Comprehensive Transportation Plan

Orange County

October, 2013

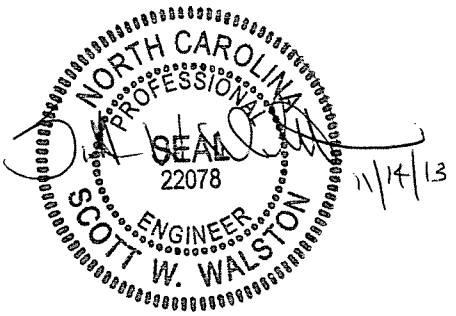
Comprehensive Transportation Plan

Orange County

Prepared by: Sarah Lee, EI, Project Engineer
Scott Walston, PE, Triangle Planning Group Supervisor
Transportation Planning Branch
N.C. Department of Transportation

In Cooperation with: Orange County
Triangle Area Rural Planning Organization
Durham-Chapel Hill-Carrboro Metropolitan Planning Organization
Burlington Graham Metropolitan Planning Organization

October, 2013



Scott Walston, PE
Triangle Planning Group Supervisor

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Executive Summary

In March of 2009, the Transportation Planning Branch of the North Carolina Department of Transportation and Orange County initiated a study to cooperatively develop the Orange County Comprehensive Transportation Plan (CTP), which includes only the rural areas of the county (no municipalities) not included in an MPO. The planning area is the Triangle Area Rural Planning Organization (TARPO) area of Orange County, outside the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO) and the Burlington Graham Metropolitan Planning Organization (BGMPO). This is a long range multi-modal transportation plan that covers transportation needs through the year 2035. Modes of transportation evaluated as part of this plan include: highway, public transportation and rail, bicycle, and pedestrian. This plan does not cover routine maintenance or minor operations issues. Refer to Appendix A for contact information on these types of issues.

Findings of this CTP study were based on an analysis of the transportation system, environmental screening, and public input. Refer to Figure 1 for the CTP maps, which were mutually endorsed/adopted in 2013. Implementation of the plan is the responsibility of Orange County and NCDOT. Refer to Chapter 2 for information on the implementation process.

This report documents the recommendations for improvements that are included in the Orange County CTP. More detailed information can be found in Chapter 2.

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Adopted by:

Orange County
Date: March 7, 2013

NCDOT
Date: September 5, 2013

Endorsed by:

Triangle Area RPO
Date: August 15, 2013

Recommended by:

Transportation Planning Branch
Date: August 15, 2013

NOTES:

Caswell County

Person County

Durham County

Alamance County

Chatham County

Durham-Chapel Hill-Carrboro Metropolitan Planning Organization

Burlington-Graham Metropolitan Planning Organization

49 86 57 157 54

Sheet 1	**Adoption Sheet**
Sheet 2	**Highway Map**
Sheet 3	**Public Transportation and Rail Map**
Sheet 4	**Bicycle Map**
Sheet 5	**Pedestrian Map**

- Airports
- Schools
- Roads
- Rivers and Streams
- Water Bodies
- Parks and Gamelands
- County Boundaries
- MPO Boundaries

0 1 2 3 4
Miles

N W E S

Figure 1
Sheet 1 of 5

Base map date: April, 2009

Refer to CTP document for more details

Orange County

North Carolina

Comprehensive Transportation Plan

Plan date: March 7, 2013

Back of Figure

Caswell County

Person County

Alamance County

Durham County

Chatham County

Corbett Ridge Rd (SR 1004)

Lynch Store Rd (SR 1364)

Carr Store Rd (SR 1004)

Mill Creek Rd (SR 1343)

High Rock Rd (SR 1340)

Efland-Cedar Grove Rd (SR 1004/1357)

Highland Farm Rd (SR 1332)

Carr Store Rd (SR 1352)

Sawmill Rd (SR 1545)

Wilkerson Rd (SR 1507)

Walnut Grove Church Rd (SR 1001)

Little River Church Rd (SR 1543)

Holly Ridge Rd (SR 1524)

Schley Rd (SR 1548)

Church Rd (SR 1538)

New Sharon

Durham-Chapel Hill-Carrboro Metropolitan Planning Organization

Burlington-Graham Metropolitan Planning Organization

Mount Willing Rd (SR 1120)

Buckhorn Rd (SR 1114)

Oak Grove Church Rd (SR 1117)

Mebane Oaks Rd (SR 1007)

Bradshaw Quarry Rd (SR 1115)

Orange Grove Rd (SR 1006)

Old NC 86 (SR 1009)

Arthur Minnis Rd (SR 1115/1113)

Dairyland Rd (SR 1177)

Dodsons Cross Rd (SR 1102)

Morrow Mill Rd (SR 1958)

Orange Chapel Rd (SR 1956)

Clover Garden Rd (SR 1956)

Crawford Dairy Rd (SR 1956)

Old Greensboro Rd (SR 1005)

White Cross Rd (SR 1951)

Jones Ferry Rd (SR 1942)

49

86

57

157

54

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 1 2 3 4
Miles

N W E S

Figure 1
Sheet 2 of 5

Base map date: April, 2009

Refer to CTP document for more details

Highway Map

Orange County
Comprehensive Transportation Plan

Plan date: March 7, 2013

Back of Figure

Caswell County

Person County

Alamance County

Durham County

Chatham County

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Sawmill Rd (SR 1545)

Carr Store Rd (SR 1352)

Dodsons Cross Rd (SR 1102)

White Cross Rd (SR 1951)

Burlington-Graham Metropolitan Planning Organization

Durham-Chapel Hill-Carrboro Metropolitan Planning Organization

Durham-Chapel Hill-Carrboro Metropolitan Planning Organization

Durham-Chapel Hill-Carrboro Metropolitan Planning Organization

Bus Routes
- Existing
- Needs Improvement
- Recommended

Rail Corridor
- Active
- Inactive
- Recommended

Intermodal Connector
- Existing
- Recommended

Fixed Guideway
- Existing
- Needs Improvement
- Recommended

High Speed Rail Corridor
- Existing
- Recommended

Rail Stops
- Existing
- Recommended

Operational Strategies
- Existing
- Needs Improvement
- Recommended

Park and Ride Lot
- Existing
- Recommended

0 1 2 3 4
Miles

N W E S

Figure 1
Sheet 3 of 5

Base map date: April, 2009

Refer to CTP document for more details

Public Transportation and Rail Map

Orange County
Comprehensive Transportation Plan

Plan date: March 7, 2013

Back of Figure

Caswell County

Person County

Alamance County

Durham County

Chatham County

Corbett Ridge Rd (SR 1004)

Lynch Store Rd (SR 1364)

Carr Store Rd (SR 1004)

Efland-Cedar Grove Rd (SR 1004/1357)

Carr Store Rd (SR 1352)

Sawmill Rd (SR 1545)

Walnut Grove Church Rd (SR 1001)

Holly Ridge Rd (SR 1524)

Schley Rd (SR 1548)

New Sharon Church Rd (SR 1538)

Highland Earth Rd (SR 1332)

High Rock Rd (SR 1340)

Durham-Chapel Hill-Carrboro Metropolitan Planning Organization

Burlington-Graham Metropolitan Planning Organization

Buckhorn Rd (SR 1114)

Oak Grove Church Rd (SR 1117)

Mebane Oaks Rd (SR 1007)

Bradshaw Quarry Rd (SR 1115)

Orange Grove Rd (SR 1006)

Dairyland Rd (SR 1171)

Dodsons Cross Rd (SR 1102)

Old Greensboro Rd (SR 1005)

White Cross Rd (SR 1951)

Jones Ferry Rd (SR 1942)

49

86

57

157

54

2

On-road

- Existing
- Needs Improvement
- Recommended

Multi-Use Paths

- Existing
- Needs Improvement
- Recommended

Off-road

- Existing
- Needs Improvement
- Recommended

- Existing Grade Separation
- Proposed Grade Separation
- North Carolina Bike Route (#)

0 1 2 3 4
Miles

N W E S

Figure 1
Sheet 4 of 5

Base map date: April, 2009

Refer to CTP document for more details

Bicycle Map

Orange County
Comprehensive Transportation Plan

Plan date: March 7, 2013

Back of Figure

Caswell County

Person County

Alamance County

Durham County

Chatham County

Carr

Cedar Grove

Caldwell

Schley

Carr Store Rd (SR 1004)

Carr Store Rd (SR 1004/1357)

Carr Store Rd (SR 1352)

Sawmill Rd (SR 1545)

Walnut Grove Church Rd (SR 1001)

Little River Church Rd (SR 1543)

Schley Rd (SR 1548)

New Sharon Church Rd (SR 1538)

Efland-Cedar Grove Rd (SR 1357)

Highland Farm Rd (SR 1332)

High Rock Rd (SR 1340)

49

86

57

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Durham-Chapel Hill-Carrboro Metropolitan Planning Organization

Burlington-Graham Metropolitan Planning Organization

Mount Willing Rd (SR 1120)

Camp Chestnut Ridge

Pedestrian Mountains to Sea Trail

Dairyland Rd (SR 1177)

Dodsons Cross Rd (SR 1102)

Cane Creek Reservoir

White Cross

R

Sidewalks

- Existing
- Needs Improvement
- Recommended

Off-Road

- Existing
- Needs Improvement
- Recommended

Multi-Use Paths

- Existing
- Needs Improvement
- Recommended

- Existing Grade Separation
- Proposed Grade Separation

- Rural Communities
- Local Recreation Sites

0 1 2 3 4 Miles

N W E S

Figure 1
Sheet 5 of 5

Base map date: April, 2009

Refer to CTP document for more details

Pedestrian Map

Orange County
Comprehensive Transportation Plan

Plan date: March 7, 2013

Back of Figure

I. Analysis of the Existing and Future Transportation System

A Comprehensive Transportation Plan (CTP) is developed to ensure that the progressively developed transportation system will meet the needs of the region for the planning period. The CTP serves as an official guide to providing a well-coordinated, efficient, and economical transportation system for the future of the region. This document should be utilized by the local officials to ensure that planned transportation facilities reflect the needs of the public, while minimizing the disruption to local residents, businesses and environmental resources.

In order to develop a CTP, the following are considered:

- Analysis of the transportation system, including any local and statewide initiatives;
- Impacts to the natural and human environment, including natural resources, historic resources, homes, and businesses;
- Public input, including community vision and goals and objectives.

Analysis Methodology and Data Requirements

Reliable forecasts of future travel patterns must be estimated in order to analyze the ability of the transportation system to meet future travel demand. These forecasts depend on careful analysis of the character and intensity of existing and future land use and travel patterns.

An analysis of the transportation system looks at both current and future travel patterns and identifies existing and anticipated deficiencies. This is usually accomplished through a capacity deficiency analysis, a traffic crash analysis, and a system deficiency analysis. This information, along with population growth, economic development potential, and land use trends, is used to determine the potential impacts on the future transportation system.

Roadway System Analysis

An important stage in the development of a CTP is the analysis of the existing transportation 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 result from inadequacies such as pavement widths, intersection geometry, and intersection controls; or system problems, such as the need to construct missing travel links, bypass routes, loop facilities, additional radial routes or infrastructure improvements to meet statewide initiatives.

One of those statewide initiatives is the Strategic Highway Corridor (SHC) Vision Plan adopted by the Board of Transportation on September 2, 2004 and last revised on July

10, 2008. The SHC Vision Plan represents a timely initiative to protect and maximize the mobility and connectivity on a core set of highway corridors throughout North Carolina, while promoting environmental stewardship through maximizing the use of existing facilities to the extent possible, and fostering economic prosperity through the quick and efficient movement of people and goods.

The primary purpose of the SHC Vision Plan is to provide a network of high-speed, safe, reliable highways throughout North Carolina. The primary goal to support this purpose is to create a greater consensus towards the development of a genuine vision for each corridor – specifically towards the identification of a desired facility type (Freeway, Expressway, Boulevard, or Thoroughfare) for each corridor. Individual Comprehensive Transportation Plans shall incorporate the long-term vision of each corridor. Refer to Appendix A for contact information.

In the development of this plan, travel demand was projected from 2007 to 2035 by two methods. The first method was a trendline analysis based on Annual Average Daily Traffic (AADT) from 1990 to 2007. AADT data from 2008 and 2009 was available, but due to high gasoline prices and less travel during these years, the data did not match past growth trends. In order to avoid underestimating future travel demand in 2035, data from 2007 was used for projections instead.

In addition, local land use plans and growth expectations were used to further refine future growth rates and patterns. The second projection method used the Triangle Regional Model ("TRM V4-2008," Official Adopted Triangle Regional Model) as a comparison to the growth patterns of the trendline analysis. The Triangle Regional Model (TRM) is a tool that was developed for understanding how future growth in the region impacts transportation facilities and services. The TRM can help identify the location and scale of future transportation problems, and proposed solutions to those problems can be tested using the TRM. The projections of the TRM utilized for this comparison were found to be consistent with the trendline AADT data projections.

The above two methods were used to establish growth rates for studied roadways, ranging between 1.0% and 3.0%. The final growth rates were used to project 2007 AADT data to the 2035 horizon year, and this data was endorsed by the Orange County Board of Commissioners on May 17, 2011. Refer to Figure 2 for the Growth Rate Map.

Existing and future travel demand is compared to existing roadway capacities. Capacity deficiencies occur when the traffic volume of a roadway exceeds the roadway's capacity. Roadways are considered near capacity when the traffic volume is at least eighty percent of the capacity. The planning area contained no capacity deficiencies in the existing conditions. Refer to Figure 3 for future capacity deficiencies.

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 along the road, including residential, commercial, agricultural, and industrial developments;
- Number of traffic signals along the route;
- Peaking characteristics of the traffic on the road;
- Characteristics of side-roads feeding into the road; and
- Directional split of traffic or the percentages of vehicles traveling in each direction along a road at any given time.

The relationship of travel demand 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.

LOS D indicates "practical capacity" of a roadway, or the capacity at which the public begins to express dissatisfaction. The practical capacity for each roadway was developed based on the 2000 Highway Capacity Manual using the NCLOS program. Recommended improvements and overall design of the transportation plan were based upon achieving a minimum LOS D on existing facilities and a LOS C for new facilities. Refer to Appendix E for detailed information on LOS.

Traffic Crash Analysis

Traffic crashes are often used as an indicator for locating congestion and roadway problems. Crash patterns obtained from an analysis of crash data can lead to the identification of improvements that will reduce the number of crashes. A crash analysis was performed for the Orange County CTP for crashes occurring in the planning area between January 1, 2007 and December 31, 2009. During this period, a total of 2 intersections were identified as having a high number of crashes as illustrated in Figure 4. Refer to Appendix F for a detailed crash analysis.

Bridge Deficiency Assessment

Bridges are a vital and unique element of a highway system. First, 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 NCDOT Structures Management Unit inspects all bridges in North Carolina at least once every two years. Bridges having the highest priority are replaced as Federal and State funds become available. Six (6) deficient bridges were identified within the planning area and are illustrated in Figure 5. Refer to Appendix G for more detailed information.

Caswell County

Person County

Alamance County

Durham County

Chatham County

Corbett Ridge Rd (SR 1004)

Lynch Store Rd (SR1364)

Carr Store Rd (SR 1004)

Mill Creek Rd (SR 1343)

High Rock Rd (SR 1340)

Efland-Cedar Grove Rd (SR 1004/1357)

Highland Farm Rd (SR 1332)

Carr Store Rd (SR 1352)

Sawmill Rd (SR 1545)

Wilkerson Rd (SR 1507)

Walnut Grove Church Rd (SR 1001)

Holly Ridge Rd (SR 1524)

Little River Church Rd (SR 1543)

Schley Rd (SR 1548)

Church Rd (SR 1538)

New Sharon

49

86

57

157

54

Burlington-Graham Metropolitan Planning Organization

Durham-Chapel Hill-Carrboro Metropolitan Planning Organization

Mount Willing Rd (SR 1120)

Buckhorn Rd (SR 1114)

Oak Grove Church Rd (SR 1117)

Mebane Oaks Rd (SR 1007)

Bradshaw Quarry Rd (SR 1115)

Orange Grove Rd (SR 1006)

Old NC 86 (SR 1009)

Arthur Minnis Rd (SR 1115/1113)

Dairyland Rd (SR 1177)

Dodsons Cross Rd (SR 1102)

Morrow Mill Rd (SR 1958)

Orange Chapel Clover Garden Rd (SR 1956)

Old Greensboro Rd (SR 1005)

Crawford Dairy Rd (SR 1956)

White Cross Rd (SR 1951)

Jones Ferry Rd (SR 1942)

Growth Rate (%)

- 1.0
- 1.5
- 2.0
- 2.5
- 3.0

0 0.5 1 2 3 4

Miles

N

W E

S

Figure 2

Base map date: April, 2009

Refer to CTP document for more details

Growth Rates Map

Orange County

Comprehensive Transportation Plan

Back of Figure

Caswell County

Person County

Alamance County

Durham County

Chatham County

Corbett Ridge Rd (SR 1004)

Lynch Store Rd (SR 1364)

Carr Store Rd (SR 1004)

Mill Creek Rd (SR 1343)

High Rock Rd (SR 1340)

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New Sharon

49

86

57

157

Burlington-Graham Metropolitan Planning Organization

Mount Willing Rd (SR 1120)

Buckhorn Rd (SR 1114)

Oak Grove Church Rd (SR 1117)

Mebane Oaks Rd (SR 1007)

Bradshaw Quarry Rd (SR 1115)

Orange Grove Rd (SR 1006)

Old NC 86 (SR 1009)

Arthur Minnis Rd (SR 1115/1113)

Durham-Chapel Hill-Carrboro Metropolitan Planning Organization

Dairyland Rd (SR 1177)

Dodsons Cross Rd (SR 1102)

54

Morrow Mill Rd (SR 1958)

Orange Chapel Garden Clover Rd (SR 1956)

Old Greensboro Rd (SR 1005)

Crawford Dairy Rd (SR 1956)

White Cross Rd (SR 1951)

Jones Ferry Rd (SR 1942)

Roadway Deficiency (Volume/Capacity Ratio)

- Under Capacity (0 - 0.7)
- Near Capacity (0.8 - 0.9)
- Over Capacity (1.0+)

0 0.5 1 2 3 4
Miles

N W E S

Figure 3

Base map date: April, 2009

Refer to CTP document for more details

Future (2035) Roadway Deficiency Map

Orange County
Comprehensive Transportation Plan

Back of Figure

Caswell County

Person County

Alamance County

Durham County

Chatham County

Corbett Ridge Rd (SR 1004)

Lynch Store Rd (SR 1364)

Carr Store Rd (SR 1004)

Mill Creek Rd (SR 1343)

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Durham-Chapel Hill-Carrboro Metropolitan Planning Organization

Morrow Mill Rd (SR 1958)

Orange Chapel Clover Garden Rd (SR 1956)

Old Greensboro Rd (SR 1005)

Crawford Dairy Rd (SR 1956)

White Cross Rd (SR 1951)

Jones Ferry Rd (SR 1942)

49

86

57

157

54

1

2

- Crash Locations (# Map Index)
- CTP Road Network
- Roads
- Rivers and Streams
- Water Bodies
- Parks and Gamelands
- County Boundaries
- MPO Boundaries

0 1 2 3 4
Miles

N
W E
S

Figure 4

Base map date: April, 2009

Refer to CTP document for more details

Crash Locations Map

Orange County
Comprehensive Transportation Plan

Back of Figure

Caswell County

Person County

Alamance County

Durham County

Chatham County

Corbett Ridge Rd (SR 1004)

Lynch Store Rd (SR 1364)

Carr Store Rd (SR 1004)

Mill Creek Rd (SR 1343)

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Dodsons Cross Rd (SR 1102)

Morrow Mill Rd (SR 1958)

Orange Chapel Garden Rd (SR 1956)

Old Greensboro Rd (SR 1005)

Crawford Dairy Rd (SR 1956)

White Cross Rd (SR 1951)

Jones Ferry Rd (SR 1942)

Durham-Chapel Hill-Carrboro Metropolitan Planning Organization

49 86 24 57 157 8 43 54 84 76 228

- Deficient Bridges (# Bridge Number)
- CTP Road Network
- Roads
- Rivers and Streams
- Water Bodies
- Parks and Gamelands
- County Boundaries
- MPO Boundaries

0 1 2 3 4 Miles

N W E S

Figure 5

Base map date: April, 2009

Refer to CTP document for more details

Deficient Bridges Map

Orange County
Comprehensive Transportation Plan

Back of Figure

Public Transportation and Rail

Public transportation and rail are vital modes of transportation that give alternative options for transporting people and goods from one place to another.

Public Transportation

North Carolina's public transportation systems serve more than 50 million passengers each year. Five categories define North Carolina's public transportation system: community, regional community, urban, regional urban and intercity.

- Community Transportation - Local transportation efforts formerly centered on assisting clients of human service agencies. Today, the vast majority of rural systems serve the general public as well as those clients.

- Regional Community Transportation - Regional community transportation systems are composed of two or more contiguous counties providing coordinated / consolidated service. Although such systems are not new, the NCDOT Board of Transportation is encouraging single-county systems to consider mergers to form more regional systems.

- Urban Transportation – There are currently nineteen urban transit systems operating in North Carolina, from locations such as Asheville and Hendersonville in the west to Jacksonville and Wilmington in the east. In addition, small urban systems are at work in three areas of the state. Consolidated urban-community transportation exists in five areas of the state. In those systems, one transportation system provides both urban and rural transportation within the county.

- Regional Urban Transportation - Regional urban transit systems currently operate in three areas of the state. These systems connect multiple municipalities and counties.

- Intercity Transportation - Intercity bus service is one of a few remaining examples of privately owned and operated public transportation in North Carolina. Intercity buses serve many cities and towns throughout the state and provide connections to locations in neighboring states and throughout the United States and Canada. Greyhound/Carolina Trailways operates in North Carolina. However, community, urban and regional transportation systems are providing increasing intercity service in North Carolina.

An inventory of existing and planned fixed public transportation routes for the planning area is presented on Sheet 3 of Figure 1. Although the areas of Hillsborough and Chapel Hill have public transportation services in place, there are currently no fixed or scheduled services that serve the Orange County CTP area (the rural areas of the county). Orange Public Transit (OPT) offers transportation for the elderly or disabled to medical care, shopping, nutrition sites, and senior centers; however, these services are provided on the basis of individual qualifications and requests, so they were not included in the CTP inventory of existing routes.

The Triangle Regional Transit Plan (TRTP), which is in progress, contains a bus element for Orange County, which was utilized in the development of the public transportation element of the CTP. All recommendations for public transportation were coordinated with the local government and the Public Transportation Division of NCDOT. Refer to Appendix A for contact information.

Rail

Today North Carolina has 3,684 miles of railroad tracks throughout the state. There are two types of trains that operate in the state, passenger trains and freight trains.

The North Carolina Department of Transportation sponsors two passenger trains, the Carolinian and Piedmont. The Carolinian runs between Charlotte and New York City, while the Piedmont train carries passengers from Raleigh to Charlotte and back everyday. Combined, the Carolinian and Piedmont carry more than 200,000 passengers each year.

There are two major freight railroad companies that operate in North Carolina – CSX Transportation and Norfolk Southern Corporation. Also, there are more than 20 smaller freight railroads, known as shortlines.

There are currently no existing rail facilities within the CTP planning area; Orange County's existing rail lines are contained within the MPO areas. Refer to Appendix A for contact information for the Rail Division of NCDOT.

Bicycles & Pedestrians

Bicyclists and pedestrians are a growing part of the transportation equation in North Carolina. Many communities are working to improve mobility for both cyclists and pedestrians.

NCDOT's Bicycle Policy, updated in 1991, clarifies responsibilities regarding the provision of bicycle facilities upon and along the 77,000-mile state-maintained highway system. The policy details guidelines for planning, design, construction, maintenance, and operations pertaining to bicycle facilities and accommodations. All bicycle improvements undertaken by the NCDOT are based upon this policy.

The 2000 NCDOT Pedestrian Policy Guidelines specifies that NCDOT will participate with localities in the construction of sidewalks as incidental features of highway improvement projects. At the request of a locality, state funds for a sidewalk are made available if matched by the requesting locality, using a sliding scale based on population.

NCDOT's administrative guidelines, adopted in 1994, ensure that greenways and greenway crossings are considered during the highway planning process. This policy was incorporated so that critical corridors which have been adopted by localities for future greenways will not be severed by highway construction.

The 1999 Orange County Bicycle Transportation Plan was utilized in the development of the bicycle element of the CTP. Orange County currently contains the Mountains to Sea Trail, also known as NC Bike Route 2, which runs along Old Greensboro Road (SR 1005) within the planning area. Although much of the bicycling that presently occurs in Orange County is for recreational purposes, the proposed network of bicycle recommendations in the CTP, when combined with connections recommended in neighboring plans by Durham-Chapel Hill-Carrboro (DCHC) MPO and Burlington Graham MPO, will present additional commuting opportunities as well. Detailed coordination was specifically performed with the draft DCHC MPO 2040 Metropolitan Transportation Plan (MTP) and CTP as it was under development, to ensure consistent connections across planning boundaries throughout the county.

The pedestrian element of the CTP depicts approximate locations of recommended off-road trails that follow historic road corridors and link rural community nodes, public facilities, and destinations. The trail locations are consistent with a draft Rural Pedestrian Connectivity Plan for Orange County that was developed by a steering committee subcommittee for the Comprehensive Transportation Plan.

Inventories of existing and planned bicycle and pedestrian facilities for the planning area are presented on Sheets 4 and 5 of Figure 1. All recommendations for bicycle and pedestrian facilities were coordinated with the local governments and the NCDOT Division of Bicycle and Pedestrian Transportation. Refer to Appendix A for contact information.

Land Use

G.S. §136-66.2 requires that local areas have a current (less than five years old) land development plan prior to adoption of the CTP. For this CTP, the 2030 Orange County Comprehensive Plan, adopted in 2008, was used to meet this requirement and is illustrated in Figure 6.

Land use refers to the physical patterns of activities and functions within an area. Traffic demand in a given area is, in part, attributed to adjacent land use. For example, a large shopping center typically generates higher traffic volumes than a residential area. The spatial distribution of different types of land uses is a predominant determinant of when, where, and to what extent traffic congestion occurs. The travel demand between different land uses and the resulting impact on traffic conditions varies depending on the size, type, intensity, and spatial separation of development. Additionally, traffic volumes have different peaks based on the time of day and the day of the week. For transportation planning purposes, land use is divided into the following categories:

- Residential: Land devoted to the housing of people, with the exception of hotels and motels which are considered commercial.

- Commercial: Land 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: Land devoted to the manufacturing, storage, warehousing, and transportation of products.

- Public: Land devoted to social, religious, educational, cultural, and political activities; this would include the office and service employment establishments.

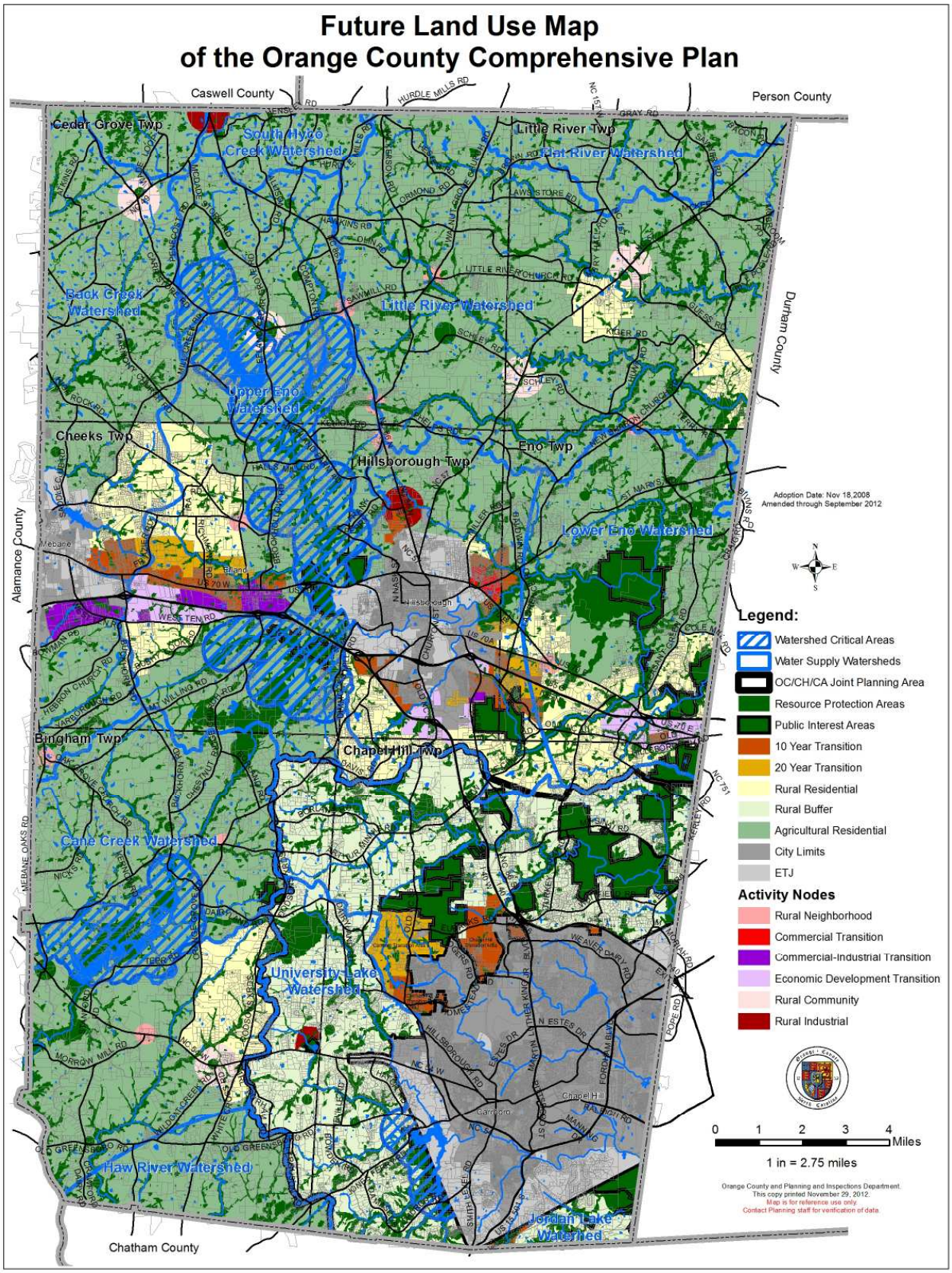
- Agricultural: Land devoted to the use of buildings or structures for the raising of non-domestic animals and/or growing of plants for food and other production.

- Mixed Use: Land devoted to a combination of any of the categories above.

Anticipated future land development is, in general, a logical extension of the present spatial land use distribution. Locations and types of expected growth within the planning area help to determine the location and type of proposed transportation improvements.

Orange County anticipates the CTP planning area, which covers the rural areas of the county outside of the MPOs and municipalities, to remain primarily rural. The county's 2030 Comprehensive Plan reflects predominantly low-density residential development on private wells and septic systems and agricultural land uses for the future (See Figure 6). There are five Rural Community Nodes, located at key intersections along the more heavily traveled routes, and relatively smaller Rural Neighborhood Nodes at other less traveled intersections. One Rural Industrial Node, intended for small scale industrial uses not requiring urban services, is located at the northwest boundary of the planning area at the intersection of NC 86 and NC 49. Small portions of the Rural Buffer, an area that is jointly planned among Orange County, Chapel Hill, and Carrboro, are also located within the planning area. The Rural Buffer is intended to protect rural character and is to remain rural, containing very low-density residential uses, and not require urban services. In general, the county's plan focuses the majority of the growth in and around the municipalities, which fall inside the MPO areas.

Figure 6


Future Land Use Map
of the Orange County Comprehensive Plan
Caswell County
Person County
Durham County
Alamance County
Chatham County
Cedar Grove Twp
Little River Twp
Cheeks Twp
Eno Twp
Hillsborough Twp
Bingham Twp
Chapel Hill Twp
South Hyco Creek Watershed
Flat River Watershed
Back Creek Watershed
Little River Watershed
Upper Eno Watershed
Lower Eno Watershed
Cane Creek Watershed
University Lake Watershed
Haw River Watershed
Jordan Lake Watershed
Adoption Date: Nov 18,2008
Amended through September 2012
Legend:
Watershed Critical Areas
Water Supply Watersheds
OC/CH/CA Joint Planning Area
Resource Protection Areas
Public Interest Areas
10 Year Transition
20 Year Transition
Rural Residential
Rural Buffer
Agricultural Residential
City Limits
ETJ
Activity Nodes
Rural Neighborhood
Commercial Transition
Commercial-Industrial Transition
Economic Development Transition
Rural Community
Rural Industrial
0 1 2 3 4 Miles
1 in = 2.75 miles
Orange County and Planning and Inspections Department.
This copy printed November 29, 2012.
Map is for reference use only.
Contact Planning staff for verification of data.

Back of Figure

Consideration of Natural and Human Environment

Environmental features are a key consideration in the transportation planning process. Section 102 of the National Environmental Policy Act (NEPA) requires consideration of impacts on wetlands, wildlife, water quality, historic properties, and public lands. While a full NEPA evaluation was not conducted as part of the CTP, potential impacts to these resources were identified as a part of the project recommendations in Chapter 2 of this report. Prior to implementing transportation recommendations of the CTP, a more detailed environmental study would need to be completed in cooperation with the appropriate environmental resource agencies.

A full listing of environmental features that were examined as a part of this study is shown in the following tables utilizing the best available data. Environmental features occurring within Orange County are shown in Figure(s) 7, 8, and 9.

Table 1 – Environmental Features

- Airport Boundaries
- Anadromous Fish Spawning Areas
- Beach Access Sites
- Bike Routes (NCDOT)
- Coastal Marinas
- Colleges and Universities
- Conservation Tax Credit Properties
- Emergency Operation Centers
- Federal Land Ownership
- Fisheries Nursery Areas
- Geology (including Dikes and Faults)
- Hazardous Substance Disposal Sites
- Hazardous Waste Facilities
- High Quality Water and Outstanding Resource Water Management Zones
- Hospital Locations
- Hydrography (1:24,000 scale)
- Land Trust Priority Areas
- National Heritage Element Occurrences
- National Wetlands Inventory
- North Carolina Coastal Region Evaluation of Wetland Significance (NC-CREWS)
- Paddle Trails – Coastal Plain
- Railroads (1:24,000 scale)
- Recreation Projects – Land and Water Conservation Fund
- Sanitary Sewer Systems – Discharges, Land Application Areas, Pipes, Pumps and Treatment Plants
- Schools – Public and Non-Public
- Shellfish Strata
- Significant Natural Heritage Areas
- State Parks
- Submersed Rooted Vasculars
- Target Local Watersheds - EEP
- Trout Streams (DWQ)
- Trout Waters (WRC)
- Water Distribution Systems – Pipes, Pumps, Tanks, Treatment Plants, and Wells
- Water Supply Watersheds
- Wild and Scenic Rivers

Additionally, the following environmental features were considered but are not mapped due to restrictions associated with the sensitivity of the data.

Table 2 – Restricted (Confidential) Environmental Features

- Known Archaeological Sites
- Known Historic National Register Districts
- Known Historic National Register Structures
- Macrosite Boundaries
- Managed Areas
- Megasite Boundaries

Caswell County

Person County

Alamance County

Durham County

Chatham County

Burlington-Graham Metropolitan Planning Organization

Durham-Chapel Hill-Carrboro Metropolitan Planning Organization

Corbett Ridge Rd (SR 1004)

Lynch Store Rd (SR 1364)

Carr Store Rd (SR 1004)

Mill Creek Rd (SR 1343)

High Rock Rd (SR 1340)

Carr Store Rd (SR 1352)

Eltand-Cedar Grove Rd (SR 1004/1337)

Highland Farm Rd (SR 1332)

Whitespring Rd (SR 1507)

Sawmill Rd (SR 1545)

Walnut Grove Church Rd (SR 1004)

Little River Church Rd (SR 1543)

Holly Ridge Rd (SR 1524)

Schley Rd (SR 1548)

New Sharon Church Rd (SR 1538)

Mount Willing Rd (SR 1120)

Buckhorn Rd (SR 1114)

Oak Grove Church Rd (SR 1117)

Meadow Oaks Rd (SR 1007)

Bradshaw Quarry Rd (SR 1115)

Orange Grove Rd (SR 1006)

Old NC 86 (SR 1009)

Arthur Minnis Rd (SR 1115/1113)

Dairyland Rd (SR 1117)

Dodsons Cross Rd (SR 1102)

Morrow Mill Rd (SR 1958)

Orange Chapel Clover Garden Rd (SR 1956)

Crawford Dairy Rd (SR 1956)

Old Greensboro Rd (SR 1006)

White Cross Rd (SR 1951)

Jones Ferry Rd (SR 1942)

49

86

57

157

54

0 1 2 3 4
Miles

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W E
S

Environmental Features Map 1

Figure 7

Base map date: April, 2009

Refer to CTP document for more details

Orange County
Comprehensive Transportation Plan

- National Wetlands Inventory
- Water Supply Watersheds
- Target Local Watersheds
- Roads
- County Boundaries
- MPO Boundaries

Back of Figure

Caswell County

Person County

Alamance County

Durham County

Chatham County

Corbett Ridge Rd (SR 1004)

Lynch Store Rd (SR 1364)

Carr Store Rd (SR 1004)

Mill Creek Rd (SR 1343)

High Rock Rd (SR 1340)

Efland Cheeseborough Rd (SR 1004/1357)

Highland Farm Rd (SR 1332)

Carr Store Rd (SR 1352)

Sawmill Rd (SR 1545)

Watkinson Rd (SR 1507)

Walnut Grove Church Rd (SR 1005)

Holly Ridge Rd (SR 1524)

Little River Church Rd (SR 1543)

Schley Rd (SR 1548)

New Sharon Church Rd (SR 1538)

Burlington-Graham Metropolitan Planning Organization

Mount Willing Rd (SR 1120)

Buckhorn Rd (SR 1114)

Orange Grove Rd (SR 1006)

Old NC 86 (SR 1009)

Durham-Chapel Hill-Carrboro Metropolitan Planning Organization

Oak Grove Church Rd (SR 1117)

Bradshaw Quarry Rd (SR 1115)

Arthur Minnis Rd (SR 1115/1113)

Mebane Oaks Rd (SR 1007)

Dairyland Rd (SR 1177)

Dodsons Cross Rd (SR 1102)

Morrow Mill Rd (SR 1958)

Orange Chapel Clover Garden Rd (SR 1956)

Old Greensboro Rd (SR 1005)

Crawford Dairy Rd (SR 1956)

White Cross Rd (SR 1951)

Jones Ferry Rd (SR 1942)

49

86

57

157

54

- Hazardous Waste Disposal Sites
- Inactive Hazardous Sites
- Recreation Projects - Land and Water Conservation Fund
- Conservation Tax Credit Properties
- Significant Natural Heritage Areas
- Natural Heritage Element Occurrences
- Land Trust Priority Areas
- NCDOT Bike Routes
- Roads
- County Boundaries
- MPO Boundaries

0 1 2 3 4
Miles

N
W E
S

Figure 8

Base map date: April, 2009

Refer to CTP document for more details

Environmental Features Map 2

Orange County
Comprehensive Transportation Plan

Back of Figure

Caswell County

Person County

Alamance County

Durham County

Chatham County

Burlington-Graham Metropolitan Planning Organization

Durham-Chapel Hill-Carrboro Metropolitan Planning Organization

49

86

57

157

54

Corbett Ridge Rd (SR 1004)

Lynch Store Rd (SR 1364)

Carr Store Rd (SR 1004)

Mill Creek Rd (SR 1343)

High Rock Rd (SR 1340)

1004/1357

Efland-Cedar Grove Rd (SR

Carr Store Rd (SR 1352)

Highland Farm Rd (SR 1332)

Whitfield Rd (SR 1507)

Sawmill Rd (SR 1545)

Walnut Grove Church Rd (SR 1001)

Holly Ridge Rd (SR 1524)

Little River Church Rd (SR 1543)

Schley Rd (SR 1548)

New Sharon Church Rd (SR 1538)

Mount Willing Rd (SR 1120)

Buckhorn Rd (SR 1114)

Oak Grove Church Rd (SR 1117)

Mebane Oaks Rd (SR 1007)

Bradshaw Quarry Rd (SR 1115)

Orange Grove Rd (SR 1006)

Old NC 86 (SR 1009)

Arthur Minnis Rd (SR 1115/1113)

Dairyland Rd (SR 1177)

Dodsons Cross Rd (SR 1102)

Morrow Mill Rd (SR 1958)

Orange Chapel Rd (SR 1956)

Clover Garden Rd (SR 1956)

Crawford Dairy Rd (SR 1956)

Old Greensboro Rd (SR 1005)

White Cross Rd (SR 1951)

Jones Ferry Rd (SR 1942)

- Hydrography (1:24k scale)
- High Quality Water Outstanding Resource Water Management Zones
- Roads
- County Boundaries
- MPO Boundaries

0 1 2 3 4
Miles

N
W E
S

Figure 9

Base map date: April, 2009

Refer to CTP document for more details

Environmental Features Map 3

Orange County
Comprehensive Transportation Plan

Back of Figure

Public Involvement

Public involvement is a key element in the transportation planning process. Adequate documentation of this process is essential for a seamless transfer of information from systems planning to project planning and design.

A meeting was held with the Orange County Board of Commissioners in September, 2009 to provide an overview of the transportation planning process and to gather input on area transportation needs.

Throughout the course of the study, the Transportation Planning Branch cooperatively worked with the CTP committee, which included representatives from the Orange County planning staff, the Orange Unified Transportation Board (OUTBoard), Triangle Area RPO, and Durham-Chapel Hill-Carrboro MPO, and NCDOT Division 7. The committee worked to provide information on current local plans, to develop transportation vision and goals, to discuss population and employment projections, and to develop proposed CTP recommendations. A representative from Burlington Graham MPO was also routinely updated on the CTP status and data from the committee. Refer to Appendix H for detailed information on the Statement of the CTP Vision and Goals & Objectives, the public survey, and a listing of committee members.

The Orange Unified Transportation Board (OUTBoard) is a local volunteer advisory board that reports to the Orange County Board of Commissioners and provides information on transportation projects and issues. This board served as a key element for input throughout the CTP study. Three OUTBoard members served on the CTP committee, and they were responsible for updating the entire OUTBoard of the CTP status at its regularly scheduled meetings. Presentations were also given to the OUTBoard by the Transportation Planning Branch at various steps throughout the planning process.

In addition to the OUTBoard, the County Planning Board is another volunteer advisory board, comprised of members appointed by the County Board of Commissioners. The focus of this group is to determine objectives in the development of the County, and make recommendations to the Board of Commissioners. The Planning Board was routinely updated on the status of the CTP by Orange County planning staff, and a presentation was also given by the Transportation Planning Branch on the draft recommendations.

The public involvement process included holding three public drop-in sessions in Orange County to present the proposed CTP to the public and solicit comments. The first was a public awareness session, held on September 29, 2009 from 5:00pm to 9:00pm at the Efland Ruritan Club, with the purpose of informing citizens of the plan that was under development and gaining their input on areas in need of study. The second meeting was a public drop-in session for the growth data, traffic projections, and preliminary recommendations, held on February 7, 2011 from 4:30pm to 7:30pm at the Orange County Public Library. The third meeting was a public drop-in session for the draft recommendations, held on September 14, 2011 from 4:30pm to 7:30pm at the Link

Government Services Center. Each public session was publicized in the local newspaper, on local government websites, in local blogs and advisory websites, on local radio shows, through email lists, and on flyers in various locations around the county.

One comment form was submitted during the session held on February 7, 2011, and one comment form was submitted during the session held on September 14, 2011. An online comment website was also created for the duration of the study, but no comment submissions were received via that format.

The public involvement process also included a public survey, which was created with input from the Transportation Planning Branch, Triangle Area RPO, Durham-Chapel Hill-Carrboro MPO, Orange Unified Transportation Board, and Orange County Board of Commissioners. It was released to the public on September 23, 2009, and closed on November 2, 2009. A total 491 surveys were completed (including both online and paper submissions).

In January of 2011, it was discovered that there was an overlap of boundaries between Durham-Chapel Hill-Carrboro MPO and Burlington Graham MPO in Orange County. Staff discussions on options for adjusting boundaries were held between the fall of 2011 and the fall of 2012, with a final option being approved by Orange County and the MPOs in the fall of 2012. Due to these developments, after the Orange County CTP recommendations were finalized by the committee in the spring of 2012, adoption of the CTP was postponed until approval of the MPO boundary adjustments.

A public hearing was held on January 24, 2013 during the Orange County Board of Commissioners meeting. The purpose of this meeting was to discuss the plan recommendations and to solicit further input from the public. The CTP was adopted at the meeting held on March 7, 2013.

The Triangle Area RPO endorsed the CTP on August 15, 2013. The North Carolina Board of Transportation voted to mutually adopt the Orange County CTP on September 5, 2013.

II. Recommendations

This report documents the development of the 2013 Orange County CTP as shown in Figure 1. This chapter presents recommendations for each mode of transportation in the County.

Implementation

The CTP is based on the projected growth for the planning area. 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 implementation 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.

Initiative for implementing the CTP rests predominately with the policy boards and citizens of the County, as well as NCDOT. As transportation needs throughout the State exceed available funding, it is imperative that the local planning area aggressively pursue funding for priority projects. Refer to Appendix A for contact information on funding. Projects should be prioritized locally and submitted to the Triangle Area RPO for regional prioritization and submittal to NCDOT via a formalized process. Projects can only move into the project development phase after first being ranked in NCDOT's Prioritization Process and programmed into the State Transportation Improvement Program (STIP), which requires coordination with local MPOs and RPOs. Once programmed, the MPOs and RPOs play a significant role (as a concurring member on the team that oversees the project development and permitting process) in the location and design of projects as they move through the process. These projects must be in compliance with local plans and undergo additional public involvement efforts. Orange County is a member of the Triangle Area RPO and thus represented by the RPO throughout this process.

Local governments may use the CTP to guide development and protect corridors for the recommended projects. It is critical that NCDOT and local government coordinate on relevant land development reviews and all transportation projects to ensure proper implementation of the CTP. Local governments and NCDOT share the responsibility for access management and the planning, design and construction of the recommended projects.

Prior to implementing projects from the CTP, additional analysis will be necessary to meet the National Environmental Policy Act (NEPA) or the North Carolina (or State) Environmental Policy Act (SEPA). This CTP may be used to provide information in the NEPA/SEPA process.

The following pages contain problem statements for each recommendation, organized by CTP modal element.

Problem Statements

Multi-Modal Plan Aspects

A complete inventory of studied facilities and recommendations for the CTP is provided in Appendix C. Several facilities contain recommendations for multiple modes of transportation. These additional modes are referenced in the final column entitled "Other Modes" in the table in Appendix C.

HIGHWAY

Refer to Figure 1, Sheet 2 for the Highway CTP map.

Refer to Appendix C for cross section recommendations for each project. Refer to Appendix D for details of each cross section, including lane widths and shoulder widths.

NC 54 (Orange Grove Road to Neville Road/DCHC MPO), Local ID ORAN0002-H

NC 54 from Orange Grove Road (SR 1006) to Neville Road (SR 1945) (the DCHC MPO boundary) is projected to exceed Level of Service (LOS) D by 2035. Improvements are needed in order to relieve anticipated congestion and to maintain a minimum LOS D on the existing facility. This section of NC 54 is currently a 2-lane, 24-foot undivided cross section, with a continuous center turn lane in some segments.

The CTP project proposal is to provide a 4-lane divided cross section for this facility. The addition of a median will allow for better access control, thereby providing higher mobility for the facility.

NC 86 (Coleman Loop Road/DCHC MPO to Caswell County), Local ID ORAN0001-H

NC 86 from Coleman Loop Road (SR 1334) (the DCHC MPO boundary) to Walnut Grove Church Road (SR 1001) is projected to exceed Level of Service (LOS) D by 2035. Improvements are needed in order to relieve anticipated congestion and to maintain a minimum LOS D on the existing facility.

In addition, NC 86 throughout northern Orange County is identified as a recommended expressway on the Strategic Highway Corridor Vision Plan, in order to maintain regional and statewide mobility and connectivity. This section of NC 86 is currently a 2-lane, 24-foot undivided cross section.

The CTP project proposal is to provide a 4-lane divided expressway cross section for this facility from Coleman Loop Road (SR 1334) (the DCHC MPO boundary) to Caswell County. This includes the section of NC 86 that is concurrent with NC 49. The

conversion to an expressway is consistent with the Strategic Highway Corridors Vision Plan. Refer to the draft DCHC MPO 2040 Metropolitan Transportation Plan (MTP) and CTP for the preferred concept for NC 86, which will connect this CTP project segment to I-40 with a consistent expressway cross section around the Town of Hillsborough.

The CTP was temporarily delayed in the spring of 2010 due to local concerns with this project proposal and the Strategic Highway Corridors designation. However, while traffic on NC 86 is still projected to exceed capacity, CTP traffic projections to 2035 do not warrant a full expressway cross section within the planning horizon of this CTP. Ultimately, it was decided to move forward with the CTP, including this project proposal, with the understanding that the proposed cross section is ultimately driven by vision and not yet by traffic. NC 86 will be improved as needed, with the ultimate vision of an expressway. As with all projects, any improvements to NC 86 must also be submitted and programmed through NCDOT's Project Prioritization process in order to enter project development.

This project proposal overlaps with NCDOT project W-5318 to provide geometric improvements, paved shoulders, and rumble strips to NC 86 from NC 57 (inside the DCHC MPO) to the Caswell County line. NCDOT project W-5318 is scheduled to be completed in November, 2013.

Buckhorn Road Extension, Local ID ORAN0008-H

Buckhorn Road (SR 1114) and Dairyland Road (SR 1177) are currently primary choices for travel in southwest Orange County. However, the two roadways are discontinuous at their shared intersection with Orange Grove Road (SR 1006), another primary carrier throughout the area. The CTP project proposal is to provide a new location 2-lane cross section at Orange Grove Road (SR 1006) to extend Buckhorn Road (SR 1114) (ORAN0004-H) into Dairyland Road (SR 1177). This will provide better connectivity and improve traffic flow for this area of the county.

Little River Church Road Extension, Local ID ORAN0005-H

Northern Orange County contains very few options for continuous east-west travel beyond the primary route along Carr Store Road (SR 1004 / SR 1352), Sawmill Road (SR 1545), and Little River Church Road (SR 1543). However, Sawmill Road (SR 1545) and Little River Church Road (SR 1543) are discontinuous at their shared intersection with Walnut Grove Church Road (SR 1001). The CTP project proposal is to provide a new location 2-lane cross section at Walnut Grove Church Road (SR 1001) to extend Little River Church Road (SR 1543) into Sawmill Road (SR 1545). This will provide better east-west continuity and connectivity for this area of the county.

Minor Improvements

Not all of the following facilities are projected to exceed Level of Service (LOS) D by 2035, but improvements such as turn lanes, minor widening, and/or surfacing are ideal for better mobility and more streamlined facilities as growth occurs.

- **Arthur Minnis Road (SR 1115), Local ID ORAN0003-H:** Arthur Minnis Road (SR 1115) from Dodsons Cross Road (SR 1102) to Rocky Ridge Road / Arthur Minnis Road (SR 1113) is currently an unsurfaced, 20-foot cross section. The CTP project proposal is to provide a surfaced, 24-foot cross section suitable for public traffic use. The CTP committee identified the importance of this facility for east-west connectivity in this area of the county.
- **Buckhorn Road (SR 1114), Local ID ORAN0004-H:** Buckhorn Road (SR 1114) from Orange Grove Road (SR 1006) to Bradshaw Quarry Road (SR 1115) is currently an unsurfaced, 20-foot cross section. The CTP project proposal is to provide a surfaced, 24-foot cross section suitable for public traffic use. The CTP committee identified the importance of this facility for north-south connectivity in this area of the county.
- **(North) Efland-Cedar Grove Road (SR 1004), SPOT ID # 559:** Efland-Cedar Grove Road (SR 1004) from Highland Farm Road (SR 1332) to the northern property line of the US Post Office north of Carr Store Road (SR 1004 / SR 1352) is currently a 2-lane, 20-foot cross section. The CTP project proposal is to provide a 24-foot cross section with improvements to turn lanes and straightening of the roadway where needed. This project proposal overlaps with NCDOT project W-5143 to improve the horizontal alignment of the curve on Efland-Cedar Grove Road (SR 1004) north of the intersection with Highland Farm Road (SR 1332). NCDOT project W-5143 is scheduled to begin right-of-way in April, 2013 and construction in April, 2014.
- **Mebane Oaks Road (SR 1007), Local ID ORAN0006-H:** Mebane Oaks Road (SR 1007) from NC 54 to Alamance County is currently a 2-lane, 22-foot cross section. The CTP project proposal is to provide a 24-foot cross section with wide shoulders and turn lanes where needed.
- **Old NC 86 (SR 1009), Local ID ORAN0007-H:** Old NC 86 (SR 1009) from Arthur Minnis Road (SR 1113) / New Hope Church Road (SR 1723) (the DCHC MPO boundary) to Davis Road (SR 1129) (the DCHC MPO boundary) is currently a 2-lane, 22-foot cross section. The CTP project proposal is to provide a 24-foot cross section with wide shoulders and turn lanes where needed. (Note that widening improvements should only be constructed for the purpose of vehicular safety, and not to accommodate or encourage bicycling along this route. This section of Old NC 86 (SR 1009) is not suitable for bicycle improvements due to hills, curves, and other dangerous conditions for bicyclists that would remain even with wider shoulders for bicycles. Investment in bicycle improvements on this facility would not be beneficial unless the route is straightened and elevation issues are addressed.)

PUBLIC TRANSPORTATION & RAIL

Refer to Figure 1, Sheet 3 for the Public Transportation & Rail CTP map.

There are currently no existing rail facilities or recommendations within the CTP planning area; Orange County's existing rail lines are contained within the MPO areas. However, development of commuter rail lines in the MPO areas could have a traffic impact on surrounding feeder routes that may need to be addressed in the future.

Bus Routes

"The Bus and Rail Investment Plan in Orange County", adopted by the Orange County Board of County Commissioners on October 2, 2012, was utilized in the development of the bus element of the Orange County CTP. The CTP bus recommendations are listed below. More detailed information regarding "The Bus and Rail Investment Plan in Orange County" is available through Orange County.

- **Local ID ORAN0001-T:** Bus route along NC 54 from Alamance County to Neville Road (SR 1945) (the DCHC MPO boundary). The draft DCHC MPO 2040 Metropolitan Transportation Plan (MTP) and CTP identifies this recommendation as Express Bus projects B6a and B6b.
- **Local ID ORAN0002-T:** Bus route along NC 86 from Coleman Loop Road (SR 1334) (the DCHC MPO boundary) to Caswell County.

Park-and-Ride Lots

The CTP proposes the following potential park-and-ride lots to provide access to the proposed bus routes (ORAN0001-T and ORAN0002-T). All locations are based on current available information and are subject to change based on further study in the future. In addition, specific information such as number of spaces, surface of lot, and additional amenities would be developed at a later date. The CTP recommendation identifies general areas where lots are anticipated to be needed, with the intent of initially small lots with relatively minor amenities that grow as ridership increases.

- **Local ID ORAN0003-T:** The CTP project proposal is to provide a park-and-ride lot at the intersection of NC 54 and White Cross Road (SR 1951). This project would provide access to the bus route along NC 54 (ORAN0001-T), for users of both vehicles and bicycles.
- **Local ID ORAN0004-T:** The CTP project proposal is to provide a park-and-ride lot at the Cedar Grove Park on NC 86. This project would provide access to the bus route along NC 86, for users of both vehicles and bicycles (ORAN0001-B).

BICYCLE

Refer to Figure 1, Sheet 4 for the Bicycle CTP map.

The Orange County Bicycle Transportation Plan was adopted in 1999 and was intended to develop transportation facilities and programs for bicyclists in Orange County. These recommendations were incorporated into the Orange County CTP. The 1999 Orange County Bicycle Transportation Plan and detailed information regarding its recommendations are available through Orange County.

Minor additions to the CTP recommendations beyond the 1999 Orange County Bicycle Transportation Plan are listed below. As previously mentioned, the network of CTP recommendations provides a combination of recreational and commuting opportunities.

- **Local ID ORAN0001-B:** NC 86 from Carr Store Road (SR 1352) / Sawmill Road W (SR 1545) to proposed park-and-ride lot at Cedar Grove Park (ORAN0004-T). This recommendation was added in order to provide users on the recommended bicycle facility along Carr Store Road (SR 1352) / Sawmill Road W (SR 1545) with access to public transportation services via the proposed park-and-ride lot (ORAN0004-T). This is currently an on-road recommendation for more immediate improvements, but the ultimate 4-lane expressway cross section for NC 86 in the future could require an off-road facility to maintain this connection for bicycles.
- **Local ID ORAN0002-B:** NC Bike Route 2 / Mountains to Sea Trail along Old Greensboro Road (SR 1005) from Carl Durham Road (SR 1950) to Bowden Road (SR 1946) (the DCHC MPO boundary). Although this facility is already designated as NC Bike Route 2, this section is in need of upgrades, such as wider lanes or shoulders, in order to accommodate bicycles. (The section from Alamance County to Carl Durham Road (SR 1950) has recently been widened and resurfaced.)
- **Local ID ORAN0003-B**: Jones Ferry Road (SR 1942) from Chatham County to Ferguson Road (SR 1948) (the DCHC MPO boundary). This project was included in order to ensure connectivity with the 2035 DCHC MPO Long Range Transportation Plan recommendations and the draft DCHC MPO 2040 Metropolitan Transportation Plan (MTP) and CTP recommendations.
- **Local ID ORAN0004-B**: NC 86 from Phelps Rd (SR 1551) to Walnut Grove Church Rd (SR 1001). This project was included in order to provide connectivity with recommendations in the draft DCHC MPO 2040 Metropolitan Transportation Plan (MTP) and CTP recommendations.
- **Local ID ORAN0005-B**: Walnut Grove Church Rd (SR 1001) from NC 86 to Pearson Rd (SR 1544). This project was included in order to provide connectivity with recommendations in the draft DCHC MPO 2040 Metropolitan Transportation Plan (MTP) and CTP recommendations.
- **Local ID ORAN0006-B**: Schley Rd (SR 1548) from Walnut Grove Church Rd (SR 1001) to New Sharon Church Rd (SR 1538) (the DCHC MPO boundary).

This project was included in order to provide connectivity with recommendations in the draft DCHC MPO 2040 Metropolitan Transportation Plan (MTP) and CTP recommendations.

- **Local ID ORAN0007-B**: Efland-Cedar Grove Rd (SR 1357) from Carr Store Rd (SR 1004/1352) to McDade Store Rd (SR 1358/1354). This project was included in order to provide further connectivity between recommendations included from the 1999 Orange County Bicycle Transportation Plan.
- **Local ID ORAN0008-B**: McDade Store Rd (SR 1361) from Pentecost Rd (SR 1361) / McDade Store Rd (SR 1358) to NC 49. This project was included in order to provide further connectivity between recommendations included from the 1999 Orange County Bicycle Transportation Plan.
- **Local ID ORAN0009-B**: NC 49 from McDade Store Rd (SR 1361) to Caswell County. This project was included in order to provide further connectivity between recommendations included from the 1999 Orange County Bicycle Transportation Plan.
- **Local ID ORAN0010-B**: W Lebanon Rd (SR 1306) from Saddle Club Rd (SR 1346) to Mill Creek Rd (SR 1345). This project was included in order to provide connectivity with recommendations in the draft DCHC MPO 2040 Metropolitan Transportation Plan (MTP) and CTP recommendations.
- **SPOT ID 1160:** Orange Grove Road (SR 1006) and Buckhorn Road (SR 1114) from Dairyland Road (SR 1177) to West Ten Road (SR 1146). This project was submitted by the Triangle Area RPO to the NCDOT Strategic Planning Office of Transportation (SPOT) as part of the Prioritization 2.0 Process in 2011. This project overlaps with a section of NCDOT project EB-5520 on Orange Grove Road (SR 1006) between Dairyland Road (SR 1177) and Buckhorn Road (SR 1114).
- **Local ID EB-5520:** NCDOT project EB-5520 is to add 4-foot shoulders to Orange Grove Road (SR 1006) from NC 54 to Arthur Minnis Road (SR 1115). There is currently no right-of-way or construction date scheduled. This project overlaps with the Orange Grove Road (SR 1006) section of SPOT ID 1160 between Dairyland Road (SR 1177) and Buckhorn Road (SR 1114).

The projects below were also submitted by the Triangle Area RPO to the NCDOT Strategic Planning Office of Transportation (SPOT) as part of the Prioritization 2.0 Process in 2011, but were already included in the CTP recommendations taken from the 1999 Orange County Bicycle Transportation Plan.

- **SPOT ID 1095:** Dairyland Road (SR 1177) from Union Grove Church Road (SR 1111) to Orange Grove Road (SR 1006).
- **SPOT ID 958:** Orange Grove Road (SR 1006) and Dodsons Cross Road (SR 1102) from I-40 to Dairyland Road (SR 1177).
- **SPOT ID 559:** Efland-Cedar Grove Road (SR 1004) from Highland Farm Road (SR 1332) to Carr Store Road (SR 1004 / SR 1352).

PEDESTRIAN

Refer to Figure 1, Sheet 5 for the Pedestrian CTP map.

Orange County currently has a pedestrian plan under development for off-road pedestrian facilities throughout the county. Existing recommendations from this plan were incorporated into the Orange County CTP. The county's pedestrian plan and detailed information regarding its recommendations are available through Orange County.

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APPENDICES

Appendix A
Resources and Contacts

North Carolina Department of Transportation

Customer Service Office

Contact information for other units within the NCDOT that are not listed in this appendix is available by calling the Customer Service Office or by visiting the NCDOT homepage:

1-877-DOT-4YOU
(1-877-368-4968)
https://apps.dot.state.nc.us/dot/directory/authenticated/ToC.aspx

Secretary of Transportation

Mr. Anthony J. Tata
1501 Mail Service Center
Raleigh, NC 27699-1501
(919) 707-2800
ajtata@ncdot.gov
http://www.ncdot.org/about/leadership/secretary.html

Board of Transportation Member

Ms. Cheryl McQueary
Post Office Box 14996
Greensboro, NC 27415
(336) 487-0000
clmcqueary@ncdot.gov
http://www.ncdot.gov/about/board/

Highway Division Engineer

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

Mr. Mike Mills, PE
PO Box 14996 (mail)
1584 Yanceyville Street (office)
Greensboro, NC 27415-4996
(336) 487-0000
https://connect.ncdot.gov/letting/Pages/Letting-List.aspx?let_type=7

Division Project Manager

Contact the Division Project Manager with questions concerning transportation projects within each Division.

Mr. Donnie Huffines
PO Box 14996 (mail)
1584 Yanceyville Street (office)
Greensboro, NC 27415-4996
(336) 487-0000
dhuffines@ncdot.gov

Division Construction Engineer

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

Ms. Patty Eason, PE
PO Box 14996 (mail)
1584 Yanceyville Street (office)
Greensboro, NC 27415-4996
(336) 487-0000
peason@ncdot.gov

Division Traffic Engineer

Contact the Division Traffic Engineer for information concerning traffic signals, highway signs, pavement markings and crash history.

Ms. Dawn McPherson
PO Box 14996 (mail)
1584 Yanceyville Street (office)
Greensboro, NC 27415-4996
(336) 487-0000
dmcpherson@ncdot.gov

Division Operations Engineer

Contact the Division Operations Engineer for information concerning facility operations.

Mr. Pat Wilson, PE
PO Box 14996 (mail)
1584 Yanceyville Street (office)
Greensboro, NC 27415-4996
(336) 487-0000
pwilson@ncdot.gov

Division Maintenance Engineer

Contact the Division Maintenance Engineer information regarding maintenance of all state roadways, improvement of secondary roads and other small improvement projects. The Division Maintenance Engineer also oversees the District Offices, the Bridge Maintenance Unit and the Equipment Unit.

Mr. Brad Wall, PE
PO Box 14996 (mail)
1584 Yanceyville Street (office)
Greensboro, NC 27415-4996
(336) 487-0000
bwall@ncdot.gov

District Engineer

Contact the District Engineer for information on outdoor advertising, junkyard control, driveway permits, road additions, subdivision review and approval, Adopt A Highway program, encroachments on highway right of way, issuance of oversize/overwidth permits, paving priorities, secondary road construction program and road maintenance.

Mr. C. N. (Chuck) Edwards, PE
PO Box 766 (mail)
127 East Crescent Square Dr. (office)
Graham, NC 27253
(336) 570-6833
cnedwards@ncdot.gov

Transportation Planning Branch (TPB)

Contact the Transportation Planning Branch for information on long-range multi-modal planning services, including Strategic Highway Corridors.

1554 Mail Service Center
Raleigh, NC 27699-1554
(919) 707-0900
https://connect.ncdot.gov/projects/planning/Pages/default.aspx

Triangle Area Rural Planning Organization (RPO)

Contact the RPO for information on long-range multi-modal planning services.

Mr. Matthew Day, AICP
4307 Emperor Blvd, Suite 110
Durham, NC 27703
919-558-9397
mday@tjcog.org
www.tarpo.org (www.tjcog.org)

Strategic Planning Office

Contact the Strategic Planning Office for information concerning prioritization of transportation projects.

Mr. Don Voelker
1501 Mail Service Center
Raleigh, NC 27699-1501
(919) 707-4740
djvoelker@ncdot.gov
https://apps.dot.state.nc.us/dot/directory/authenticated/UnitPage.aspx?id=11054

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) 707-6000
https://connect.ncdot.gov/resources/Environmental/Pages/default.aspx

Secondary Roads Office

Contact the Secondary Roads Office for information regarding the status for unpaved roads to be paved, additions and deletions of roads to the State maintained system and the Industrial Access Funds program.

1535 Mail Service Center
Raleigh, NC 27699-1535
(919) 707-2500
https://connect.ncdot.gov/resources/stateroads/Pages/default.aspx

Program Development Branch

Contact the Program Development Branch for information concerning Roadway Official Corridor Maps, Feasibility Studies and the Transportation Improvement Program (TIP).

1534 Mail Service Center
Raleigh, NC 27699-1534
(919) 707-4610
https://connect.ncdot.gov/projects/planning/Pages/default.aspx

Public Transportation Division

Contact the Public Transportation Division for information public transit systems.

1550 Mail Service Center
Raleigh, NC 27699-1550
(919) 707-4670
http://www.ncdot.gov/nctransit/

Rail Division

Contact the Rail Division for rail information throughout the state.

1553 Mail Service Center
Raleigh, NC 27699-1553
(919) 707-4700
http://www.bytrain.org/

Division of Bicycle and Pedestrian Transportation

Contact this Division for bicycle and pedestrian transportation information throughout the state.

1552 Mail Service Center
Raleigh, NC 27699-1552
(919) 707-2600
http://www.ncdot.gov/bikeped/
https://connect.ncdot.gov/projects/planning/Pages/default.aspx

Structure Management Unit

Contact the Bridge Maintenance Unit for information on bridge management throughout the state.

1565 Mail Service Center
Raleigh, NC 27699-1565
(919) 707-6400
http://www.ncdot.gov/projects/ncbridges/
https://connect.ncdot.gov/resources/Structures/Pages/default.aspx

Highway Design Branch

The Highway Design Branch consists of the Roadway Design, Structure Design, Photogrammetry, Location & Surveys, Geotechnical, and Hydraulics Units. Contact the Highway Design Branch for information regarding design plans and proposals for road and bridge projects throughout the state.

1584 Mail Service Center
Raleigh, NC 27699-1584
(919) 707-6200
https://connect.ncdot.gov/projects/Roadway/Pages/default.aspx

Other State Government Offices

Department of Commerce – Division of Community Assistance

Contact the Department of Commerce for resources and services to help realize economic prosperity, plan for new growth and address community needs.

http://www.nccommerce.com/en/CommunityServices/

Appendix B
Comprehensive Transportation Plan Definitions

Highway Map

For visual depiction of facility types for the following CTP classification, visit http://www.ncdot.gov/doh/preconstruct/tpb/SHC/facility/.

Facility Type Definitions

- **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 (HOV)/High Occupancy Transit (HOT) 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 1,000ft or for 350ft plus 650ft 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 – HOV lanes, busways, very wide paved shoulders (rural), shared use paths (separate from roadway but within ROW)
  - Type of access control – limited or partial control of access;
  - Access management – minimum interchange/intersection spacing 2,000ft; 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 current NCDOT *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 *(US and NC routes may have less than four lanes)*
  - 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 roadway with center turn lane as permitted by the current NCDOT *Driveway Manual*

- **Minor Thoroughfares**
  - Functional purpose – balanced mobility and access, moderate volume, low to medium speed
  - Posted speed – 25 to 55 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 current NCDOT *Driveway Manual*

Other Highway Map Definitions

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

Public Transportation and Rail Map

- **Bus Routes** – The primary fixed route bus system for the area. Does not include demand response systems.
- **Fixed Guideway** – Any transit service that uses exclusive or controlled rights-of-way or rails, entirely or in part. The term includes heavy rail, commuter rail, light rail, monorail, trolleybus, aerial tramway, included plane, cable car, automated guideway transit, and ferryboats.

- **Operational Strategies** – Plans geared toward the non-single occupant vehicle. This includes but is not limited to 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 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.
- **Existing Grade Separation** – Locations where existing rail facilities and are physically separated from existing highways or other transportation facilities. These may be bridges, culverts, or other structures.
- **Proposed Grade Separation** – Locations where rail facilities are recommended to be physically separated from existing or recommended highways or other transportation facilities. These may be bridges, culverts, or other structures.

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 **an existing** 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 only bicycle transportation and is physically separated from a highway facility either within the right-of-way or within an independent right-of-way.
- **Off Road-Needs Improvement** – A facility that accommodates only bicycle transportation and is physically separated from a highway facility either within the right-of-way or within an independent right-of-way that will not adequately serve future bicycle needs. Improvements may include but are not limited to, widening, paving (not re-paving or other maintenance activities), and improved horizontal or vertical alignment.
- **Off Road-Recommended** – A facility needed to accommodate only bicycle transportation and is physically separated from a highway facility either within the right-of-way or within an independent right-of-way.
- **Multi-use Path-Existing** – An existing facility physically separated from motor vehicle traffic that is either within the highway right-of-way or on an independent right-of-way that serves bicycle and pedestrian traffic. Sidewalks should not be designated as a multi-use path.
- **Multi-use Path-Needs Improvement** – An existing facility physically separated from motor vehicle traffic that is either within the highway right-of-way or on an independent right-of-way that serves bicycle and pedestrian traffic that will not adequately serve future needs. Improvements may include but are not limited to, widening, paving (not re-paving or other maintenance activities), and improved horizontal or vertical alignment. Sidewalks should not be designated as a multi-use path.
- **Multi-use Path-Recommended** – A facility physically separated from motor vehicle traffic that is either within the highway right-of-way or on an independent right-of-way that is needed to serve bicycle and pedestrian traffic. Sidewalks should not be designated as a multi-use path.
- **Existing Grade Separation** – Locations where existing “Off Road” facilities and “Multi-use Paths” are physically separated from existing highways, railroads, or other transportation facilities. These may be bridges, culverts, or other structures.
- **Proposed Grade Separation** – Locations where “Off Road” facilities and “Multi-use Paths” are recommended to be physically separated from existing or recommended highways, railroads, or other transportation facilities. These may be bridges, culverts, or other structures.

Pedestrian Map

- **Sidewalk-Existing** – Paved paths (including but not limited to concrete, asphalt, brick, stone, or wood) on both sides of a highway facility and within the highway right-of-way that are adequate to safely accommodate pedestrian traffic.

- **Sidewalk-Needs Improvement** – Improvements are needed to provide paved paths on both sides of a highway facility. The highway facility may or may not need improvements. Improvements do not include re-paving or other maintenance activities but may include: filling in gaps, widening sidewalks, or meeting ADA (Americans with Disabilities Act) requirements.
- **Sidewalk-Recommended** – At the systems level, it is desirable for a recommended highway facility to accommodate pedestrian transportation **or** to add sidewalks on an existing facility where no sidewalks currently exist. The highway should be designed and built to safely accommodate pedestrian traffic.
- **Off Road-Existing** – A facility that accommodates only pedestrian traffic and is physically separated from a highway facility usually within an independent right-of-way.
- **Off Road-Needs Improvement** – A facility that accommodates only pedestrian traffic and is physically separated from a highway facility usually within an independent right-of-way that will not adequately serve future pedestrian needs. Improvements may include but are not limited to, widening, paving (not re-paving or other maintenance activities), improved horizontal or vertical alignment, and meeting ADA requirements.
- **Off Road-Recommended** – A facility needed to accommodate only pedestrian traffic and is physically separated from a highway facility usually within an independent right-of-way.
- **Multi-use Path-Existing** – An existing facility physically separated from motor vehicle traffic that is either within the highway right-of-way or on an independent right-of-way that serves bicycle and pedestrian traffic. Sidewalks should not be designated as a multi-use path.
- **Multi-use Path-Needs Improvement** – An existing facility physically separated from motor vehicle traffic that is either within the highway right-of-way or on an independent right-of-way that serves bicycle and pedestrian traffic that will not adequately serve future needs. Improvements may include but are not limited to, widening, paving (not re-paving or other maintenance activities), and improved horizontal or vertical alignment. Sidewalks should not be designated as a multi-use path.
- **Multi-use Path-Recommended** – A facility physically separated from motor vehicle traffic that is either within the highway right-of-way or on an independent right-of-way that is needed to serve bicycle and pedestrian traffic. Sidewalks should not be designated as a multi-use path.
- **Existing Grade Separation** – Locations where existing “Off Road” facilities and “Multi-use Paths” are physically separated from existing highways, railroads, or other transportation facilities. These may be bridges, culverts, or other structures.

- **Proposed Grade Separation** – Locations where “Off Road” facilities and “Multi-use Paths” are recommended to be physically separated from existing or recommended highways, railroads, or other transportation facilities. These may be bridges, culverts, or other structures.

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Appendix C
CTP Inventory and Recommendations

Assumptions/ Notes:

- **Local ID:** This Local ID is the same as the one used for the Prioritization Project Submittal Tool. If a TIP project number exists it is listed as the ID. Otherwise, the following system is used to create a code for each recommended improvement: the first 4 letters of the county name is combined with a 4 digit unique numerical code followed by '-H' for highway, '-T' for public transportation, '-R' for rail, '-B' for bicycle, '-M' for multi-use paths, or '-P' for pedestrian modes. If a different code is used along a route it indicates separate projects will probably be requested. Also, upper case alphabetic characters (i.e. 'A', 'B', or 'C') are included after the numeric portion of the code if it is anticipated that project segmentation or phasing will be recommended.

- **Jurisdiction:** Jurisdictions listed are based on municipal limits, county boundaries, and MPO Metropolitan Planning Area Boundaries (MAB), as applicable.

- **Existing Cross-Section:** Listed under '(ft)' is the approximate width of the roadway from edge of pavement to edge of pavement. Listed under 'lanes' is the total number of lanes, with the letter 'D' if the facility is divided.

- **Existing ROW:** The estimated existing right-of-way is based on the Road Characteristics shapefile from the NCDOT GIS Unit. These right-of-way amounts are approximate and may vary.

- **Existing and Proposed Capacity:** The estimated capacities are given in vehicles per day (vpd) based on LOS D for existing facilities and LOS C for new facilities. These capacity estimates were developed using the NCLOS program, as documented in Chapter I.

- **Existing and Proposed AADT** (Annual Average Daily Traffic) volumes, given in vehicles per day (vpd), are estimates only based on a systems-level analysis. The '2035 AADT with CTP' is an estimate of the volume in 2035 with all proposed CTP improvements assumed to be in place. The '2035 AADT with CTP' is shown in bold if it exceeds the proposed capacity, indicating an unmet need. For additional information about the assumptions and techniques used to develop the AADT volume estimates, refer to Chapter I.

- **Proposed Cross-section:** The CTP recommended cross-sections are listed by code; for depiction of the cross-section, refer to Appendix D. An entry of 'ADQ' indicates the existing facility is adequate and there are no improvements recommended as part of the CTP.

- **CTP Classification:** The CTP classification is listed, as shown on the adopted CTP Maps (see Figure 1). Abbreviations are F= freeway, E= expressway, B= boulevard, Maj= other major thoroughfare, Min= minor thoroughfare.

- **Tier:** Tiers are defined as part of the North Carolina Mulitmodal Investment Network (NCMIN). Abbreviations are Sta= statewide tier, Reg= regional tier, Sub= subregional tier.

- **Other Modes:** If there is an improvement recommended for another mode of transportation that relates to the given recommendation, it is indicated by an alphabetic code (H=highway, T= public transportation, R= rail, B= bicycle, and P= pedestrian).

CTP INVENTORY AND RECOMMENDATIONS

HIGHWAY																		
					2007 Existing System						2035 Proposed System							
Local ID	Facility	Section (From - To)	Jurisdiction	Dist. (mi)	Cross-Section (ft)	Cross-Section lanes	ROW (ft)	Speed Limit (mph)	Existing Capacity (vpd)	2007 (2006*) AADT	2035 AADT with CTP	Proposed Capacity (vpd)	Cross-Section	ROW (ft)	CTP Classification	Tier	Other Modes
-	NC 49	Alamance Co - Lynch Store Rd (SR 1364)	Orange County	1.7	24	2	60	55	12,000	2,600	4,100	-	ADQ	-	Maj	Reg	-
-	NC 49	Lynch Store Rd (SR 1364) - Carr Store Rd / Corbett Ridge Rd (SR 1004)	Orange County	0.8	24	2	60	55	12,000	3,300	5,100	-	ADQ	-	Maj	Reg	-
-	NC 49	Carr Store Rd / Corbett Ridge Rd (SR 1004) - NC 86	Orange County	2.7	24	2	60	55	12,000	2,900	4,500	-	ADQ	-	Maj	Reg	-
ORAN0001-H / W-5318	NC 49	NC 86 - Caswell Co	Orange County	0.1	24	2	60	55	12,000	7,100	12,100	24,000	4B	150	E	Reg	T
-	NC 54	Alamance Co - Mebane Oaks Rd (SR 1007)	Orange County	0.6	24	2	120	55	12,000	5,400	9,200	-	ADQ	-	Maj	Reg	-
-	NC 54	Mebane Oaks Rd (SR 1007) - Morrow Mill Rd (SR 1958)	Orange County	2.8	24	2	120	55	12,000	5,400	9,200	-	ADQ	-	Maj	Reg	-
-	NC 54	Morrow Mill Rd (SR 1958) - Orange Grove Rd (SR 1006)	Orange County	0.8	24	2	120	55	12,000	5,400	9,200	-	ADQ	-	Maj	Reg	-
ORAN0002-H	NC 54	Orange Grove Rd (SR 1006) - Butler Rd (SR 1951) / Dodsons Cross Rd (SR 1102)	Orange County	1.6	24	2	120	55	12,000	8,700	14,800	24,000	4B	150	B	Reg	T
ORAN0002-H	NC 54	Butler Rd (SR 1951) / Dodsons Cross Rd (SR 1102) - Neville Rd (SR 1945) / Inside DCHC	Orange County	2.2	24	2	120	55	12,000	12,000	20,400	24,000	4B	150	B	Reg	T

HIGHWAY																		
					2007 Existing System						2035 Proposed System							
Local ID	Facility	Section (From - To)	Jurisdiction	Dist. (mi)	Cross-Section (ft)	Cross-Section lanes	ROW (ft)	Speed Limit (mph)	Existing Capacity (vpd)	2007 (2006*) AADT	2035 AADT with CTP	Proposed Capacity (vpd)	Cross-Section	ROW (ft)	CTP Classification	Tier	Other Modes
-	NC 57	Phelps Rd (SR 1550) / DCHC - Schley Rd (SR 1548)	Orange County	1.8	20	2	100	55	12,000	4,900	7,600	-	ADQ	-	Maj	Reg	-
-	NC 57	Schley Rd (SR 1548) - Little River Church Rd (SR 1543)	Orange County	2.8	20	2	100	55	12,000	4,900	7,600	-	ADQ	-	Maj	Reg	-
-	NC 57	Little River Church Rd (SR 1543) - NC 157 (Guess Rd)	Orange County	0.8	20	2	100	55	12,000	3,700	5,800	-	ADQ	-	Maj	Reg	-
-	NC 57	NC 157 (Guess Rd) - Holly Ridge Rd (SR 1524) / New Sharon Church Rd (SR 1538)	Orange County	1.8	20	2	100	55	12,000	2,700	4,200	-	ADQ	-	Maj	Reg	-
-	NC 57	Holly Ridge Rd (SR 1524) / New Sharon Church Rd (SR 1538) - Person Co	Orange County	3.2	20	2	100	55	12,000	1,800	2,800	-	ADQ	-	Maj	Reg	-
ORAN0001-H / W-5318	NC 86	Coleman Loop Rd (SR 1334) / DCHC - Walnut Grove Church Rd (SR 1001)	Orange County	0.8	24	2	100	55	12,000	8300*	14,300	24,000	4B	150	E	Sta	T, B
ORAN0001-H / W-5318	NC 86	Walnut Grove Church Rd (SR 1001) - Carr Store Rd (SR 1352) / Sawmill Rd (SR 1545)	Orange County	2.3	24	2	100	55	12,000	4,800	8,200	24,000	4B	150	E	Sta	T
ORAN0001-H / W-5318	NC 86	Carr Store Rd (SR 1352) / Sawmill Rd (SR 1545) - Caviness Jordan Rd (SR 1506) / AADT Change	Orange County	1.6	24	2	60	55	12,000	4,800	8,200	24,000	4B	150	E	Sta	T, B
ORAN0001-H / W-5318	NC 86	Caviness Jordan Rd (SR 1506) / AADT Change - Efland-Cedar Grove Rd (SR 1357)	Orange County	2.3	24	2	60	55	12,000	4,200	7,100	24,000	4B	150	E	Sta	T
ORAN0001-H / W-5318	NC 86	Efland-Cedar Grove Rd (SR 1357) - NC 49	Orange County	1.9	24	2	60	55	12,000	4,400	7,500	24,000	4B	150	E	Sta	T
-	NC 86	NC 49 - Caswell Co	*Concurrent with NC 49*														

HIGHWAY																		
					2007 Existing System						2035 Proposed System							
Local ID	Facility	Section (From - To)	Jurisdiction	Dist. (mi)	Cross-Section (ft)	Cross-Section lanes	ROW (ft)	Speed Limit (mph)	Existing Capacity (vpd)	2007 (2006*) AADT	2035 AADT with CTP	Proposed Capacity (vpd)	Cross-Section	ROW (ft)	CTP Classification	Tier	Other Modes
-	NC 157 (Guess Rd)	New Sharon Church Rd (SR 1538) / DCHC - Green Riley Rd (SR 1579) / AADT Change	Orange County	2.0	20	2	60	55	12,000	2,200	3,400	-	ADQ	-	Maj	Reg	-
-	NC 157 (Guess Rd)	Green Riley Rd (SR 1579) / AADT Change - NC 57	Orange County	1.0	20	2	60	55	12,000	2,100	3,300	-	ADQ	-	Maj	Reg	-
-	NC 157 (Guess Rd)	NC 57 - Holly Ridge Rd (SR 1524)	Orange County	2.8	20	2	60	55	12,000	2,400	3,700	-	ADQ	-	Maj	Reg	-
-	NC 157 (Guess Rd)	Holly Ridge Rd (SR 1524) - Person Co	Orange County	1.1	20	2	60	55	12,000	2,400	3,700	-	ADQ	-	Maj	Reg	-
-	Arthur Minnis Rd (SR 1115)	Orange Grove Rd (SR 1006) - Dodsons Cross Rd (SR 1102)	Orange County	1.2	22	2	60	55	12,000	380*	700	-	ADQ	-	Min	Sub	-
ORAN0003-H	Arthur Minnis Rd (SR 1115)	Dodsons Cross Rd (SR 1102) - Rocky Ridge Rd / Arthur Minnis Rd (SR 1113)	Orange County	1.6	20	2	60	55	unsurf-aced	2,300	3,900	12,000	2A	60	Min	Sub	-
-	Arthur Minnis Rd (SR 1113)	Rocky Ridge Rd (SR 1113) / Arthur Minnis Rd (SR 1115) - Old NC 86 (SR 1009) / DCHC	Orange County	1.8	20	2	60	50	10,300	2,300	3,900	-	ADQ	-	Min	Sub	-
-	Bradshaw Quarry Rd (SR 1100)	Mebane Oaks (SR 1007) - Teer Rd (SR 1100) / Bradshaw Quarry Rd (SR 1115)	Orange County	0.7	20	2	60	55	12,000	500*	900	-	ADQ	-	Min	Sub	-
-	Bradshaw Quarry Rd (SR 1115)	Teer Rd / Bradshaw Quarry Rd (SR 1100) - Buckhorn Rd (SR 1114)	Orange County	3.1	20	2	60	55	12,000	500*	900	-	ADQ	-	Min	Sub	-
-	Bradshaw Quarry Rd (SR 1115)	Buckhorn Rd (SR 1114) - Orange Grove Rd (SR 1006)	Orange County	1.2	24	2	60	55	12,000	990	1,700	-	ADQ	-	Min	Sub	-

HIGHWAY																	
					2007 Existing System						2035 Proposed System						
Local ID	Facility	Section (From - To)	Jurisdiction	Dist. (mi)	Cross-Section (ft)	Cross-Section lanes	ROW (ft)	Speed Limit (mph)	Existing Capacity (vpd)	2007 (2006*) AADT	2035 AADT with CTP	Proposed Capacity (vpd)	Cross-Section	ROW (ft)	CTP Classification	Tier	Other Modes
ORAN0004-H	Buckhorn Rd (SR 1114)	Orange Grove Rd (SR 1006) - Bradshaw Quarry Rd (SR 1115)	Orange County	1.6	20	2	-	55	unsurf-aced	750	1,200	12,000	2A	60	Min	Sub	B
-	Buckhorn Rd (SR 1114)	Bradshaw Quarry Rd (SR 1115) - Mount Willing Rd (SR 1120)	Orange County	3.2	20	2	-	55	12,000	750	1,200	-	ADQ	-	Min	Sub	-
-	Buckhorn Rd (SR 1114)	Mount Willing Rd (SR 1120) - W Ten Rd (SR 1146)	Orange County	2.2	20	2	-	55	12,000	1,500	2,100	-	ADQ	-	Min	Sub	-
ORAN0008-H	Buckhorn Rd Extension	Orange Grove Rd (SR 1006) - Dairyland Rd (SR 1177)	Orange County	0.7	*New location*						-	12,000	2A	60	Min	Sub	-
-	Butler Rd (SR 1951)	White Cross Rd (SR 1952) - NC 54	Orange County	1.0	20	2	60	55	12,000	940	1,500	-	ADQ	-	Min	Sub	-
-	Carr Store Rd (SR 1004)	NC 49 - Pentecost Rd (SR 1361) / AADT Change	Orange County	2.1	20	2	-	55	12,000	800	1,100	-	ADQ	-	Min	Sub	-
-	Carr Store Rd (SR 1004)	Pentecost Rd (SR 1361) / AADT Change - Mill Creek Rd (SR 1343)	Orange County	1.1	20	2	-	55	12,000	830*	1,200	-	ADQ	-	Min	Sub	-
-	Carr Store Rd (SR 1004)	Mill Creek Rd (SR 1343) - Speed Limit Change	Orange County	1.1	20	2	-	55	12,000	1,100	1,600	-	ADQ	-	Min	Sub	-
-	Carr Store Rd (SR 1004)	Speed Limit Change - Efland-Cedar Grove Rd (SR 1004 / SR 1357) / Carr Store Rd (SR 1352)	Orange County	0.3	20	2	-	45	6,200	1,100	1,600	-	ADQ	-	Min	Sub	-
-	Carr Store Rd (SR 1352)	Efland-Cedar Grove Rd (SR 1004 / SR 1357) / Carr Store Rd (SR 1004) - NC 86	Orange County	2.0	20	2	-	45	6,200	1300*	1,900	-	ADQ	-	Min	Sub	-
-	Claibornes Rd (SR 1367)	Alamance Co - Corbett Ridge Rd (SR 1004)	Orange County	1.0	20	2	60	55	12,000	650*	800	-	ADQ	-	Min	Sub	-

HIGHWAY																		
					2007 Existing System						2035 Proposed System						
Local ID	Facility	Section (From - To)	Jurisdiction	Dist. (mi)	Cross-Section (ft)	Cross-Section lanes	ROW (ft)	Speed Limit (mph)	Existing Capacity (vpd)	2007 (2006*) AADT	2035 AADT with CTP	Proposed Capacity (vpd)	Cross-Section	ROW (ft)	CTP Classifi-cation	Tier	Other Modes
-	Coleman Loop Rd (SR 1334)	Highland Farm Rd / Coleman Loop Rd (SR 1332) - NC 86	Orange County	1.1	20	2	60	45	6,200	390	500	-	ADQ	-	Min	Sub	-
-	Corbett Ridge Rd (SR 1004)	Caswell Co - Claibornes Rd (SR 1367)	Orange County	0.4	18	2	-	55	10,900	650*	900	-	ADQ	-	Min	Sub	-
-	Corbett Ridge Rd (SR 1004)	Claibornes Rd (SR 1367) - NC 49	Orange County	2.2	18	2	-	55	10,900	650*	900	-	ADQ	-	Min	Sub	-
-	Crawford Dairy Rd (SR 1956)	Chatham Co - Old Greensboro Rd (SR 1005)	Orange County	1.5	20	2	60	55	12,000	600*	800	-	ADQ	-	Min	Sub	-
-	Dairyland Rd (SR 1177)	Orange Grove Rd (SR 1006) - Dodsons Cross Rd (SR 1102)	Orange County	1.9	24	2	100	50	12,000	810	1,000	-	ADQ	-	Min	Sub	-
-	Dodsons Cross Rd (SR 1102)	NC 54 - Speed Limit Change	Orange County	2.7	22	2	60	55	12,000	1800*	2,800	-	ADQ	-	Min	Sub	-
-	Dodsons Cross Rd (SR 1102)	Speed Limit Change - Dairlyland Rd (SR 1177)	Orange County	0.7	22	2	60	45	6,200	1800*	2,800	-	ADQ	-	Min	Sub	-
-	Dodsons Cross Rd (SR 1102)	Dairlyland Rd (SR 1177) - Arthur Minnis Rd (SR 1115)	Orange County	1.6	20	2	-	45	6,200	1800*	2,800	-	ADQ	-	Min	Sub	-
-	Dodsons Cross Rd (SR 1102)	Arthur Minnis Rd (SR 1115) - Orange Grove Rd (SR 1006)	Orange County	1.2	20	2	-	45	6,200	770*	1,200	-	ADQ	-	Min	Sub	-

HIGHWAY																		
					2007 Existing System						2035 Proposed System							
Local ID	Facility	Section (From - To)	Jurisdiction	Dist. (mi)	Cross-Section (ft)	Cross-Section lanes	ROW (ft)	Speed Limit (mph)	Existing Capacity (vpd)	2007 (2006*) AADT	2035 AADT with CTP	Proposed Capacity (vpd)	Cross-Section	ROW (ft)	CTP Classification	Tier	Other Modes
-	(N) Efland-Cedar Grove Rd (SR 1004)	Harmony Church Rd (SR 1339) / Brookhollow Rd (SR 1338) / DCHC - Highland Farm Rd (SR 1332)	Orange County	2.0	20	2	-	55	12,000	1900*	3,600	-	ADQ	-	Min	Sub	-
SPOT ID # 559 / W-5143	(N) Efland-Cedar Grove Rd (SR 1004)	Highland Farm Rd (SR 1332) - Speed Limit Change	Orange County	1.4	20	2	-	55	12,000	2100*	3,900	12,000	2A [1]	60	Min	Sub	B
SPOT ID # 559 / W-5143	(N) Efland-Cedar Grove Rd (SR 1004)	Speed Limit Change - Carr Store Rd (SR 1004 / SR 1352)	Orange County	0.1	20	2	-	45	6,200	2100*	3,900	6,200	2B [1]	60	Min	Sub	B
-	Efland-Cedar Grove Rd (SR 1357)	Carr Store Rd (SR 1004 / SR 1352) - Speed Limit Change	Orange County	0.3	20	2	-	45	6,200	980*	1,800	-	ADQ	-	Min	Sub	-
-	Efland-Cedar Grove Rd (SR 1357)	Speed Limit Change - NC 86	Orange County	3.1	20	2	-	55	12,000	980*	1,800	-	ADQ	-	Min	Sub	-
-	High Rock Rd (SR 1340)	Alamance Co - Mill Creek Rd (SR 1343)	Orange County	2.7	20	2	60	55	12,000	740*	1,200	-	ADQ	-	Min	Sub	-
-	High Rock Rd (SR 1340)	Mill Creek Rd (SR 1343) - Ira Rd (SR 1341) / DCHC	Orange County	2.0	20	2	60	55	12,000	740*	1,200	-	ADQ	-	Min	Sub	-
-	Highland Farm Rd (SR 1332)	Efland-Cedar Grove Rd (SR 1004) - Coleman Loop Rd (SR 1334)	Orange County	3.1	20	2	60	55	12,000	680*	1,000	-	ADQ	-	Min	Sub	-
-	Holly Ridge Rd (SR 1524)	NC 57 - Hall Dairy Rd (SR 1525) / AADT Change	Orange County	0.8	20	2	60	55	12,000	460*	600	-	ADQ	-	Min	Sub	-
-	Holly Ridge Rd (SR 1524)	Hall Dairy Rd (SR 1525) / AADT Change - NC 157 (Guess Rd)	Orange County	1.7	20	2	60	55	12,000	610	800	-	ADQ	-	Min	Sub	-
-	Jones Ferry Rd (SR 1942)	Chatham Co - Ferguson Rd (SR 1948) / DCHC	Orange County	0.9	24	2	-	55	12,000	3,500	6,000	-	ADQ	-	Min	Sub	-

HIGHWAY																		
					2007 Existing System						2035 Proposed System						
Local ID	Facility	Section (From - To)	Jurisdiction	Dist. (mi)	Cross-Section (ft)	Cross-Section lanes	ROW (ft)	Speed Limit (mph)	Existing Capacity (vpd)	2007 (2006*) AADT	2035 AADT with CTP	Proposed Capacity (vpd)	Cross-Section	ROW (ft)	CTP Classification	Tier	Other Modes
-	Little River Church Rd (SR 1543)	Walnut Grove Church Rd (SR 1001) - Hawkins Rd (SR 1508) / AADT Change	Orange County	3.0	18	2	-	55	10,900	610	800	-	ADQ	-	Min	Sub	-
-	Little River Church Rd (SR 1543)	Hawkins Rd (SR 1508) / AADT Change - NC 57	Orange County	1.0	18	2	-	55	10,900	580*	700	-	ADQ	-	Min	Sub	-
ORAN0005-H	Little River Church Rd Extension	Walnut Grove Church Rd (SR 1001) - Sawmill Rd E (SR 1545)	Orange County	0.8	*New location*						-	12,000	2A	60	Min	Sub	-
-	Lynch Store Rd (SR 1364)	Alamance Co - NC 49	Orange County	3.5	20	2	-	55	12,000	690*	900	-	ADQ	-	Min	Sub	-
ORAN0006-H	Mebane Oaks Rd (SR 1007)	NC 54 - Bradshaw Quarry Rd (SR 1100)	Orange County	1.1	22	2	60	45	6,200	2,300	4,200	6,200	2B [1]	60	Min	Sub	-
ORAN0006-H	Mebane Oaks Rd (SR 1007)	Bradshaw Quarry Rd (SR 1100) - Alamance Co	Orange County	0.8	22	2	60	45	6,200	2,300	4,200	6,200	2B [1]	60	Min	Sub	-
ORAN0006-H	Mebane Oaks Rd (SR 1007)	Alamance Co - Oak Grove Church Rd (SR 1117)	Orange County	1.4	22	2	60	45	6,200	3000*	5,500	6,200	2B [1]	60	Min	Sub	-
ORAN0006-H	Mebane Oaks Rd (SR 1007)	Oak Grove Church Rd (SR 1117) - Alamance Co	Orange County	1.5	22	2	60	45	6,200	3,900	5,500	6,200	2B [1]	60	Min	Sub	-
-	Mill Creek Rd (SR 1343)	W Lebanon Rd (SR 1306) / DCHC - Doe Run Rd (SR 1343/1344)	Orange County	0.3	20	2	-	55	12,000	1800*	2,600	-	ADQ	-	Min	Sub	-
-	Mill Creek Rd (SR 1343)	Doe Run Rd (SR 1343/1344) - High Rock Rd (SR 1340)	Orange County	1.5	20	2	60	55	12,000	1800*	2,600	-	ADQ	-	Min	Sub	-
-	Mill Creek Rd (SR 1343)	High Rock Rd (SR 1340) - Harmony Church Rd (SR 1341) / AADT Change	Orange County	1.4	20	2	60	55	12,000	1,700	2,400	-	ADQ	-	Min	Sub	-
-	Mill Creek Rd (SR 1343)	Harmony Church Rd (SR 1341) / AADT Change - Carr Store Rd (SR 1004)	Orange County	2.3	20	2	60	55	12,000	730*	1,000	-	ADQ	-	Min	Sub	-

HIGHWAY																		
					2007 Existing System						2035 Proposed System						
Local ID	Facility	Section (From - To)	Jurisdiction	Dist. (mi)	Cross-Section (ft)	Cross-Section lanes	ROW (ft)	Speed Limit (mph)	Existing Capacity (vpd)	2007 (2006*) AADT	2035 AADT with CTP	Proposed Capacity (vpd)	Cross-Section	ROW (ft)	CTP Classifi-cation	Tier	Other Modes
-	Morrow Mill Rd (SR 1958)	Orange Chapel Clover Garden Rd (SR 1956) - NC 54	Orange County	1.4	20	2	60	55	12,000	1,200	1,500	-	ADQ	-	Min	Sub	-
-	Mount Willing Rd (SR 1120)	Oak Grove Church Rd (SR 1117) - Holly Hill Rd / AADT Change	Orange County	0.5	20	2	-	55	12,000	590*	900	-	ADQ	-	Min	Sub	-
-	Mount Willing Rd (SR 1120)	Holly Hill Rd / AADT Change - Buckhorn Rd (SR 1114)	Orange County	1.7	20	2	-	55	12,000	630*	1,000	-	ADQ	-	Min	Sub	-
-	Mount Willing Rd (SR 1120)	Buckhorn Rd (SR 1114) - Speed Limit Change	Orange County	2.9	20	2	-	55	12,000	900	1,400	-	ADQ	-	Min	Sub	-
-	Mount Willing Rd (SR 1120)	Speed Limit Change - W Ten Rd (SR 1146) / Inside DCHC	Orange County	0.8	20	2	-	45	6,200	1900*	3,000	-	ADQ	-	Min	Sub	-
-	New Sharon Church Rd (SR 1538)	Walker Rd (SR 1553) / DCHC - Schley Rd (SR 1548)	Orange County	2.2	20	2	60	55	12,000	1600*	2,500	-	ADQ	-	Min	Sub	-
-	New Sharon Church Rd (SR 1538)	Schley Rd (SR 1548) - Terry Rd (SR 1573) / AADT Change	Orange County	1.1	20	2	60	55	12,000	1,600	2,500	-	ADQ	-	Min	Sub	-
-	New Sharon Church Rd (SR 1538)	Terry Rd (SR 1573) / AADT Change - NC 157 (Guess Rd)	Orange County	1.9	20	2	60 - 110	55	12,000	1400*	2,200	-	ADQ	-	Min	Sub	-
-	New Sharon Church Rd (SR 1538)	NC 157 (Guess Rd) - NC 57	Orange County	3.0	20	2	60	55	12,000	1800*	2,800	-	ADQ	-	Min	Sub	-
-	Oak Grove Church Rd (SR 1117)	Mebane Oaks Rd (SR 1007) / DCHC - Mount Willis Rd (SR 1120)	Orange County	0.6	20	2	60	55	12,000	1,100	1,700	-	ADQ	-	Min	Sub	-

HIGHWAY																		
					2007 Existing System						2035 Proposed System						
Local ID	Facility	Section (From - To)	Jurisdiction	Dist. (mi)	Cross-Section (ft)	Cross-Section lanes	ROW (ft)	Speed Limit (mph)	Existing Capacity (vpd)	2007 (2006*) AADT	2035 AADT with CTP	Proposed Capacity (vpd)	Cross-Section	ROW (ft)	CTP Classification	Tier	Other Modes
-	Old Greensboro Rd (SR 1005)	Alamance Co - Crawford Dairy Rd / Orange Chapel Clover Garden Rd (SR 1956)	Orange County	0.9	24	2	-	55	12,000	2800*	4,800	-	ADQ	-	Min	Sub	-
-	Old Greensboro Rd (SR 1005)	Crawford Dairy Rd / Orange Chapel Clover Garden Rd (SR 1956) - Wildcat Creek Rd (SR 1953) / AADT Change	Orange County	1.7	24	2	-	55	12,000	2800*	4,800	-	ADQ	-	Min	Sub	-
-	Old Greensboro Rd (SR 1005)	Wildcat Creek Rd (SR 1953) / AADT Change - White Cross Rd (SR 1951)	Orange County	1.1	24	2	-	55	12,000	2,400	4,100	-	ADQ	-	Min	Sub	-
-	Old Greensboro Rd (SR 1005)	White Cross Rd (SR 1951) - Carl Durham Rd (SR 1950) / AADT Change	Orange County	1.4	24	2	-	55	12,000	2900*	5,000	-	ADQ	-	Min	Sub	-
-	Old Greensboro Rd (SR 1005)	Carl Durham Rd (SR 1950) / AADT Change - Bowden Rd (SR 1946) / Inside DCHC	Orange County	1.6	20	2	-	55	12,000	4,000	6,800	-	ADQ	-	Min	Sub	-
ORAN0007-H	Old NC 86 (SR 1009)	Arthur Minnis Rd (SR 1113) / New Hope Church Road (SR 1723) / DCHC - Davis Rd (SR 1129) / DCHC	Orange County	2.1	22	2	60	45	6,200	3,500	6,400	6,200	2B [1]	60	Min	Sub	-
-	Orange Chapel Clover Garden Rd (SR 1956)	Old Greensboro Rd (SR 1005) - Morrow Mill Rd (SR 1958)	Orange County	2.0	20	2	-	55	12,000	820	1,000	-	ADQ	-	Min	Sub	-

HIGHWAY																		
					2007 Existing System						2035 Proposed System							
Local ID	Facility	Section (From - To)	Jurisdiction	Dist. (mi)	Cross-Section (ft)	Cross-Section lanes	ROW (ft)	Speed Limit (mph)	Existing Capacity (vpd)	2007 (2006*) AADT	2035 AADT with CTP	Proposed Capacity (vpd)	Cross-Section	ROW (ft)	CTP Classification	Tier	Other Modes
-	Orange Grove Rd (SR 1006)	NC 54 - Teer Rd (SR 1101) / AADT Change	Orange County	2.5	22	2	-	55	12,000	1300*	1,900	-	ADQ	-	Min	Sub	-
-	Orange Grove Rd (SR 1006)	Teer Rd (SR 1101) / AADT Change - Dairlyland Rd (SR 1177)	Orange County	0.9	22	2	-	55	12,000	980*	1,400	-	ADQ	-	Min	Sub	-
-	Orange Grove Rd (SR 1006)	Dairlyland Rd (SR 1177) - Buckhorn Rd (SR 1114)	Orange County	0.2	22	2	-	55	12,000	980*	1,400	-	ADQ	-	Min	Sub	-
-	Orange Grove Rd (SR 1006)	Buckhorn Rd (SR 1114) - Speed Limit Change	Orange County	0.8	22	2	-	55	12,000	980*	1,400	-	ADQ	-	Min	Sub	-
-	Orange Grove Rd (SR 1006)	Speed Limit Change - Arthur Minnis Rd / Bradshaw Quarry Rd (SR 1115)	Orange County	0.4	22	2	-	45	6,200	980*	1,400	-	ADQ	-	Min	Sub	-
-	Orange Grove Rd (SR 1006)	Arthur Minnis Rd / Bradshaw Quarry Rd (SR 1115) - Dodsons Cross Rd (SR 1102)	Orange County	1.6	22	2	-	45	6,200	980*	1,400	-	ADQ	-	Min	Sub	-
-	Orange Grove Rd (SR 1006)	Dodsons Cross Rd (SR 1102) - Dimmicks Mill Rd (SR 1134) / DCHC	Orange County	2.1	20	2	-	45	6,200	2,400	3,700	-	ADQ	-	Min	Sub	-
-	Sawmill Rd E (SR 1545)	Wilkerson Rd (SR 1507) - Walnut Grove Church Rd (SR 1001)	Orange County	0.4	20	2	-	55	12,000	1,200	1,700	-	ADQ	-	Min	Sub	-
-	Sawmill Rd W (SR 1545)	NC 86 - Speed Limit Change	Orange County	0.7	20	2	-	45	6,200	1,200	1,700	-	ADQ	-	Min	Sub	-
-	Sawmill Rd W (SR 1545)	Speed Limit Change - Wilkerson Rd (SR 1507)	Orange County	0.6	20	2	-	55	12,000	1,200	1,700	-	ADQ	-	Min	Sub	-
-	Saxapahaw Rd (SR 1961)	Alamance Co - NC 54	Orange County	0.4	20	2	-	45	6,200	2,000	3,100	-	ADQ	-	Min	Sub	-
-	Schley Rd (SR 1548)	NC 57 - New Sharon Church Rd (SR 1538)	Orange County	3.1	18	2	-	55	12,000	1100*	1,600	-	ADQ	-	Min	Sub	-

HIGHWAY																		
					2007 Existing System						2035 Proposed System							
Local ID	Facility	Section (From - To)	Jurisdiction	Dist. (mi)	Cross-Section (ft)	Cross-Section lanes	ROW (ft)	Speed Limit (mph)	Existing Capacity (vpd)	2007 (2006*) AADT	2035 AADT with CTP	Proposed Capacity (vpd)	Cross-Section	ROW (ft)	CTP Classifi-cation	Tier	Other Modes
-	Walnut Grove Church Rd (SR 1001)	NC 86 - Wilkerson Rd (SR 1507)	Orange County	2.4	20	2	-	55	12,000	2,600	4,100	-	ADQ	-	Min	Sub	B
-	Walnut Grove Church Rd (SR 1001)	Wilkerson Rd (SR 1507) - Sawmill Rd (SR 1545)	Orange County	0.6	20	2	-	55	12,000	2,600	4,100	-	ADQ	-	Min	Sub	B
-	Walnut Grove Church Rd (SR 1001)	Sawmill Rd (SR 1545) - Little River Church Rd (SR 1543)	Orange County	0.3	20	2	-	55	12,000	1600*	2,500	-	ADQ	-	Min	Sub	B
-	Walnut Grove Church Rd (SR 1001)	Little River Church Rd (SR 1543) - Person Co	Orange County	4.2	20	2	-	55	12,000	1,200	1,900	-	ADQ	-	Min	Sub	B
-	White Cross Rd (SR 1951)	Chatham Co - Old Greensboro Rd (SR 1005)	Orange County	1.8	20	2	60	55	12,000	1200*	1,900	-	ADQ	-	Min	Sub	-
-	White Cross Rd (SR 1951)	Old Greensboro Rd (SR 1005) - Butler Rd (SR 1951)	Orange County	1.0	20	2	60	55	12,000	1200*	1,900	-	ADQ	-	Min	Sub	-
-	Wilkerson Rd (SR 1507)	Walnut Grove Church Rd (SR 1001) - Sawmill Rd (SR 1545)	Orange County	0.5	20	2	60	55	12,000	640	900	-	ADQ	-	Min	Sub	-
-	Wilkerson Rd (SR 1507)	Sawmill Rd (SR 1545) - Hurdle Mills Rd (SR 1506)	Orange County	1.3	20	2	60	55	12,000	550	800	-	ADQ	-	Min	Sub	-
-	Wilkerson Rd (SR 1507)	Hurdle Mills Rd (SR 1506) - Person Co	Orange County	0.1	18	2	60	55	12,000	550	800	-	ADQ	-	Min	Sub	-

[1] Add turn lanes where needed.

PUBLIC TRANSPORTATION AND RAIL

PUBLIC TRANSPORTATION							
			Speed		Existing System	Proposed System	
Local ID	Facility/ Route	Section (From - To)	Limit (mph)	Distance (mi)	Type	Type	Other Modes
ORAN0001-T	NC 54 [1]	Alamance Co - Neville Rd (SR 1945) / Inside DCHC	55	8.0	None	Bus	H
ORAN0002-T	NC 86 [2] and NC 49/86	Coleman Loop Rd (SR 1334) / DCHC - Caswell Co	55	8.9	None	Bus	H, B

[1] Park-and-ride lot (ORAN0003-T) proposed on NC 54 at White Cross Rd (SR 1951).

[2] Park-and-ride lot (ORAN0004-T) proposed on NC 86 at Cedar Grove Park.

BICYCLE AND PEDESTRIAN

BICYCLE [1]								
			Distance	Existing System		Proposed System		Other
				Cross-Section				
Local ID	Facility/ Route	Section (From - To)	(mi)	(ft)	lanes	Type	Cross-Section	Modes
-	NC Bike Route 2 / Mountains to Sea Trail (along Old Greensboro Rd (SR 1005))	Alamance Co - Carl Durham Rd (SR 1950)	5.3	24	2	ADQ	ADQ	-
ORAN0002-B	NC Bike Route 2 / Mountains to Sea Trail (along Old Greensboro Rd (SR 1005))	Carl Durham Rd (SR 1950) - Bowden Rd (SR 1946) / Inside DCHC	1.6	20	2	On Road	2A	-
ORAN0009-B	NC 49	McDade Store Rd (SR 1361) - Caswell Co	1.3	24	2	On Road	2A	H, T
-	NC 54	Alamance Co - Neville Rd (SR 1945) / Inside DCHC	8.0	24	2	ADQ	ADQ	-
ORAN0001-B	NC 86	Carr Store Rd (SR 1352) / Sawmill Rd W (SR 1545) - Park and Ride lot at Cedar Grove Park	0.3	24	2	On Road [2]	2A [2]	H, T
ORAN0004-B	NC 86	Phelps Rd (SR 1551) - Walnut Grove Church Rd (SR 1001)	0.5	24	2	On Road [2]	2A [2]	H, T
ORAN0007-B	Efland-Cedar Grove Rd (SR 1357)	Carr Store Rd (SR 1004/1352) - McDade Store Rd (SR 1358/1354)	1.5	20	2	On Road	2A	-
ORAN0003-B	Jones Ferry Rd (SR 1942)	Chatham Co - Ferguson Rd (SR 1948) / DCHC	0.9	24	2	On Road	2A	-
ORAN0010-B	W Lebanon Rd (SR 1306)	Saddle Club Rd (SR 1346) - Mill Creek Rd (SR 1345)	0.6	24	2	On Road	2A	-
-	Mebane Oaks Rd (SR 1007) / Alamance County Bicycle Route	Alamance Co - Alamance Co	1.4	22	2	ADQ	ADQ	-
ORAN0008-B	McDade Store Rd (SR 1361)	Pentecost Rd (SR 1361) / McDade Store Rd (SR 1358) - NC 49	1.0	24	2	On Road	2A	-
SPOT ID # 1160 [3]	Orange Grove Road (SR 1006) / Buckhorn Road (SR 1114)	Dairyland Road (SR 1177) to West Ten Road (SR 1146) / Inside DCHC	7.3	20 - 22	2	On Road	2A	-
EB-5520 [3]	Orange Grove Road (SR 1006)	NC 54 - Arthur Minnis Road (SR 1115)	4.9	20 - 22	2	On Road	2A	-
ORAN0006-B	Schley Rd (SR 1548)	Walnut Grove Church Rd (SR 1001) - New Sharon Church Rd (SR 1538) / DCHC	6.2	18	2	On Road	2A	-
ORAN0005-B	Walnut Grove Church Rd (SR 1001)	NC 86 - Pearson Rd (SR 1544)	3.0	20	2	On Road	2A	-

[1] For all other CTP bicycle recommendations, see the 1999 Orange County Bicycle Transportation Plan.

[2] Cross section 2A will suffice for more immediate improvements, but the ultimate 4-lane expressway cross section for NC 86 in the future could require an off-road facility to maintain this connection for bicycles.

[3] These projects include a small portion of overlap on Orange Grove Road.

PEDESTRIAN [4]

[4] For all CTP pedestrian recommendations, see the pedestrian plan under development by Orange County.

Appendix D
Typical 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.

The typical cross sections were updated on December 7, 2010 to support the Department's "Complete Streets" policy that was adopted in July 2009. This guidance established design elements that emphasize safety, mobility, and accessibility for multiple modes of travel. These "typical" cross sections should be used as preliminary guidelines for comprehensive transportation planning, project planning and project design activities. The specific and final cross section details and right of way limits for projects will be established through the preparation of the National Environmental Policy Act (NEPA) documentation and through final plan preparation.

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.
- roadways which may need to accommodate an additional transportation mode

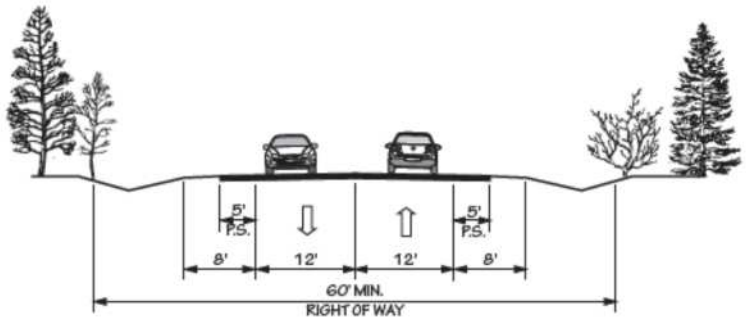
Figure 10

TYPICAL HIGHWAY CROSS SECTIONS

2 LANES

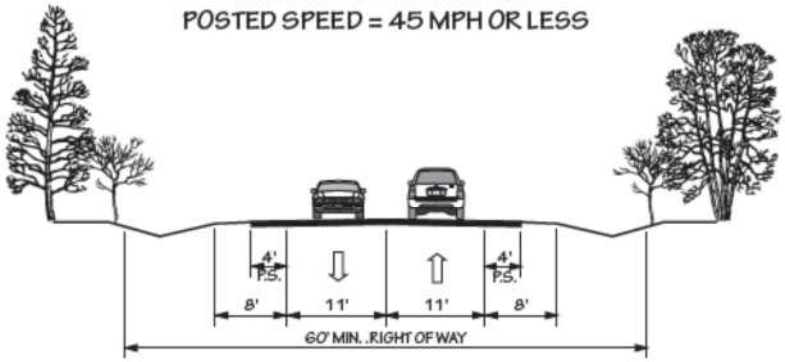
2 A

WIDE PAVED SHOULDERS
POSTED SPEED = 55 MPH



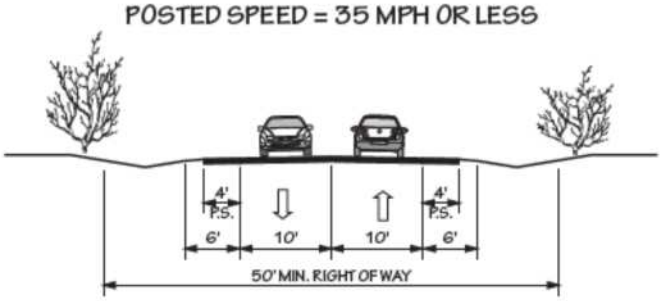
2 B

WIDE PAVED SHOULDERS
POSTED SPEED = 45 MPH OR LESS



2 C

WIDE PAVED SHOULDERS
POSTED SPEED = 35 MPH OR LESS



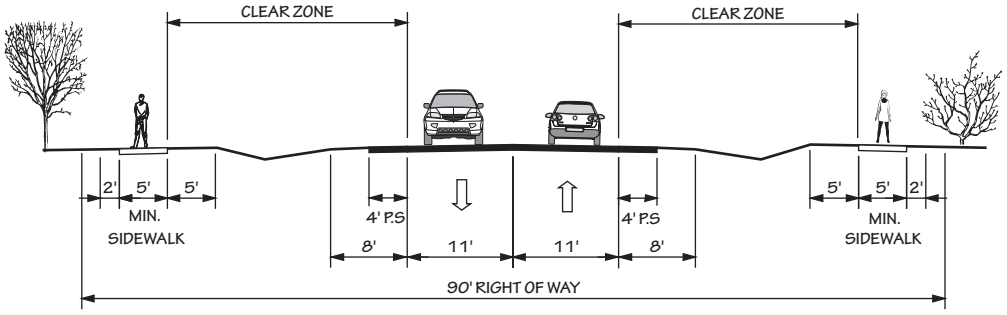
Revised 12/07/2010

TYPICAL HIGHWAY CROSS SECTIONS

2 LANES

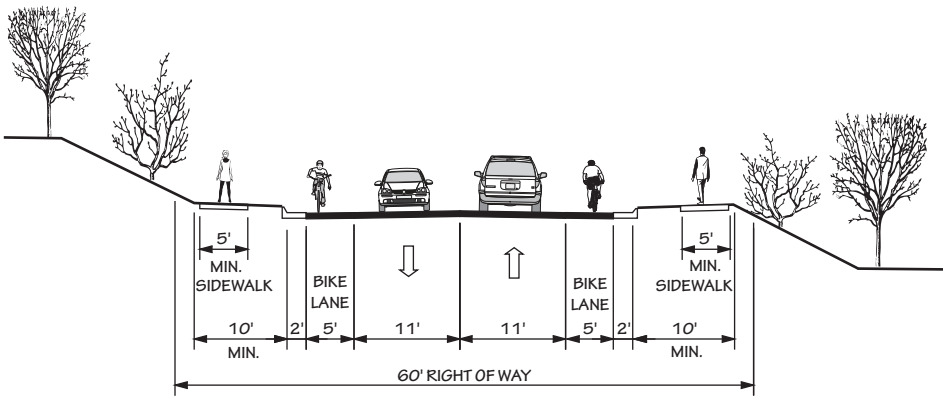
2 D

SIDEWALK PLACEMENT BEHIND A ROADWAY DITCH



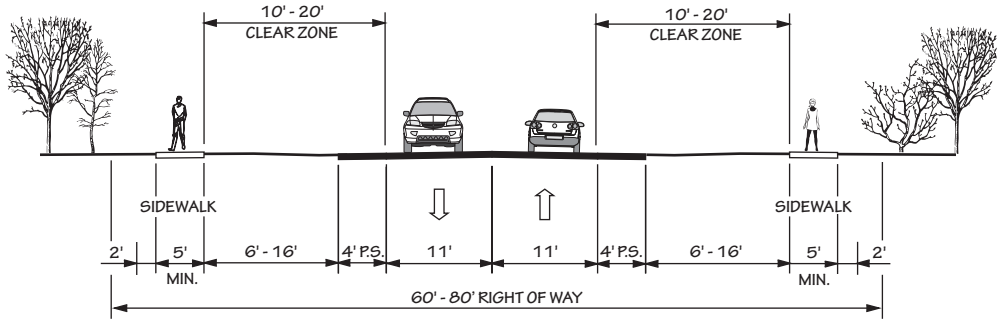
2 E

CURB AND GUTTER
WITH BIKE LANES AND SIDEWALKS



2 F

BUFFERS AND SIDEWALKS WITHOUT A ROADWAY DITCH
(20 MPH TO 45 MPH)
(TYPICALLY COASTAL AREA MANAGEMENT ACT COUNTIES)



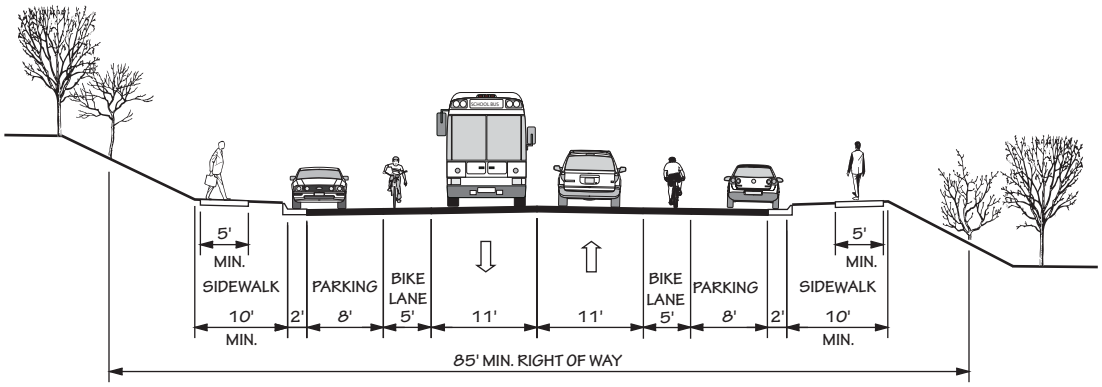
Revised 12/07/2010

TYPICAL HIGHWAY CROSS SECTIONS

2 LANES

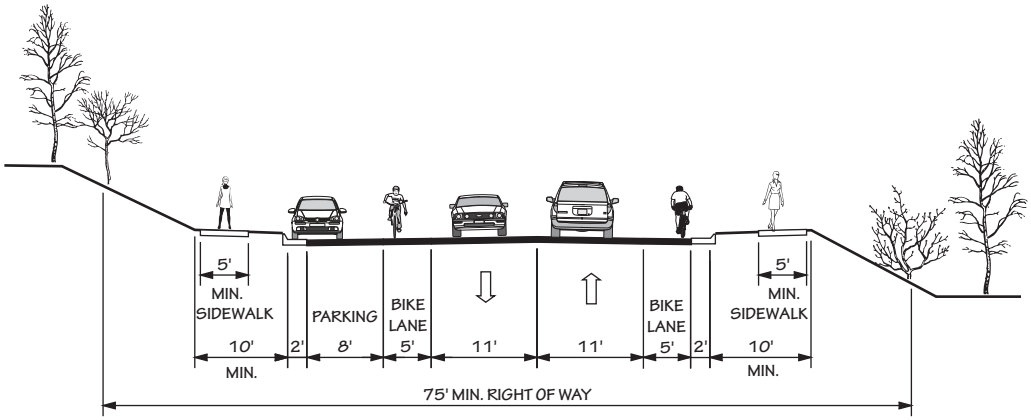
2 G

CURB & GUTTER - PARKING ON EACH SIDE



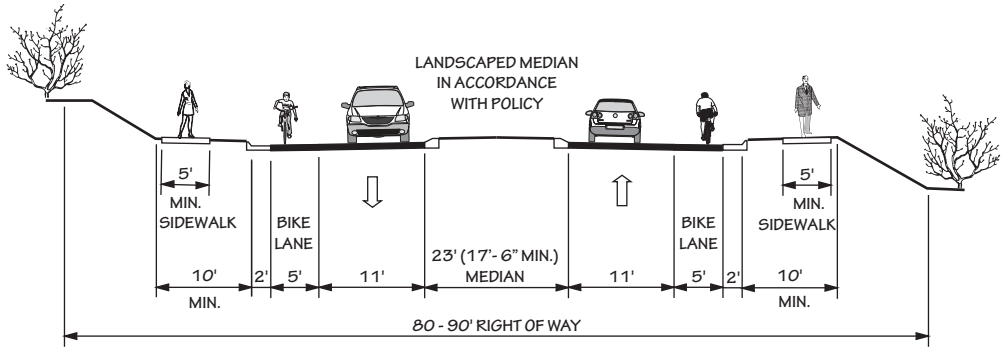
2 H

CURB & GUTTER - PARKING ON ONE SIDE



2 I

RAISED MEDIAN WITH CURB & GUTTER



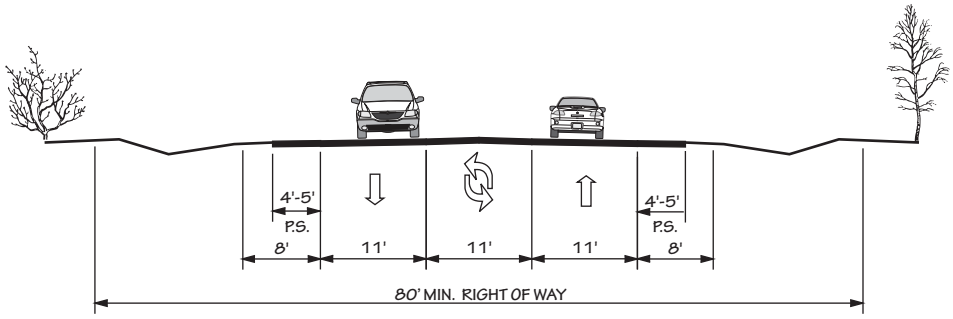
Revised 12/07/2010

TYPICAL HIGHWAY CROSS SECTIONS

3 LANES

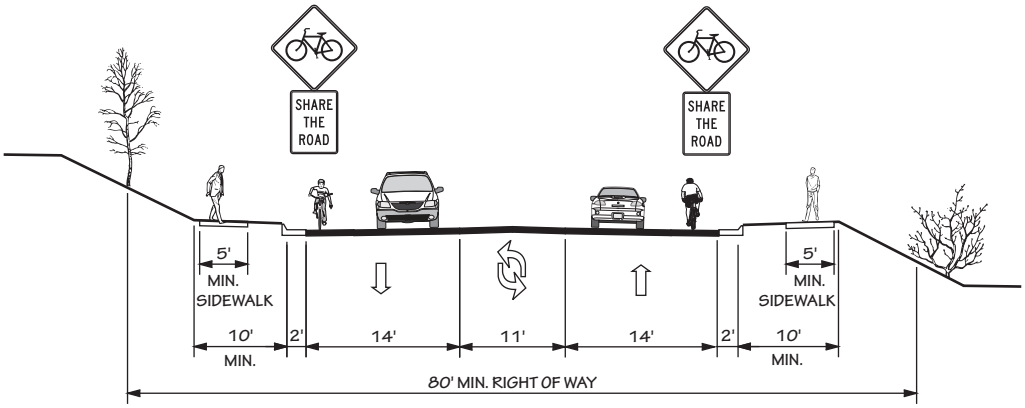
3 A

WIDE PAVED SHOULDERS



3 B

CURB & GUTTER WITH WIDE OUTSIDE LANES AND SIDEWALKS



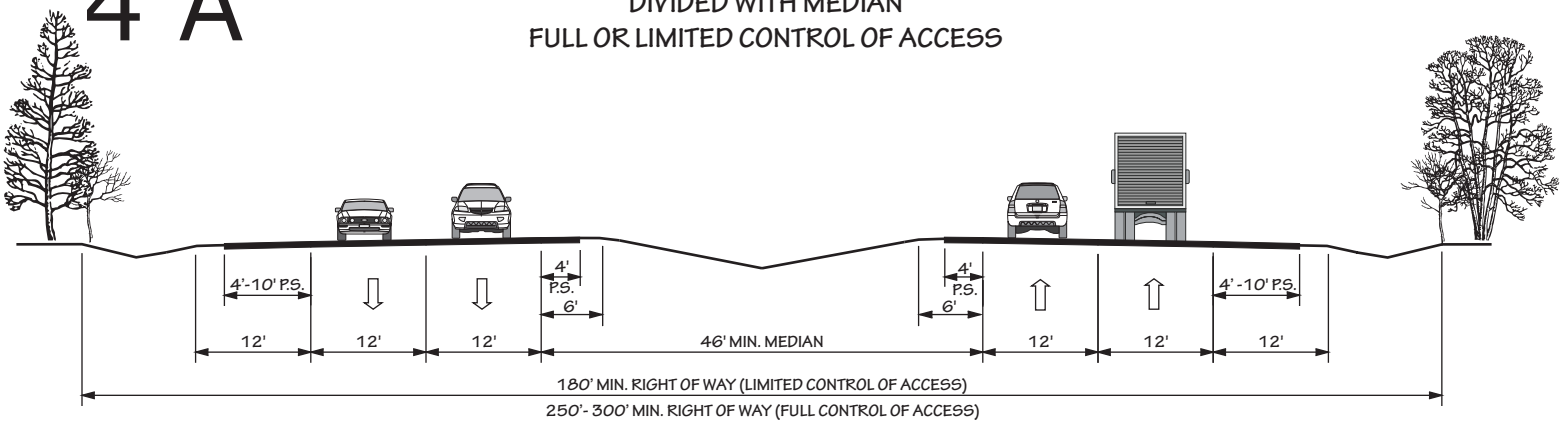
Revised 12/07/2010

TYPICAL HIGHWAY CROSS SECTIONS

4 LANES

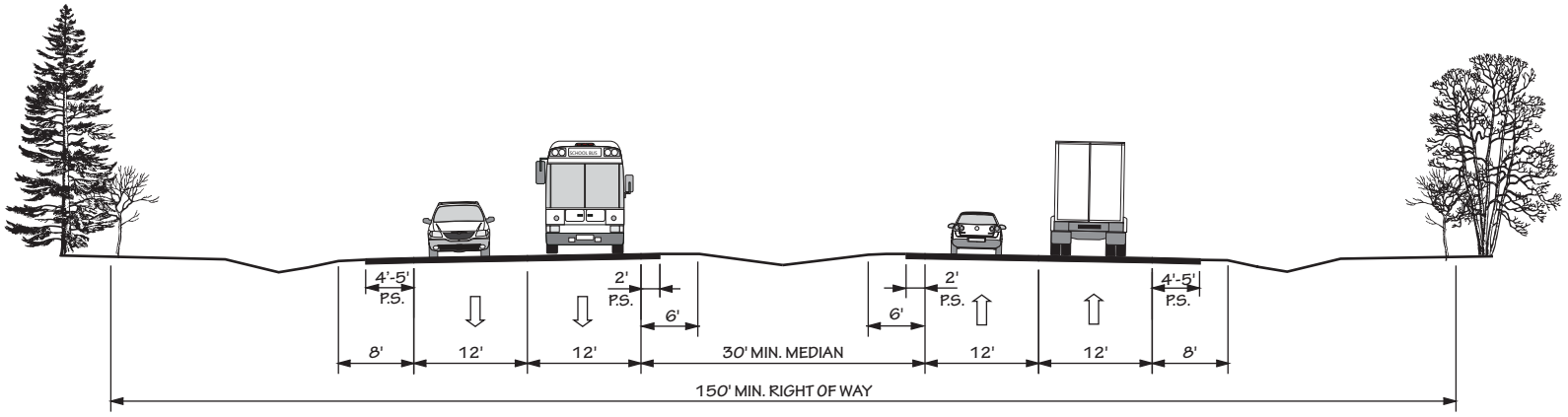
4 A

DIVIDED WITH MEDIAN
FULL OR LIMITED CONTROL OF ACCESS



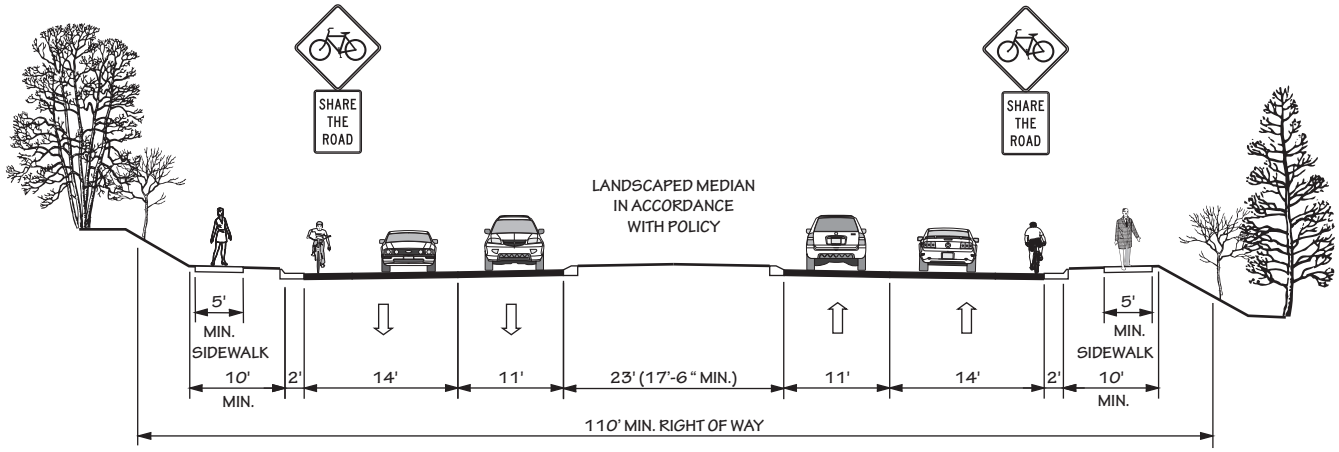
4 B

DIVIDED WITH MEDIAN - NO CURB & GUTTER
PARTIAL CONTROL OF ACCESS



4 C

RAISED MEDIAN WITH WIDE OUTSIDE LANES AND SIDEWALKS



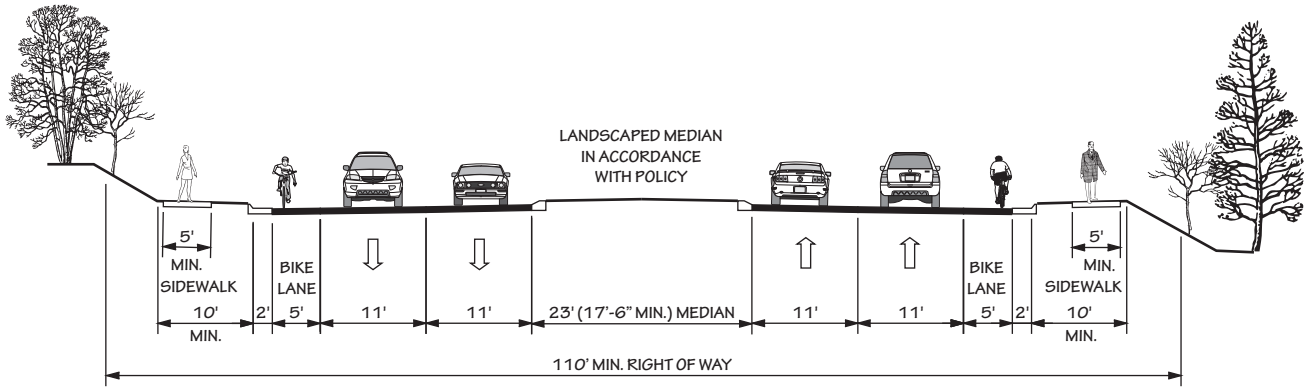
Revised 12/07/2010

TYPICAL HIGHWAY CROSS SECTIONS

4 LANES

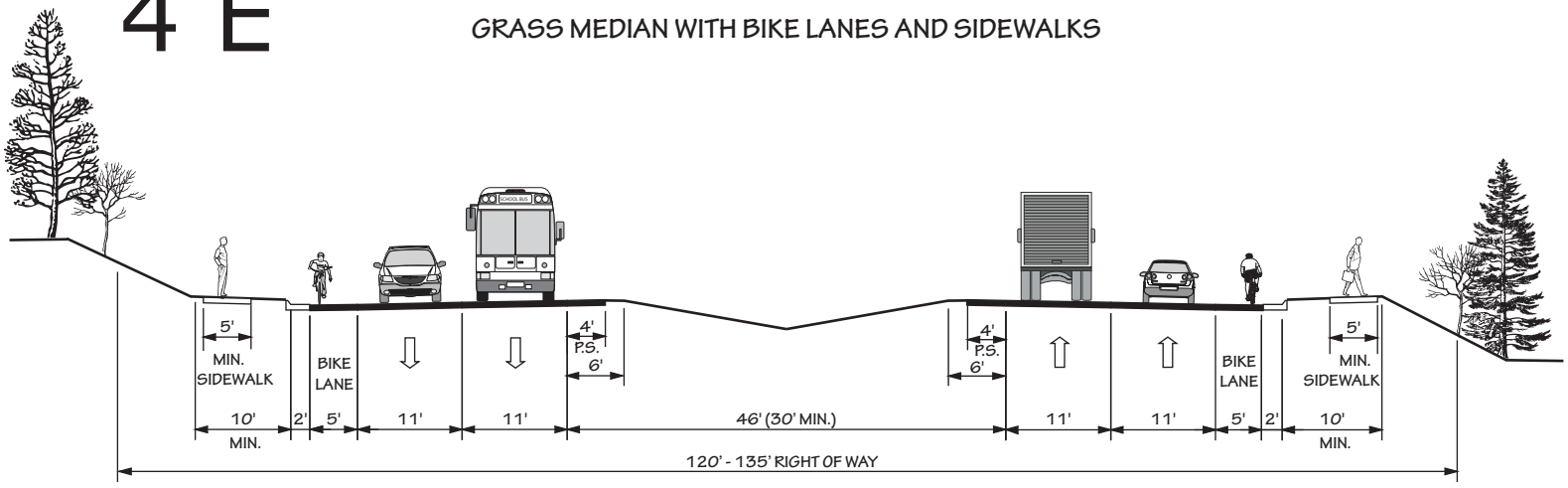
4 D

RAISED MEDIAN - CURB & GUTTER WITH BIKE LANES AND SIDEWALKS



4 E

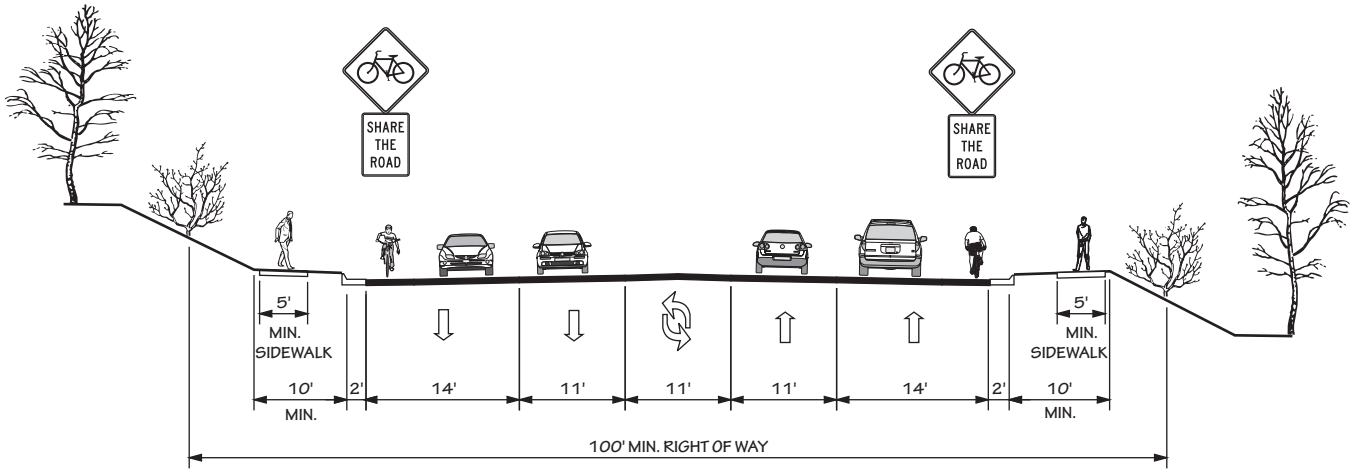
GRASS MEDIAN WITH BIKE LANES AND SIDEWALKS



5 LANES

5 A

WIDE OUTSIDE LANES



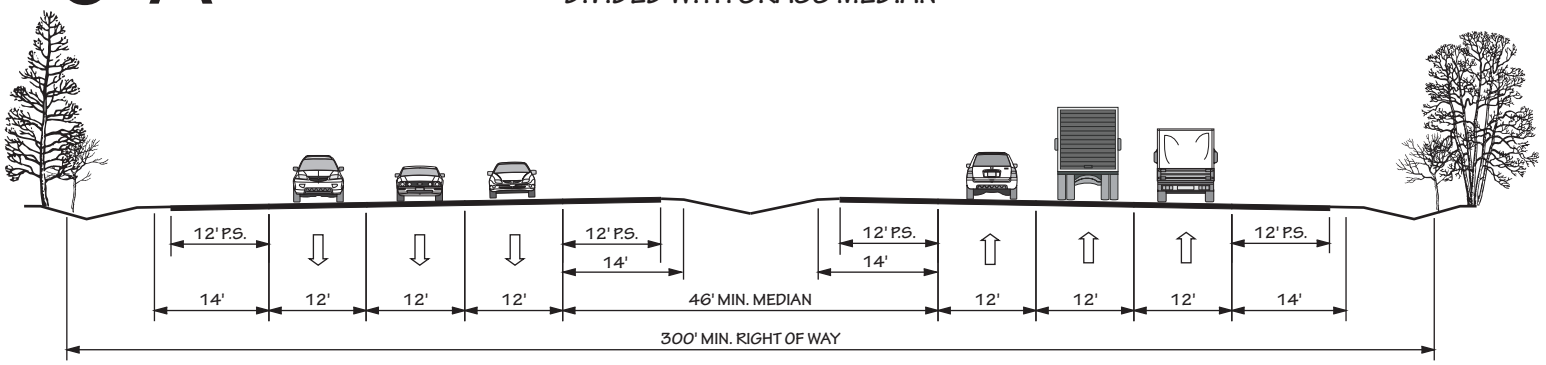
Revised 12/07/2010

TYPICAL HIGHWAY CROSS SECTIONS

6 LANES

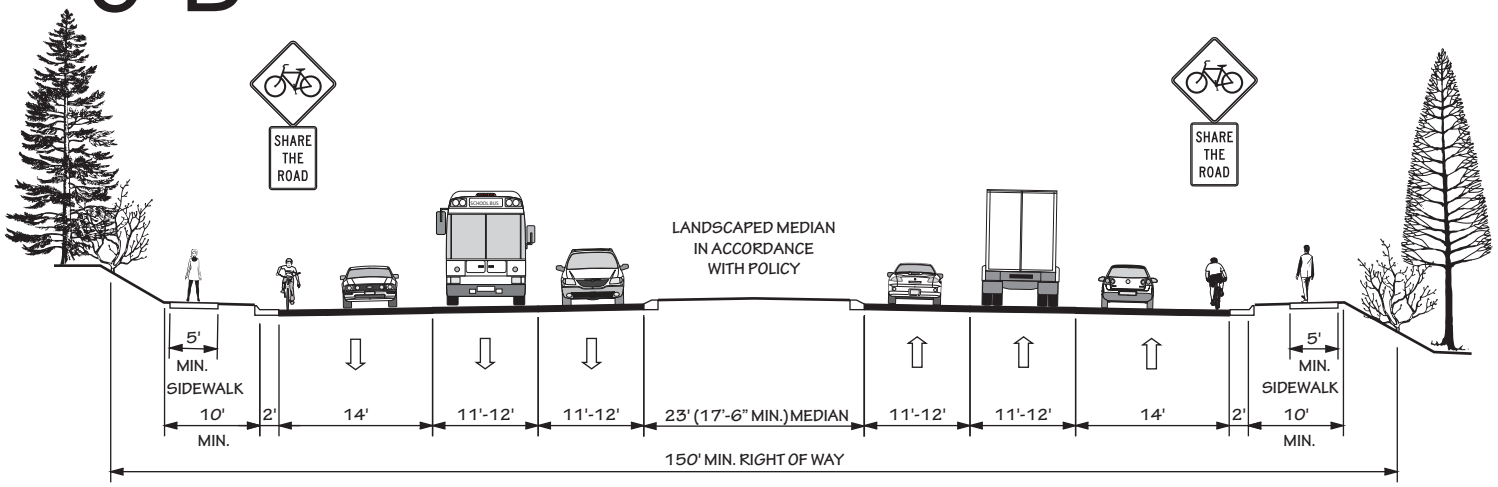
6 A

DIVIDED WITH GRASS MEDIAN



6 B

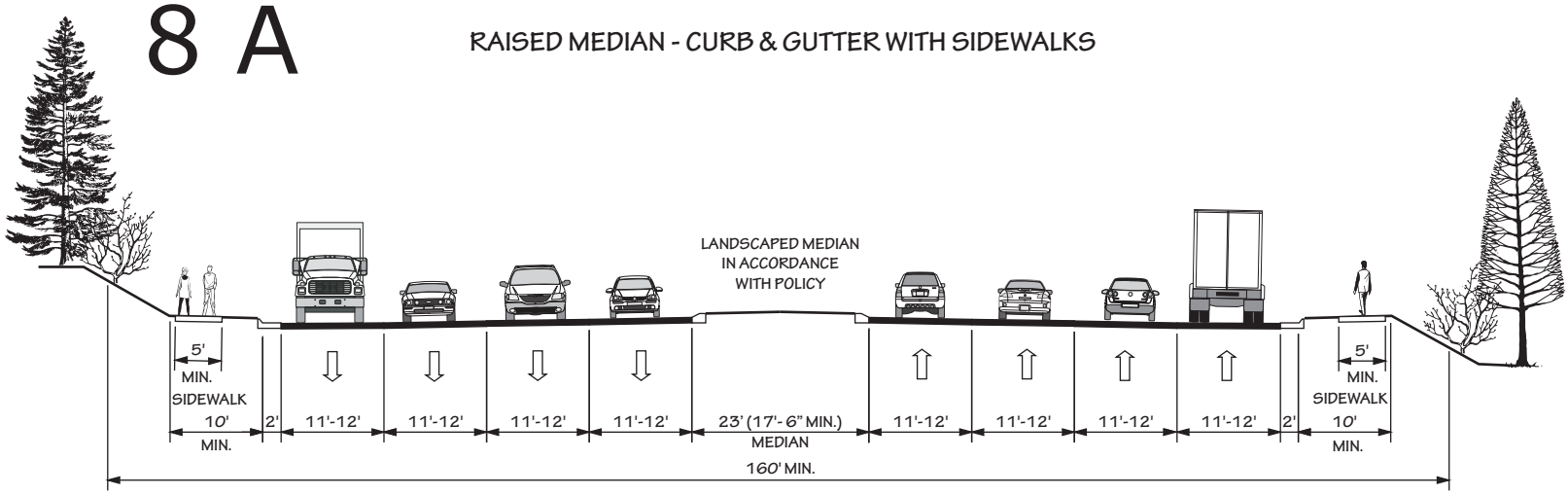
RAISED MEDIAN - CURB & GUTTER WITH WIDE OUTSIDE LANES AND SIDEWALKS



8 LANES

8 A

RAISED MEDIAN - CURB & GUTTER WITH SIDEWALKS

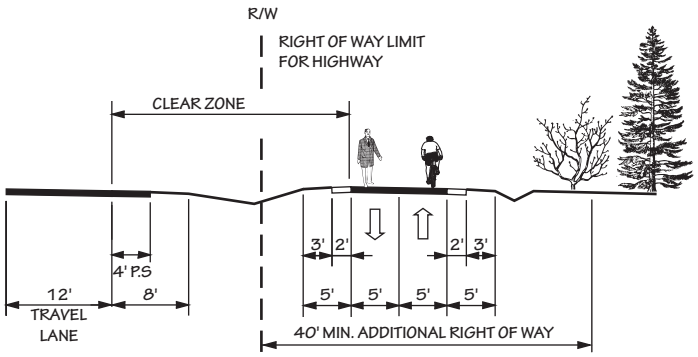


Revised 12/07/2010

TYPICAL MULTI - USE PATH

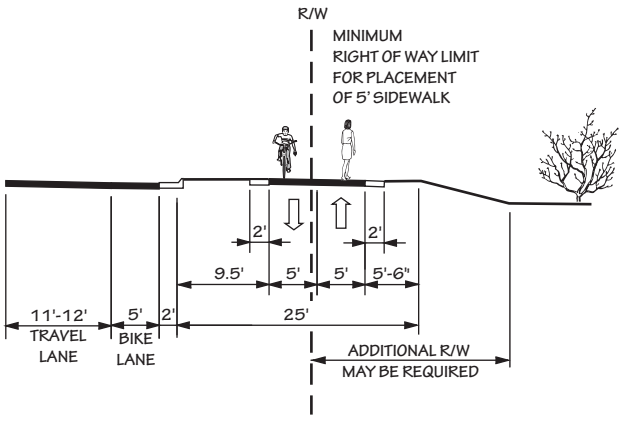
MULTI - USE PATH
ADJACENT TO RIGHT OF WAY OR SEPARATE PATHWAY

M A



MULTI - USE PATH ADJACENT TO CURB AND GUTTER

M B



Revised 12/07/2010

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Appendix E
Level of Service Definitions

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 11.

- **LOS A**: Describes primarily free flow conditions. The motorist experiences a high level of physical and psychological comfort. The effects of minor incidents of breakdown are easily absorbed. Even at the maximum density, the average spacing between vehicles is about 528 ft, or 26 car lengths.
- **LOS B**: Represents reasonably free flow conditions. The ability to maneuver within the traffic stream is only slightly restricted. The lowest average spacing between vehicles is about 330 ft, or 18 car lengths.
- **LOS C**: Provides for stable operations, but flows approach the range in which small increases will cause substantial deterioration in service. Freedom to maneuver is noticeably restricted. Minor incidents may still be absorbed, but the local decline in service will be great. Queues may be expected to form behind any significant blockage. Minimum average spacing is in the range of 220 ft, or 11 car lengths.
- **LOS D**: Borders on unstable flow. Density begins to deteriorate somewhat more quickly with increasing flow. Small increases in flow can cause substantial deterioration in service. Freedom to maneuver is severely limited, and the driver experiences drastically reduced comfort levels. Minor incidents can be expected to create substantial queuing. At the limit, vehicles are spaced at about 165 ft, or 9 car lengths.
- **LOS E**: Describes operation at capacity. Operations at this level are extremely unstable, because there are virtually no usable gaps in the traffic stream. Any disruption to the traffic stream, such as a vehicle entering from a ramp, or changing lanes, requires the following vehicles to give way to admit the vehicle. This can establish a disruption wave that propagates through the upstream traffic flow. At capacity, the traffic stream has no ability to dissipate any disruption. Any incident can be expected to produce a serious breakdown with extensive queuing. Vehicles are spaced at approximately 6 car lengths, leaving little room to maneuver.

- **LOS F**: Describes forced or breakdown flow. Such conditions generally exist within queues forming behind breakdown points.

Figure 11 - 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

Appendix F
Traffic Crash Analysis

A crash analysis performed for the Orange County CTP factored crash frequency, crash type, and crash severity. Crash frequency is the total number of reported crashes and contributes to the ranking of the most problematic intersections. Crash type provides a general description of the crash and allows the identification of any trends that may be correctable through roadway or intersection improvements. Crash severity is the crash rate based upon injuries and property damage incurred.

The severity of every crash is measured with a series of weighting factors developed by the NCDOT Division of Highways (DOH). 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 is 11.8 times more severe than one with only property damage. In general, a higher severity index indicates more severe accidents. Listed below are levels of severity for various severity index ranges.

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, 2007 and December 31, 2009. The data represents locations with 10 or more crashes and/or a severity average greater than that of the state's 4.56 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.

Table 4 - Crash Locations

Map Index	Intersection	Average Severity	Total Crashes
1	NC 57 and NC 157	16.86	19
2	NC 54 and Dodsons Cross Road (SR 1102)	2.48	10

As of October, 2013, NCDOT has improved the safety at both locations listed in Table 4. Per Division staff, an all-way stop was installed at the intersection of NC 57 and NC 157 around 2010, resulting in zero reported crashes for a two-year period. Left turn

lanes were also installed in both directions on NC 54 at the intersection with Dodson's Cross Road (SR 1102) / Butler Road (SR 1951) to reduce crashes and improve traffic operations.

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.

Appendix G
Bridge Deficiency Assessment

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. Structurally deficient means there are elements of the bridge that need to be monitored and/or repaired. The fact that a bridge is "structurally deficient" does not imply that it is likely to collapse or that it is unsafe. It means the bridge must be monitored, inspected and repaired/replaced at an appropriate time to maintain its structural integrity. A functionally obsolete bridge is one that was built to standards that are not used today. These bridges are not automatically rated as structurally deficient, nor are they inherently unsafe. Functionally obsolete bridges are those that do not have adequate lane widths, shoulder widths, or vertical clearances to serve current traffic demand or to meet the current geometric standards, or those that may be occasionally flooded.

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	Facility	Feature	Condition	Local ID
8	High Rock Rd (SR 1340)	Unnamed Creek	Structurally Deficient	-
24	Walnut Grove Church Rd (SR 1001)	North Fork Little River	Functionally Obsolete	-
43	Mount Willing Rd (SR 1120)	Seven Mile Creek	Structurally Deficient	-
76	Arthur Minnis Rd (SR 1113)	New Hope Creek	Functionally Obsolete	-
84	Old Greensboro Rd (SR 1005)	Collins Creek	Structurally Deficient	-
228	Old NC 86 (SR 1009)	New Hope Creek	Functionally Obsolete	ORAN0007-H

Appendix H
Public Involvement

Includes:

- Listing of committee members;
- Statement of CTP Vision and Goals & Objectives;
- Public survey description and summary of results; and
- Summary of public involvement sessions.

Orange County CTP Committee List

Name	Organization
Tom Altieri (formerly Karen Lincoln)	Orange County Planning
Paul Guthrie	Orange Unified Transportation Board
Randy Marshall	Orange Unified Transportation Board
Nancy Baker	Orange Unified Transportation Board
Tina Love	Orange County Planning
Matthew Day (formerly Paul Black)	Triangle Area RPO
Sarah Lee	NCDOT Transportation Planning Branch
Scott Walston	NCDOT Transportation Planning Branch
Andy Henry	Durham-Chapel Hill-Carrboro MPO

ORANGE COUNTY CTP

Vision Statement Goals and Objectives

The goals of the 2030 Orange County Comprehensive Plan were used as a guide when creating the following document for the CTP.

Vision:

To provide an efficient and balanced transportation system that uses multiple motorized and nonmotorized modes of transportation and for which the planning, design, and implementation will be guided by the following overarching qualities:

A. Protects air quality, water quality and quantity, soil quality, and biological resources
B. Promotes public health and safety
C. Encourages sustainable economic development
D. Provides equal access to all users
E. Is highly modally and inter-modally integrated and connected
F. Fosters sustainable and efficient use of resources, including financial and natural resources
G. Protects the County's natural and cultural heritage
H. Uses creative and well-designed infrastructure
I. Is attractive, user-friendly, and easy to understand because of factors such as signage, brochures, and web pages
J. Respects privacy and citizen rights.

Goals and Objectives:

Goal 1. An efficient and integrated multi-modal transportation system that protects the natural environment and community character.

Objectives:

1-1. Increase the occupancy of automobiles through ridesharing and other means; and expand the use of public transit (including bus and rail), walking, and biking as primary modes of travel.
1-2. Facilitate the overall development and use of a transportation system that is more energy-efficient, reduces carbon emissions, and reduces the use of fossil fuels while promoting the use of local renewable and sustainable fuels.
1-3. Develop new transportation facilities in a manner that has a positive impact or avoids negative impacts on the natural environment, including air quality, water resources, biological resources, and wildlife habitat.
1-4. Develop new transportation facilities in a manner that has a positive impact or avoids negative impacts on the community, including historical or cultural assets, existing neighborhoods, schools and recreational facilities, and the overall rural character in Orange County.
1-5. Identify prime view sheds along major transportation corridors and protect these areas for their scenic and natural resource values.
1-6. Expand the availability and use of public transportation (including bus and rail) throughout the County to provide better connections between employment centers, shopping and service locations, and other key points of interest in both

urban and rural areas, particularly for the County's senior and disabled populations and others without access to automobiles.

Goal 2: A multi-modal transportation system that is affordable, available, and accessible to all users and that promotes public health and safety

Objectives:

2-1. Increase the provision of bikeways and walkways, and also increase supportive facilities such as bicycle parking zones.
2-2. Evaluate and serve special transportation needs of the senior population, youth, the economically disadvantaged and the disabled, including both everyday needs and disaster transit provision.
2-3. Increase countywide access for emergency vehicles, including ways to improve response times, both for existing and new developments.
2-4. Improve the provision of public transit facilities and services, and also increase supportive facilities for transit, such as park and ride lots.
2-5. Improve public education and advertising of existing transit services.
2-6. Increase safety awareness between car drivers and bicycle riders, and increase safety for pedestrians.
2-7. Construct bicycle facilities in Orange County that will make cycling safer, more convenient, and more efficient.

Goal 3: Integrated land use planning and transportation planning that serves existing development, supports future development, and is consistent with the County's land use plans which include provisions for preserving the natural environment and community character.

Objectives:

3-1. Improve the County's transportation system by first enhancing existing facilities as opposed to developing new facilities.
3-2. Create and implement an Orange County Comprehensive Transportation Plan that provides the framework for a comprehensive and connected transportation system supporting a mix of all transportation modes, including sidewalks and bicycle facilities, bus and rail transit facilities, and highways.
3-3. The plan should be coordinated with the goals and objectives of this Comprehensive Plan and seek to maintain and enhance community character and the natural environment
3-4. Determine the policies to guide connectivity within and between residential developments based on their impact on neighborhood character.
3-5. Direct development to higher density mixed-use districts along transit corridors and make necessary multi-modal transportation improvements to service lands that are slated for future intense development, such as Economic Development Districts.
3-6. Use innovative techniques to increase mobility and reduce rush hour congestion.

ORANGE COUNTY CTP

Vision Statement Goals and Objectives

Goal 4: A countywide and regionally-integrated, multi-modal transportation planning process that is comprehensive, creative and effective.

Objectives

4-1. Work with nearby jurisdictions to integrate the County's transportation plans with those of other transportation planning agencies and service providers in Orange County and the Triangle region. The resulting intermodal transportation system should reflect regional goals and objectives to meet projected travel demand and to reduce congestion and reliance on single occupancy vehicles.

4-2. Plan and integrate the County's multi-modal transportation routes and services with regional transportation agencies and transit service providers, agencies and transit providers in neighboring counties, the North Carolina Department of Transportation, Amtrak, and the North Carolina Railroad.

4-3. Revive rail transportation in Orange County and the Triangle region.

Orange County CTP Public Survey

The public survey was open from September 23, 2009 to November 2, 2009, and a total of 491 surveys were completed (including both online and paper submissions).

The following sheets contain a short summary of the information garnered from the survey results.

Other documents pertaining to the public survey, including:

- The blank survey that was distributed to the public,
- The overall results of the survey (not including open-ended answers), and
- A full response set of the survey results, including all open-ended responses, pie charts, and graphs,

can be viewed on the Orange County CTP website at http://www.ncdot.org/doh/preconstruct/tpb/planning/orangecounty.html.

Survey Results

Important Transportation Issues

Top picks...

- Increased walking and biking choices
- Service for low income, elderly, and disabled residents
- Preserving the community/rural character and heritage
- Protecting the natural environment, such as air and water quality
- Sustainable and efficient use of natural and financial resources

How to Improve a Road

Top rated...

- Build additional travel lanes
- Provide an alternative means of transportation, such as bus, train, bicycle, or park-n-ride

Lowest rated...

- Control the access of driveways and cross streets
- Use less frequent traffic signals

Comments...

- Stop building additional roads
- Promote public transportation/transit
- Bike lanes on roads that don't have them
    - Estes
    - Carrboro to Hillsborough
    - Old NC 86
- Separate bike paths
- Bypass around Hillsborough
- Enforce traffic laws with bicyclists
- Connector roads between neighborhoods
- Light rail from Chapel Hill / Durham / Raleigh to RDU and RTP
- Better signal timing and synchronization
- Sidewalks and greenways in other areas of county besides the main towns
- Information Technology
- Multi-use land-use and zoning - live and work close together

Roads to Focus Improvements

Top rated...

- US 70 Bypass
- New NC 86
- NC 15-501

Lowest rated...

- I-85/40
- NC 49
- NC 57
- NC 157

Comments...

- Sidewalks, bike routes, and public transportation connecting Efland with Hillsborough
- Old NC 86
- Bike lanes
    - Between Orange County schools in the county and population centers like Hillsborough
    - New Hope Church Rd
    - NC 10
    - Erwin Rd (commute to Durham)
    - Extend existing in Carrboro on Greensboro St/Hillsborough Rd to Calvander on SR 1009
    - Across the bypass from 15-501 up Columbia St toward campus and town

    - New NC 86
    - Old NC 86
    - NC 15-501
    - NC 54
- NC 86 bypass of Hillsborough
- NC 86 connector to I-85
- Sidewalks and bike lanes on Smith Level from high school to NC 54
- Reopen bus service from Hillsborough to Durham - to Duke East Campus, down Main St to downtown

Congested Routes
Comments... (all in MPO)

Economic Development Districts
Comments... (all 3 mentioned, all in MPO)

Safety/Crash Problems
Comments...
- Bicyclists on Old Greensboro Rd
- Dodson's Crossroads at NC 54

Safe and Convenient Bike Routes
Important - 79%
Comments...
- Dairyland
- Orange Grove
- Dodson's Crossroads
- Bradshaw Quarry
- NC 86
- Old NC 86
- Off-road greenways
- Jones Ferry
- Old Greensboro
- where there are schools (ex. Cameron Park)
- New Sharon Church Rd
- Schley
- NC 57
- NC 157
- NC 54

Safe and Convenient Walking Routes
Important - 78%
Comments...
- NC 86
- Dairyland

Destinations for Taxi, Bus, or Van Service
Top picks...
- RDU Airport
- Downtown Durham
- UNC and Duke hospitals

Comments...
- Efland
- Shopping - Southpoint, Crabtree

- Alamance Community College
- Pittsboro

Any Other Transportation Issues
Comments...

- Improving Efland-Cedar Grove Rd, due to traffic using it from Virginia to I-40/85
- Transportation service in rural areas for not only elderly but disabled as well
- Want bike routes and sidewalks to the schools
- Preserve rural peace and quiet

General observations...

- Lots of concern for bicycling - many wanting better facilities
    - Also many drivers frustrated at the safety issues bicycles present, as well as bicyclists not obeying traffic laws, and the fact that they must share the road but are not registered or taxed
- Generally don't want more roads - instead want more public transit, as well as more mixed use development and consolidated growth
- There is interest in rail service to connect the Triangle
- Got a few comments that they appreciated the survey and it had good questions

*****Most summaries here only list answers from the RPO areas for purpose of the CTP study. There are many more answers regarding the MPO area within the survey results.

*****Questions not included in this summary...

- NC 86 / Strategic Highways
- Traffic in downtown Hillsborough
- Demographic section

Summary of Public Involvement Sessions

Three total sessions were held for members of the public to attend to learn about the Orange County CTP and provide input. Common information presented at all sessions included the basic definition of a CTP, the typical CTP process, a description of the Strategic Highway Vision Plan and its corridors in Orange County, and the definitions and examples of highway facility types.

Below is information specific to each public session.

September 29, 2009
Public Awareness Session
5:00pm to 9:00pm
Efland Ruritan Club, 3106 Highway 70 West, Efland
Purpose / information presented: informing locals of the CTP study that was in its early stages, gaining their input on areas in need of study
Number of attendees: 2 (not including NCDOT and county staff)

February 7, 2011
Public Drop-in Session
4:30pm to 7:30pm
Orange County Public Library, 137 W. Margaret Lane, Hillsborough
Purpose / information presented: growth data, traffic projections, and preliminary recommendations
Number of attendees: 13 (not including NCDOT and county staff)

September 14, 2011
Public Drop-in Session
4:30pm to 7:30pm
Link Government Services Center, 200 S. Cameron Street, Hillsborough
Purpose / information presented: draft recommendations
Number of attendees: 9 (not including NCDOT and county staff)

Appendix I
Existing Transportation Plans

The following CTPs or Thoroughfare Plans for areas within the County that are not included as a part of this plan are listed below and depicted in this appendix.

- Durham-Chapel Hill-Carrboro Metropolitan Planning Organization
  - 2035 Long Range Transportation Plan (2009): see http://www.dchcmpo.org/index.php?option=com_content&task=view&id=65&Itemid=35
  - Draft 2040 Metropolitan Transportation Plan (MTP) and CTP
  - Extensive coordination was conducted to ensure connectivity with recommendations
- Burlington Graham Metropolitan Planning Organization 2030 Comprehensive Transportation Plan (2010)
  - See http://www.ncdot.org/doh/preconstruct/tpb/planning/BGMPOCTP.html
  - Coordination was conducted to ensure connectivity with recommendations
- 1990 Orange County Thoroughfare Plan (not adopted)

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