & GUTTER

Other Major Thoroughfare

H

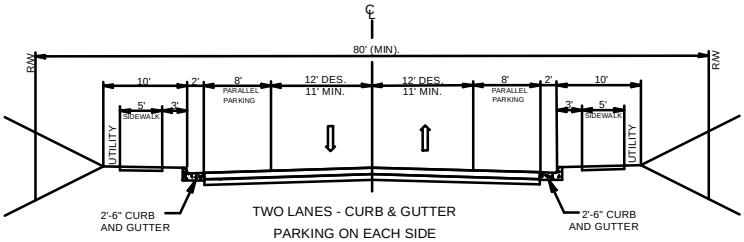


THREE LANES - CURB & GUTTER

Other Major Thoroughfare

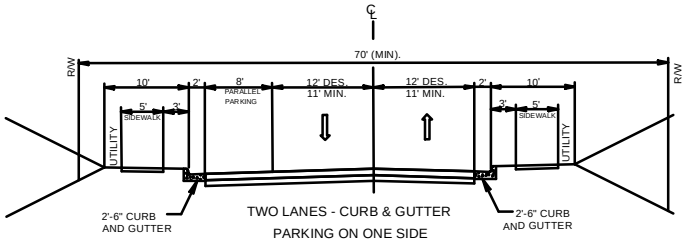
TYPICAL HIGHWAY CROSS SECTIONS

I



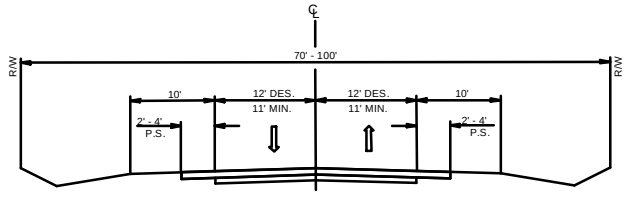
TWO LANES - CURB & GUTTER
PARKING ON EACH SIDE
Minor Thoroughfare

J



TWO LANES - CURB & GUTTER
PARKING ON ONE SIDE
Minor Thoroughfare

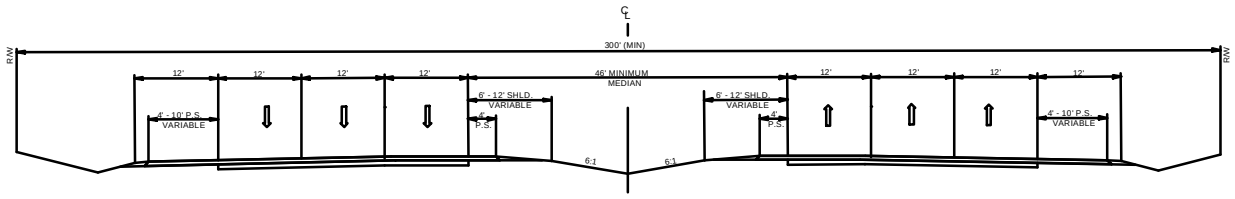
K



TWO LANES - PAVED SHOULDER
Minor Thoroughfare

TYPICAL HIGHWAY CROSS SECTIONS

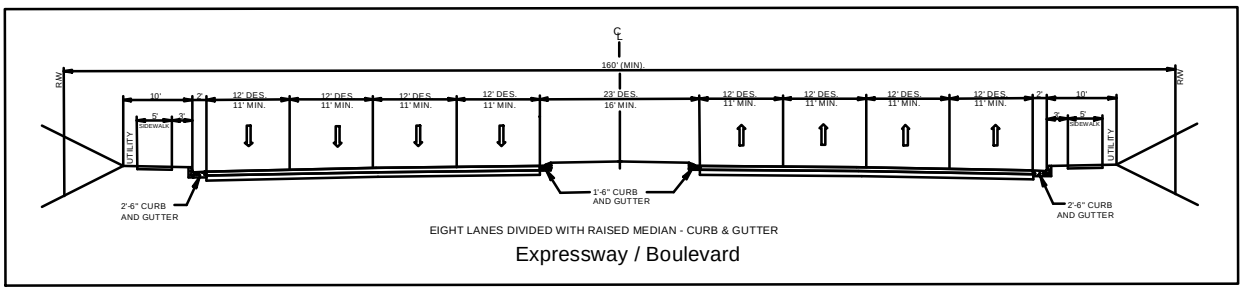
L



SIX LANES DIVIDED WITH GRASS MEDIAN

Freeway / Expressway

M



EIGHT LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER

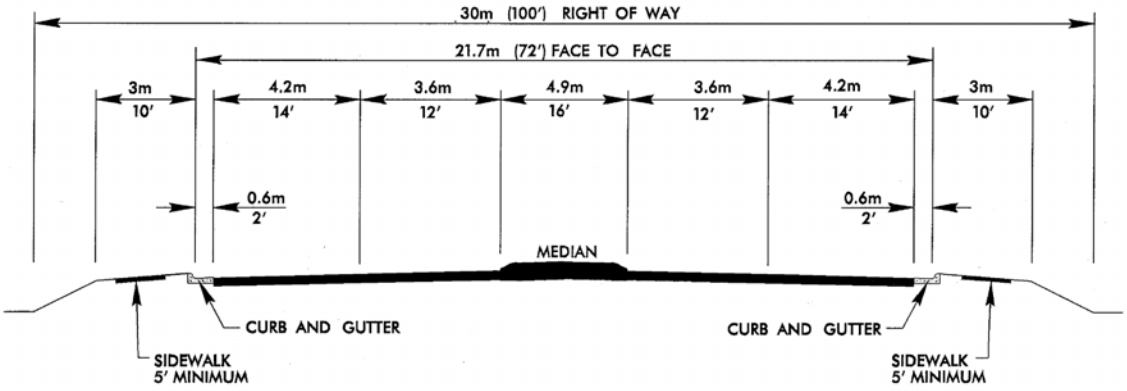
Expressway / Boulevard

Typical Bicycle Cross Sections

WIDE CURB LANES

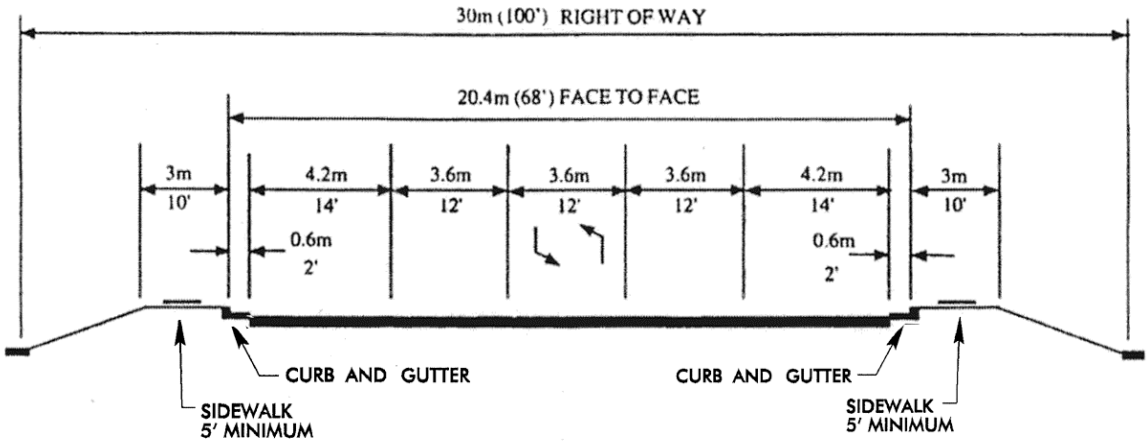
B –1 4-LANE MEDIAN DIVIDED TYPICAL SECTION

With Wide Outside Lanes



B-2 5-LANE TYPICAL SECTION

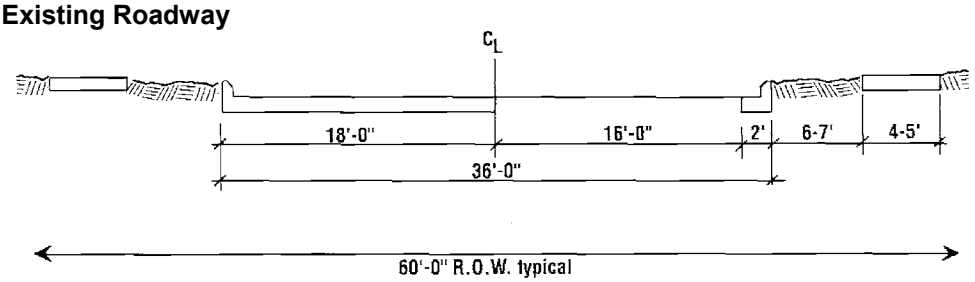
With Wide Outside Lanes



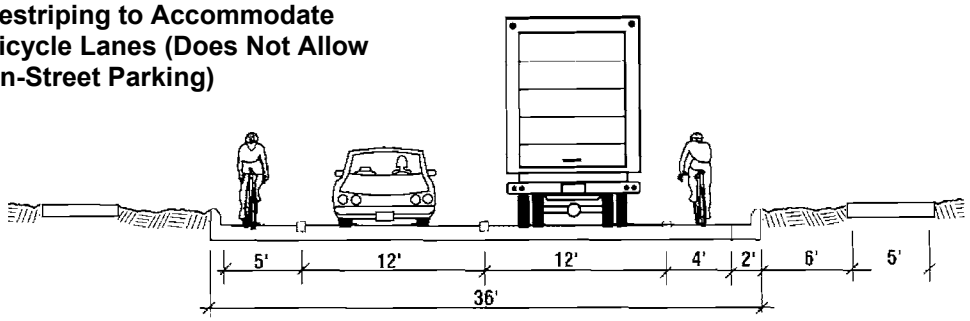
Typical Bicycle Cross Sections

B-3 BICYCLE LANES ON COLLECTOR STREETS

Existing Roadway



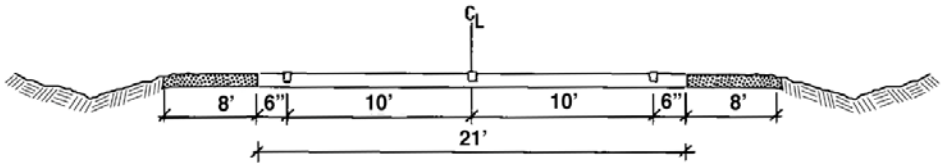
Restriping to Accommodate Bicycle Lanes (Does Not Allow On-Street Parking)



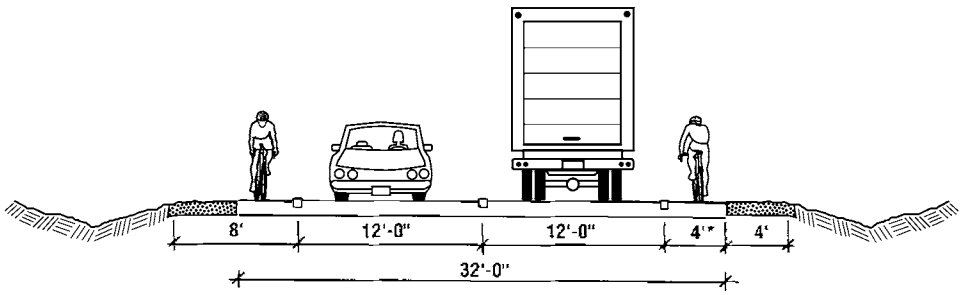
Typical Bicycle Cross Sections

B-4 WIDE PAVED SHOULDERS

Existing Roadway



Roadway Retrofitted with 4-Ft Paved Shoulders

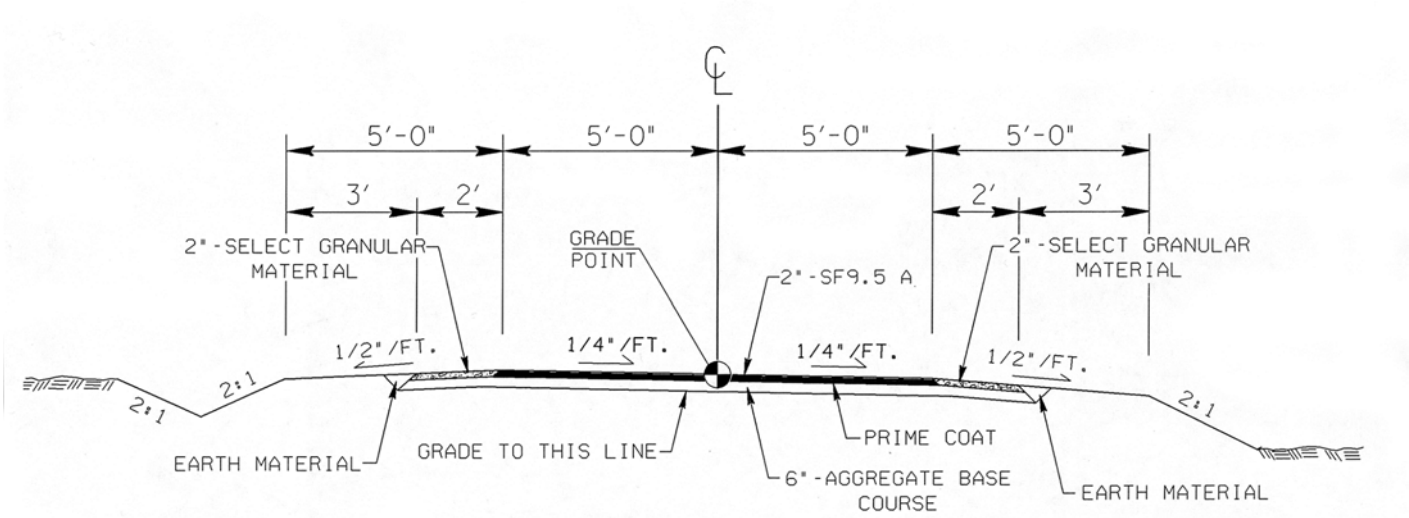


* If speeds are higher than 40 mph, shoulder widths greater than 4' are recommended.

Typical Bicycle Cross Sections

B-5 RECOMMENDED TYPICAL SECTION OF 10-FT ASPHALT PATHWAY

With 2-Ft Select Material Shoulder



Appendix E
Recommended Subdivision Ordinances

Definitions

Rural Roads

- *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.
- *Minor Arterial* - A rural roadway joining cities and larger towns and providing intra-state and inter-county service at relatively high overall travel speeds with minimum interference to through movement.
- *Major Collector* - A road that serves major intra-county travel corridors and traffic generators and provides access to the arterial system.
- *Minor Collector* - A road that provides service to small local communities and traffic generators and provides access to the major collector system.
- *Local Road* - A road that serves primarily to provide access to adjacent land over relatively short distances.

Urban Streets

- *Major Thoroughfares* - Major thoroughfares consist of inter-state, 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.
- *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.
- *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.

Specific Type Rural or Urban Streets

- *Freeway, expressway, or parkway* - Divided multilane roadways designed to carry large volumes of traffic at high speeds. A *freeway* provides for continuous flow of vehicles with no direct access to abutting property and with access to selected crossroads only by way of interchanges. An *expressway* is a facility with full or partial control of access and generally with grade separations at major intersections. A *parkway* is for non-commercial traffic, with full or partial control of access.

- *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.
- *Local Residential Street* - Cul-de-sacs, loop streets less than 2,500 feet in length, or streets less than 1.0 mile in length that do not connect thoroughfares, or serve major traffic generators, and do not collect traffic from more than 100 dwelling units.
- *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.
- *Frontage Road* - A road that is parallel to a partial or full access controlled facility and provides access to adjacent land.
- *Alley* - A strip of land, owned publicly or privately, set aside primarily for vehicular service access to the backside of properties otherwise abutting on a street.

Property

- *Building Setback Line* - A line parallel to the street in front of which no structure shall be erected.
- *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.
- *Lot* - A portion of a subdivision, or any other parcel of land, which is intended as a unit for transfer of ownership or for development or both. The word "lot" includes the words "plat" and "parcel".

Subdivision

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

- *Dedication* - A gift, by the owner, of his property to another party without any consideration being given for the transfer. The dedication is made by written instrument and is completed with an acceptance.
- *Reservation* - Reservation of land does not involve any transfer of property rights. It constitutes an obligation to keep property free from development for a stated period of time.

Design Standards

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 and Transportation Officials (AASHTO) manual.

The provision of street rights-of-way shall conform and meet the recommendations of the transportation plan, as adopted by the municipality. 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.

Right-of-way Widths

Right-of-way widths shall not be less than the following and shall apply except in those cases where right-of-way requirements have been specifically set out in the transportation plan.

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

A partial width right-of-way, not less than 60 feet in width, may be dedicated when adjoining undeveloped property that is owned or controlled by the subdivider; provided that the width of a partial dedication be such as to permit the installation of such facilities as may be necessary to serve abutting lots. When the said adjoining property is sub-divided, the remainder of the full required right-of-way shall be dedicated. Minimum right-of-way requirements are shown in Table E-1.

Table E-1

Minimum Right-of-way Requirements

Area Classification	Functional Classification	Minimum ROW
Rural	Principal Arterial (Freeway)	350 feet
	Principal Arterial (Other)	200 feet
	Minor Arterial	100 feet
	Major Collector	100 feet
	Minor Collector	80 feet
	Local Road (see note #1)	60 feet
Urban	Major Thoroughfare	90 feet
	Minor Thoroughfare	70 feet
	Local Street	60 feet
	Cul-de-sac (See note #2)	varies

1) The desireable miinimum right-of-ways is 60 feet. If curb and gutter is provided, 50 feet of ROW is adequate on local residential streets.

2) The ROW dimension will depend on the radius used for vehicle turn-a-around. Distance from edge of pavement of turn-a-around to ROW should not be less than distance from edge of pavement to ROW on street approaching turn-a-round.

Street Widths

Widths for street and road classifications other than local shall be as recommended by the transportation plan. Width of local roads and streets shall be as follows:

- *Local Residential*
  - Curb and Gutter section - 26 feet, face to face curb
  - Shoulder section - 20 feet to edge of pavement, 4 feet for shoulders
- *Residential Collector*
  - Curb and Gutter section - 34 feet, face to face of curb
  - Shoulder section - 20 feet to edge of pavement, 6 feet for shoulders

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.

- *Design Speed* - The design speed for a roadway should be a minimum of 5 mph greater than the posted speed limit. The design speeds for subdivision type streets are shown in Table E-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 E-3.
- *Superelevation* - Table E-4 shows the minimum radius and the related maximum super elevation for design speeds. The maximum rate of roadway super elevation (e) for rural roads with no curb and gutter is 0.08. The maximum rate of super elevation for urban streets with curb and gutter is 0.06, with 0.04 being desirable.
- *Maximum and Minimum Grades* - The maximum grades in percent are shown in Table E-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 E-2

Design Speeds

Facility Type	Design Speed (mph) Desirable	Minimum Level	Minimum Rolling
Rural			
Minor Collector Roads (AADT Over 2000)	60	50	40
Local Roads[1] (AADT Over 400)	50	*50	*40
Urban			
Major Thoroughfares[2]	60	50	40
Minor Thoroughfares	40	30	30
Local Streets	30	**30	**20

*Based on AADT of 400-750. Where roads serve limited area and small number of units, reduce minimum design speed.
**Based on projected ADT of 50-250. (Refer to NCDOT Roadway Design Manual page 1-1B)
[1] Local Roads including Residential Collectors and Local Residential.
[2] Major Thoroughfares other than Freeways or Expressways.

Table E-3

Sight Distance

Design Speed (mph)	Stopping Sight Distance (feet)		Minimum K[1] Values (feet)		Passing Sight Distance (feet)
	Desirable	Minimum	Crest Curve	Sag Curve	For 2-lanes
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 feet. Calculated lengths shall be rounded up in each case. (Reference NCDOT Roadway Design Manual page 1-12 T-1)

[1]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. Sight distance provided for stopped vehicles at intersections should be in accordance with "A Policy on Geometric Design of Highways and Streets, 1990".

Table E-4

Superelevation

Design Speed (mph)	Minimum Radius of Maximum e[1]			Maximum Degree of Curve		
	e=0 .04	e=0.06	e=0.08	e=0.04	e=0.06	e=0.08
30	302	273	260	19 00'	21 00'	22 45'
60	573	521	477	10 00'	11 15'	12 15'
80	955	955	819	6 00'	6 45'	7 30'
100	1,637	1,432	1,146	3 45	4 15'	4 45'

[1] e = rate of roadway superelevation, foot per foot

Note: (Reference NCDOT Roadway Design Manual page 1-12 T-6 thru T-8)

Table E-5

Maximum Vertical Grade

Facility Type and Design Speed (mph)		Minimum Grade in Percent Flat	Rolling	Mountainous
RURAL				
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*[1]				
	20	-	11	16
	30	7	10	14
	40	7	9	12
	50	6	8	10
	60	5	6	-
URBAN				
Major Thoroughfares[2]				
	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	-

Note: *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)

[1] Local Roads including Residential Collectors and Local Residential.

[2] Major Thoroughfares other than Freeways or Expressways.

Intersections

1. Streets shall be laid out so as to interest 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. Intersections that cannot be aligned should be separated by a minimum length of 200 feet between survey centerlines.

Cul-de-sacs

Cul-de-sacs shall not be more than 500 feet 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.

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 as may be required by the planning board.

Permits for Connection to State Roads

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

Offsets to Utility Poles

Poles for overhead utilities should be located clear of roadway shoulders, preferably a minimum of at least 30 feet form 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.

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.

Horizontal Width on Bridge Deck

The clear roadway widths for new and reconstructed bridges serving two-lane, two-way traffic should be as follows:

- shoulder section approach:
  * under 800 ADT design year - minimum 28 feet width face to face of parapets, rails, or pavement width plus 10 feet, whichever is greater,
  * 800 - 2000 ADT design year - minimum 34 feet width face to face of parapets, 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.

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 F
Public Involvement

Stokes County
Comprehensive Transportation Plan Survey Results

In September 2006, a transportation needs survey was distributed through the postal mail, public outlets and on-line. 100 responses were received. Below is a summary of highlights from these results.

Transportation Goals

Responses ranking each goal as 'Important' or 'Very Important'.

Goals	Important	Very Important
Increase Transportation Choices	38	26
Increase Public Transportation Options	40	23
Faster Automobile Travel Times	43	19
Preserve Community and Rural Character	39	44
Protect the Environment	42	44
Support Economic Growth	43	41
Improve Services for Special Needs	44	36
Increased Transportation Mode Choices	40	30

Strategies for increasing road capacity

Total responses 'agreed to'

Strategies	Responses
Build additional traffic lanes	57
Make improvements to intersections and signal timing	82
Control the frequency and location of driveways and cross-streets accessing the road	66

Safety and crash problems

57% of respondents indicated they had safety concerns about specific locations. Of those locations identified, the top five are listed below.

Rank	Location
1	NC 8, various locations
2	NC 89, various locations
3	Piney Grove Church Rd. & NC8 intersection
4	NC 66,various locations
5	Flat shoals Rd

Connectivity of Roads

Respondents were asked about their travel patterns. 20% of respondents indicated they have no direct route between specific locations, top three locations are listed below.

Rank	Location
1	King and Walnut Cove
2	King and Danbury
3	King to West Winston-Salem

Key transportation issues

61 respondents identified a wide range of transportation issues facing Caswell County. The top five 'themes' found in responses are identified below.

Rank	Issue
1	Enhancing public transportation options
2	Improving Narrow and curvy roads
3	Improving road width
4	Connectivity to nearby urban areas
5	Limit the growth of the area

Accessibility

Respondents ranked their desire for enhanced access to regions and roadways.

Areas	Rank
Winston-Salem	1
Greensboro	2
Virginia	3
Other Areas	

Roads	Rank
US 52	1
NC 8	2
I-40	3
NC 66	4
US 311	5
Other Roads	

Alternative Modes

Respondents were asked about their usage and desire for more sidewalks, greenways, bicycle lanes and transit services.

If provided, you would use…	**Percentage**
Sidewalks	34%
Off-road trails for walking or bicycling	46%
On-road bicycle facilities	26%
Park-and-ride lots (for commuting)	44%
Bus Service to… - Triangle (Raleigh-Durham) - Triad (Greensboro-Winston-Salem)	 32% 40%
Rail	40%
Others destinations	28%