



Collector Street Plan

August 2017

ACKNOWLEDGEMENTS

ROCK HILL - FORT MILL AREA TRANSPORTATION STUDY

COLLECTOR STREET PLAN

The RFATS Collector Street Plan is a collaboration involving stakeholders, the RFATS Committees, staff, and Ramey Kemp & Associates as consultant. Public meetings were held in four locations throughout the study area in October and November 2016. Adoption meetings are anticipated in Fall 2017.

Policy Committee:

Hon. A. Douglas Echols, RFATS Chairman, Mayor, City of Rock Hill

Hon. Brian Carnes, RFATS Vice Chairman, County Councilmember, Lancaster County

Hon. Kathy Pender, City Councilmember, City of Rock Hill

Hon. James C. Reno, Jr., City Councilmember, City of Rock Hill

Hon. Guynn Savage, Mayor, Town of Fort Mill

Hon. George Sheppard, Mayor, City of Tega Cay

Hon. Dr. J. Britt Blackwell, O.D., County Councilmember, York County

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[Chapter 1](#) - Introduction.....1

[Chapter 2](#) - Existing Conditions.....5

[Chapter 3](#) - Planning Process.....7

[Chapter 4](#) - Design Considerations10

[Chapter 5](#) - Case Studies & Best Practices12

[Chapter 6](#) - Policy & Implementation Recommendations17

[Appendix A](#) - Maps18

[Appendix B](#) - Typical Sections.....28

[Appendix C](#) - Traffic Calming.....32

CHAPTER 1

INTRODUCTION

OVERVIEW

In the rapidly growing Rock Hill-Fort Mill Area Transportation Study (RFATS) region, the transportation system is processing heavy travel demand on most major arterial roadways, particularly so during the morning and evening peak driving periods. In a high growth environment, these operating conditions are not entirely unexpected. Given current and projected population and employment growth rates, the need to ensure the effective linkage among different roadway types will be a critical component to extracting the highest degree of operational efficiency from the region’s transportation network. With this in mind, RFATS has initiated a Metropolitan Planning Organization (MPO)-wide Collector Street Plan, the first of its kind in the state of South Carolina, to reduce long-term traffic congestion as additional development occurs by outlining a network of supporting streets to expand driver choice, provide alternate routes, and guide the construction of a more fully developed network of interconnected streets.

Definition

Collector streets are two and three lane roads that provide access and mobility to and from local streets and connect to the larger arterial street system. Collector streets typically carry lower vehicle volume and operate at lower speeds than arterial streets, but nonetheless serve to provide important connectivity among different roadway types.

Purpose & Operation

The general purpose of a collector street is to fill a gap between high-speed, high-volume arterial roadways and low-speed, low-volume local streets. Collector streets are integral linkages for efficient movement by effectively distributing travel demand across an appropriate network of supporting roads. Operationally, collector streets are characterized by moderate speeds with access to individual driveways. Collector streets connect with arterial roads. Examples of collector streets in the RFATS region include, but are not limited to the following:

- Town of Fort Mill – Sutton and Banks Road
- Lancaster County – Harrisburg and Possum Hollow Road
- City of Rock Hill – Twin Lakes and Eastview Road
- City of Tega Cay – Dam Road
- Catawba Indian Nation – Reservation Road and George Dunn Road
- York County – Neelys Creek Road and McConnells Highway

Who Pays

In addition to the operational benefits collector streets provide, it is also important for government to include collector streets in their roadway network to leverage and coordinate with private investment. In most cities and counties, developers build and/or pay for the construction of collector streets. This is done because collector streets have development on both sides of the street, the width of the street is reasonable, and building such streets has been recognized as a normal cost component of development activity.

Public Sector Role

In some cases, government agencies build collector streets when necessary. Examples of publicly funded collector streets are river and ravine crossings where the cost of a bridge may exceed the budget of some developers. In most cases, government agencies that have land use authority adopt policies and ordinances that require developers to build some of their streets with connections to the exterior roadway network. Given the growth projections within the RFATS region, the functional importance of identifying needed collector roads will serve an important role for both proper development and operational reasons.



Benefits

The following are benefits of collector streets:

- 1 Creates choices for citizens.
- 2 Improves response times for emergency services including EMS, Fire and Police.
- 3 Allows local officials to optimize tax dollars when locating new Fire and Police substations.
- 4 Improves the efficiency of public service-delivery enterprises such as school buses, garbage collection, meter reading, and street maintenance by avoiding 'dead-heading' on culs-de-sac.
- 5 Improves the efficiency (and therefore the cost) of private service-delivery enterprises including postal mail, express packages, and newspapers.
- 6 Eases extreme traffic congestion on nearby major roads and intersections.
- 7 Optimizes public funds spent to widen major roads by leveraging with privately-funded collector streets that are built as development occurs. Major road funding is often delayed years after recurring congestion begins.
- 8 Creates a network of interconnected streets and safe pathways for people who choose to travel by bicycle, golf cart, stroller, and on foot.
- 9 Water pressure at the faucet is improved with water distribution systems that have interconnected pipe networks under the street pavement.
- 10 Eases pressure on natural environmental resources and communities by planning and building streets that can be located on alignments that are in harmony with nature.

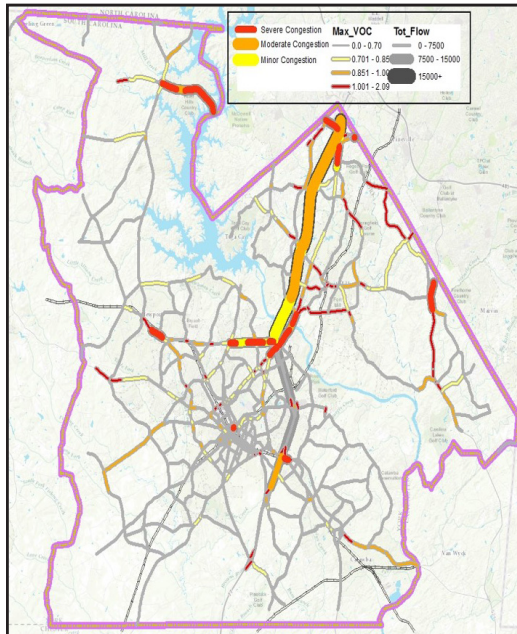
Challenges

The three primary challenges to building collector streets are as follows:

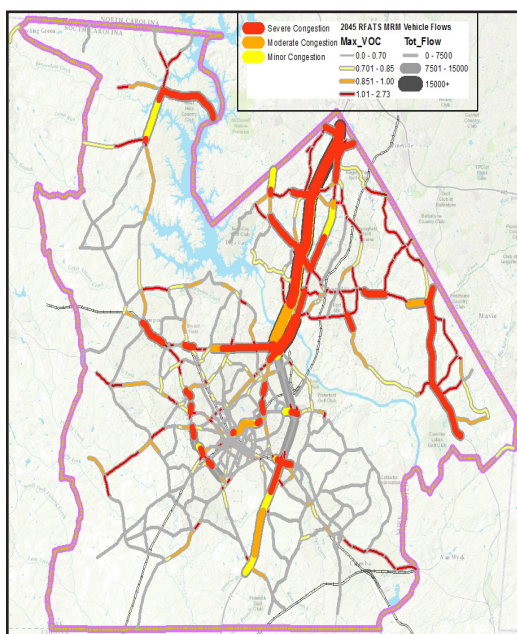
- 1 Planning for collector streets is often overlooked by transportation planning agencies. By way of example, a web search for collector street plans produces a concentration in North Carolina, which is represented by five of the top ten listings in an online search. Upon adoption, the RFATS Collector Street Plan will be the first of its kind in South Carolina.
- 2 Developers and their engineers prefer to lay out new streets within their developments to follow the natural topography of the land. This is desirable and a best practice to land development. Designing new streets to fit the terrain is time consuming and well beyond the scope of this collector street plan. For this reason, this Plan shows lines on maps representing where new collector streets within the transportation network are needed for connectivity and efficient routing. With this in mind, it is important to note that an exact alignment has not been set and will require refinement during the land development review and approval process.
- 3 Timing of construction can be a challenge. The best time to build a collector street is before residents occupy the fronting homes. Delay in making the final connection on a collector street can lead to built-in opposition; first from homeowners who have taken occupancy on their home street and then from the developer who takes the resident's (customer's) side of the argument.

Problem Statement

The Rock Hill – Fort Mill Area Transportation Study (RFATS) region has experienced significant and steady growth over the past few decades. During the most recent Census period (2000-2010), the RFATS region experienced a 46% increase in population from roughly 120,000 to almost 175,000. Since this time, population growth has continued to sharply increase with a planning area population total near 223,000 in 2015. With many desirable qualities within the region, elevated growth rates are expected to continue for the foreseeable future.



2015 Congested Roads



2045 Congested Roads

GOALS

The Collector Street Plan (CSP) will help achieve an overall goal of the RFATS Long Range Transportation Plan (LRTP) to develop plans and strategies that promote an efficient and effective transportation system for all users in the RFATS Study Area. Several of the specific transportation system goals outlined in the LRTP that will be supported by a Collector Street Plan include:

- Protect existing corridors and reserve future right-of-way affected by both public and private development.
- Enhance mobility by improving existing roads, corridors, and street connectivity.
- Encourage the incorporation of access management strategies on major roads and corridors, and require development to provide adequate internal circulation and connectivity to maximize linkages with other nearby development.
- Identify connections for pedestrians and bicyclists to enhance safety and mobility.
- Minimize environmental impacts by the transportation system with proper planning and preservation techniques for the area’s natural features.

Vision

The identification of future connections (collector streets) between existing arterial and local roadways can provide alternative routes for local trips, help lessen delay, and minimize the impacts associated with major roadway widenings. The Plan consists of ten maps (shown in Appendix A) covering the RFATS area showing the proposed connections, the process and methodology used to develop the recommendations, as well as guidance for elected officials and technical staff to implement the policies and practices discussed. ***It should be noted that the future collector streets shown on the maps represent a desired connection, not a mandated street alignment or point of intersection.***

ROADWAY TYPES

There are four types of roadways: (1) local, (2) collector, (3) arterial, and (4) highways. There are subtypes within some of these categories; for example, freeways are a subtype within highways. The Federal Highway Administration and the South Carolina Department of Transportation refer to this system as functional classification; that is, defining classes of roadways according to their function.

Table 1 provides a comparison of the four types of roadways within RFATS as well as regional examples of each type.

Table 1 - Relationship between Functional Classification and Travel Characteristics

Functional Classification	Distance Served (Route Length)	Access Points	Speed Limit	Distance between Routes (Spacing)	Annual Average Daily Traffic Volumes	Significance	Number of Travel Lanes	Regional Examples
Arterial	Longest	Few	Highest	Longest	Highest	Regional	More	US 521, SC 160
Collector	Medium	Some	Medium	Medium	Medium	Community	Medium	Neely Store Road, New Gray Rock Road, Possum Hollow Road
Local	Shortest	Many	Lowest	Shortest	Lowest	Neighborhood	Fewer	Harvest Pointe Drive, Newport Drive

PLAN BENEFITS AND USE

The identification of desired roadway connections and documenting them in this Collector Street Plan (CSP) will provide specific guidance and locational information for expanding driver choice, improving network connectivity, and proactively reducing long term traffic congestion as additional development occurs.

The formal adoption and implementation of the RFATS CSP by the Policy Committee and member jurisdictions will be a key step to establishing collector street planning principles as a routine consideration in the development review and approval process. The adopted CSP will set baseline expectations across the region, from which planning staff can augment as needed to suit their respective planning jurisdiction.

It should again be noted that the future collector streets shown on the accompanying maps are illustrative of desired connectivity between roadways and are not indicative of specific alignments. A set of design specifications should be approved by each local government. Roadway alignments should be developed collaboratively between planning staff and developers using this CSP as a guide. Design recommendations in this Plan, SCDOT Design Guidelines, or local standards should be applied through the development review process. It is intended that the connections shown in the CSP be built by developers. However, this does not preclude State and local governments from contributing to the road network where appropriate.

“The future collector streets shown on the accompanying maps are illustrative of desired connectivity between roadways and are not indicative of specific alignments.”



CHAPTER 2

EXISTING CONDITIONS

TRAFFIC CONGESTION

The RFATS Study Area has significant traffic congestion due to sustained growth, increases in population and employment, attractive amenities, and a relatively strong position within the greater Charlotte region. With this in mind, the effectiveness and completeness of a supporting collector street system that will distribute traffic across an appropriate network of arterial and collector streets is necessary for more efficient functioning throughout the transportation network.

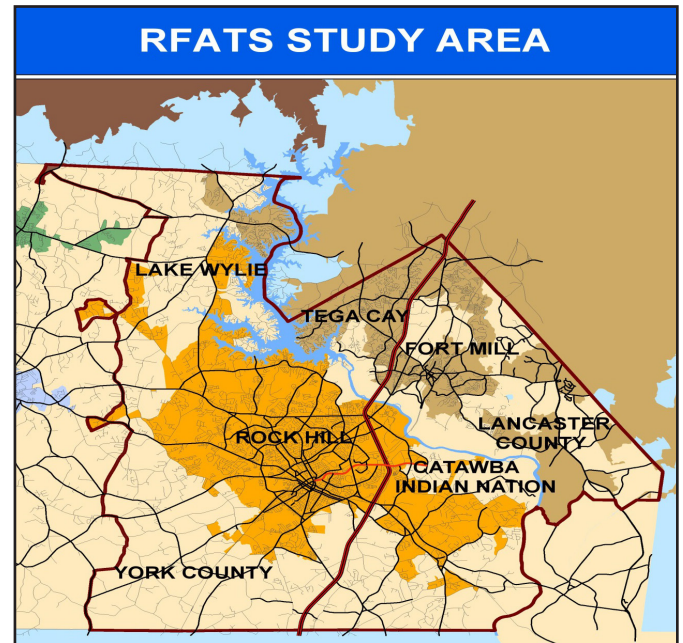
Currently, drivers in the RFATS region spend approximately a third of their time in congested conditions of level of service (LOS) D or lower, and this is projected to increase to roughly 80% in 2045. Against this backdrop, it is critical that the road network (local, collector, arterial and highways) function at their highest efficiency as a system for mobility, connectivity, and safety. Congested arterials and highways in the RFATS region are well known by the motoring public and include, but are not limited to the following:

- Interstate 77 at Celanese Road, Anderson Road, Dave Lyle Boulevard, SC 160, and between Gold Hill Road and the North Carolina state line
- US 21 at Spratt Street / Sutton Road, and SC 160 at Gold Hill Road
- US 521 at SC 160
- SC 49 between Highway 55 and the North Carolina state line (Lake Wylie)
- SC 160 at Sutton Road, Dobys Bridge Road and Gold Hill Road
- SC 161 (Celanese Road) at Heckle Boulevard to I-77
- US 21 (Cherry Road)
- SC 55 west of Highway 49 / 274
- SC 901 (Heckle Boulevard) at South Herlong Avenue and at West Main Street
- Fort Mill Southern Parkway between US 21 and Dobys Bridge Road

In addition to existing and projected operating conditions along most arterial roadways, there are other concerns and variables that influence transportation planning options. For example, there are natural features in the study area, including the Catawba River and Lake Wylie, that preclude desired spacing of connected streets. Opportunities to provide additional network capacity through new

arterials are limited. This places an even greater importance on developing a well-connected roadway network.

LOCAL COMMUNITIES IN RFATS



The following is a brief summary of key transportation issues in the member communities of RFATS.



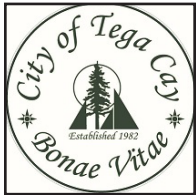
Catawba Indian Nation: the Catawba Indian Nation is the only federally recognized tribe in South Carolina, and it is located within RFATS in eastern York County. The Catawba Indians identify several sacred sites along the Catawba River which are to be taken into consideration when exploring connection options across the river. There are no significant traffic congestion issues on roadways in the Catawba Indian Nation.



City of Rock Hill: the City of Rock Hill is served by I-77 on its east and contains a number of key corridors within the transportation network (i.e.

Celanese Road, US 21, Dave Lyle Blvd, SC 72, etc.) that operate in congested conditions. In the northern portion of the City, severe roadway congestion occurs along the Celanese Corridor and India Hook Road. Celanese Road is a major arterial roadway connecting western York County and the broader Lake Wylie area to I-77 and is a heavy commuter route. The Rock Hill / York County airport is situated between Celanese Road and Mt. Gallant Road, and the likely expansion of the airport to the north will limit opportunities to build a new roadway there. The City is concentrating on congestion management efforts including optimized signal coordination and control-of-

access restrictions to limit driveways on major roadways. Completing the widening of SC 72 is a priority for the City of Rock Hill as is extending Celriver Road and building a three-lane Eden Terrace from Cel-River Road to Mt. Gallant Road. Other roadway projects of interest in Rock Hill include Ebinport Road between India Hook Road and Cherry Road and I-77 interchange modifications at Celanese Road and Cherry Road (I-77 exit 82 A, B & C).



City of Tega Cay: the City of Tega Cay is located along the shores of Lake Wylie and the Catawba River. The majority of development on the peninsula is for residential and recreational uses.

Additional growth is occurring to the north and southeast in the form of mixed-use developments. Developers have contributed funding to build collector streets including in this jurisdiction.



Lancaster County: the panhandle of Lancaster County is located in the northeast section of RFATS. It is bound by

North Carolina to its north and east, and the Catawba River to its west. US 521 is the major north-south arterial in this part of the RFATS area and is intersected by several east-west roads including SC 160, Dobys Bridge Road, and SC 75. The County has engaged in several efforts to promote more efficient connectivity such as pursuing right-of-way to widen existing roads leading to new developments and requiring residential developments to stub-out roadways to adjacent properties.

The planned Dave Lyle Boulevard Extension would have a significant impact on northern Lancaster County, connecting US 521 to Rock Hill, and ultimately to I-77. The County has discussed corridor right-of-way preservation for this project, but no official determinations have been made.



Town of Fort Mill: the Town of Fort Mill is located north of the Catawba River, along the I-77 Corridor. It is bound by Tega Cay to its west, Lancaster County to its east, and the state line to its north. Recent

annexations and major development activity reflect a robust growth environment. Particularly notable is the Kingsley Development located just east of I-77 at SC 160 as well as planned development along the Fort Mill Southern Parkway. Traffic congestion is significant on I-77, US 21, Springfield Parkway, SC 160, and Dobys Bridge Road. Planned improvement projects include an interchange reconfiguration at SC 160 / I-77, five-lane widenings along

US 21 from SC 160 to Gold Hill Road, as well as the Fort Mill Southern Parkway from US 21 to Holbrook Road.



York County: the eastern urbanized portion of York County is included in the RFATS Study Area. This portion of the county is bounded by Gaston County and Mecklenburg County to the north, Lancaster County on the east, Chester County on the south, and the towns of Clover, York, and McConnells on the west. Traffic Congestion is significant throughout this area. In the unincorporated Lake Wylie area, traffic congestion is particularly strong along SC 49, Hwy 557, Pole Branch Road, and Hwy 274.



Avenue of the Nations in Catawba Indian Nation



City of Rock Hill



City of Tega Cay



CHAPTER 3

PLANNING PROCESS

MAJOR ROADWAY IMPROVEMENT PLANS



There are geographic challenges that include Lake Wylie, the Catawba River, floodplains, and sacred Catawba Indian Nation grounds. Crossing any of these features involves many points of evaluation and an extended planning and implementation timeframe.

The following is a summary of other plans that are complete or underway.

Catawba River Crossing Studies

An additional connection across the Catawba River between Sutton Road and Mt Gallant Road is a missing network link that is needed to achieve optimal transportation efficiency. With many challenges and limited opportunities to building a river crossing to the west of I-77, it is strongly suggested that opportunities to preserve this option be supported as additional development occurs along Sutton Road.

In reviewing the Advanced Planning Project Report (APPR) prepared by SCDOT, a connecting route linking Mt Gallant and Sutton Road would help lessen traffic congestion on I-77, US 21, and the Celanese Corridor as well as provide an alternate route to the rapidly growing area south of Lake Wylie. While a multi-lane project above three lanes would not be classified as a collector street, it is being highlighted as an important network connection consistent with the intent of collector streets nonetheless.

Dave Lyle Boulevard Extension (DLBE)

Dave Lyle Boulevard (SC 122) currently stretches from west of Main Street in Rock Hill to Waterford Park Drive, a distance of less than six miles, connecting to major corridors such as I-77 and US 21. The cross section varies between a four-lane divided roadway with turn lanes and a five-lane cross section with a continuous two-way center left-turn lane along the corridor. The extension of Dave

Lyle Boulevard is proposed from the existing terminus near Waterford Park Drive to US 521 and beyond in Lancaster County. Although no specific alignment or corridor has been decided, the DLBE will provide more direct access to the Catawba Indian Nation, northeast York County and northern Lancaster County. Plans for the extension include another Catawba River crossing connecting York and Lancaster Counties.

Planning for the DLBE Extension and adjacent land uses is in discussion by planning staff, councils, as well as residents and is the subject of several studies including the 2012 Dave Lyle Boulevard Extension Corridor/Small Area Plan. The functional classification of the existing DLBE is highway / expressway. The extended section is currently proposed to be classified as a minor arterial by the SCDOT.

Garden Parkway (Gaston East-West Connector)

The North Carolina Department of Transportation (NC-DOT) studied corridor recommendations for a new free-way facility from I-485/NC 160 in Mecklenburg County, just west of Charlotte, to I-85 west of Gastonia - a length of almost 22 miles. While the original project concept known as the “Garden Parkway” is no longer being actively studied, a modified approach that would incorporate a new Catawba River bridge crossing (just north of Lake Wylie) is being considered. The potential project area runs from roughly South New Hope Road to just west of I-485 south of the Charlotte-Douglas International Airport.

ADOPTED PLANS

The study team examined adopted plans prepared by the RFATS, member jurisdictions, and the South Carolina Department of Transportation (SCDOT). These include, but are not limited to the following:

- 2035 RFATS Long Range Transportation Plan (LRTP)
- 2011 RFATS Congestion Management Plan (CMP)
- 2025 York County Comprehensive Plan
- 2014-2024 Lancaster County Comprehensive Plan
- 2012 Fort Mill Comprehensive Plan
- Focus 2020 Rock Hill Comprehensive Plan
- 2015-2025 Tega Cay Comprehensive Plan
- SCDOT State Transportation Improvement Program (STIP)

THE LAND USE-TRANSPORTATION CONNECTION



Research published by the City of Charlotte shows that 200 to 400-foot block spacing is ideal for a central business district, expanding to a 3,000 foot spacing between connected streets (arterials and collectors) in suburban residential and mixed-use areas where the average density is four dwelling units to the acre. The existing and future land use maps adopted with each Comprehensive Plan are a key focus of the study team review. Though the study area is experiencing rapid growth in general, this growth is not consistent across municipal and county boundaries. The future land use maps along with proposed developments were carefully reviewed to isolate any significant conflicts of anticipated land use across constituent boundaries. The future land uses identified in the plans were generally compatible; however, ongoing coordination between adjacent planning departments is recommended as potential development opportunities are announced. This is particularly important in areas that have large tracts of undeveloped land, or tracts that are beginning to develop, as these are prime areas to implement connectivity requirements that may have significant benefits. The RFATS staff are encouraged to look for such opportunities.

For example, Fort Mill recently annexed land just north of the Catawba River between Fort Mill and Rock Hill/York County for several developments. The development of each side of the river should be coordinated across planning departments to avoid approving developments that would preclude a viable river crossing option.

Numerous small area plans and corridor studies were reviewed to understand and identify connectivity opportunities including the:

- US 521 / SC 9 Corridor Study
- Dave Lyle Boulevard Extension Small Area Plan
- Exit 90 / Carowinds Boulevard Master Plan

On a more refined level, the Unified Development Ordinance (UDO) and Zoning maps for the RFATS member jurisdictions were reviewed to identify existing connectivity requirements and conditions as well as roadway design standards for collector streets. This information was used as a base to expand upon in this study to provide a more consistent approach for collector street planning throughout the RFATS region.

DATA ASSIMILATION

The technical information used in developing a preliminary collector street network for the study area includes:

- Average Annual Daily Traffic (AADT) volumes and crash data from the SCDOT
- Floodplains, natural environment constraints, and areas of severe topology from national mapping databases
- Traffic growth patterns, impacts of programmed roadway projects, and corridors anticipated to operate over capacity in the future from the Metro-lina Regional Model (MRM)

Information gathering and review meetings were held with all six member jurisdictions within RFATS to discuss key corridors, anticipated growth areas, newly approved and pending developments, as well as chronic congestion points. The draft CSP maps (shown in Appendix A) were then modified to reflect the input and guidance received. Following those meetings, volume-to-capacity ratios by roadway segment were included, and this resulted in additional collector street extensions and connections being identified by the RFATS Technical Team.

PLANS AND STUDIES UNDERWAY



Several planning initiatives for alternative methods of transportation have either recently been completed or were underway during the development of the CSP. This includes the RFATS 2045 Long Range Transportation Plan and the RFATS Bicycle & Pedestrian Connectivity Plan. While this study focuses on new collector street connections, it should be implemented with the recommendations found in these complementary plans, where appropriate, to maximize multi-modal connectivity and develop a robust comprehensive transportation network that offers many options to residents.

PUBLIC OUTREACH



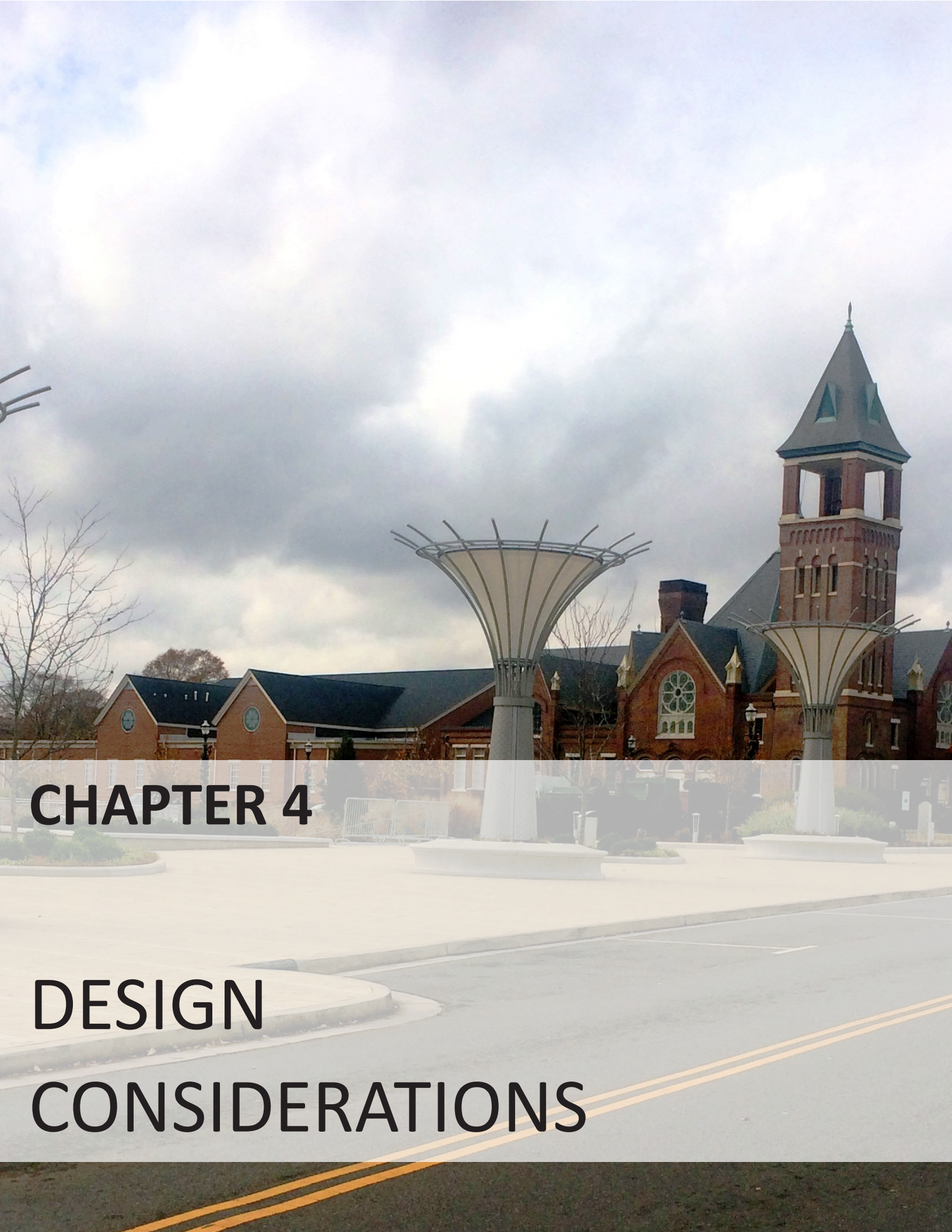
Four community outreach sessions were held to present and discuss the draft Plan with members of the public. Meetings were held as follows:

- Lake Wylie: October 4, 2016 at Lake Wylie Public Library on Blucher Circle
- Fort Mill & Tega Cay : October 6, 2016 at the Spratt Building on Main Street
- Lancaster County: October 25, 2016 at Del Webb Library on Charlotte Highway
- Rock Hill & Catawba Indian Nation: November 1, 2016 at Manchester Meadows on Mt. Gallant Road

Attendees provided input on locations where collector street connections are needed, congestion ‘hot-spots’ and alternative ‘back road’ routes that are used to circumvent delays, as well as commenting on proposed cross sections and the planned incorporation of multi-modal elements for collector streets. Public input was solicited through a survey as well. The survey was provided at each public session as well as online via the RFATS MPO website.

During the public outreach meetings, comments were received about existing collector streets that need to be improved; in particular, Henry Harris Road in Lancaster County and Bethel School Road/Baird Road in the Lake Wylie area were noted by multiple participants.

Based on responses from participants in the public outreach process, congestion in RFATS is generally perceived as heavy, widespread, and putting the existing roadway network at a critical level. There is an overall attitude of agreement that action needs to be taken to not only preserve and improve the operations of the existing transportation network, but to strategically plan for accommodating area growth with more complete roadways and alternative route and mode choices as well.



CHAPTER 4

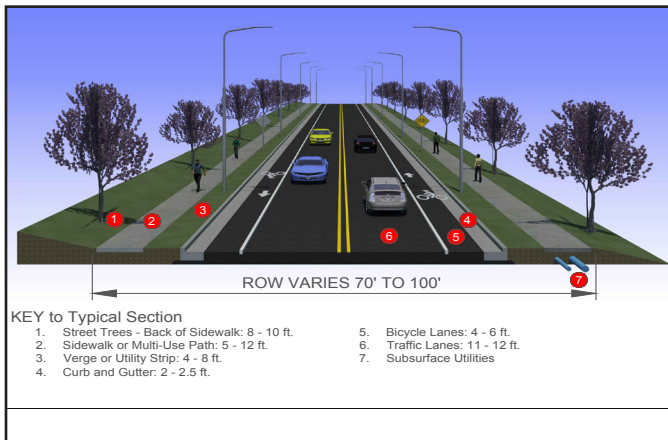
DESIGN CONSIDERATIONS

TYPICAL SECTIONS

Typical design elements within the right-of-way for collector streets include: vehicle travel lanes, bicycle lanes, drainage, utilities, landscaping or planting strips, and sidewalks. Depending on the surrounding land uses, medians and on-street parking may also be provided.

Collector streets typically have the following characteristics and should be designed with the following guidelines in mind:

- Average Daily Traffic between 1,500 vehicles per day (vpd) and 7,500 vehicles per day
- Speed limit between 25 miles per hour (mph) and 35 mph
- Two (2) lane cross section with turn lanes at intersections and major driveways
- Travel lanes 11 feet or 12 feet wide
- Collector street spacing between 1,500 feet and 3,000 feet depending on the density of development.



The Collector Street maps shown in Appendix A identify proposed cross-sections for future collector streets as a guide based on anticipated land uses, intensities, and discussions with local planning staff. Included in Appendix B are four typical cross-section options.

Paved Shoulders

Collector Streets in some RFATS areas may have two-foot shoulders, however new collector streets with paved shoulders would benefit by increasing the width to six or eight feet. Wider paved shoulders benefit motorists when vehicles break down and when emergency vehicles must pass. Wider paved shoulders also serve as defacto bike lanes and sidewalks.

Urban and Suburban Areas

Collector Streets in urban and suburban areas typically have four to five-foot wide bicycle lanes, curb and gutter,

landscaping strip, and five to six-foot wide sidewalks. Six-foot wide sidewalks are preferred so two people can walk side-by-side without stepping off the sidewalk.

TRAFFIC CALMING

Definition

Traffic calming is the combination of mostly physical features that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for pedestrians, joggers, and cyclists. The South Carolina Department of Transportation (SCDOT) considers traffic calming to include physical and visual measures, as well as educational and enforcement activities.

Proactive Calming



Proactive traffic calming techniques are design elements that are built when the street is built. They include horizontal curves that slow most motorists and raised-curb islands that narrow the travel way at key locations to ensure motorists slow down. Traffic calming can include intersections where “through” traffic must turn and the street name changes. Proactive traffic calming includes generous planting strips with street trees that will grow and mature to provide a canopy over the street, lending visual cues to motorists that induce them to drive at reasonable speeds.

Reactive Calming

Traffic calming measures can be reactive; that is, added to existing collector streets that are experiencing speeding problems.

Desired Results

The purpose of traffic calming is to reduce the speed and volume of traffic to acceptable levels, reduce crashes, and to provide safe environments for pedestrians, cyclists, and children. Additional information about traffic calming is presented in Appendix C.

Partnerships for Traffic Calming Programs

Engineering applications, enforcement cooperation, education of motorists, and economics typically determine the success of any traffic calming endeavor. A partnership between various entities including local government, regional agencies and SCDOT will be beneficial in designing and implementing a successful traffic calming program. Each traffic calming program and project should include a community awareness and education component. Each traffic calming project should be endorsed by the law enforcement agency within that jurisdiction, including perhaps increased presence in the area. The three-pronged approach of using physical measures combined with police presence and public service announcements is a recommended best practice.

Funding

Local governments are responsible for funding traffic calming programs and projects in South Carolina. SCDOT does not have a designated funding source for traffic calming. Depending on the proposed measures and the characteristics of the area, traffic calming projects may be eligible for funding from “C-funds” which are administered by County Transportation Committees. Consideration should be given to securing funding from developers if there is a rational nexus to mitigate the impact of traffic from their development.



CHAPTER 5

CASE STUDIES & BEST PRACTICES

Case studies are included in this section to serve as a point of reference for policies and implementation practices recommended in this plan. These studies provide relevant best practices from peer agencies that have experience implementing collector street requirements. They are:

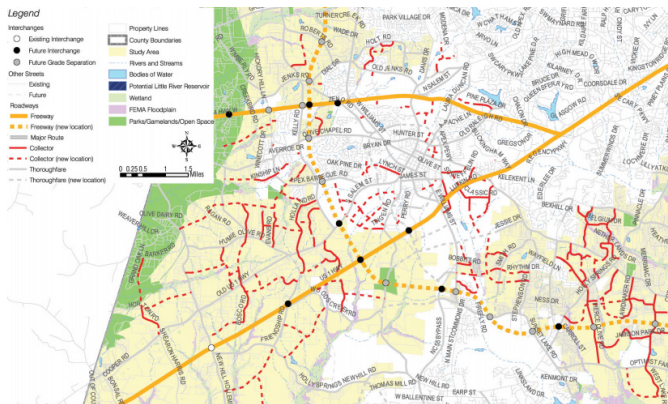
- Capital Area MPO (NC)
- Cary (NC)
- Charlotte (NC)
- Durham-Chapel Hill - Carrboro MPO (NC)
- Grand Strand (SC)
- Greensboro MPO (NC)
- Greenville-Pickens Area (SC)
- Wilmington MPO (NC)
- Winston-Salem MPO (NC)

BEST PRACTICES

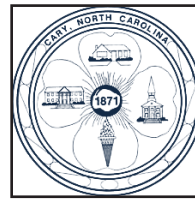
Summaries of each case study are provided below. Information was obtained from the agency website, a telephone / e-mail survey, and meetings that were held specifically with staff in Cary and Charlotte. A summary table of the survey results is included on page 16 of this report.



Capital Area MPO (NC): The collector street policy for CAMPO is based on local plans. CAMPO includes collector streets in area studies and analyses to assist the local agencies in updating their plans. The MPO “adopts collector level streets as part of county-level Comprehensive Transportation Plans (CTP) where there has been an identified improvement as part of the overall CTP.” For example, the Wake County Collector Street Plan includes extensions of existing roadways.



[Wake County Collector Street Plan](#)



Cary (NC): The Town of Cary is located in Wake and Chatham counties, immediately southwest of the capital city, Raleigh. In October 1988, Town Council adopted the Collector Streets Policy Statement that has been strengthened since its adoption.

This policy is implemented through the land development process. It requires new developments to build collector streets if any of the following criteria are met:

- The development contains a street that services traffic from more than 100 dwelling units.
- The development contains a total commercial area of 20 acres or greater.
- The development contains other land uses that generate traffic volumes similar to 100 dwelling units or 20 acres of commercial area (such as schools), as deemed by the Town Council.

The policy also sets minimum design standards for collector streets, such as a width of 35 feet from back-of-curb to back-of-curb and a posted speed limit not to exceed 35 mph. There are several typical sections used by the Town. The Comprehensive Transportation Plan provides guidance as to whether the collector street is major or minor, with major collectors being designed with medians and bicycle lanes but without driveways. The Collector Streets Policy Statement goes on to identify reasonable instances for modifying an identified collector street alignment including topography and soil conditions.

Though not directly addressed in the Collector Streets Policy Statement, the Town of Cary does utilize a ‘connectivity index’ for all proposed residential developments, as discussed in Chapter 7 of the Town’s Land Development Ordinance. A connectivity index is a measure of how well vehicular and pedestrian/bicyclist networks are connected both within a development and to the external roadway network. The index value can be a ratio of road ‘links’ to road ‘nodes’ (intersections or cul-de-sacs) or a ratio of intersections to cul-de-sacs. If a residential development does not meet the minimum connectivity index requirement, pedestrian paths must be constructed to provide pedestrian connections from the cul-de-sac to the adjacent roadway.



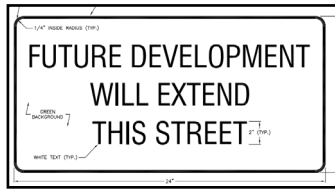
Charlotte (NC): The City of Charlotte sets expectations that streets will be connected and will provide safe facilities for pedestrians, bicyclists, transit (if appropriate), cars and trucks. Charlotte has had a collector street ordinance since 2002 when the City Council adopted the Major Collector Plan. In Charlotte, collector streets are considered to have the following

collector street ordinance since 2002 when the City Council adopted the Major Collector Plan. In Charlotte, collector streets are considered to have the following

characteristics:

- Intersect with an arterial roadway
- Serve more than 125 dwelling units
- Lane configuration serves the functions of a collector street
- Connects to non-residential area

Planned collector streets are referenced in the Subdivision Ordinance and are primarily required of developers. The City does not typically build collector streets. To let citizens know about potential future road extensions or construction, any street stub built after 2008 is required to have a connectivity sign posted at the end-of-road barricades. The sign is a reminder to residents that the street will be extended and connected to other streets in the future.



The collector streets reflected in the plan simply illustrate intent or logical connection routes, rather than exact alignments for future roads. According to Danny Pleasant (Director of the Charlotte Department of Transportation), “as long as the street being built meets that intent as determined by staff, the exact alignment is somewhat flexible.” Exceptions may be granted for steep topography and crossing of water features. Developers are expected to dedicate right-of-way and build planned collector streets. The City may participate in a public-private partnership to fund a portion of a culvert or bridge.



Durham – Chapel Hill – Carrboro (DCHC) MPO (NC):

The DCHC MPO utilizes a Collector Street Plan to determine future street connections. Final alignment and design of collector streets are determined through the development review process. The MPO provides some flexibility to adapt to the particulars of future developments. Extensions of existing streets are also taken into consideration. In order to give residents knowledge that a collector street will be built in the future, the Town of Chapel Hill posts signs stating, “Road subject to future extension.” These signs are sometimes taken down by angry neighbors and vandals. In addition to these signs, public input meetings are held, and invitations are sent to all residents in the area to spread the word and get as much participation as possible.



Grand Strand (SC): The Grand Strand Area Transportation Study (GSATS) is the Metropolitan Planning

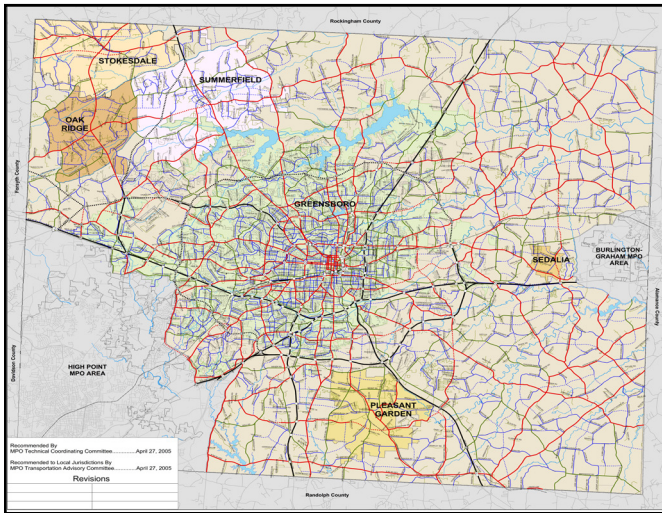
Organization (MPO) for the Myrtle Beach-Socastee SC/NC Urbanized Area, also referred to as the Waccamaw region. The Waccamaw Region Council of Governments (WRCOG) administers the transportation programs, collect and compile land use data and gather any additional planning data required.

According to Mr. Tom Britton, AICP, Planning Director for WRCOG, collector streets are included in the transportation planning process along with arterial roads and highways. There is not a separate process or plan for collector streets. The GSATS 2035 Long Range Transportation Plan was adopted in June 2011 and the document and maps show approximate alignments for future collector streets along with arterial roadways and highways. GSATS has initiated the 2040 Metropolitan Transportation Plan update and the intent is to continue to show collector streets, arterials and highways together. New collector streets are typically identified by the local governmental agency and requested through a formal process. All submittals are evaluated using a quantitative process to include the most cost-effective projects that help the region attain its goals.



Greensboro MPO (NC): The Greensboro MPO Collector Street Plan identifies existing and future collector streets. A draft of the plan was developed in August 2004 and was endorsed by the Transportation Advisory Committee in 2005.

Different jurisdictions within the MPO adopted the Collector Street Plan for roadways within their jurisdiction, including Greensboro, Summerfield, Sedalia, Guilford County, Oak Ridge and Stokesdale. The intended outcomes for preparing the Collector Street Plan were to assist in local planning for public transportation, pedestrian and bicycle facilities, as well as improving traffic circulation and traffic control. Most of the collector streets will be constructed by private development activity. The future collectors and extensions of existing collectors shown on the maps are not definitive in their actual alignment or location.



Greensboro Urban Area MPO - Collector Street Plan



Greenville-Pickens Area (SC): The Greenville-Pickens Area Transportation Study (GPATS) is the MPO for the Greenville Urbanized Area.

GPATS is one of the largest of the eleven MPOs in South Carolina in terms of funding and population. GPATS covers a significant portion of Greenville County and Pickens County, and smaller portions of Anderson, Laurens and Spartanburg counties. It contains the municipalities of Central, Clemson, Easley, Fountain Inn, Greenville, Greer, Liberty, Mauldin, Norris, Pelzer, Pendleton, Pickens, Simpsonville, Travelers Rest, West Pelzer and Williamston. It covers an area of 777 square miles and is home to more than 500,000 residents. The South Carolina Department of Transportation (SCDOT) maintains and manages a large percentage of the roads within GPATS. Many of the municipalities and counties within GPATS manage their own transportation improvement projects within their boundaries.

The primary role of GPATS is to be the designated recipient of all state and federal funds for transportation projects. The GPATS Policy Coordinating Committee approves the scheduling of projects, the allocation of funds, and helps to guide the development of the region's transportation infrastructure. This includes roads and highways, mass transit, bicycle and pedestrian facilities, and freight facilities.

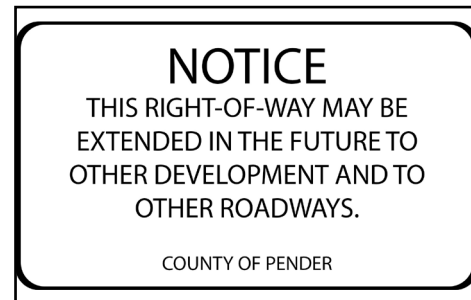
According to GPATS Transportation Planning Manager, Mr. Keith Brockington, AICP; collector streets are included in the overall MPO area transportation planning process. Existing and future collector streets are shown on the same map as arterials and highways in the 2035 Long Range Transportation Plan (LRTP). GPATS is currently updating to a Horizon Year 2040 LRTP and the intent is to continue to show collectors and arterials together in the LRTP. Implementation of collector street recommenda-

tions from the LRTP rely on public and private funding sources. Developers (private sector) are required only to build streets and provide right-of-way within their development sites or along their frontage. GPATS strives to ensure that collector streets do not look like some of their stripped-out arterial roads that have too many commercial driveways and are too wide. GPATS firmly supports planning for major and minor collector streets. Mr. Brockington like the idea that RFATS is preparing a Collector Street Plan.



Wilmington MPO (NC): The Wilmington MPO has several Collector Street Plans. The most recent is the Pender

County Collector Street Plan. Within this plan, there are policies to ensure future collector street construction. A couple of policies that were suggested included establishing a maximum distance between collector streets to ensure adequate cross access between land uses, lowering the threshold for requiring a traffic impact analysis, and requiring that newly constructed roads are not closed off, but are instead stubbed out. The maps shown within the Pender County Collector Street Plan include extensions of existing streets. According to this document, there were some surveys and public outreach meetings. Their strategy for letting the public know would be the placement of roadway signs.

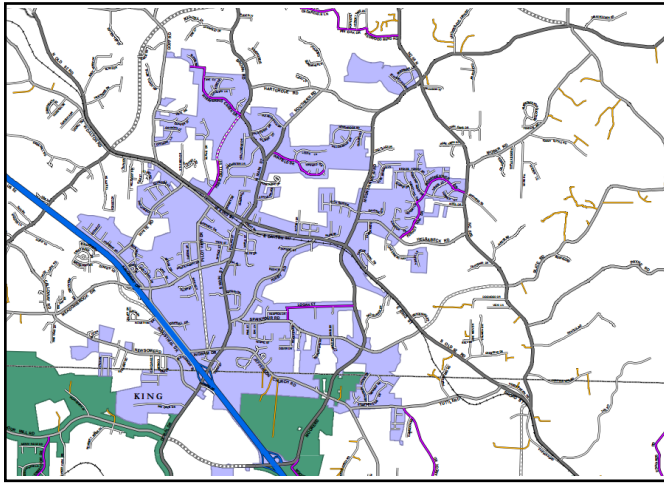


Winston-Salem MPO (NC): The Winston-Salem MPO Collector Street Plan was published in 2007. This plan identifies existing collector streets, as well as proposed future collector streets. To create the plan, a group of individuals who were very familiar with

the study area were consulted for input on roadway conditions and desired connections. The MPO has had some success with connections or stub streets, but often the streets would ultimately be negotiated with the developer, stating that the location of proposed collector streets is very subjective.

As with other plans, collector streets are presented as needed connection routes, not exact alignments. The Winston-Salem MPO places an emphasis on informing the public about future collector streets, and sometimes

this results in push-back from smaller towns and residents who do not want their local street to become a connector. There has been discussion about including signage at stub outs stating that the road would become a connector in the future.



[Winston-Salem MPO - Collector Street Plan](#)

plans, or parts thereof, adopted in accordance with the provisions of this chapter.” The statute later states “The making or certifying of such maps by the planning commission shall be in the form of a recommendation and shall not of itself constitute the opening or establishment of any street or highway or public building sites, public parks, public playground, public utility or other public open space or the taking or acceptance of any land for such purpose.”

RELEVANT SOUTH CAROLINA STATUTES

The South Carolina Code of Laws (Title 6, Chapter 7) enables “municipalities, counties and regional councils of government to preserve and enhance their present advantages, to overcome their present handicaps, and to prevent or minimize such future problems as may be foreseen. To accomplish this intent, local governments are encouraged to plan for future development, to prepare, adopt, and from time to time revise, a comprehensive plan to guide future local development; and to participate in a regional planning organization to coordinate local planning and development with that of the surrounding region. As aids in the implementation of the comprehensive plan local governments are encouraged to adopt and enforce appropriate land use controls, and cooperate with other governmental authorities. Any county or municipality may, but shall not be required to, exercise any of the powers granted by this chapter” (statutes).

The State Code of Laws (Title 6, Chapter 7, Article 13) enables that “counties and municipalities may establish official maps to reserve future locations of any street, highway, or public utility rights-of-way, public building site or public open space for future public acquisition and to regulate structures or changes in land use in such rights-of-way, building sites or open spaces. This authority is declared necessary in order to promote and preserve the public safety, economy, good order, appearance, convenience, prosperity, and general welfare and is one of the several instruments of land use control authorized by this chapter for the implementation of comprehensive

	1. Do you have a collector Street Plan that is being implemented? If yes, is there anything that helps implementation of the policy?	2. Does the plan include extensions of existing streets? If yes, what is the best way to communicate to residents of the streets so they are not surprised?	3. Does the plan include a map that shows future collector streets through parcels that are currently developed? If yes, is it a specific line on the map or some other graphical treatment?
Capital Area MPO	CAMPO utilizes local municipality and county plans. Most plans utilize language specific to the subject UDO.	Yes.	A map is included, but no parcels are shown. A specific line type and color are used.
Cary, NC	Yes; an adopted collector street policy requires new developments to provide a collector street to the boundaries of the site once a specified threshold is met.	Yes; signs are posted at the ends of streets that are slated to be extended. Public meetings are held when updating the Thoroughfare Plan Map.	Rarely.
Charlotte, NC	Yes; used in the Subdivision Ordinance.	Yes; connectivity signs added to the end-of-road barricades.	A map is included, but no parcels are shown. A specific line type and color are used.
Durham - Chapel Hill - Carrboro MPO	Yes; plans state that final alignment and design will be determined by the development review process (draft guide is attached).	Yes; a sign is posted stating "Road subject to future extension."	A map is included, but no parcels are shown. A specific line type is used.
Grand Strand, SC	Yes; implementation depends on public and private funding.	No, there is no distinction between existing and future streets.	A map is included, but not developed parcels are shown.
Greensboro MPO	Yes; policies in UDO, including conformance with the Thoroughfare and Collector Street Plans.	Yes; extension locations shown are not definitive. The MPO communicates with developers, who are then expected to notify residents.	A map is included, but no parcels are shown. A specific line type and color are used.
Greenville-Pickens Area, SC	Yes; implementation depends on public and private funding. Developers are required to build collector streets on-site and along frontage to match adopted LRTP.	No, there is no distinction between existing and future streets.	A map is included, but not developed parcels are shown.
Wilmington MPO	Yes.	Yes; strategy for the Pender County Collector Street Plan is to post signs stating a future connection will be built.	A map is included, but no parcels are shown. A specific line type and color are used.
Winston-Salem MPO	Yes; the plan is compared to the recommendations for the site through the development review process.	Yes; public involvement meetings during the planning stages.	A map is included, but no parcels are shown. A specific line type and color are used.



CHAPTER 6

POLICY & IMPLEMENTATION RECOMMENDATIONS

The following recommendations are for RFATS and its member jurisdictions. Updating and/or rewriting existing plans by member jurisdictions within RFATS is encouraged so that the recommendations of this Collector Street Plan can be effective across municipal boundaries, as well as in urbanized, but unincorporated areas. The Plan is intended to provide a unified, continuous, and comprehensive collector street network that can assist in extracting the highest degree of operational efficiency throughout the transportation network. Without full support and regular application of the CSP, opportunities for critical roadway connections may be missed, leading to a worsening of traffic congestion on the existing arterial network, and degrading the quality of life for residents and visitors.

Furthermore, member agencies should:

- Incorporate relevant sections of the *Collector Street Plan* during their next update of the Comprehensive Plan, Transportation Plan, Subarea Plans, Land Development Ordinance, etc.
- Staff in each member agency should work in a collaborative and cooperative manner to preserve future collector street corridors across jurisdictions to build a continuous, efficient collector street network that supports the arterial and local roadway networks.
- Staff in each member agency should regularly refer to the *Collector Street Plan* when reviewing new development proposals within RFATS.
- Use the plan as a means to preserve collector street corridors and communicate desired connectivity to developers as proposed development plans are submitted and reviewed.
- Review new developments for opportunities to provide desirable connectivity on a local level to supplement the collector street network.
- Require developers to dedicate right-of-way for identified collector streets and either construct a proportional share of the planned collector street, or, in certain circumstances, provide a fee-in-lieu such that the connection can be constructed by a third party at a future time that is logical for the growth of the area.
- Require new developments to ‘stub-out’ streets at the property line if the street is intended to logically connect to future adjacent developments (such as building the collector street to the property line and providing signage indicating the future roadway connection to raise awareness in the community).
- Implement ‘Complete Streets’ design by requiring appropriate bicycle, pedestrian, and transit facilities into development designs to maximize local mobility via sidewalks, bike lanes, and multi-use

pathways.

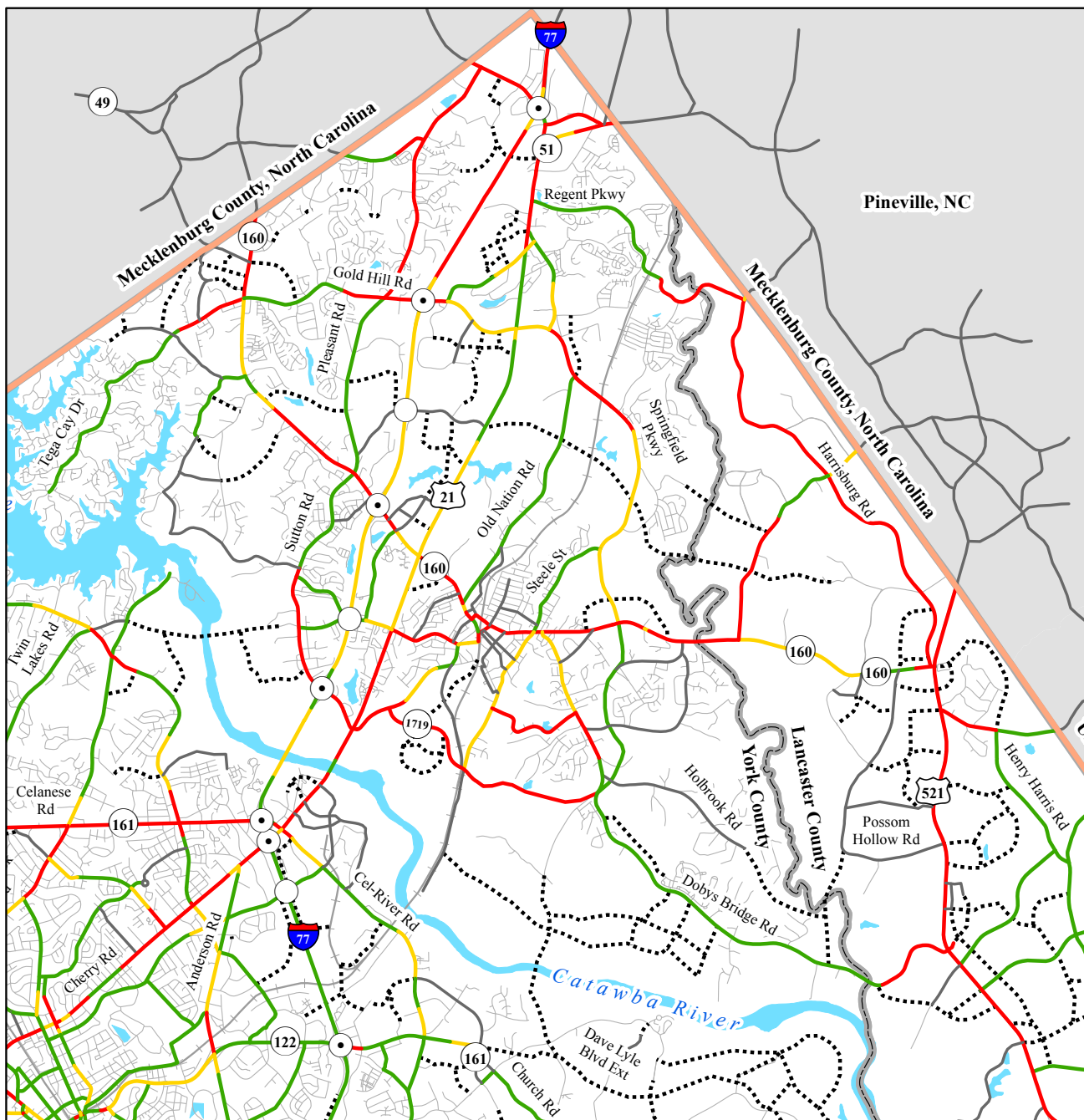
- Periodically review and amend the *Collector Street Plan* with new future collector street connections as they are identified during the development review process.
- Consider adoption and use of a connectivity index for various types of developments to provide another evaluation measure when reviewing new developments.
- Ensure that collector streets align with existing collector streets at thoroughfare intersections to promote safer crossings for pedestrians, cyclists and automobiles.





APPENDIX A

MAPS



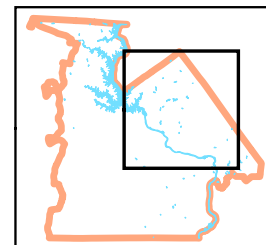
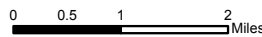
REATS Volume to Capacity Ratio

Fort Mill and Tega Cay, SC

Figure 1 of 10

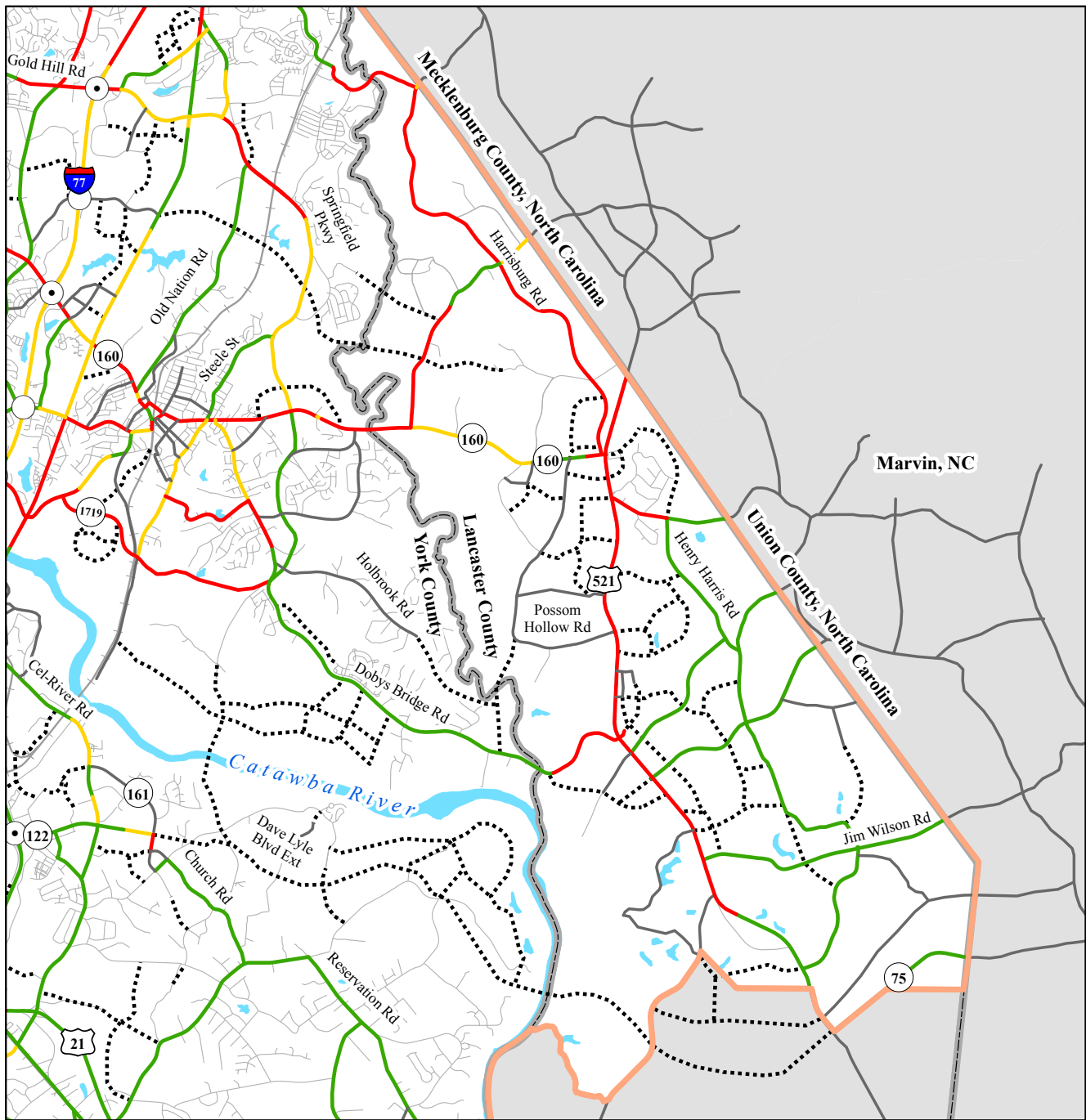
Legend

- REATS Boundary
- Water Features
- Interchange
- Grade Separation
- Proposed Roadway
- No Model Data Available
- Under Capacity (0.01-0.79)
- Approaching Capacity (0.80-0.99)
- At or Above Capacity (1.00 or greater)



Map Date: June 2017





RFATS Volume to Capacity Ratio

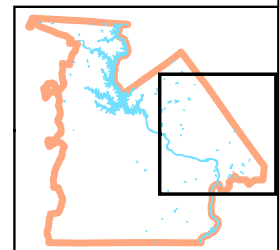
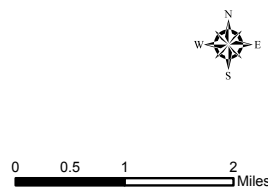
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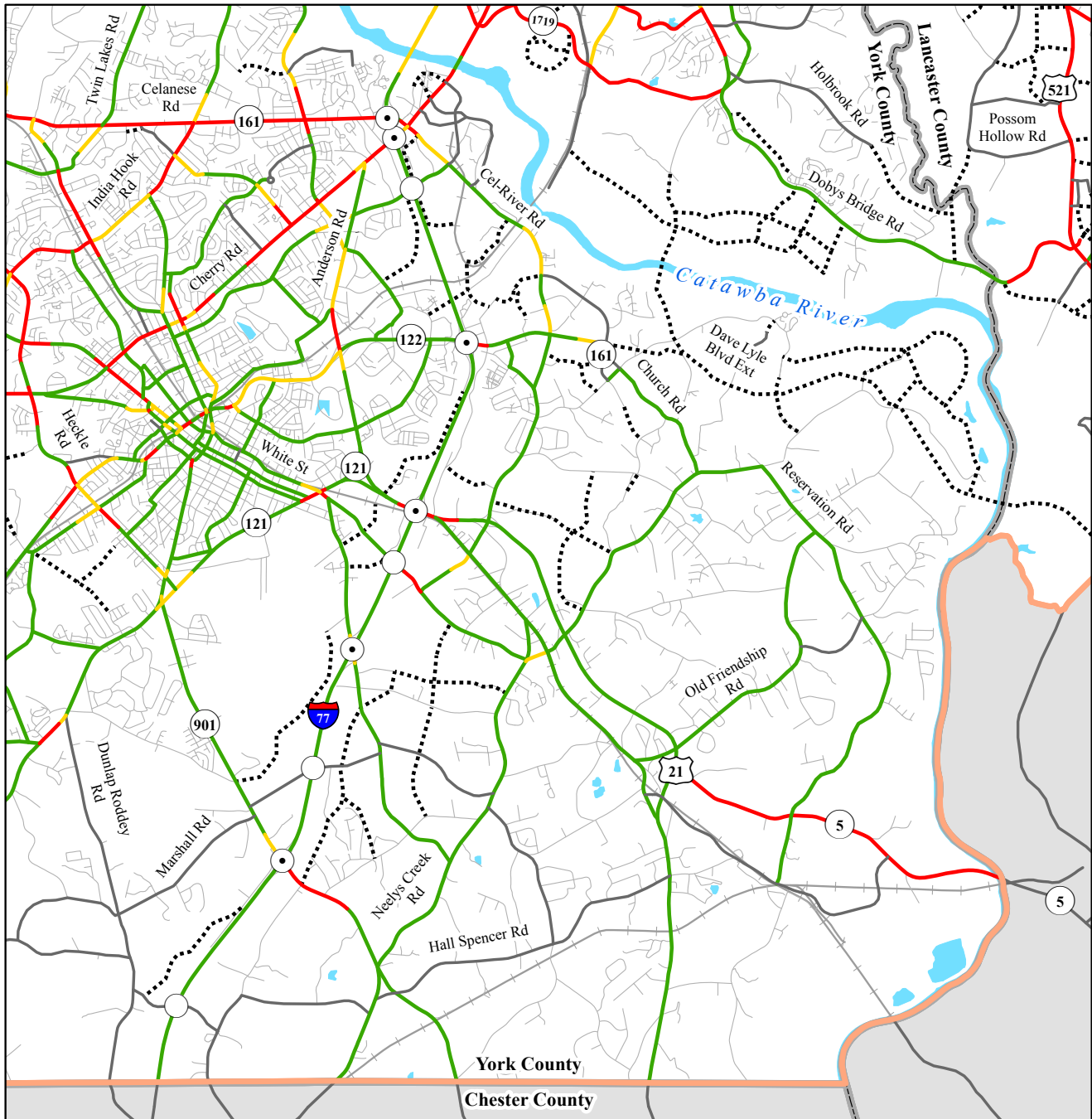
- RFATS Boundary
- Water Features
- Interchange
- Grade Separation
- Proposed Roadway
- No Model Data Available
- Under Capacity (0.01-0.79)
- Approaching Capacity (0.80-0.99)
- At or Above Capacity (1.00 or greater)

Map Date: June 2017

Lancaster County, SC

Figure 2 of 10





RFATS Volume to Capacity Ratio

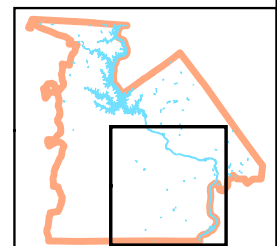
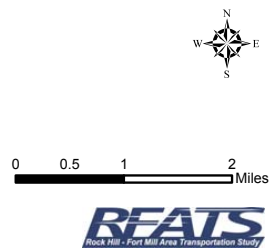
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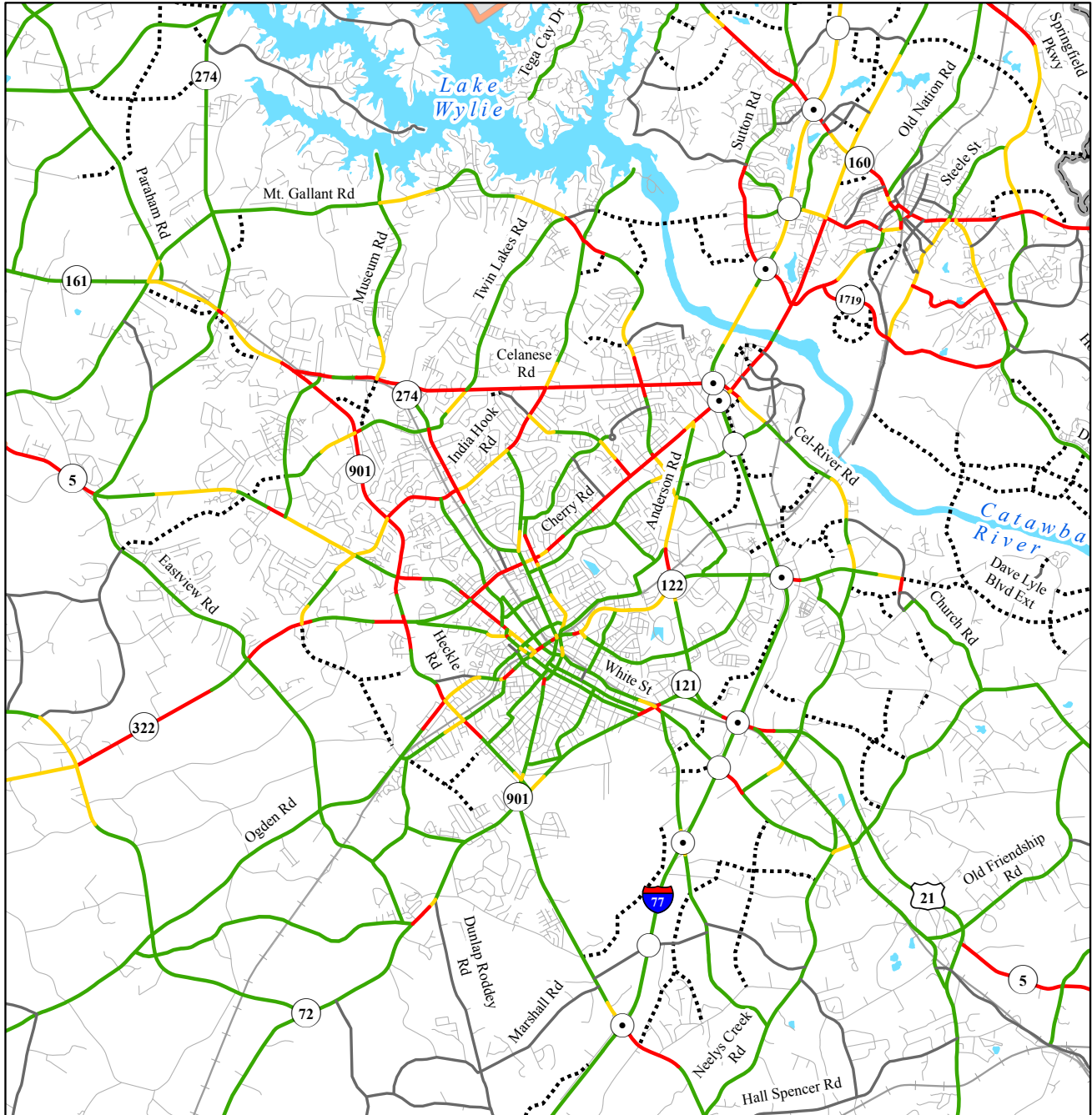
- RFATS Boundary
- Water Features
- Interchange
- Grade Separation
- Proposed Roadway
- No Model Data Available
- Under Capacity (0.01-0.79)
- Approaching Capacity (0.80-0.99)
- At or Above Capacity (1.00 or greater)

Map Date: June 2017

York County, SC

Figure 3 of 10





RFATS Volume to Capacity Ratio

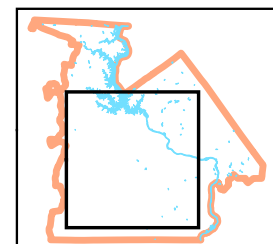
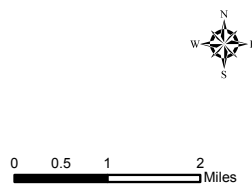
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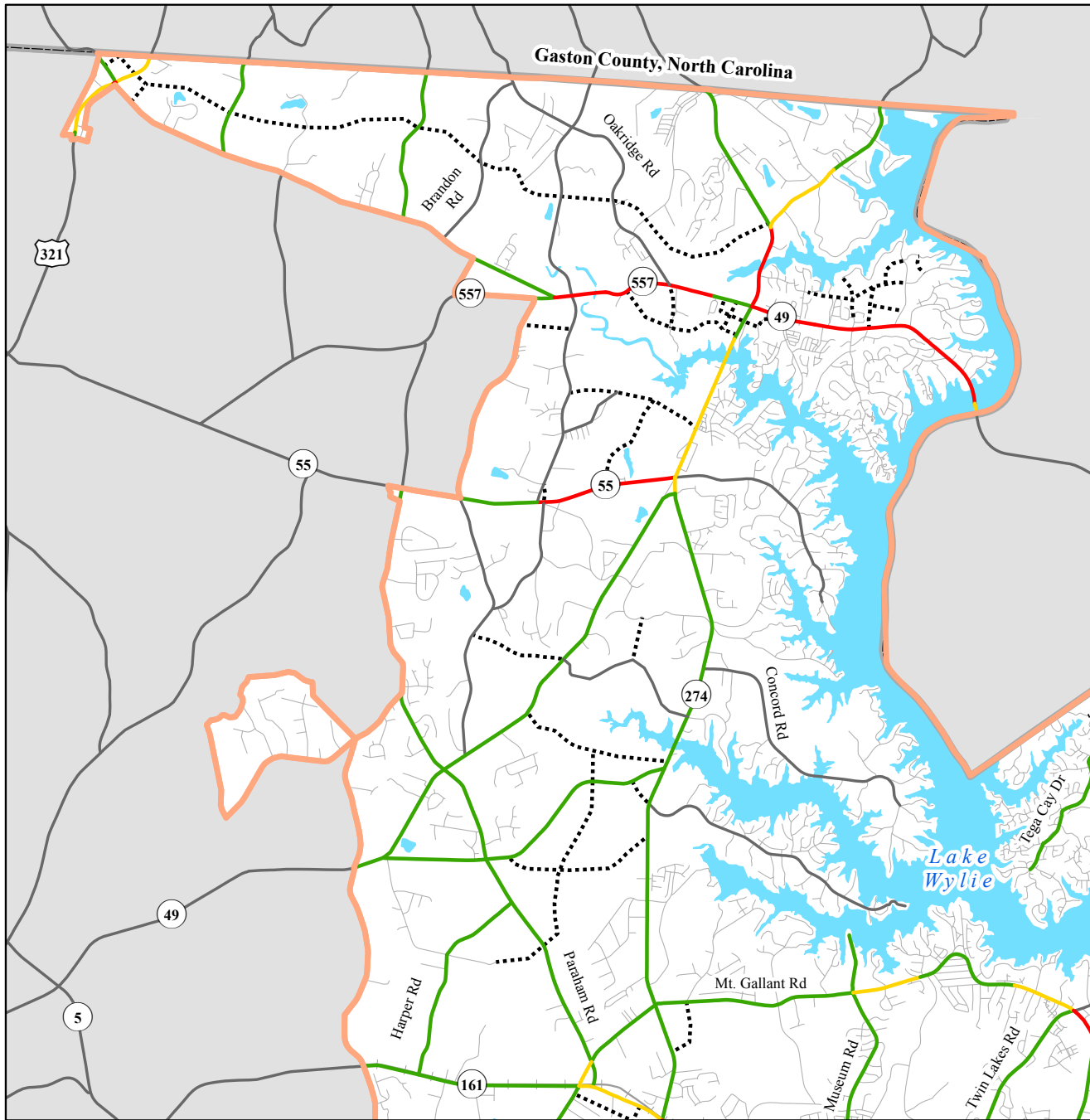
- RFATS Boundary
- Water Features
- Interchange
- Grade Separation
- Proposed Roadway
- No Model Data Available
- Under Capacity (0.01-0.79)
- Approaching Capacity (0.80-0.99)
- At or Above Capacity (1.00 or greater)

Map Date: June 2017

Rock Hill, SC

Figure 4 of 10

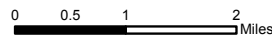




RFATS Volume to Capacity Ratio

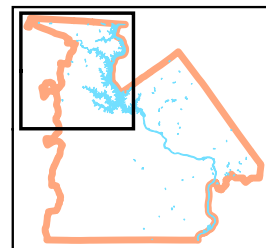
Legend

- RFATS Boundary
- Water Features
- Proposed Roadway
- No Model Data Available
- Under Capacity (0.01-0.79)
- Approaching Capacity (0.80-0.99)
- At or Above Capacity (1.00 or greater)

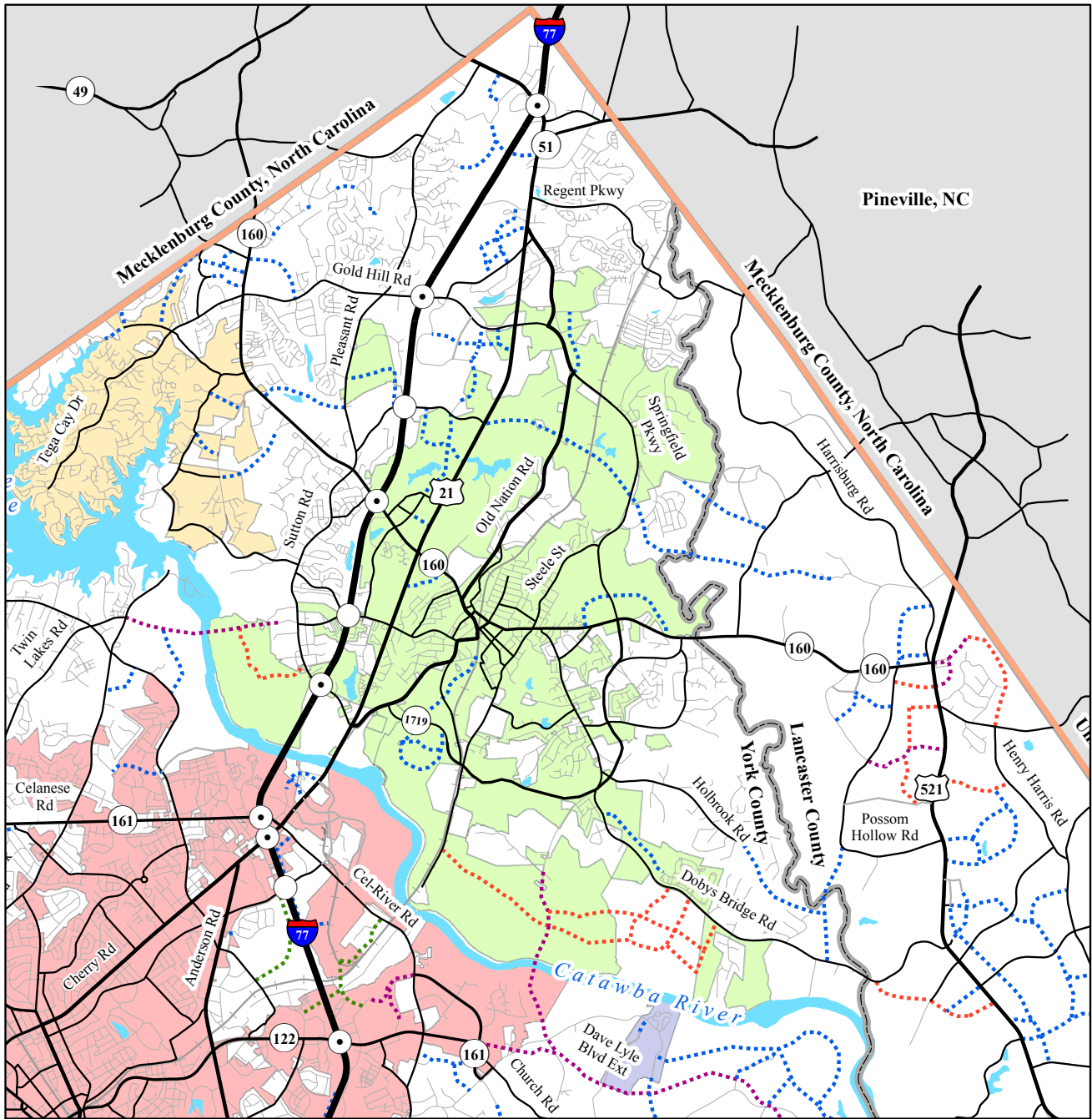


Lake Wylie, SC

Figure 5 of 10



Map Date: June 2017



RFATS Collector Street Plan

Fort Mill and Tega Cay, SC

Legend

- RFATS Boundary
- Fort Mill
- Rock Hill
- Tega Cay
- Catawba Indian Nation
- Water Features

- Interchange
- Grade Separation

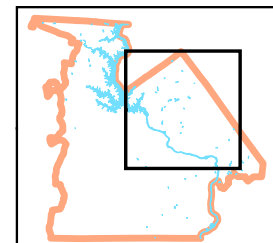
- Proposed 2-lane Collector
- Proposed 2-lane Divided Collector
- Proposed 3-lane Collector
- Proposed 4-lane Divided Collector



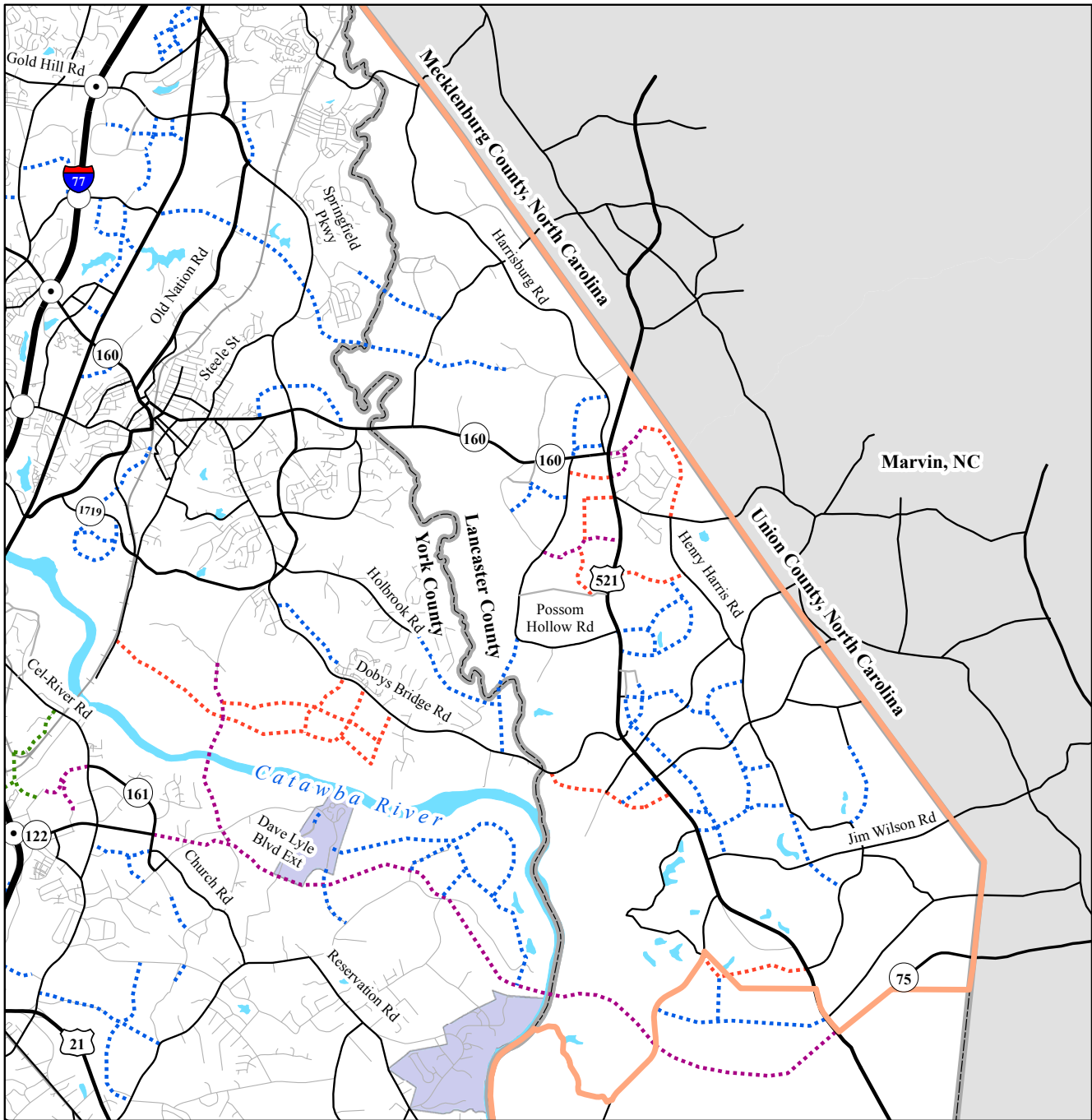
0 0.5 1 2 Miles



Figure 6 of 10



Map Date: June 2017



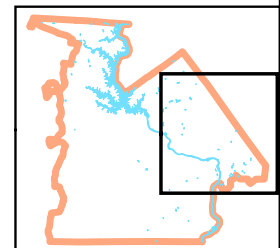
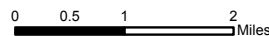
RFATS Collector Street Plan

Lancaster County, SC

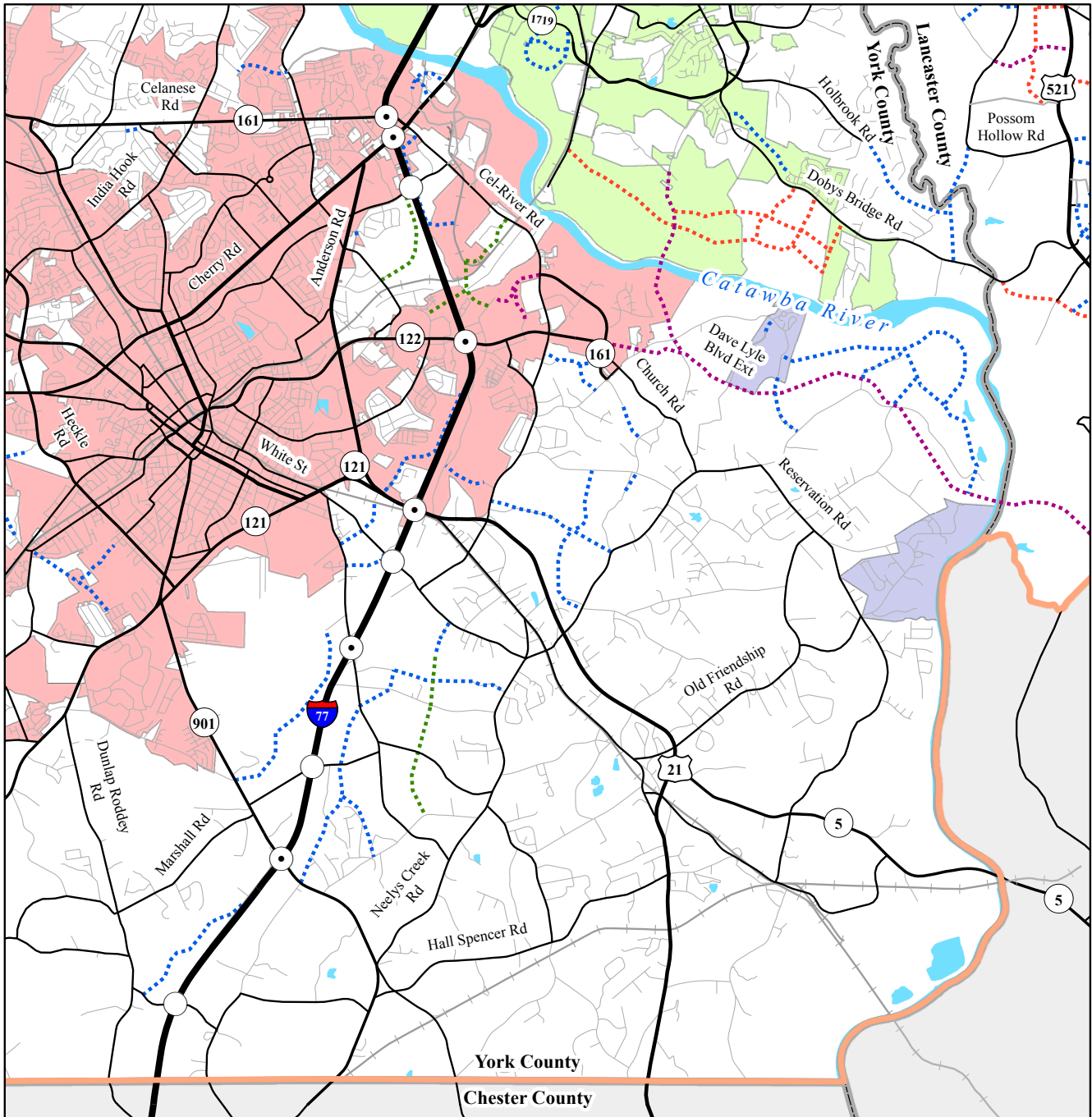
Figure 7 of 10

Legend

- RFATS Boundary
- Catawba Indian Nation
- Water Features
- Interchange
- Grade Separation
- Proposed 2-lane Collector
- Proposed 2-lane Divided Collector
- Proposed 3-lane Collector
- Proposed 4-lane Divided Collector



Map Date: June 2017

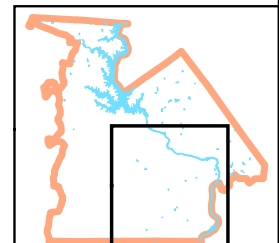
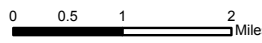


RFATS Collector Street Plan

York County, SC
Figure 8 of 10

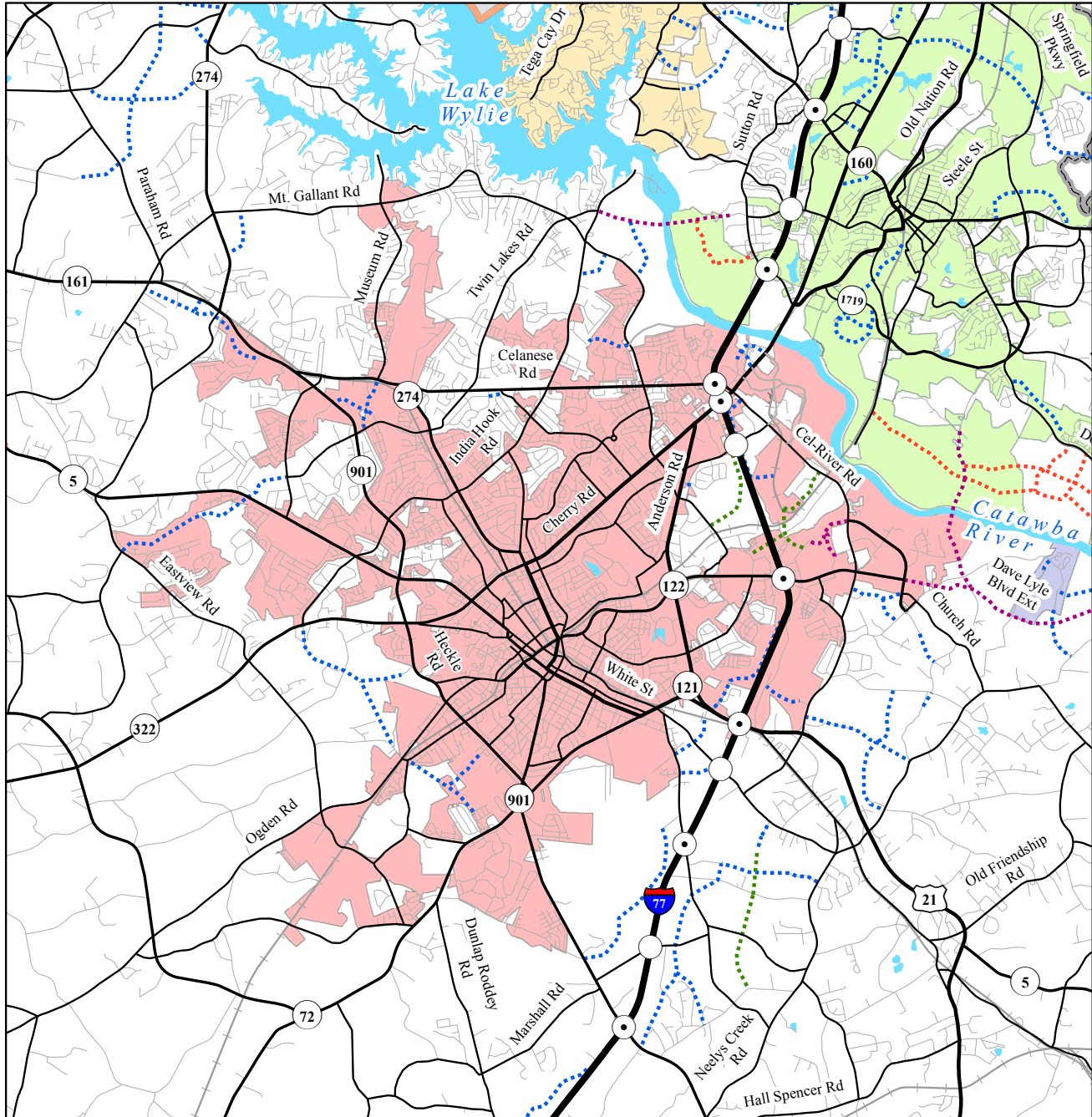
Legend

- RFATS Boundary
- Fort Mill
- Rock Hill
- Catawba Indian Nation
- Water Features
- Interchange
- Grade Separation
- Proposed 2-lane Collector
- Proposed 2-lane Divided Collector
- Proposed 3-lane Collector
- Proposed 4-lane Divided Collector



Map Date: June 2017





RFATS Collector Street Plan

Legend

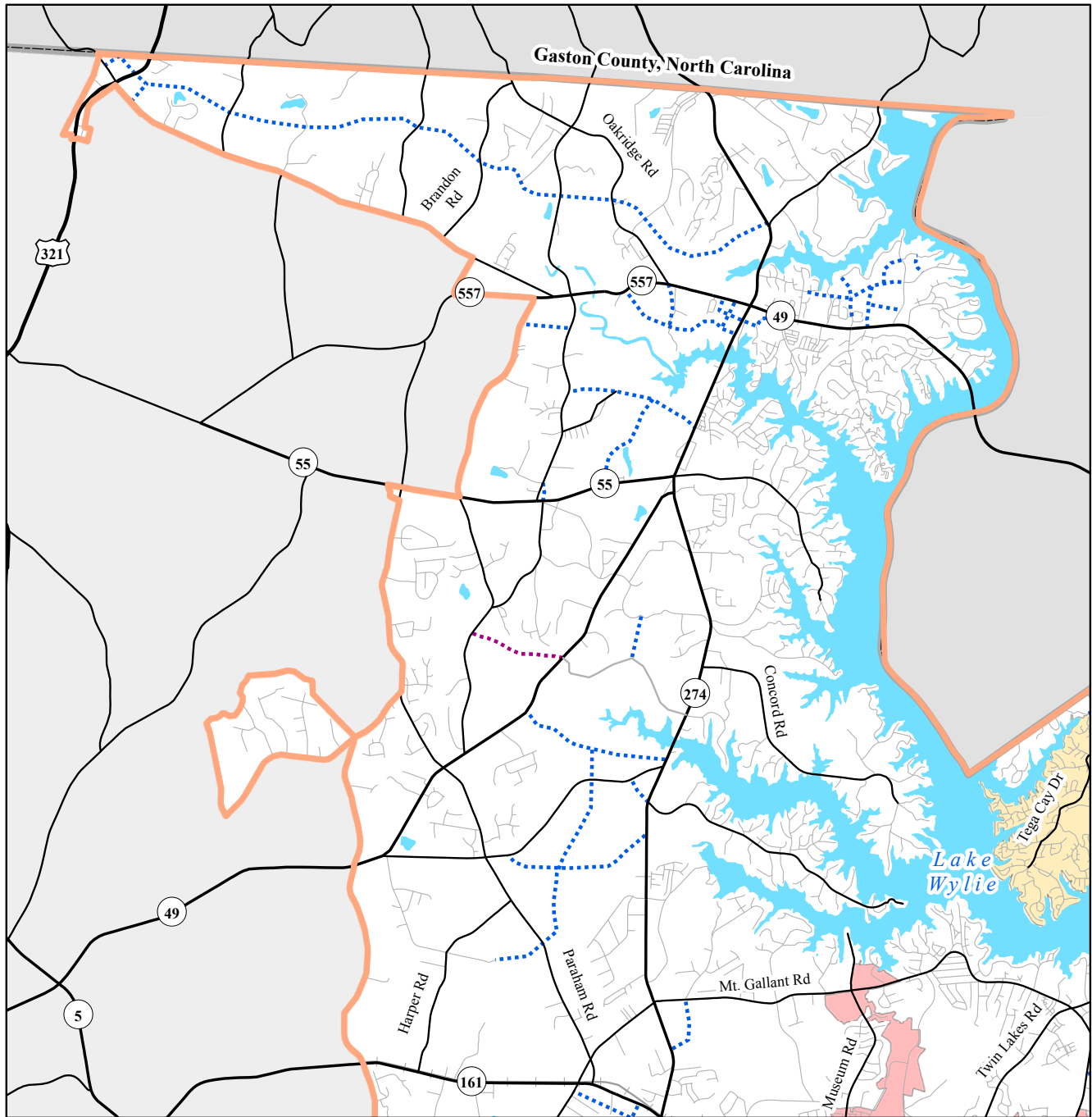
RFATS Boundary	Interchange	Proposed 2-lane Collector
Fort Mill	Grade Separation	Proposed 2-lane Divided Collector
Rock Hill		Proposed 3-lane Collector
Tega Cay		Proposed 4-lane Divided Collector
Catawba Indian Nation		
Water Features		

Rock Hill, SC

Figure 9 of 10

Map Date: June 2017

REATS
Rock Hill - Fort Mill Area Transportation Study

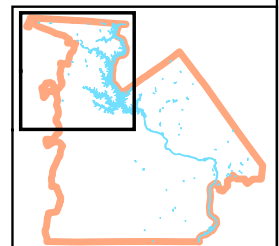
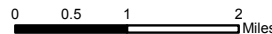


RFATS Collector Street Plan

Lake Wylie, SC
Figure 10 of 10

Legend

- RFATS Boundary
- Rock Hill
- Tega Cay
- Water Features
- Proposed 2-lane Collector
- Proposed 4-lane Divided Collector



Map Date: June 2017

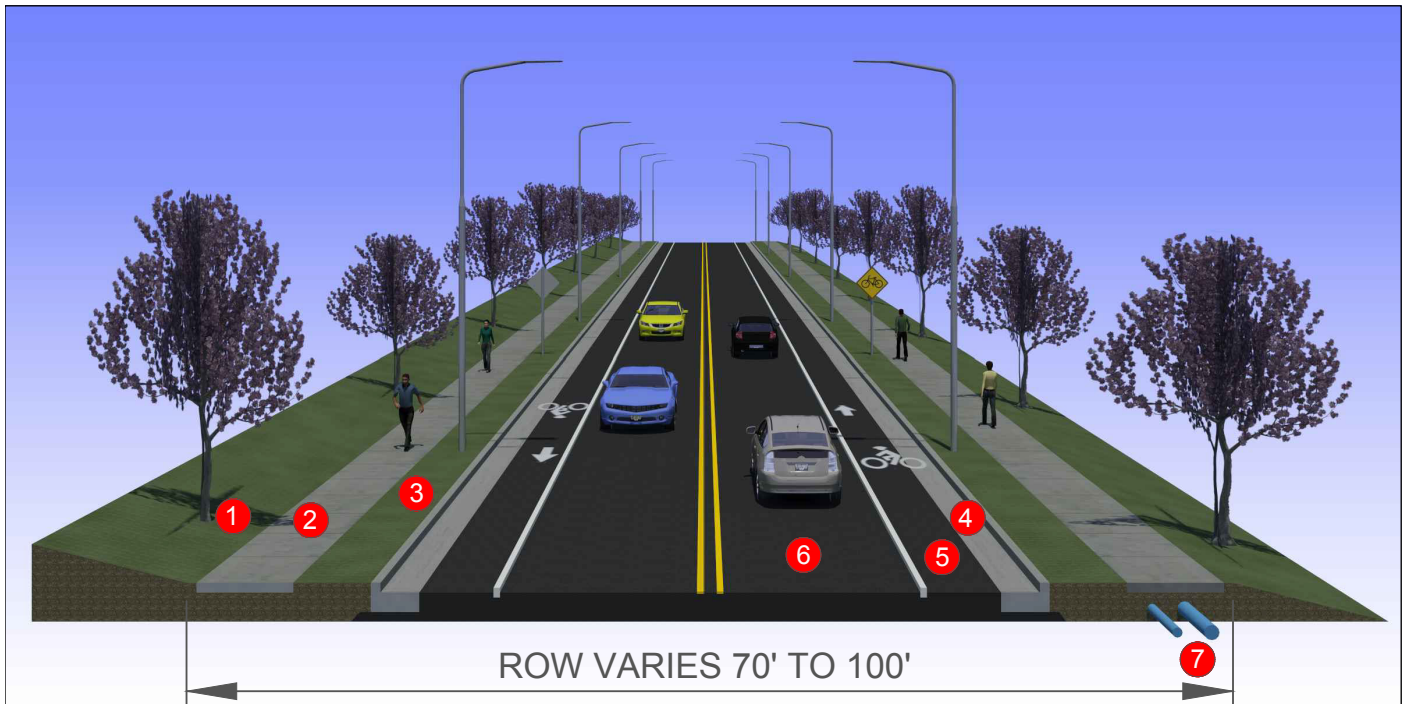


APPENDIX B

TYPICAL SECTIONS

EXHIBIT 1

TWO-LANE COLLECTOR STREET



KEY to Typical Section

- | | |
|--|-------------------------------|
| 1. Street Trees - Back of Sidewalk: 8 - 10 ft. | 5. Bicycle Lanes: 4 - 6 ft. |
| 2. Sidewalk or Multi-Use Path: 5 - 12 ft. | 6. Traffic Lanes: 11 - 12 ft. |
| 3. Verge or Utility Strip: 4 - 8 ft. | 7. Subsurface Utilities |
| 4. Curb and Gutter: 2 - 2.5 ft. | |

EXHIBIT 2

TWO-LANE DIVIDED COLLECTOR STREET

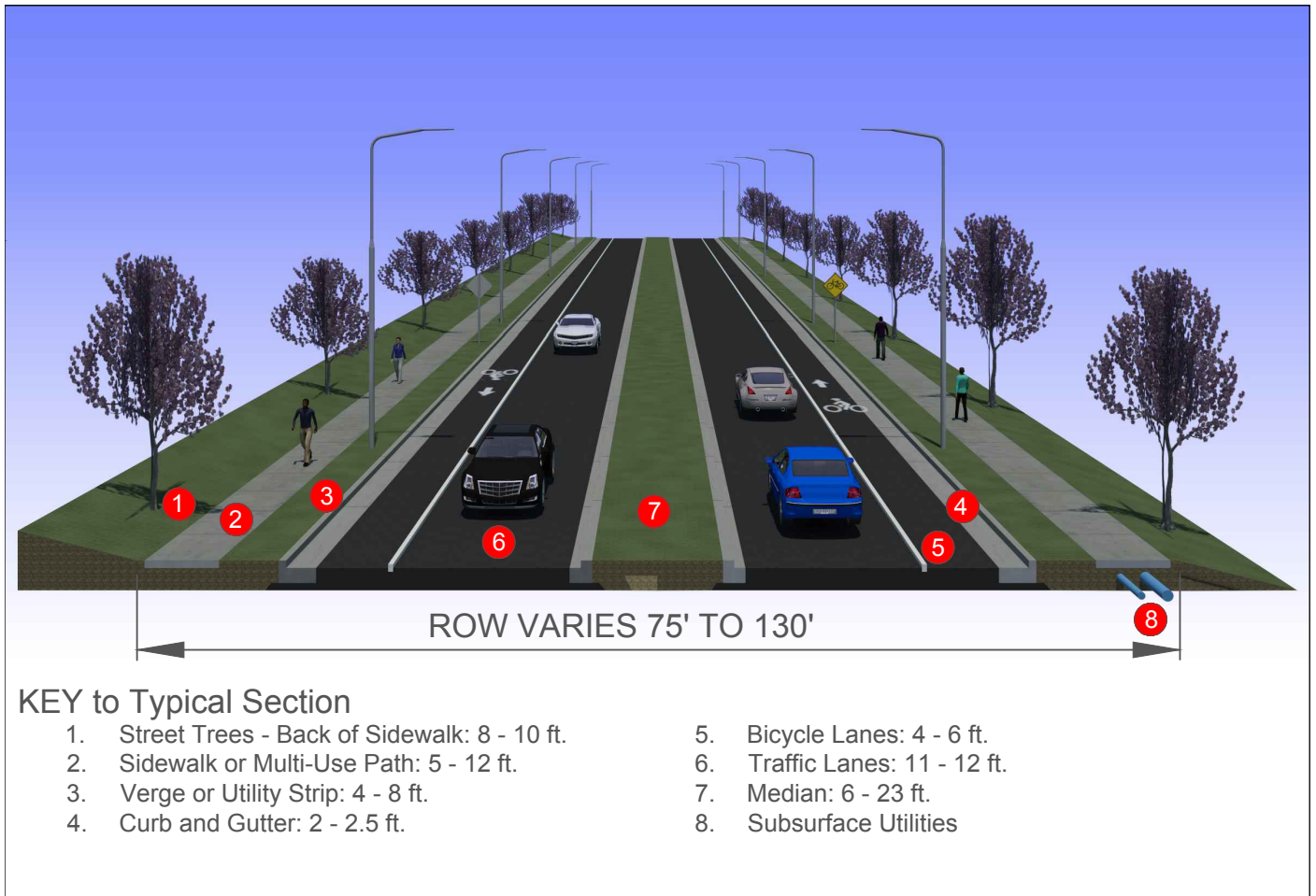


EXHIBIT 3

THREE-LANE COLLECTOR STREET

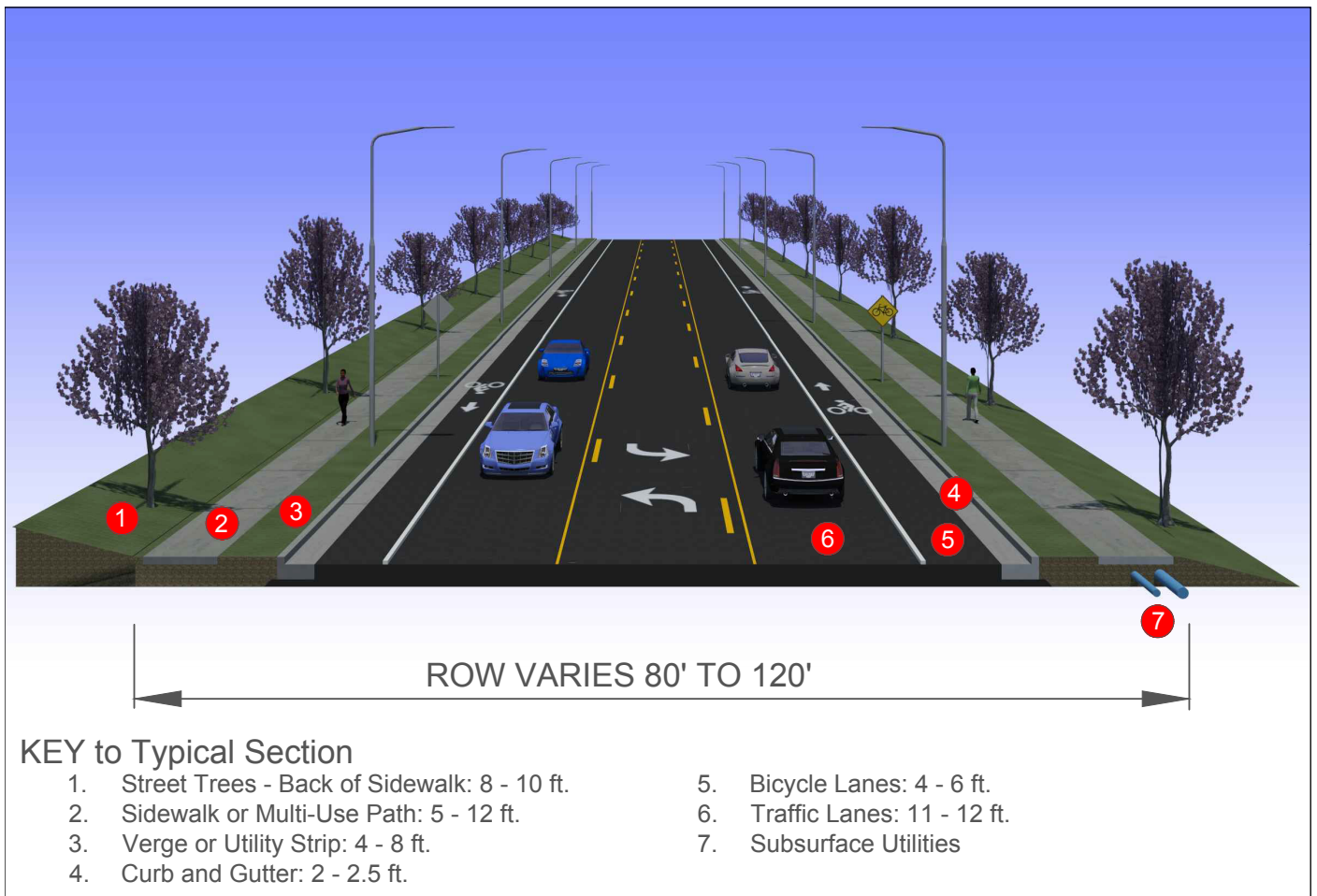
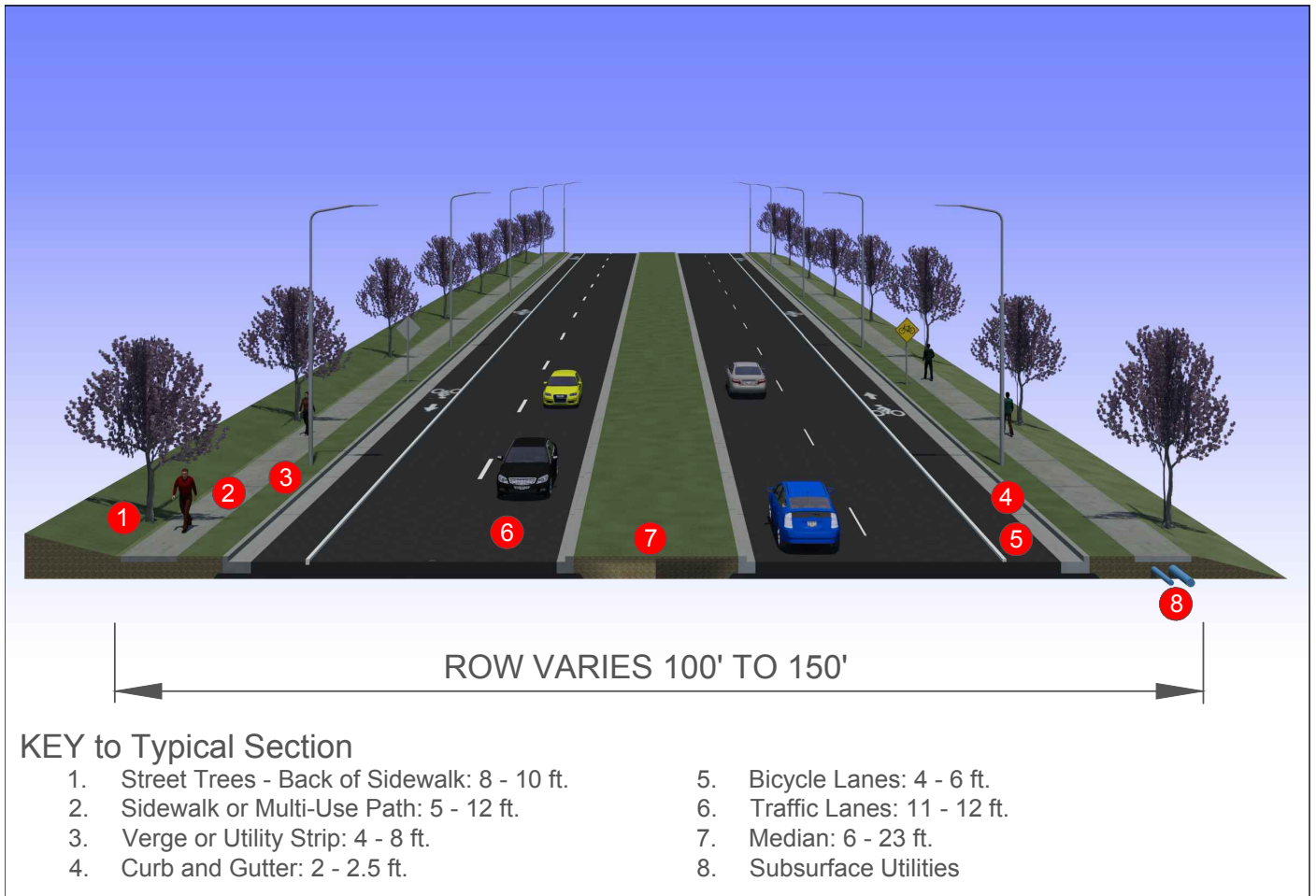


EXHIBIT 4

FOUR-LANE DIVIDED COLLECTOR STREET





APPENDIX C

TRAFFIC CALMING

Recommended Resources

There are a number of online resources to guide planners and engineers who are tasked with designing traffic calming measures to existing collector streets. These are the:

- Institute of Transportation Engineers: <http://www.ite.org/traffic/>
- U.S. Department of Transportation: http://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm
- Mothers Against Drunk Driving (MADD): www.madd.org
- Charlotte Mecklenburg County DOT: <http://charlottenc.gov/Transportation/Programs/Pages/TrafficCalming.aspx>
- Streetfilms: <http://www.streetfilms.org/no-need-for-speed-20s-plenty-for-us/>
- National Association of City Transportation Officials (NACTO): <http://nacto.org/publication/urban-street-design-guide/design-controls/design-speed/speed-reduction-mechanisms/>

Traffic Calming Principles

The following principles apply when introducing traffic calming in a residential neighborhood:

- Form a partnership with first responders and emergency service providers. Some fire department personnel can be difficult to convince so begin the process by holding internal meetings to find common ground. Success is often achieved with a focus on horizontal measures and avoiding the installation of vertical measures (humps, bumps, and tables) on collector streets.
- Seek a threshold of acceptance within the neighborhood. Some cities require a simple majority while others push for 70 percent support among affected citizens.
- Share the work responsibility with advocates for traffic calming by providing them with petitions and other resources and some education about how to seek consensus among their neighbors. Too many traffic calming plans have resulted in sore feelings among neighbors. Sharing the work allows neighbors to present the initial request as a citizen-driven proposal rather than government-driven.
- Start simple. Elaborate plans can prove to be contentious and expensive. Avoid the temptation to install STOP signs, speed bumps, and speed humps. There are problems associated with each of these. STOP signs are traffic control devices that

should only be used where warranted, so they preserve motorist respect. Humps and bumps can have unintended consequences to homeowners when they sell their home; prospective buyers and realtors view humps and bumps as a symptom of speeding problems.

- There is a tradeoff in placing too many traffic calming devices on one street in that it may cause citizen backlash. Advocates may want devices installed close together so motorists are unable to accelerate between them. Studies show an average of 0.5 to 1.0 mph increase in speed over 100 feet. Establish a maximum number of devices on any given street; for example no more than eight.
- Target enforcement of speed limits on the outlier speeders; that is, the small percentage of motorists who drive at excessive speed well above the posted speed limit.
- Be realistic when communicating the potential speed reduction. Typically, the 85th percentile speed after a street has been calmed averages 25 to 35 mph.
- Concerns may be expressed about the volume of traffic, either in terms of how long it takes to back-out of a driveway or 'there are too many cars on my street'. Be realistic in setting expectations that you can successfully engineer a solution to high traffic volume. There are often unintended consequences of pushing traffic problems to other residential streets instead of to arterial streets. It is realistic to focus on reducing speed rather than traffic volume.
- Create a system to prioritize projects before going public with a traffic calming program. New requests might come in, so it's best to be prepared.

Traffic Calming Measures

Landscaped islands that are built in strategic locations between the edges of pavement are the most recommended traffic calming measure. Some islands form a circle in the middle of an intersection while others are elongated islands in the middle of the street. A third type of island is built adjacent to the edge of pavement, and it forces motorists toward the middle of the street. The key to success is what engineers refer to as 'horizontal deflection'; that is, physical features that cause a motorist to detect the island in advance, slow down in response, and turn their steering wheel to go around the island.

Horizontal deflection is preferred over vertical deflection—think speed bumps and humps. Landscaped islands blend with residential character better than asphalt bumps that have caused concern to prospective home buyers who visit a neighborhood and ask about speeding problems.

On roads owned by SCDOT, the criteria for eligibility for traffic circles and raised landscape medians on collector streets must all be met. They are as follows:

- 30 (or less) mph speed limit
- Two-lane roadway (may have turn lanes and may have parking)
- Not a primary access route to commercial or industrial sites
- Traffic volume less than 4,000 vehicles per day (Average Daily Traffic or ADT)
- Within an urban district which is defined as having structures used by business, industry or dwellings, and said structures are separated by no more than 100 feet for a distance of at least one-quarter mile as measured along the target street.
- Ensure positive roadway drainage
- A speeding problem is evident from data. Average and 85th percentile speeds must be measured and exceedance documented.
- Trial measures using temporary materials must be tested to determine motorists' compliance and maneuverability. A permanent installation may be constructed under an approved encroachment permit.
- Designed and installed in accordance with specifications and construction details published by SCDOT, including signage and pavement markings.
- Local traffic, service vehicles, and emergency vehicles can be accommodated.



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