TOWN OF MORRISVILLE

COMPREHENSIVE TRANSPORTATION PLAN

Morrisville

Adopted March 12, 2019

Res. No. 2022-396-0, 10/25/2022

ACKNOWLEDGMENTS

On behalf of the project team, the Town of Morrisville Planning Staff thanks the diverse group of participants whose input was instrumental to create a blueprint for a safe, multimodal, and interconnected transportation system for the Town of Morrisville. The ***Town of Morrisville Comprehensive Transportation Plan*** reflects the collaborative efforts of the public, stakeholders, local staff, and elected officials. The efforts of everyone are greatly appreciated.

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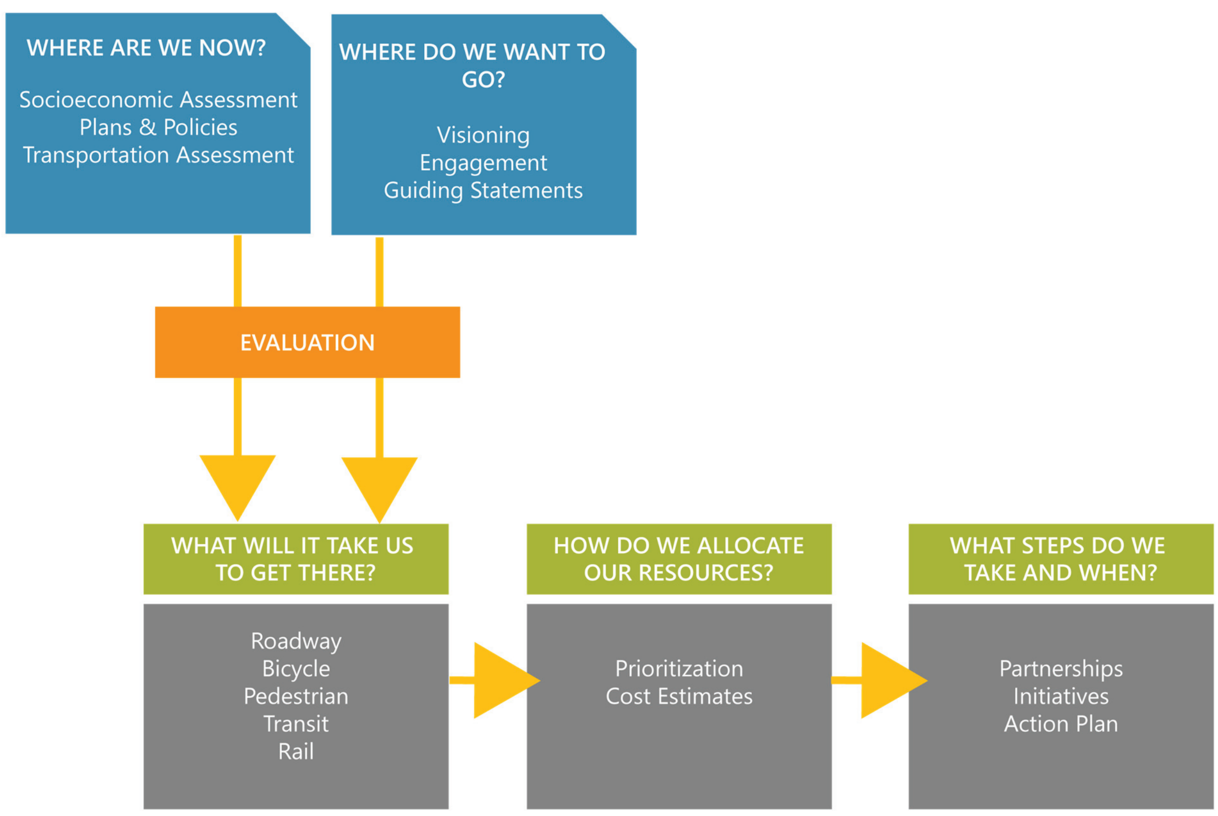
THE PLANNING PROCESS

The ***Town of Morrisville Comprehensive Transportation Plan*** represents a collaborative effort to establish a vision for the Town's transportation network and identify a coordinated set of multimodal projects to achieve it. The plan addresses existing issues and anticipated concerns for congestion, safety, access, and connectivity for all modes of transportation. The process began with an explanation of socioeconomic conditions, a review of plans and policies, and an assessment of the current transportation network. A set of guiding statements were developed ahead of creating a coordinated set of multimodal recommendations. Once the full set of recommendations were developed, a prioritization process was created as a tool to help guide decision makers as they advocate for future funding. The ***Town of Morrisville Comprehensive Transportation Plan*** serves as the Town's transportation vision, characterizes current and future transportation needs, and documents multi-modal transportation strategies to address needs through the year 2040. The graphic below outlines the planning process for the ***Town of Morrisville Comprehensive Transportation Plan***.

Figure 1-1: Planning Process



WHAT IS A COMPREHENSIVE TRANSPORTATION PLAN?

A Comprehensive Transportation Plan, or CTP, serves as a roadmap to guide multiple modes of transportation development in Morrisville.

WHAT WILL BE EXAMINED?

This effort will examine the many changes that have occurred in the Town's population, employment, land use and development since the adoption of the 2009 Transportation Plan. It will focus on all modes of transportation including roadway, bicycle, pedestrian, and transit.

WHY IS AN UPDATE NEEDED?

The last CTP was adopted in 2009 and much has changed in Morrisville since that time. There have been shifts in population and employment, new developments built, and some changes to transportation policies. In addition, many transportation improvements identified in the previous plan have already been advanced to funding and implementation.

WHAT HAS CHANGED SINCE THE 2009 TRANSPORTATION PLAN?

The 2009 Town of Morrisville Transportation Plan outlined a variety of needs, recommendations, and strategies to help guide the development and implementation of the Town's transportation system. This plan provided a list of prioritized projects for all transportation modes, and was developed in collaboration with members of the public, the Planning and Zoning Board, Town Council, and Town staff. Since the Plan's adoption in 2009, the Town of Morrisville has made significant progress in implementing the action items and transportation-related improvements identified. Some of the more notable accomplishments are detailed in the next two pages and in **Table 1-1**.

Action Items Accomplishments

Chapter 7 of the 2009 Transportation Plan outlined a series of action items that addressed transportation policies the Town should address. The list below describes actions accomplished by the Town.

- ***Create Unified Development Ordinance*** – Adopted in December 2013, the UDO provides guidance in development and is the means of implementation of goals and policies in the Transportation Plan. The plan created standards for Transit-Oriented Development Districts, city block lengths and widths, street patterns, multimodal access and circulation, parking, and loading zones.
- ***Update Language for Traffic Impact Analysis (TIA)*** – New TIA language and requirements were part of the adopted policy in the Unified Development Ordinance. Section 5.8.6 describes the requirements for initiating a TIA for development and the recommended improvements the developer would be required to provide.
- ***Create Small Area Plan or Master Plan for McCrimmon Parkway Extension Area*** – Adopted in December 2012, the McCrimmon Parkway Extension Area Development Guide was adopted by the Town Council to provide guidance on land uses and development standards in the area of Morrisville through which McCrimmon Parkway will be extended.
- ***Identify Funding Sources for Bicycle/Pedestrian Improvements*** – The Town has utilized numerous sources for bike/ped infrastructure funding: CAMPO - Locally Administered Projects Program (LAAP), NCDOT - State Transportation Improvement Program (STIP), and Wake County - Community Development Block Grant. The Blue Ribbon Commission on Transportation Funding Report, published in December 2014, provided a look at the Town's funding of transportation projects and identified sources for future projects.
- ***Coordinate with Town of Cary Transportation Planners*** – Staff regularly coordinates with Cary staff for transportation projects crossing Town boundaries. As a member of CAMPO and Wake Transit, Morrisville meets with Cary and other regional towns and cities.
- ***Update Zoning Ordinance Regarding Connectivity between Sites for Cross-Access*** – Included in the December 2013 UDO, Section 5.8 defines conditions when multimodal cross-access is required for development.
- ***Explore Potential Solutions to Connect Gaps in Sidewalk*** – In July 2015, Town Council adopted the staff developed Sidewalk Program Development Policy to prioritize sidewalk construction. In the fall of 2017, staff digitized the Town's sidewalk network in GIS to develop a baseline of sidewalk conditions.
- ***Work with Triangle Transit to Support Passenger Rail Service*** – Commuter rail service in the next ten years is an element of the 2016 Wake Transit referendum. Morrisville is a member of the Wake Transit Planning Advisory Committee (TPAC).
- ***Develop Specific Plans for Redevelopment of Koppers (former Superfund) Site*** – Adopted in June 2014 the Small Area Plan created a plan for a Transit-Oriented Development (TOD) with the development based on the envisioned commuter rail station.
- ***Rename Triangle Parkway to Southport Drive*** – The Town Council approved the renaming of Triangle Parkway, from NC 54 to International Drive, to Southport Drive in March 2010.
- ***Study and Coordinate NC 54 Improvements*** – The Town contributed funding for and participated in the NCDOT's *NC 54 & More Feasibility Study*, which studied the NC 54 corridor from NW Maynard Road in Cary to NC 540 in Morrisville. Following the completion of the Study, the Town Council endorsed the Study Report (Resolution 2016-051), with comments outlining the Town's concerns with some findings in the Report, in July 2016.

State of Morrisville's Infrastructure

ROADWAYS

- Ten of the roadway recommendations proposed in the 2009 Plan were completed, including improvements to Davis Drive, Morrisville Parkway, and Airport Boulevard. The entire list of 38 projects proposed in the Plan can be found in **Table 1-1** with current project status.
- In addition, over $260 million in roadway and sidewalk improvements are currently programmed. Funded improvements include NC 54, NC 147, McCrimmon Parkway, Aviation Parkway, and Morrisville-Carpenter Road.

BICYCLE AND PEDESTRIAN

- The bike and pedestrian network of bike lanes, sidewalks, greenways, and multi-use paths expanded by over 10 miles through a combination of public and private development.
- The largest completed project was the Shiloh Greenway, which increased the Town's greenway network by nearly 1.4 miles.
- Connectivity along Church Street improved with the completion of the 2017 sidewalk project between Jeremiah Street and Morrisville-Carpenter.
- The Crabtree-Hatcher Creek Greenway, Morrisville's longest greenway at 2.5 miles, began construction in April 2017. Once completed the greenway will link Davis Drive to Evans Road.
- The Town's local law enforcement participated in the Watch for Me NC campaign at local schools to promote active transportation as a safe means for Town residents.

Regional Partnerships

Morrisville has been involved in regional planning initiatives that shaped the direction and future of the Town.

- Morrisville was an active stakeholder in the development of the Wake County Transit Plan which outlined the expansion of regional local bus service and the development of bus rapid transit and commuter rail.
- Participation in the Triangle Bikeway Plan and Wake County Greenways Plan resulted in regional systems connecting into the Town's bicycle and pedestrian network.
- The Town's collaboration with CAMPO, NCDOT, and the Town of Cary resulted in funding to implement a coordinated signal system.

Table 1-1: 2009 Transportation Plan Status Report

PROJECT NAME	FROM	TO	MAINTENANCE RESPONSIBILITY	STATUS AS OF JAN. 2018
Airport Boulevard Extension	NC 54	Airport Boulevard in Cary	State	Not Funded
Airport Boulevard Grade Separation	NC 54	Airport Boulevard	State	Not Funded
Airport Boulevard Widening	I-40	NC 54	State	Completed
Aviation Parkway Widening	Eastern Town Limits	NC 54	State	Funded in 2018-2027 STIP (State Highway Trust Funds)
Carrington Mill Boulevard Extension	Slater Road	Carrington Mill Boulevard	Town	Completed
Carrington Mill Boulevard/Mason Farm Road Grade Separation	Carrington Mill Boulevard	NC 54	Town	Not Funded/Removed from Plan
Church Street Widening	Northern Town Limits	Morrisville-Carpenter Road	State	Not Funded
Davis Drive (North) Widening	Northern Town Limits	McCrimmon Parkway	State	Completed
Davis Drive (South) Widening	South of Airport Boulevard	Southern Town Limits	State	Completed
International Drive Extension	Airport Boulevard	International Drive (north)	Town	Not Funded
International Drive Widening	International Drive (north)	Aviation Parkway	Town	Not Funded
Kit Creek Road Reconnection	Kit Creek Road	Davis Drive	State	Completed
Little Drive[1]	Mason Farm Road	Davis Drive	State	Not Funded
Louis Stephens Drive	Louis Stephens Drive (RTP)	NC 540	State	Funded in 2018-2027 STIP (State Highway Trust Funds)
Marcom Drive Extension	Marcom Drive	Watkins Road	Town	Not Funded[5]
McCrimmon Parkway Extension (Phase I)	Perimeter Park Drive	NC 54	State	Under Construction
McCrimmon Parkway Extension (Phase II)	Airport Boulevard	International Drive Extension	State	Under Construction
McCrimmon Parkway Extension (Phase II)[2]	International Drive Extension	Aviation Parkway	State	Under Construction
McCrimmon Parkway Grade Separation	NC 54	McCrimmon Parkway	State	Funded in 2018-2027 STIP (State Highway Trust Funds and BUILD NC Bonds)
McCrimmon Parkway Widening[3]	NC 54	Louis Stephens Drive	State	Funded in 2018-2027 STIP (State Highway Trust Funds)
Morrisville-Carpenter Road at Town Hall Drive Intersection Improvements	Church Street	Morrisville Square Way	State/Town	Completed
Morrisville-Carpenter Road Widening[4]	NC 54	Western Town Limits	State	Funded/Estimated Completion 2020
Morrisville East Connector	Nova Drive	McCrimmon Parkway Extension	Town	Removed per Town Council Resolution
Morrisville East Connector	McCrimmon Parkway Extension	International Drive Extension	Town	Not Funded
Morrisville East Connector	International Drive Extension	Airport Boulevard	Town	Not Funded
Morrisville Parkway Grade Separation	Morrisville Parkway	Railroad	State	Completed
NC 54 Widening	NC 540	McCrimmon Parkway	State	Funded in 2018-2027 STIP (State Highway Trust Fund)
NC 54 Widening	McCrimmon Parkway	Sunset Avenue	State	Not Funded
NC 54 Widening	Sunset Avenue	Keybridge Drive	State	Not Funded
NC 54 Widening	Keybridge Drive	Cary Parkway	State	Not Funded
NC 54 Widening	Cary Parkway	Southern Town Limits	State	Not Funded
Shiloh Glenn Drive	Slater Road	NC 54	State/Town	Completed
Slater Road Widening	NC 540	Sorrel Grove Church Road	State	Not Funded
Southport Drive Extension	Southport Drive (West)	McCrimmon Parkway Extension	Town	Not Funded
Town Hall Drive (planted median and restripe for bike lanes)	McCrimmon Parkway	Treybrooke Drive	Town	Not Funded
Triangle Parkway	NC 540	McCrimmon Parkway	State	Funded in 2018-2027 STIP/Alternative Alignment to Davis Drive (State Highway Trust Fund and Revenue Bond)
Triangle Parkway	NC 147	NC 540	State	Completed
Watkins Road Widening	Perimeter Parkway	NC 54	State	Partially Completed

[1] The extension of Little Drive was removed from the CTP due to existing development and the fact road extension is almost completely outside of the Town's jurisdiction.

[2] McCrimmon Parkway Extension Phase II is being constructed as one project from Airport Boulevard to Aviation Parkway.

[3] STIP has McCrimmon Parkway widening funded from NC 54 to Davis Drive.

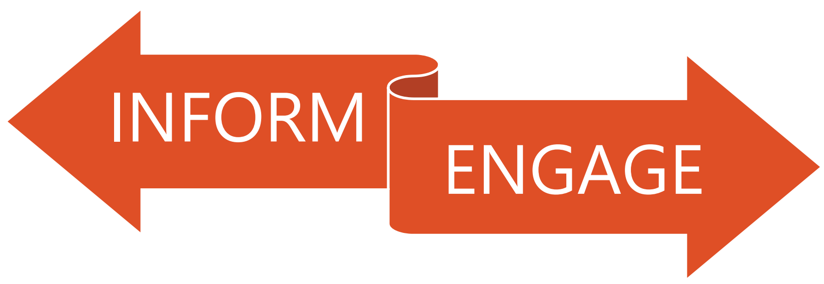
[4] Morrisville-Carpenter Road widening project is funded by Town, State, and Federal funds from the railroad to Davis Drive.

[5] Resolution 2022-396-0: CTP amendment approved Oct. 25, 2022 removed a portion of Marcom Drive Extension from the plan.

(Res. No. 2022-396-0, 10/25/2022)

ENGAGEMENT

Public outreach – whether through direct engagement or by input of community proxies – is an important part of a successful transportation plan. The two primary goals of engagement for the ***Town of Morrisville Comprehensive Transportation Plan*** are to inform and engage the public. Engagement for the Comprehensive Transportation Plan occurred in two key phases: development of the draft CTP and refining of the draft Plan. The engagement completed as part of the development of the initial draft occurred between May 2016 and September 2017, and the initial draft was released on October 10, 2017. Following this phase, Town Council and the Planning and Zoning Board provided refinements to the plan through an iterative process resulting in a final draft that was sent to public comment on February 23, 2018. During public comment, Town staff conducted a robust engagement series consisting of 14 community outreach events. The final draft was provided to Town Council and the Planning and Zoning Board on June 6, 2018 for consideration for adoption. Following a final round of review and comments, the Comprehensive Transportation Plan was adopted by Town Council on March 12, 2019.



Informing the public requires the thoughtful translation of engineering and planning vernacular into common English. The initial step of informing the public is to communicate the purpose of the Comprehensive Transportation Plan and how it affects them. Once the public understands the value of the plan and its goals and objectives, they can then engage the planning process.

Engaging the public necessitates empowering them to speak up, paired with listening to their thoughts and opinions. Those who have the most to gain or lose from investments in the transportation system have perspectives that must be valued when developing project, policy, and program recommendations. The planning process included several avenues of public engagement to improve the likelihood that the feedback obtained was representative of the entire community.

Engagement Strategies

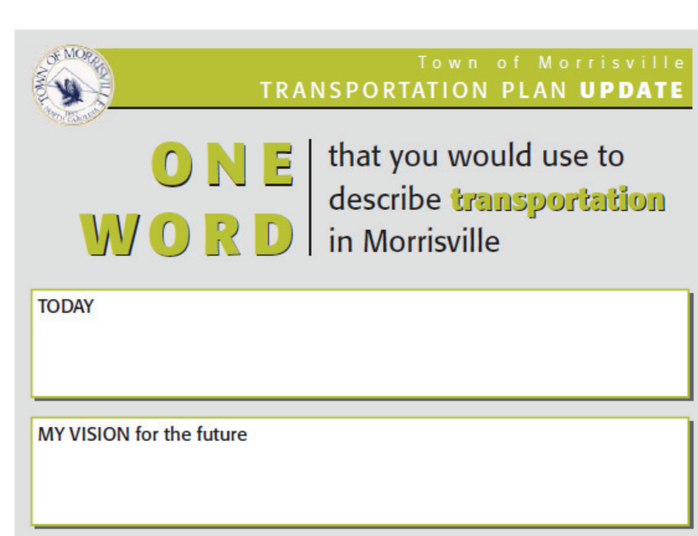
The ***Town of Morrisville Comprehensive Transportation Plan*** included a variety of strategies that intended to capture feedback from a cross-section of those who those who live, work, and recreate in Morrisville, or otherwise have a stake in the Plan's recommendations. The following sections detail several of the engagement strategies. A full compendium of the public engagement conducted before and after the initial plan release is located in **Appendix D**.

Table 1-2: Engagement Opportunities During Plan Development

STRATEGY	DATE	AUDIENCE
Community Event Outreach at SpringFest	May 14, 2016	Community at large
Community Event Outreach at Bike Safety Rodeo	June 4, 2016	Community at large
Online Survey	October 2016 – December 2016	Community at large
Public Workshops	October 6, 2016 June 29, 2017	Community at large
Public Open Houses	February 28, 2017 August 22, 2017	Community at large
Plan Update Presentations	February 28, 2017 August 9, 2017 August 22, 2017	Town Council Planning & Zoning Board Developers Council
Work Sessions	August 23, 2016 September 8, 2016 February 16, 2017 September 19, 2017 September 21, 2017	Town Council Planning & Zoning Board Planning & Zoning Board Town Council Planning & Zoning Board

Engagement Opportunities During Plan Development

The sections below describe the events and opportunities presented to the community at large, Town Council, Planning and Zoning Board, and Developers Council to inform the development of the draft Plan.



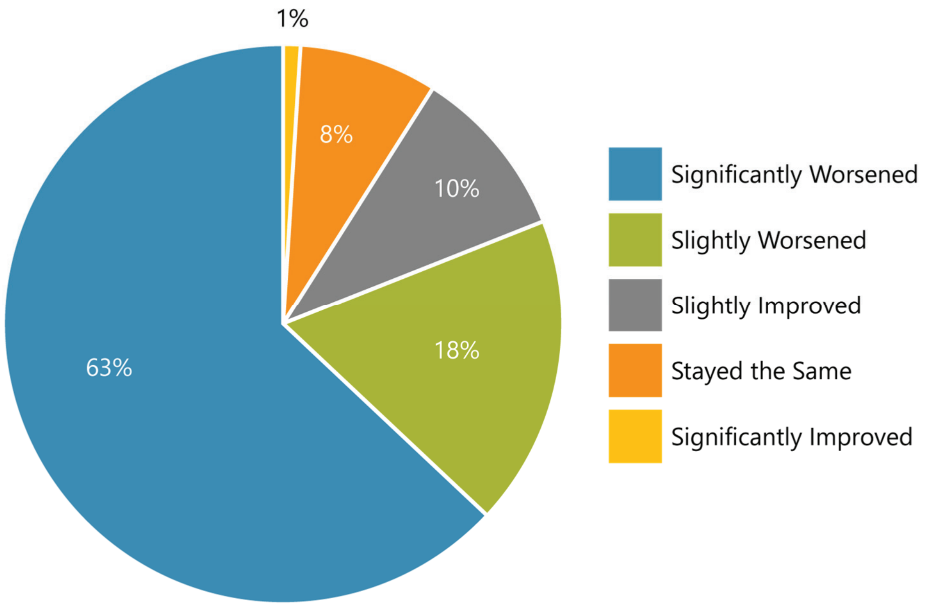
COMMUNITY EVENT OUTREACH AT SPRINGFEST AND BIKE SAFETY RODEO

The Town of Morrisville Planning Department staffed a booth at SpringFest, held on May 14, 2016 and at the Town of Morrisville Fire/Rescue Department's Bike Safety Rodeo. Information was provided at the events to introduce the update to the CTP. Attendees completed a brief visioning exercise (shown right) to help the project team capture existing sentiments and future hopes of those traveling daily in Morrisville.

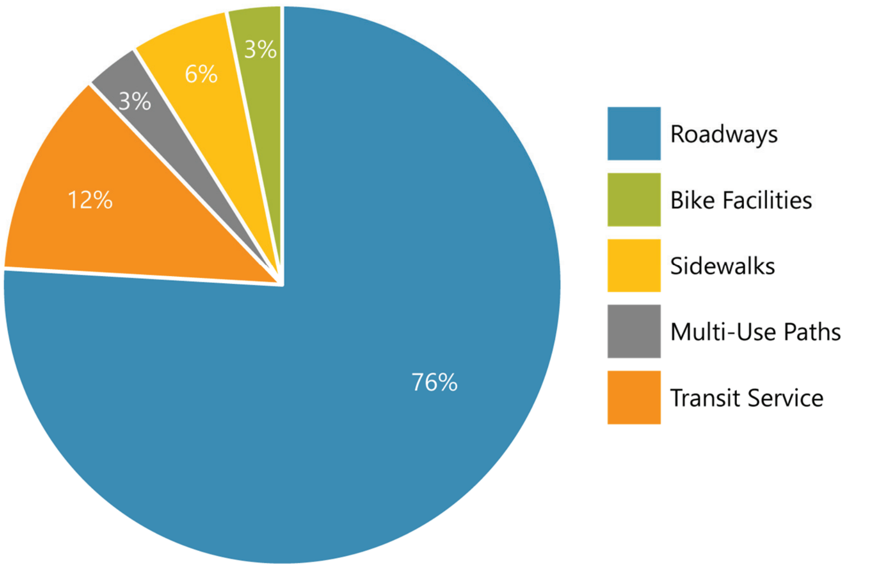
ONLINE SURVEY

An interactive online survey was available beginning in October of 2016. Over the next three months, more than 250 participants offered input on community preferences, opinions, and issues for the various transportation modes. Participants also identified issues and potential solutions by placing icons on a map. The online survey yielded more than 600 data points for consideration during the development of the Plan. The following graphics capture the results of a few survey questions, while **Figure 1-2** on the following page shows the results of the interactive mapping portion. Full survey results can be found in **Appendix D**.

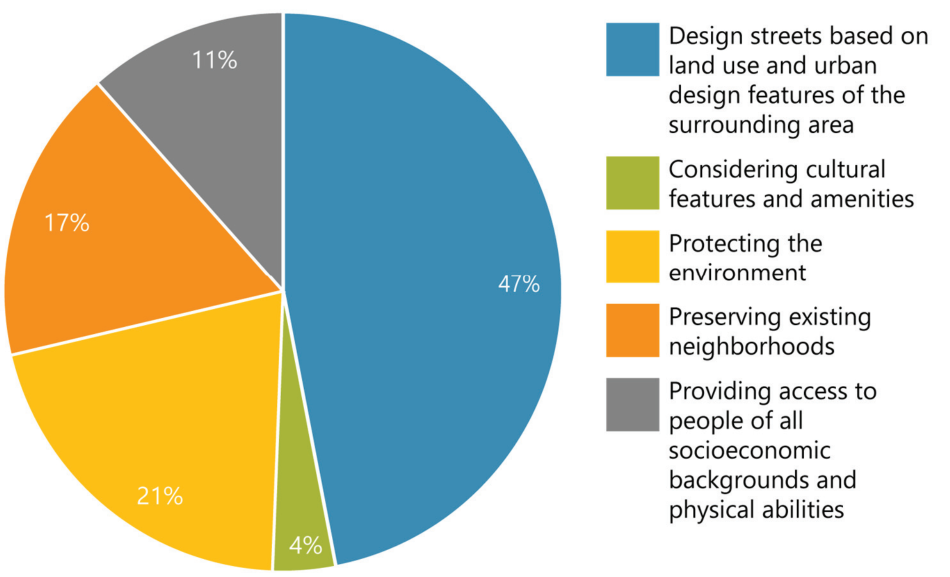
When asked to finish the sentence, ***"Over the last five years, transportation in Morrisville has,"*** survey respondents overwhelmingly (81%) stated either significantly worsened or slightly worsened.



When asked to consider the ***"biggest transportation need in Morrisville"*** most participants responded roadways.



Most participants expressed that transportation improvements should consider land use and the urban design features of surrounding areas, when asked, ***"When planning transportation improvements, we should focus on..."***



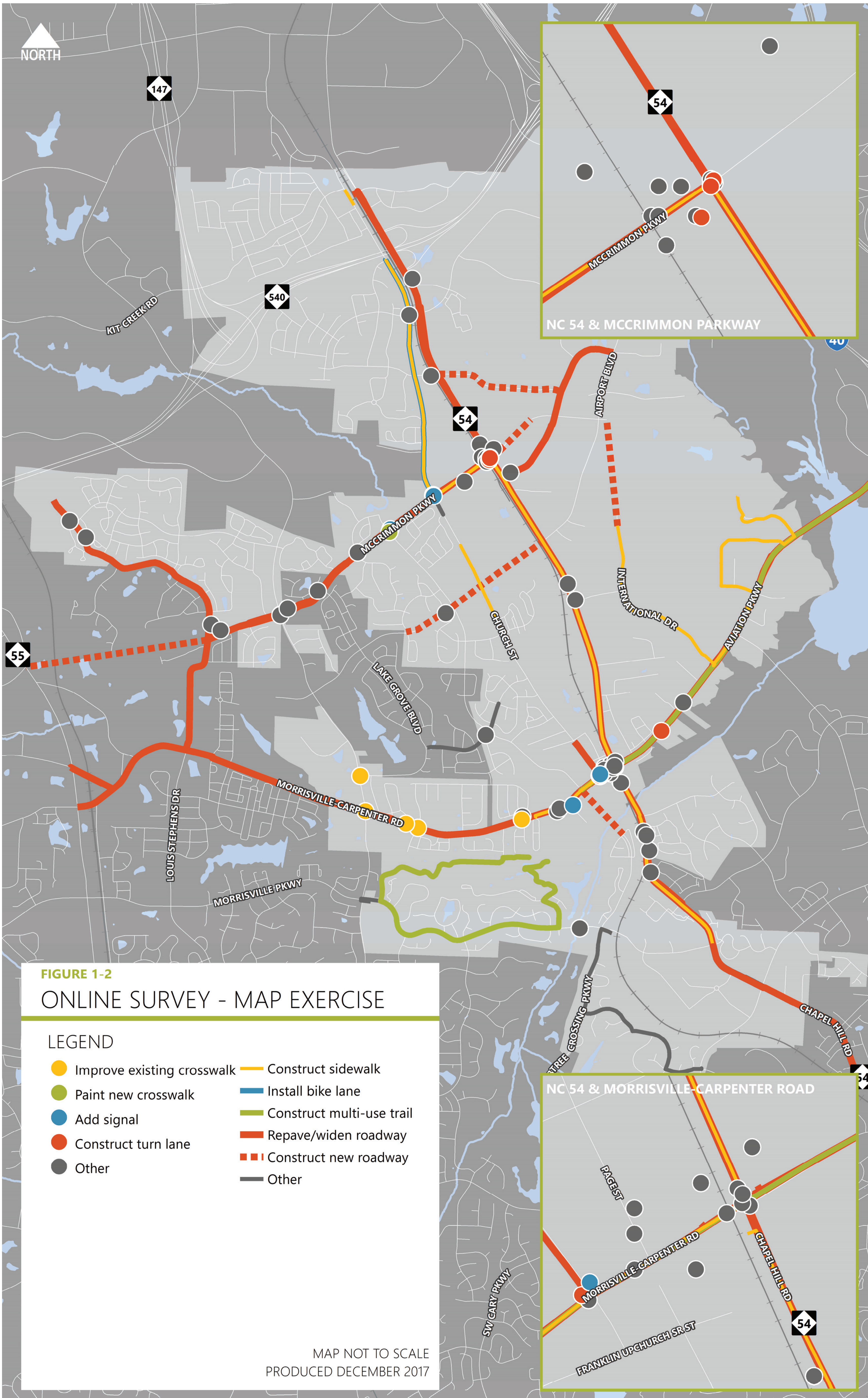


FIGURE 1-2
ONLINE SURVEY - MAP EXERCISE

PUBLIC WORKSHOPS AND OPEN HOUSES

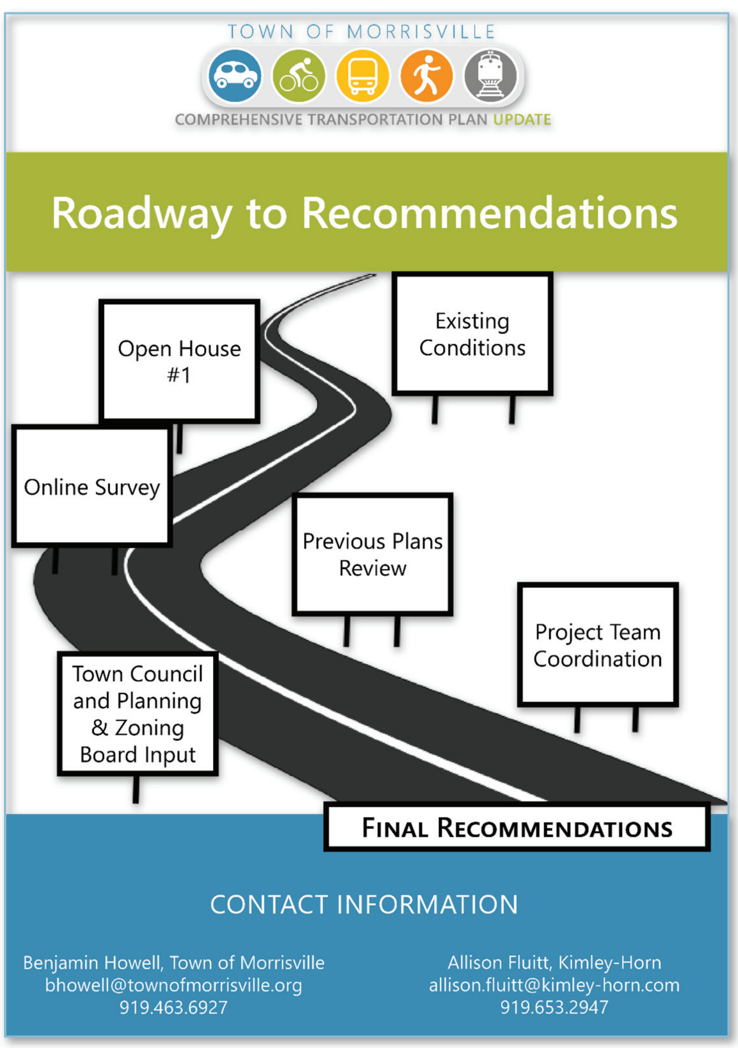
Gathering input from the public throughout the planning process is critical to understanding local needs, identifying projects of importance, and gaining understanding to see projects progress from planning to implementation. Citizens recognize the strengths and shortcomings of their transportation system, and transportation decisions affect them daily. To fully utilize the knowledge of Morrisville residents, the project team conducted two public workshops and two open houses. Meeting attendees were updated about the plan and encouraged to participate in the interactive activities.

Public Workshop #1 – October 6th, 2016

The objective of the first public workshop was to educate the public about the ***Town of Morrisville Comprehensive Transportation Plan*** and to obtain input regarding their priorities and goals, mobility issues, and desired routes and destinations. The open house was a drop-in session with several interactive activities.

Workshop activities included:

- Live, Work, Play Map
- Informational Wall
- One Word
- Priority Pyramid
- Thought Wall
- Issues Identification



Open House #1 – February 28th, 2017

The first open house event was structured to inform the public about the process of developing recommendations. Exhibits showed existing conditions, results from the first public workshop and online survey, and recommendations from previous planning efforts. Participants visited stations around the room to follow the "Roadway to Recommendations." The image to the left shows the handout guiding participants through each station at the Open House.

Public Outreach

- Results of the public input exercise from the first public workshop.
- A map depicting the results of the online survey map component.

Previous Planning Efforts

- A map showing the summary findings from the Wake County Transit Plan.
- Maps showing roadway, bicycle and pedestrian, and transit recommendations from the 2009 Morrisville Comprehensive Transportation Plan.

Existing Conditions

- Maps showing existing bicycle, pedestrian, and transit facilities within the Town.
- A map with existing traffic volume levels within the Town.
- A map with existing congestion levels within the town, based on 2010 congestion levels reflected in the Triangle Regional Model.
- A figure showing information about crashes within the Town, including crash locations, crash severity, and crash types.

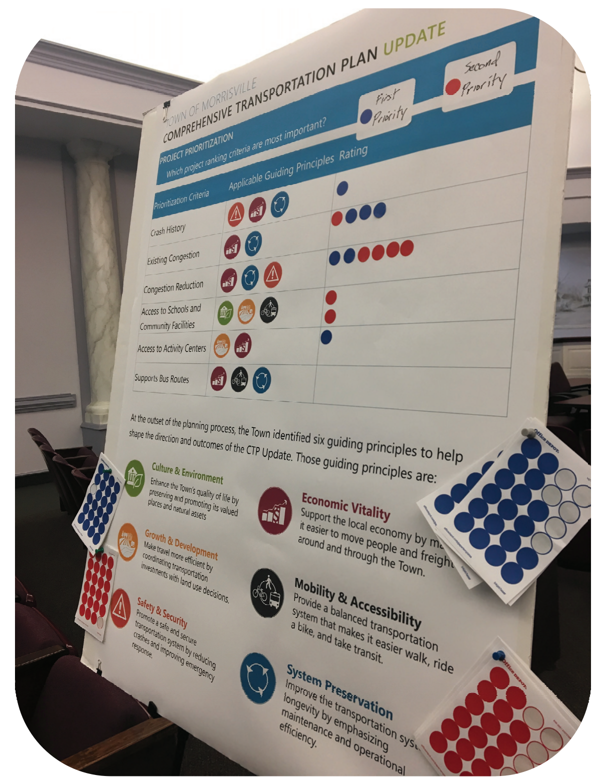
Next Steps

- Opportunity to speak with Town and consultant team members about the recommendations development process for the plan.

Public Workshop #2 – June 29th, 2017

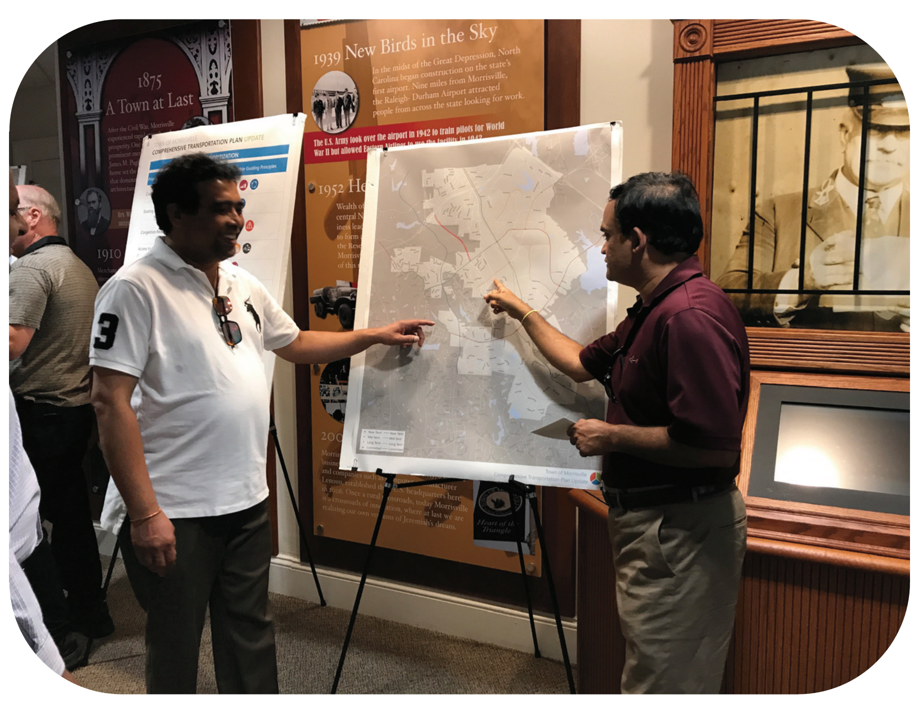
The second public workshop introduced members of the public to the preliminary recommendations for all modes of transportation, solicited feedback on prioritization metrics, and sought guidance in development of priorities for the key corridors.

- Roadway Project Prioritization – Participants were shown a board with prioritization criteria for roadway projects, and their relationship to the guiding statements of the plan. This exercise asked participants to weigh in on which prioritization criteria they felt were the most important. Participants were given three dots to put on their top choices, with their number one choice noted in a different color. The Planning and Zoning Board was also given the chance to engage in this activity during a meeting in July 2017.
- Strategic Corridors – Participants were given a worksheet with five corridors in the Town. Participants were asked to select a corridor, and then identify the top three priorities for each. Priorities to select from included safety, congestion, appearance, walking, biking, and transit.



Open House #2 – August 22nd, 2017

The final open house meeting focused on displaying draft multimodal recommendations and the results of the prioritization process. Attendees were invited to provide comments about the content of the mapping and to interact with Town and consultant team members. Comments related to the content of the open house were received before, during, and after the meeting. These comments and are included in **Appendix D**.



PLAN UPDATE PRESENTATIONS & WORK SESSIONS

Throughout the planning process, the project team presented plan updates and facilitated several work sessions with both the Town Council and the Planning and Zoning Board. Comments and results from activities used in the work sessions can be found in **Appendix D**.

YOU'RE INVITED!

TOWN OF MORRISVILLE COMPREHENSIVE TRANSPORTATION PLAN UPDATE

Below are the locations, dates, and times of the public meetings.

LOCATION	DATE	TIME
April 2018		
Cedar Fork Community Ctr. - 1050 B Town Hall Dr.	April 4	5:30 p.m. - 7 p.m.
Bike Safety Rodeo - Fire Station 1, 200 Town Hall Dr.	April 7	10 a.m. - 12 p.m.
Kitts Creek Clubhouse - 1649 Kit Creek Rd.	April 11	5:30 p.m. - 7 p.m.
Perimeter Park - 3025 Carrington Mill Blvd., Suite 130	April 17	12 p.m. - 1:30 p.m.
Morrisville Town Hall - 100 Town Hall Dr.	April 24	5 p.m. - 6 p.m.
Cedar Fork Community Ctr. - 1050 B Town Hall Dr.	April 27	10 a.m. - 12:30 p.m.
May 2018		
Park West Village Concert Series - Market Center Dr.	May 3	6 p.m. - 8 p.m.
Morrisville Aquatics & Fitness Ctr. - 1301 Morrisville Pkwy.	May 7	10 a.m - 12:30 p.m.
Morrisville Aquatics & Fitness Ctr. - 1301 Morrisville Pkwy.	May 7	5:30 p.m. - 7 p.m.
Morrisville Community Park - 1520 Morrisville Pkwy.	May 12	1 p.m. - 2:30 p.m.
Breckenridge Clubhouse - 101 Redwood Park Dr.	May 17	5:30 p.m. - 7 p.m.
SpringFest - Town Hall Dr.	May 19	4 p.m. - 9 p.m.
Triangle Rock Club - 102 Pheasant Wood Ct.	May 23	1 p.m. - 3 p.m.

Draft Plan Feedback Opportunities

The section below describes the opportunities presented to the community at large, Town Council, Planning and Zoning Board, and Developers Council to provide feedback on the draft Plan.

SPRING 2018 COMMUNITY OUTREACH

Following the release of the Draft Comprehensive Transportation Plan in February 2018, the Town held 14 Community Outreach Events throughout Town to provide opportunities for the public to ask questions and give feedback on the draft Plan. The events, held during March, April, and May, attracted over 80 citizens and resulted in several suggested changes to the draft Plan that was under review by the Planning and Zoning Board. The Town sent a postcard to every household in Town to advertise the events, and provided five handouts, seven posters and a comment card at each event to help the citizens learn more about the Plan.

GUIDING STATEMENTS

The guiding statements in this section represent six interrelated value statements established in accordance with national, state, and regional long range planning goals. The final guiding statements have been refined with guidance provided by the Town of Morrisville's Planning and Zoning Board, Town Council, and public and are reflective of the Town's needs and desires for the future of the transportation system. The established guiding statements provided direction for the entirety of the planning process and served as a tool for prioritizing recommendations – an important step as the Town faces the need to balance competing interests with limited transportation dollars. The statements consist of a key phrase (i.e. guiding principle) with supporting description. Each guiding principle is further clarified by a set of three planning goals. Guiding statements are shown in alphabetical order.

CULTURE AND ENVIRONMENT

Enhance the Town's quality of life by preserving and promoting its valued places and natural assets.

Local, state, and federal planning guidelines have evolved over recent decades to place additional emphasis on the role transportation plays in conserving the environment, preserving our neighborhoods, and protecting the quality of life. For the Town of Morrisville this process has been aided through land use planning, development controls, environmental planning, and socioeconomic awareness.

- Protect and enhance the natural and social environment by using context sensitive transportation strategies.
- Minimize direct and indirect environmental impacts of the transportation system while planning and prioritizing transportation recommendations.
- Promote consistency between transportation improvements, land use decisions, and economic development patterns.

ECONOMIC VITALITY

Support the local economy by making it easier to move people and freight around and through the Town.

Ensuring transportation investments support economic vitality in the Town is critical. Good transportation investments address industry needs such as shipping goods, encouraging economic growth, and improving access to regional assets such as Research Triangle Park and the Raleigh-Durham International Airport. The intent is to identify improvements that position the Town to be competitive in local, regional, and national markets.

- Identify transportation recommendations that enable global competitiveness, productivity, and efficiency.
- Increase the accessibility and mobility of people and freight within the Town and regionally.
- Leverage gateways and aesthetics to create an atmosphere that fosters economic investment.

GROWTH AND DEVELOPMENT

Make travel more efficient by coordinating transportation investments and land use decisions.

Transportation facilities and networks have the influence to transform development patterns, property values, and help shape a town's quality of life. How communities spatially assemble affects how accessible and appealing public transportation, bicycling, and walking are in the Town.

- Promote denser mixed-use developments that are supportive of transit, bicycle, and pedestrian activity.
- Prepare for continued population growth by coordinating transportation strategies with land use initiatives to foster a vibrant and livable community.
- Connect people to jobs and educational opportunities through coordinated transportation and land use investment decisions.

MOBILITY AND ACCESSIBILITY

Provide a balanced transportation system that makes it easier to walk, ride a bike, and take transit.

As auto-oriented growth has influenced street design for the past few decades, streets have increasingly become unaccommodating, unsafe, and inaccessible for non-motorized users. Strategic investment in major roadways must be balanced with improvements to the bicycle, pedestrian, transit, and rail networks to keep people and goods moving, allow better access for residents and visitors, and enhance quality of life in the Town. This concept seeks to enhance mobility and accessibility and provide residents with transportation options by combining multimodal improvements with nearly every roadway enhancement.

- Provide desirable and user-friendly transportation options for all user groups regardless of socioeconomic status or physical ability.
- Support a fully integrated multimodal network that advances the concept of complete streets.
- Expand and maintain a network of bicycle, pedestrian, and transit facilities that connects homes, activity centers, and complementary amenities.

SAFETY AND SECURITY

Promote a safe and secure transportation system by reducing crashes and improving emergency response.

Reducing transportation fatalities and serious injuries includes integrating safety enhancements in all transportation projects for both motorized and non-motorized users. Additionally, encouraging a connected street network can serve to improve emergency response times.

- Improve the safety of the transportation system for all user groups regardless of socioeconomic status or physical ability.
- Increase the reliability, predictability, and efficiency of the transportation experience through system improvements and enhanced communication.
- Improve safety and security by mitigating potential conflicts and delays at high-accident locations and rail crossing sites.

SYSTEM PRESERVATION AND EFFICIENCY

Improve the transportation system's longevity by emphasizing maintenance and operational efficiency.

A transportation network with high mobility is critical for sustaining and extending economic development. Ensuring local and regional mobility is an exercise in maximizing the capacity of the existing transportation system through systems management approaches. These approaches include monitoring and addressing pavement quality and ensuring that ancillary facilities such as traffic signals and ITS infrastructure are properly deployed.

- Increase the lifespan of existing infrastructure and ensure transportation facilities are used optimally.
- Maintain the transportation network by identifying and prioritizing infrastructure preservation and rehabilitation projects such as pavement management and signal system upgrades.
- Increase the use of innovative transportation technology to enhance the efficiency of the existing transportation system and to be better prepared for emerging vehicle technologies.

INTRODUCTION

Transportation is not only a critical component of our daily life, but also represents a crucial part of a region's social fabric and manmade infrastructure. Residents rely on transportation to access education, health care, and jobs, while surrounding cities, towns, and industries rely on a functioning network to keep the region moving. The ***Town of Morrisville Comprehensive Transportation Plan*** considers how Morrisville will grow in the next 25 years and offers strategies to guide improvements to the Town's transportation system including its roadways, transit services, sidewalks, bike facilities, and greenways. The initial step of the planning process is establishing a robust understanding of the geographic, administrative, operational, environmental, social, and temporal context of Morrisville today. This understanding, along with input obtained during the public engagement process, will set the stage for the development of recommendations that will be responsive to the needs and values of the community.

This chapter is intended to present a snapshot of Morrisville as it is today and includes facts and figures depicting the land uses, development constraints, community characteristics, travel patterns, and mobility options that characterize the Town. Effective transportation planning acknowledges the critical relationship between land use and transportation: the way land is used places demands on the transportation network, and the layout and character of the transportation network drives the type, density, and location of development.

The first section of the Existing Conditions Summary describes the ***LAND*** of Morrisville, how it is currently being used, and constraints on its use. This section also identifies important community facilities that the ***Town of Morrisville Comprehensive Transportation Plan*** will need to consider when emphasizing connectivity and accessibility. The next section describes the ***PEOPLE*** of Morrisville. Morrisville's population is diverse, highly educated, and is continuing to grow at a rapid pace. Also included is an investigation of where Morrisville's residents work, how they get there, and how long it takes to get there. Finally, the ***TRANSPORTATION*** section describes Morrisville's transportation network, including its roadways, sidewalks, on-street bikeways, multi-use paths, and transit routes. Estimations of traffic volumes and congestion, an understanding of crashes occurring in the last 3 years, and an inventory of existing infrastructure will provide a foundation for the development of the ***Town of Morrisville Comprehensive Transportation Plan***.

LAND

The Town of Morrisville is located in northwest Wake County and along the southern border of Durham County. Morrisville rests in the midst of the Research Triangle Region, which is anchored by three major universities; the cities of Raleigh, Durham, and Chapel Hill; and Research Triangle Park (RTP). Research Triangle Park, a 7,000-acre research park west of Morrisville, employs over 50,000 people across 260 companies. Bordering the west, south, and east sides of Morrisville, the Town of Cary houses several worldwide company headquarters and, like Morrisville, has seen continual growth. Raleigh-Durham International Airport, one of North Carolina's two primary airports, is located on the north side of I-40.

Morrisville's proximity to RTP, the interstate, and RDU has attracted several major companies including Lenovo, Time Warner Cable, NetApp, and Pharmaceutical Product Development (PPD). Paired with its community facilities including several parks and schools, it is no surprise that the Town's population growth continues to outpace Wake County's. Morrisville's regional context is shown in **Figure 2-1**. Unincorporated Wake County and unincorporated Durham County are shown in dark gray.

Land Use and Zoning

The Town of Morrisville classifies every parcel based on the land use classifications described in **Table 2-1**. The majority of Morrisville's land is classified as residential (33%) or vacant (21%).

Table 2-1: Land Use Classifications

Classification	Acreage	Percent
Commercial	409.6	7.9%
Industrial	671.2	12.9%
Institutional	243.4	4.7%
Mixed Use	13.8	0.3%
Multifamily	393.1	7.6%
Office	365.1	7.0%
Public/Private Open Space	705.5	13.6%
Single-Family Attached	149.7	2.9%
Single-Family Detached	1154.9	22.2%
Vacant	1094.2	21.0%
Total	5200.6	100%

Morrisville adopted their Unified Development Ordinance (UDO) in 2013. A Town-wide rezoning was completed in 2014 to make the Town's zoning map consistent with the UDO. The UDO combines the Town's zoning ordinance and subdivision ordinance into one document to simplify communication and enforcement. Zoning west of NC 54 includes low, medium, and high density residential uses with a strong emphasis on neighborhood and community spaces. Zoning east of NC 54 includes the majority of Morrisville's industrial, office, and commercial areas.

The Town of Morrisville's zoning includes two Airport Overlay Districts, a Floodplain Overlay District, and a Town Center Conservation Overlay District. The Airport Noise Overlay District, shown in **Figure 2-3**, restricts certain principal uses, resulting in the majority of residences and schools being located west of NC 54. Airport Overlay District A's western border is NC 54, and Airport Overlay District B is located almost entirely west of NC 54. The Floodplain Overlay District encompasses the area within the 100-year floodplain, and the Town Center Conservation Overlay District includes the area surrounding Morrisville-Carpenter Road's intersections with Town Hall Drive and NC 54, detailed in the *2007 Town Center Plan*.

The Town of Morrisville's Zoning and Land Use maps can be found by visiting the Town Planning Department's website.

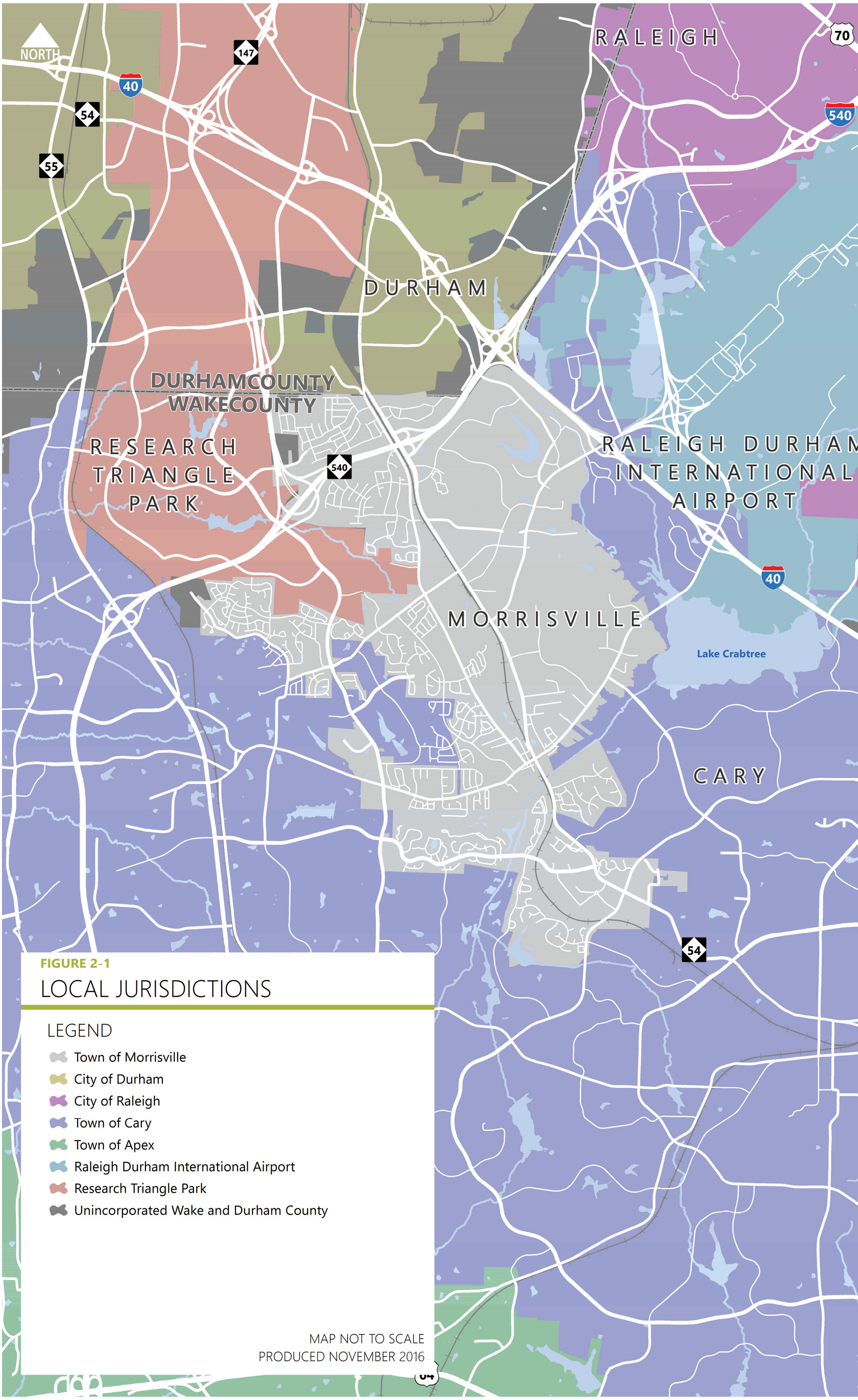


FIGURE 2-1

LOCAL JURISDICTIONS

LEGEND

- Town of Morrisville
- City of Durham
- City of Raleigh
- Town of Cary
- Town of Apex
- Raleigh Durham International Airport
- Research Triangle Park
- Unincorporated Wake and Durham County

MAP NOT TO SCALE
PRODUCED NOVEMBER 2016

Community Facilities

The Town's Parks, Recreation, & Cultural Resources Department maintains several greenways, parks, and facilities that offer outdoor and indoor recreation opportunities to Morrisville residents, listed in **Table 2-2**. Crabtree Creek Nature Park is currently a multi-purpose field, but the Town of Morrisville has plans to develop it into a more substantial Nature Park in the future. Outside of Morrisville, but adjacent to the Town, are Lake Crabtree County Park and William B. Umstead State Park. There are three schools located within Morrisville: Morrisville Elementary, Sterling Montessori, and Cedar Fork Elementary. The combined enrollment for the three schools is 2,368 students.

In addition to the existing facilities described above, there are two current projects in Morrisville that will add an elementary school and community college. The new primary school, Parkside Elementary, is currently in the design phase with anticipated occupancy in August 2019. Access to the new elementary school will be provided by Parkside Valley Drive. Construction has started on a new Wake Technical Community College satellite campus located off Chapel Hill Road (NC 54), and the first phase opened in 2018. When complete, the campus is expected to serve 7,000 to 10,000 students. **Figure 2-2** shows Morrisville's community facilities.

Table 2-2. Parks, Recreation, & Cultural Resources

Greenways
Crabtree Creek and Hatcher Creek Greenway (Under Construction)
Grace Park Greenway
Indian Creek Greenway
Park West Village Greenway
Perimeter Park Greenway
Shiloh Greenway
Parks
Cedar Fork District Park
Church Street Park
Crabtree Creek Nature Park
Indian Creek Trailhead Park
Morrisville Community Park
Northwest Park
Ruritan Park
Shiloh Community Park
Community Centers
Cedar Fork Community Center
Morrisville Aquatics & Fitness Center
Luther Green Community Center

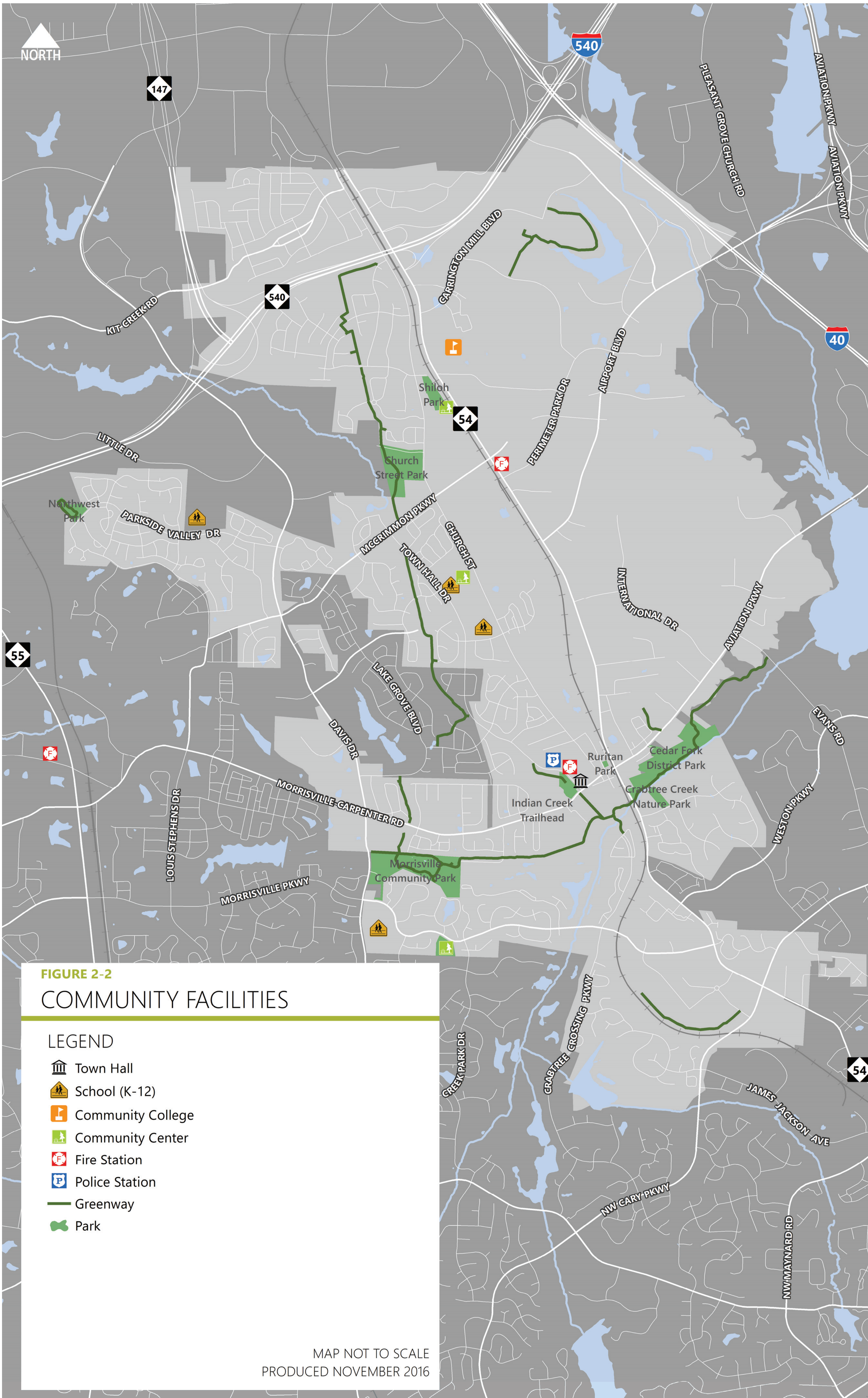


FIGURE 2-2

COMMUNITY FACILITIES

LEGEND

- Town Hall
- School (K-12)
- Community College
- Community Center
- Fire Station
- Police Station
- Greenway
- Park

MAP NOT TO SCALE
PRODUCED NOVEMBER 2016

Development Constraints

There are a number of challenges that impact the Town's planning and development. Identifying these constraints at the outset of the planning process helps to minimize environmental impacts and preserve community assets.

The Town is completely bordered by other jurisdictions (see **Figure 2-1**), leaving limited options for annexation. Additionally, many roads in Morrisville meander, crossing into and out of multiple jurisdictions. Roadways that cross jurisdictional limits require increased communication among adjacent municipalities to ensure a cohesive and effective plan for the future.

ENVIRONMENTAL FEATURES

Crabtree Creek, which passes through the southern portion of Morrisville, does not meet Environmental Protection Agency (EPA) standards and is classified as a 303(d)-impaired stream. This classification is supplemented with a unique management plan that may affect how much and where development may occur near the creek. Other environmental constraints in Morrisville include floodplains, wetlands, stream buffers, and steep slopes. The Town of Morrisville requires buffers on both intermittent and perennial streams, as well as several other stormwater provisions to ensure a high quality of life for its residents. More information about the Stormwater Program can be found in Article 7 of the Unified Development Ordinance (UDO).

Wetlands, denoted by blue dots on **Figure 2-3**, are areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Floodways, shown in dark blue on **Figure 2-3**, contain the undevelopable land area adjacent to a river or stream channel necessary to discharge flood waters without increasing water surface elevation. Finally, the 100-year Floodplain shown in lighter blue are the locations determined to have a 1% chance of flooding in any given year. Development in these areas must be located 2-feet above the base flood elevation and require a FEMA elevation certificate.

Additionally, Morrisville housed the Koppers Company, Inc. plant, a facility that processed and treated wood. The EPA found that the site was contaminated in 1980 and proceeded with cleanup efforts. While there is currently no environmental hazard on the site, it is still on the Superfund list and is being monitored by the EPA. This parcel of land is shown on **Figure 2-3**.

RAILROAD CORRIDOR

The railroad corridor running alongside NC 54 is owned by North Carolina Railroad and operated by Norfolk Southern. Norfolk Southern requires that new roadway, sidewalk, and bicycle connections across the railroad must be constructed as grade-separated crossings, with some exceptions. While this requirement mitigates potential train collisions at at-grade railroad crossings, it also results in increased costs associated with new east-west connections.

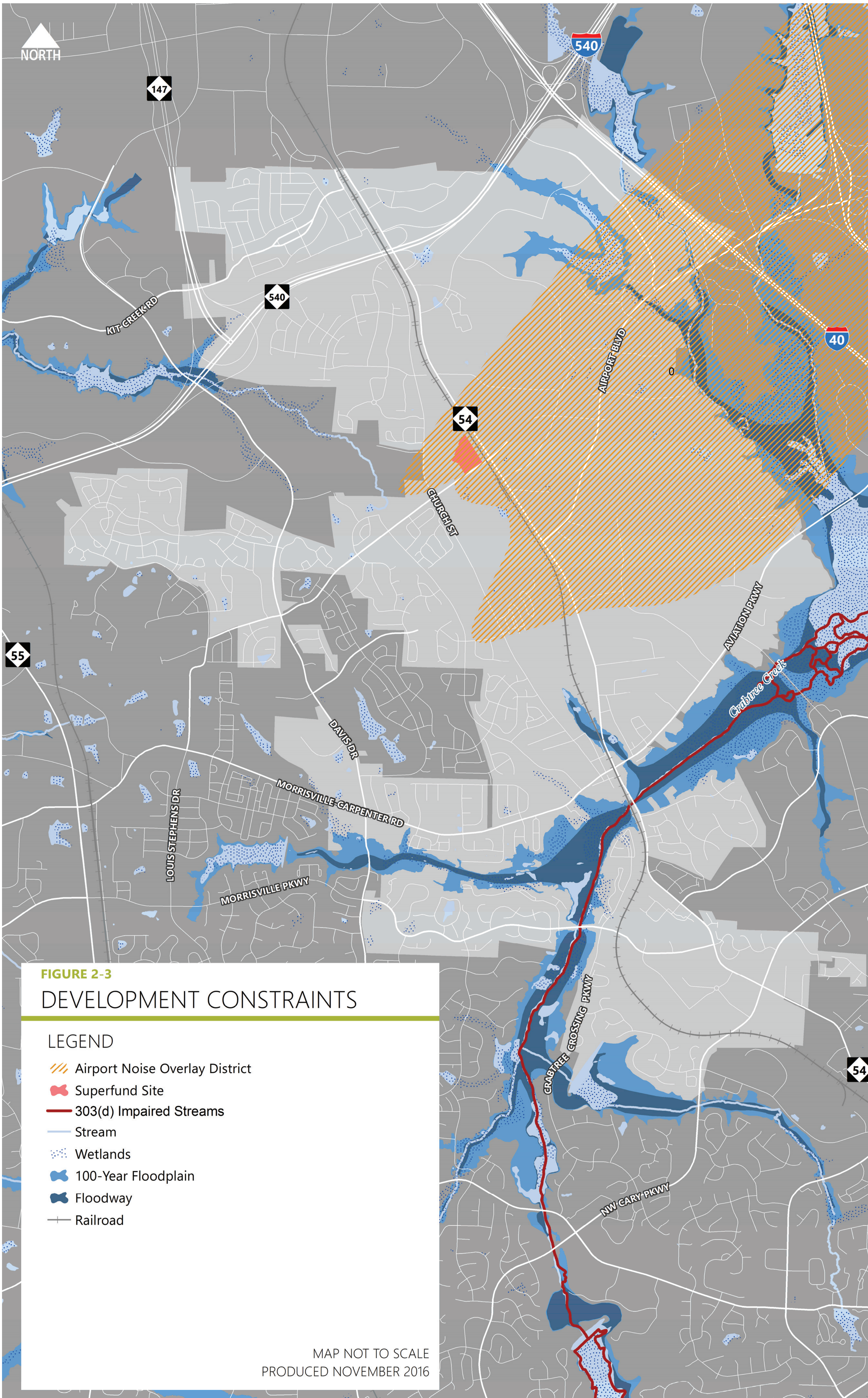


FIGURE 2-3
DEVELOPMENT CONSTRAINTS

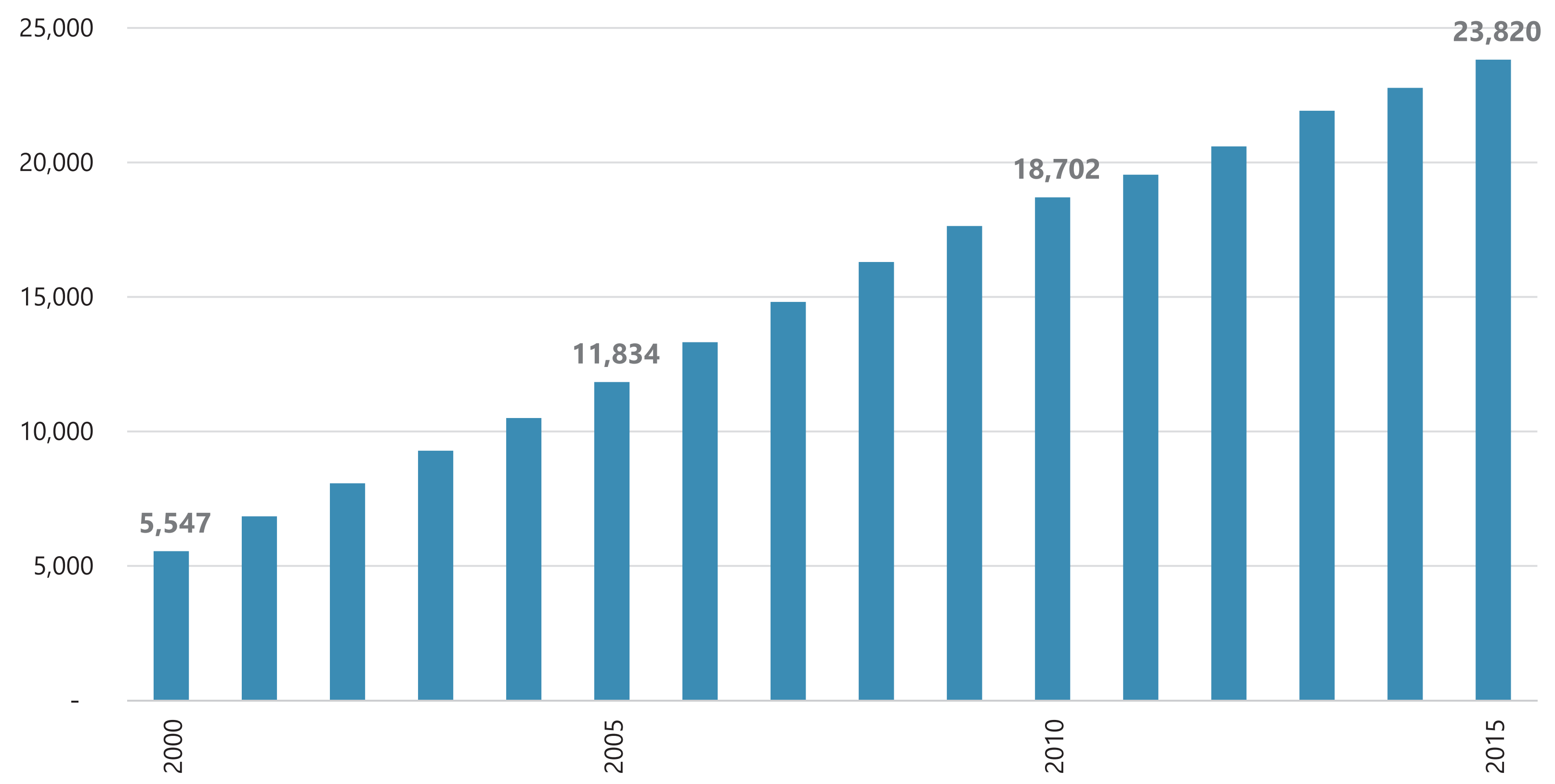
PEOPLE

Morrisville's population of over 23,000 people continues to grow. The numbers, charts, and tables in this section reflect the latest demographic data made available by the United States Census Bureau and the State Demographics branch of the North Carolina Office of State Budget and Management (OSBM), which includes the 2014 American Community Survey 5-Year Estimates, the Special Census of Morrisville conducted in 2015, and OSBM's online resources.

Population Growth

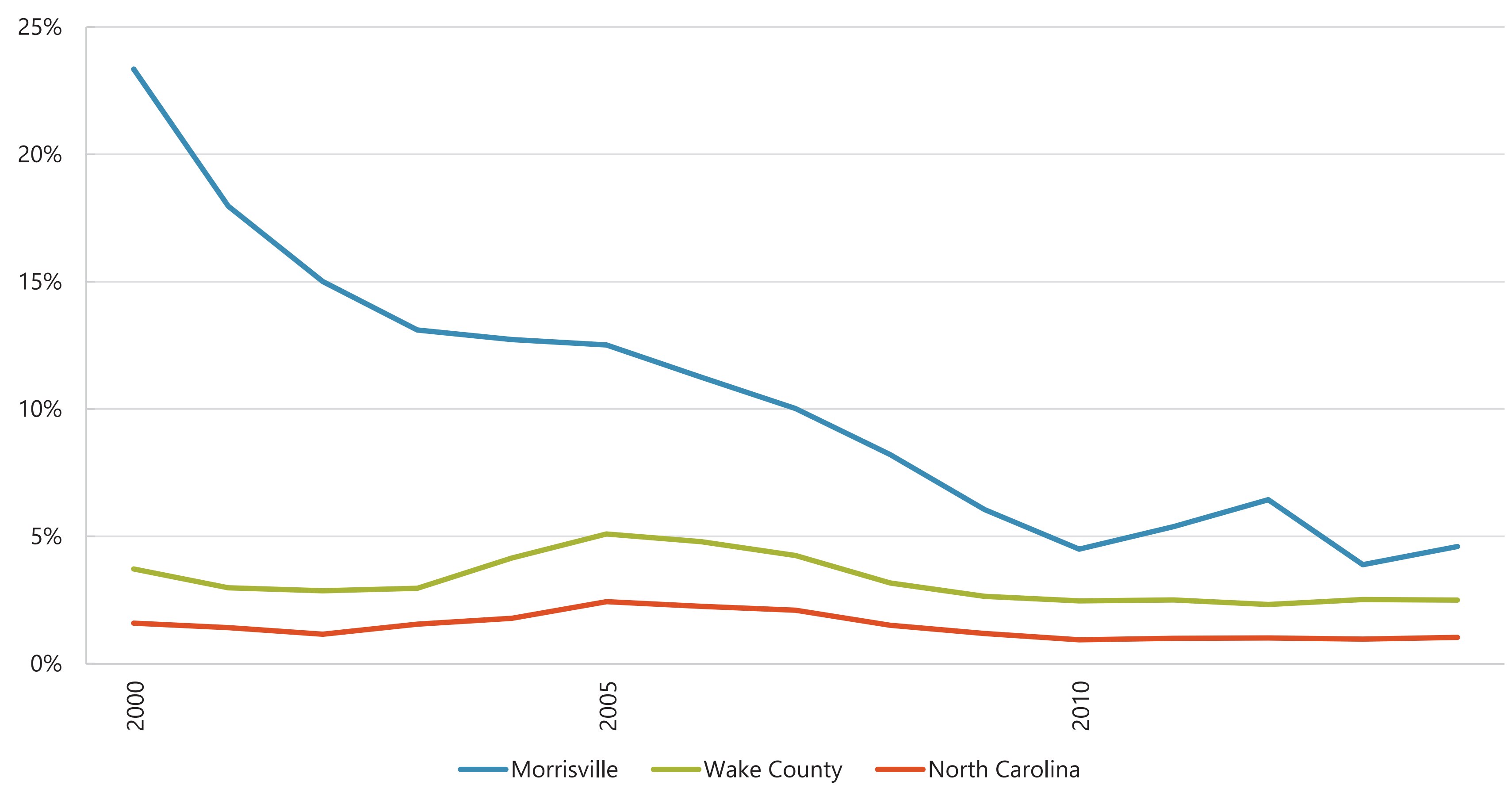
Morrisville has seen tremendous population growth in the last 15 years. Since 2000, Morrisville's population has more than quadrupled, as shown in **Figure 2-4**. The North Carolina state demographer lists Morrisville as the 14th fastest growing municipality in the state for the period from 2010 to 2014.

Figure 2-4: Population Growth



Morrisville's growth corresponds to Wake County's rapid growth as people move to the region to enjoy its high quality of life, excellent school system, and strong job market. **Figure 2-5** compares Morrisville's, Wake County's, and North Carolina's population growth rates between 2000 and 2014. Although Morrisville's growth rate has slowed in recent years, it continues to outpace Wake County and the state as a whole.

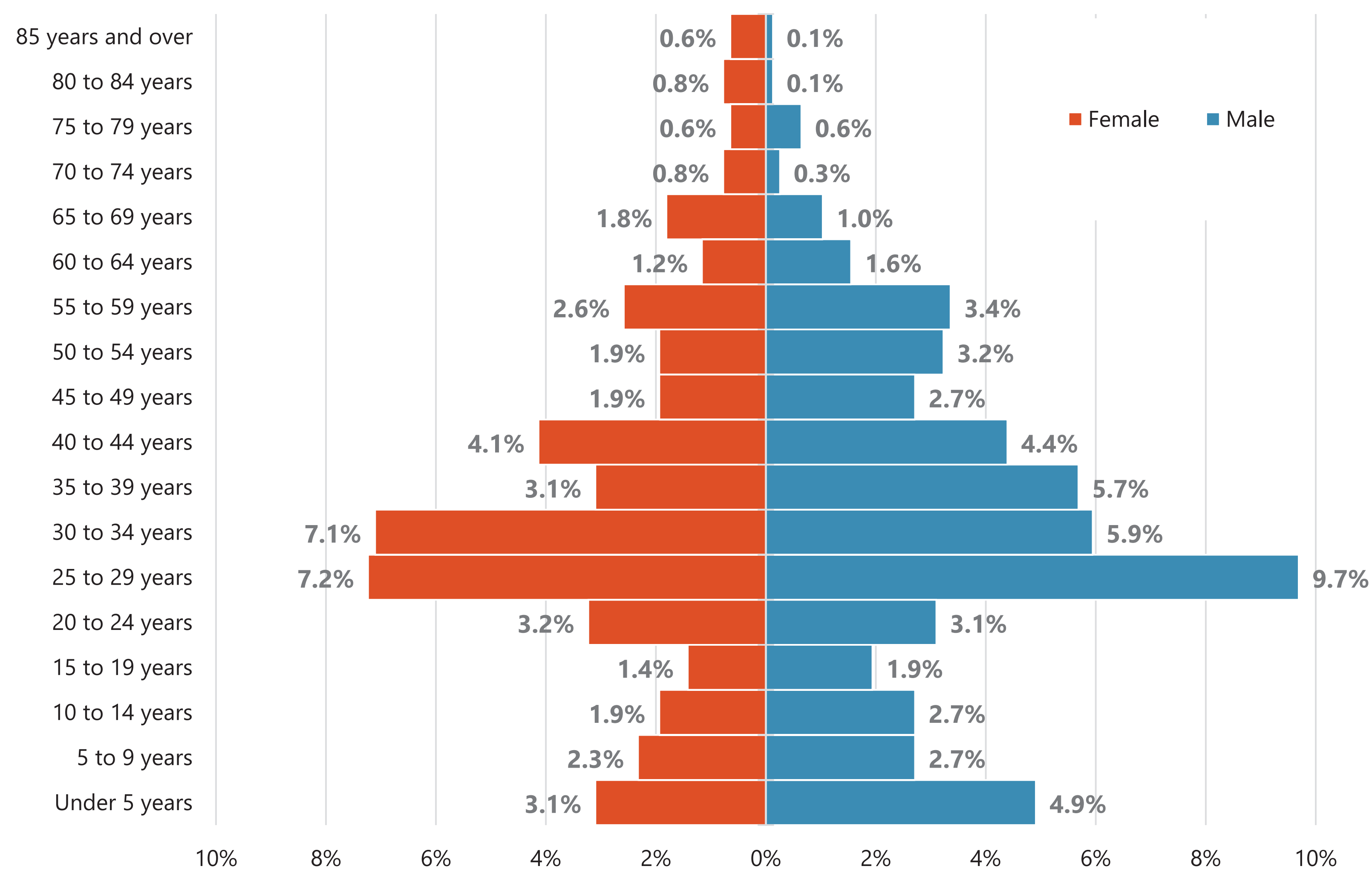
Figure 2-5: Population Growth Rate Comparison



Age and Race

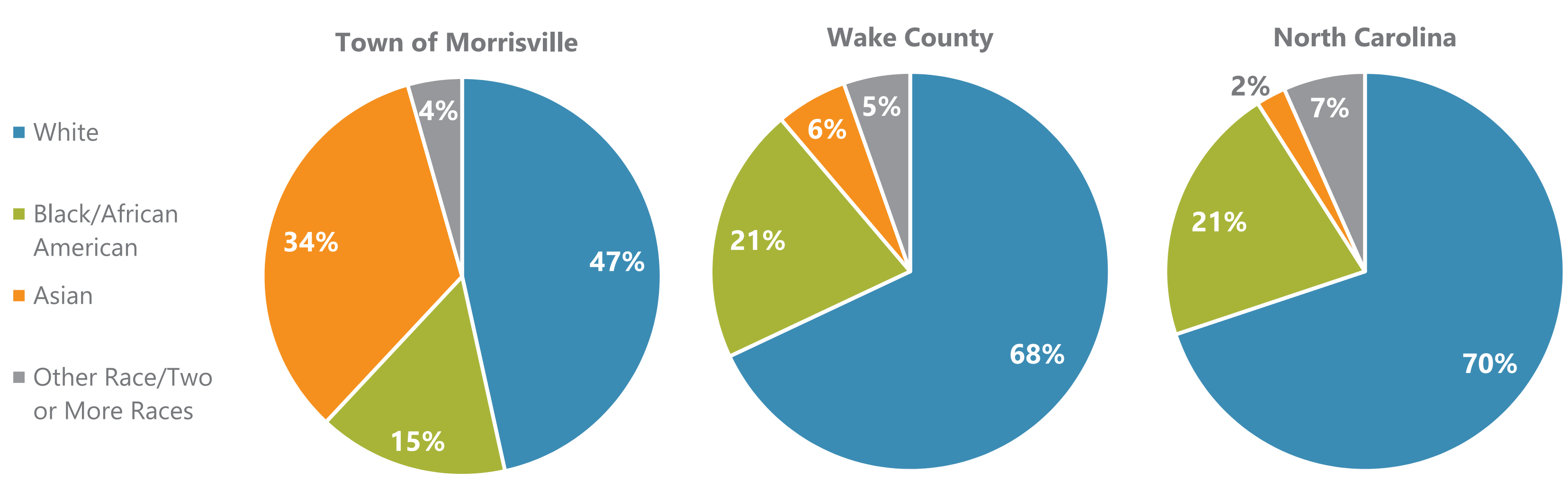
According to the 2014 American Community Survey 5-Year Estimates, Morrisville's population is relatively young compared to Wake County. The population older than 65 years of age comprises only 4% in Morrisville, compared to 9% in Wake County. On the other end of the spectrum, residents under 18 years of age comprise nearly 30% of the population, compared to 25% in Wake County. **Figure 2-6** shows Morrisville's age and sex distribution based on data from the Town of Morrisville's Special Census conducted in the spring of 2015.

Figure 2-6: Percent Population by Age & Sex



Morrisville is home to a racially diverse population. Approximately 47% of Morrisville's population is identified as white, 15% African-American, and 34% Asian. About 5% of the population identifies themselves as Hispanic or Latino. **Figure 2-7** shows the breakdown of Morrisville's racial profile in comparison to Wake County and North Carolina.

Figure 2-7: Race



Income and Education

The median household income for households in Morrisville in 2014 was $84,301, which is significantly higher than Wake County's $66,579 median income and the national median income of $53,482. Along with higher median incomes, a greater percentage of Morrisville residents have obtained higher levels of education than Wake County and North Carolina. The 2014 American Community Survey data indicates that of the residents over age 25 in Morrisville, 41% have earned a Bachelor's degree and another 24% have a Master's degree or higher. **Figure 2-8** below displays the number of households (owner-occupied and renter-occupied), income, and education characteristics of Morrisville, Wake County, and North Carolina.

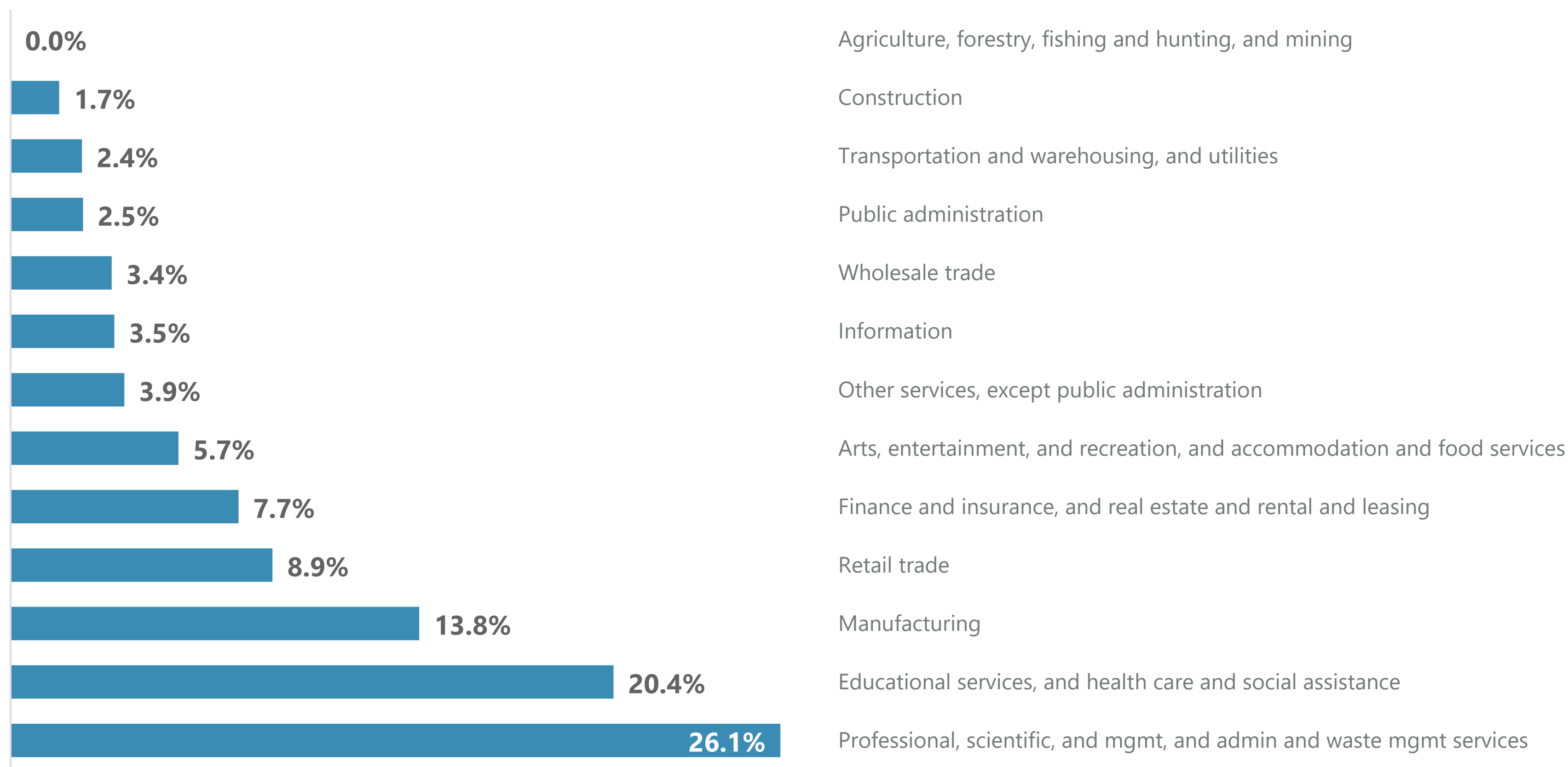
Figure 2-8: Household, Income, and Education Characteristics

Morrisville	Wake County	North Carolina	
7,905	355,647	3,742,514	Number or Households
2.62	2.62	2.54	Average Household Size
$84,301 (4.8%)	$66,579 (8.2%)	$46,693 (17.2%)	Median Income (Percent Below Poverty Line)
1.1%	2.0%	2.5%	Zero-Vehicle Access
64.8%	48.3%	27.7%	Bachelor's Degree or Higher

Employment

Morrisville is in the middle of the Raleigh/Durham/Research Triangle Park area. According to the 2014 American Community Survey 5-Year Estimates, displayed in **Figure 2-9**, over a quarter of Morrisville's employees work in the industry described as "professional, scientific, and management, and administrative and waste management services" by the U.S. Census Bureau. Educational services, health care, and social assistance account for a fifth of the Town's employment.

Figure 2-9: Employment by Industry



Only 6.4% of Morrisville residents stay in Morrisville for work, while 22.3% commute to Raleigh, 18.6% to Durham, and 15.7% to Cary. Thirty-seven percent of Morrisville residents commute to other places such as RTP, Chapel Hill, and Apex. **Figure 2-10** shows the jurisdictions Morrisville's residents commute to, while **Figure 2-11** shows the counties Morrisville's residents commute to. This information indicates that a large percentage of Morrisville residents are traveling to work outside of Morrisville, emphasizing the need for safe and efficient access to the interstate and major arterials while supporting connectivity and mobility within Morrisville.

Figure 2-10: Workplace by City

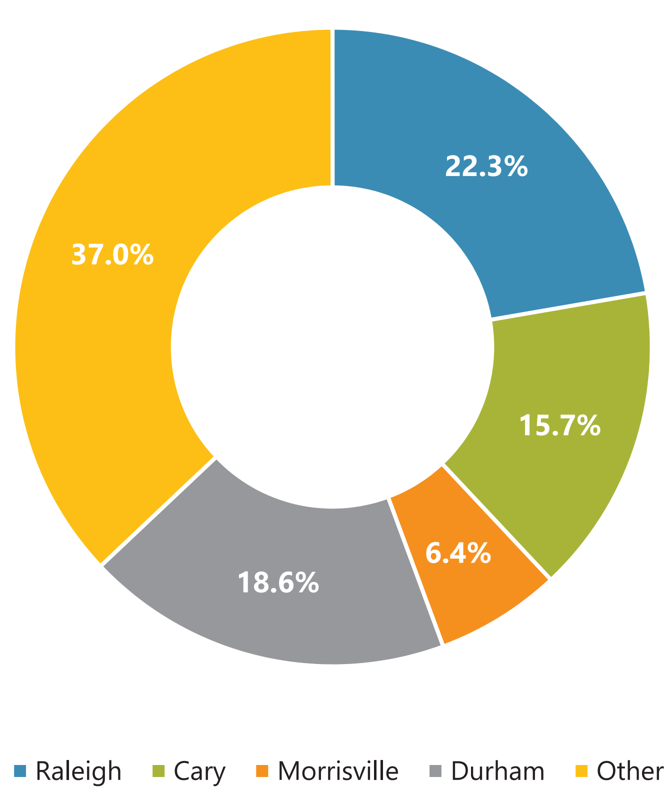
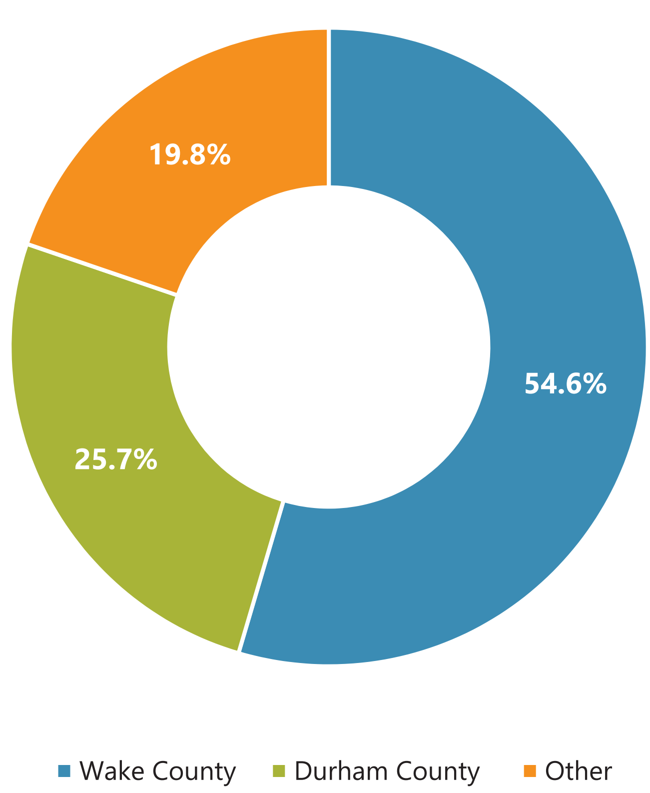


Figure 2-11: Workplace by County



Commute Characteristics

Based on the 2014 American Community Survey, the average travel time to work for residents in Morrisville was 21 minutes, compared with 24 minutes for Wake County and the state of North Carolina. **Figure 2-12** and **Figure 2-13** show residents' commute time to work and the distance traveled to work.

Eight out of ten Morrisville residents drive alone to work (consistent with Wake County as a whole), while approximately 8% participate in a carpool. About 8% work from home and 1% walk to work. Less than 1% take transit or bike to work. A high percentage of driving or carpooling to work is likely the result of Morrisville residents working outside of Morrisville, a lack of transit services, and low bicycle and pedestrian connectivity. **Figure 2-14** shows a detailed breakdown of Morrisville residents' means of transportation to work. **Figure 2-15** on the adjacent page shows where Morrisville residents work. The map shows that the largest portion of Morrisville residents work in Research Triangle Park, while several residents travel to the areas surrounding North Hills, SAS, and Duke University.

Figure 2-12: Commute Time

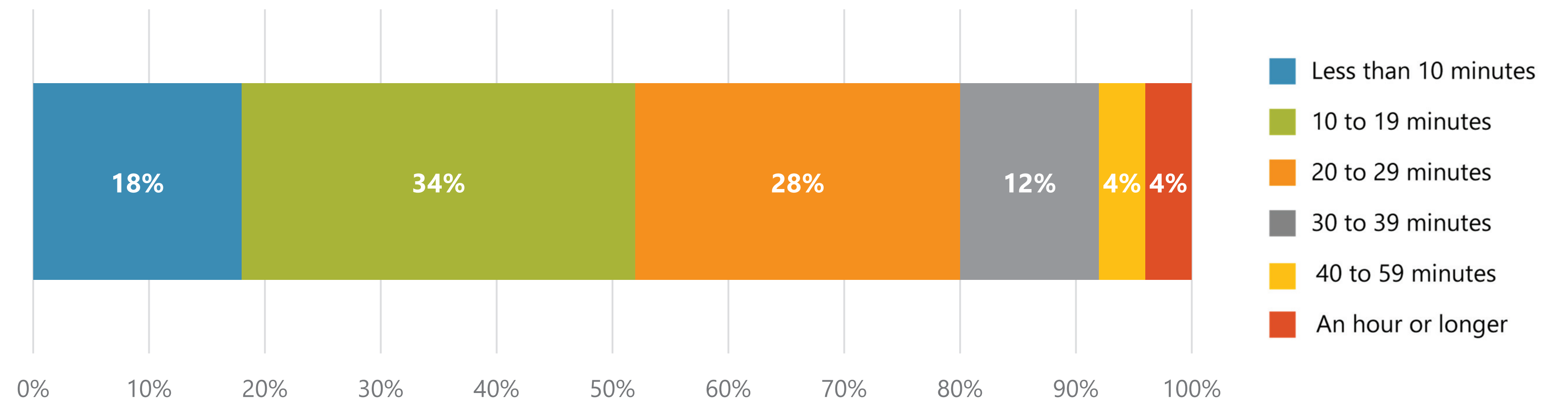


Figure 2-13: Commute Distance

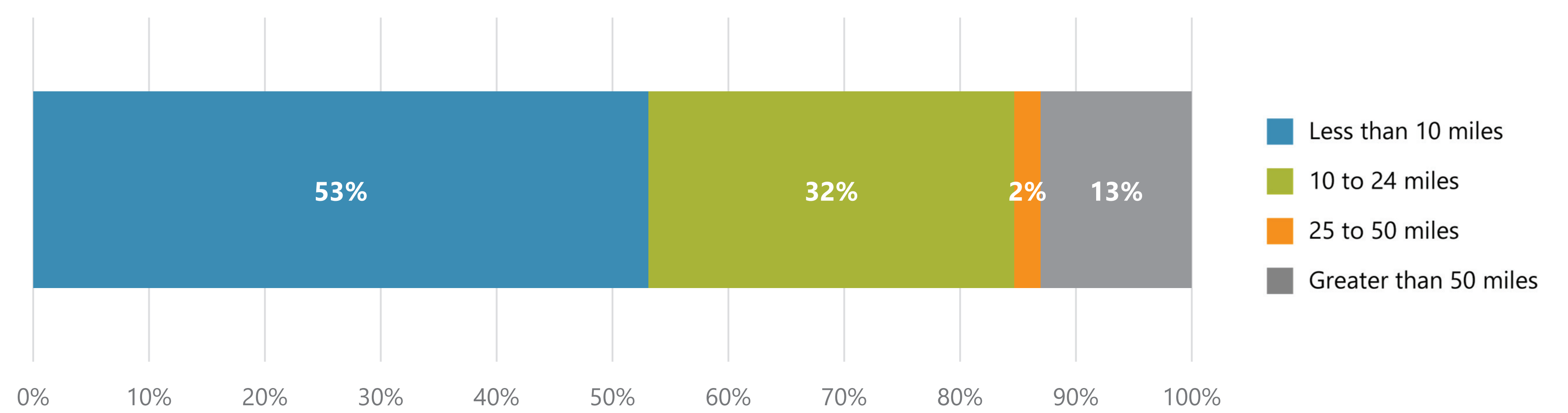
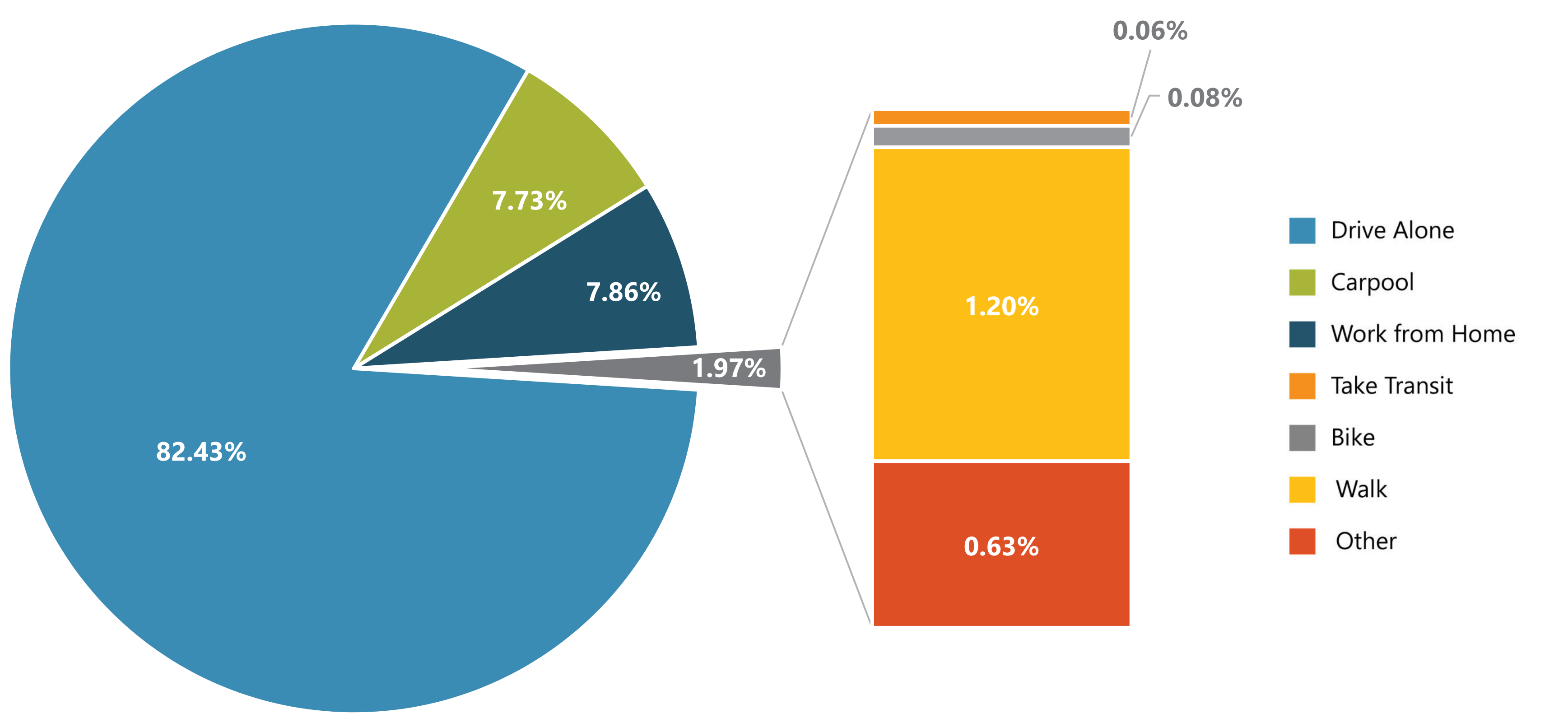


Figure 2-14: Commute Mode



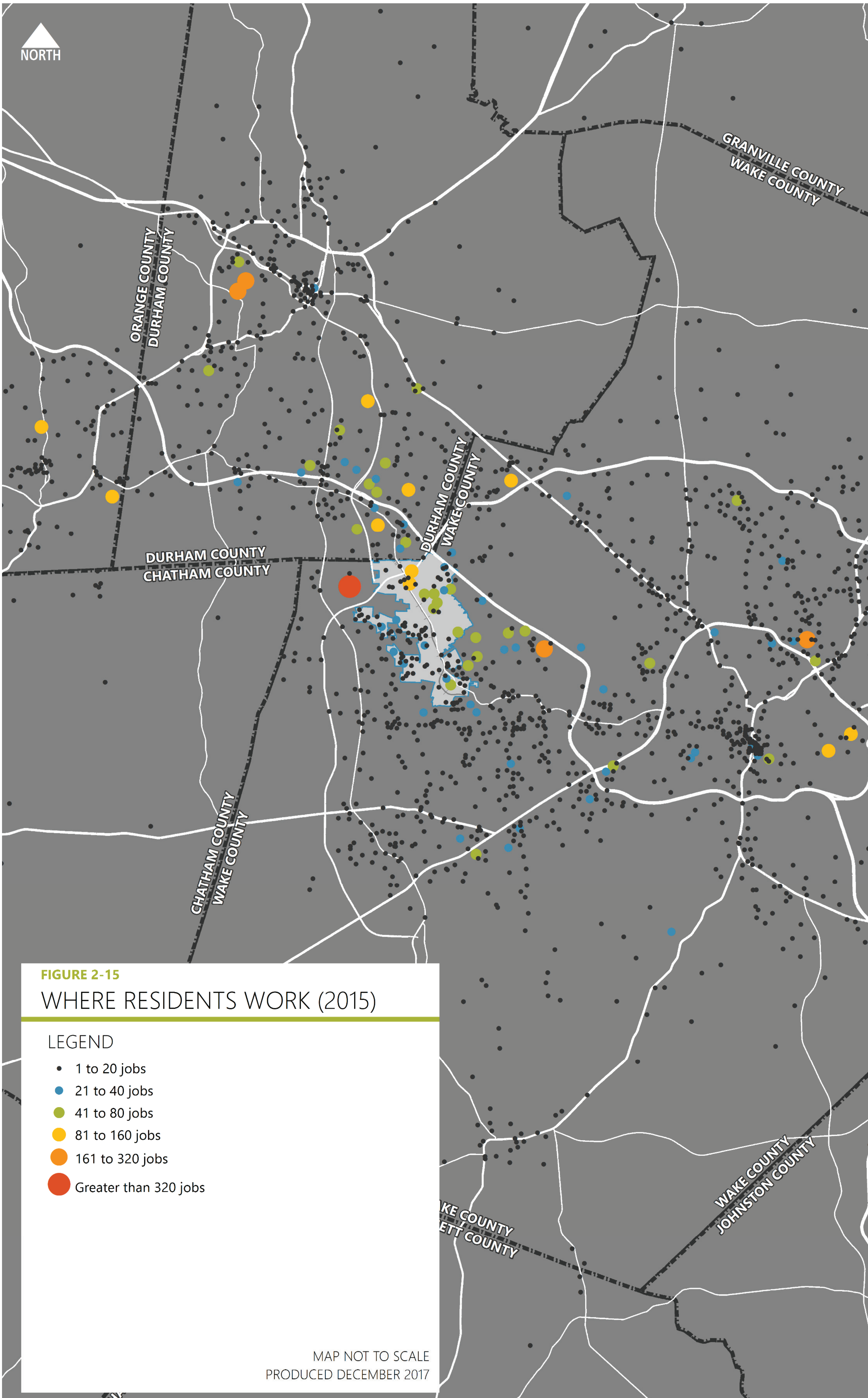


FIGURE 2-15
WHERE RESIDENTS WORK (2015)

TRANSPORTATION

The transportation network within and around Morrisville is primarily oriented to serve automobile travel. Several major roadways, detailed in **Table 2-3**, serve the Town including I-40, I-540, and the Triangle Expressway (NC 147 and NC 540) to the north; Davis Drive to the west and NC 54 to the east, which bisects the Town from north to south; and several east-west corridors including McCrimmon Parkway, Airport Boulevard, Morrisville-Carpenter Road, Aviation Parkway, Morrisville Parkway, and NW Cary Parkway. The rapid development of residential subdivisions without investment in major roadway projects has yielded a disconnected street network and stress on the Town's major corridors. Roadways within the Town are owned and maintained by either NCDOT, the Town of Morrisville, or private entities such as neighborhood associations. NCDOT maintains the following roads within the Town of Morrisville:

- Airport Boulevard
- Aviation Parkway
- Cary Parkway
- Church Street
- Davis Drive
- Evans Road
- Holly Creek Road
- Jerusalem Drive
- Kit Creek Road
- Lichtin Boulevard (partial)
- Louis Stephens Road
- McCrimmon Parkway
- Morrisville-Carpenter Road
- Morrisville Parkway
- NC 54 (Chapel Hill Road)
- NC 540
- Slater Road (partial)
- Sorrell Grove Church Road
- Watkins Road (partial)
- Wilson Road

While the Town's walking and bicycling network has seen significant growth and many opportunities for increased access to transit exist, Morrisville's growth patterns and commuting trends continue to present significant challenges for the Town of Morrisville to overcome when considering how best to maintain and improve its transportation network.

Table 2-3: Major Roadways – Existing Conditions as of January 2018

Roadway	AADTs (2015)	NCDOT Functional Classification[1]	Typical Cross-Section	Multimodal Features
Airport Boulevard	11,000 to 33,000	Minor Arterial	5-lane including center turn lane	Sidewalks
Aviation Parkway	15,000 to 31,000	Minor Arterial	2-lane	Few sidewalks and multi-use paths
Church Street	9,300	Local	2-lane	Sidewalks
Davis Drive	21,000 to 31,000	Minor Arterial	4-lane median-divided	Multi-use paths and sidewalks
I-40	151,000	Interstate	9-lane freeway	n/a
McCrimmon Parkway	8,400 to 17,000	Local	4-lane median divided	Sidewalks and multi-use paths
Morrisville-Carpenter Road	10,000 to 16,000	Minor Arterial	2-lane	Sidewalks
Morrisville Parkway	15,000 to 16,000	Major Collector	4-lane median-divided	Sidewalks and multi-use paths
NC 147[2]	13,000	Freeway	6-lane freeway	n/a
NC 54 (Chapel Hill Road)	16,000 to 22,000	Principal Arterial	2-lane	Few sidewalks
NC 540	27,000 to 40,000	Freeway	6-lane freeway	n/a
NW Cary Parkway	20,000 to 25,000	Minor Arterial	4-lane median divided	Sidewalks and wide outside lanes
Perimeter Park Drive	4,900	Local	4-lane median-divided	Sidewalks
Town Hall Drive	4,400 to 4,600	Local	4-lane median-divided	Sidewalks

[1] NCDOT categorizes streets and highways into functional classes based on the character of service they are intended to provide in serving the flow of traffic through the roadway network.
[2] NC 147 lies mostly outside of the Town of Morrisville's jurisdiction

Motor Vehicle Volumes

NCDOT collects traffic volume data on state-maintained roadways every other year and develops estimates called average annual daily traffic volumes (AADTs) which represent two-way traffic volumes on an average weekday. The most recent segment level AADTs for the state-maintained roadways in Morrisville are from 2015 and are shown in **Table 2-3** and **Figure 2-16**. NCDOT traffic volume data is not available for the roadway segments without color, and traffic volume data at the segment level has not yet been made available.

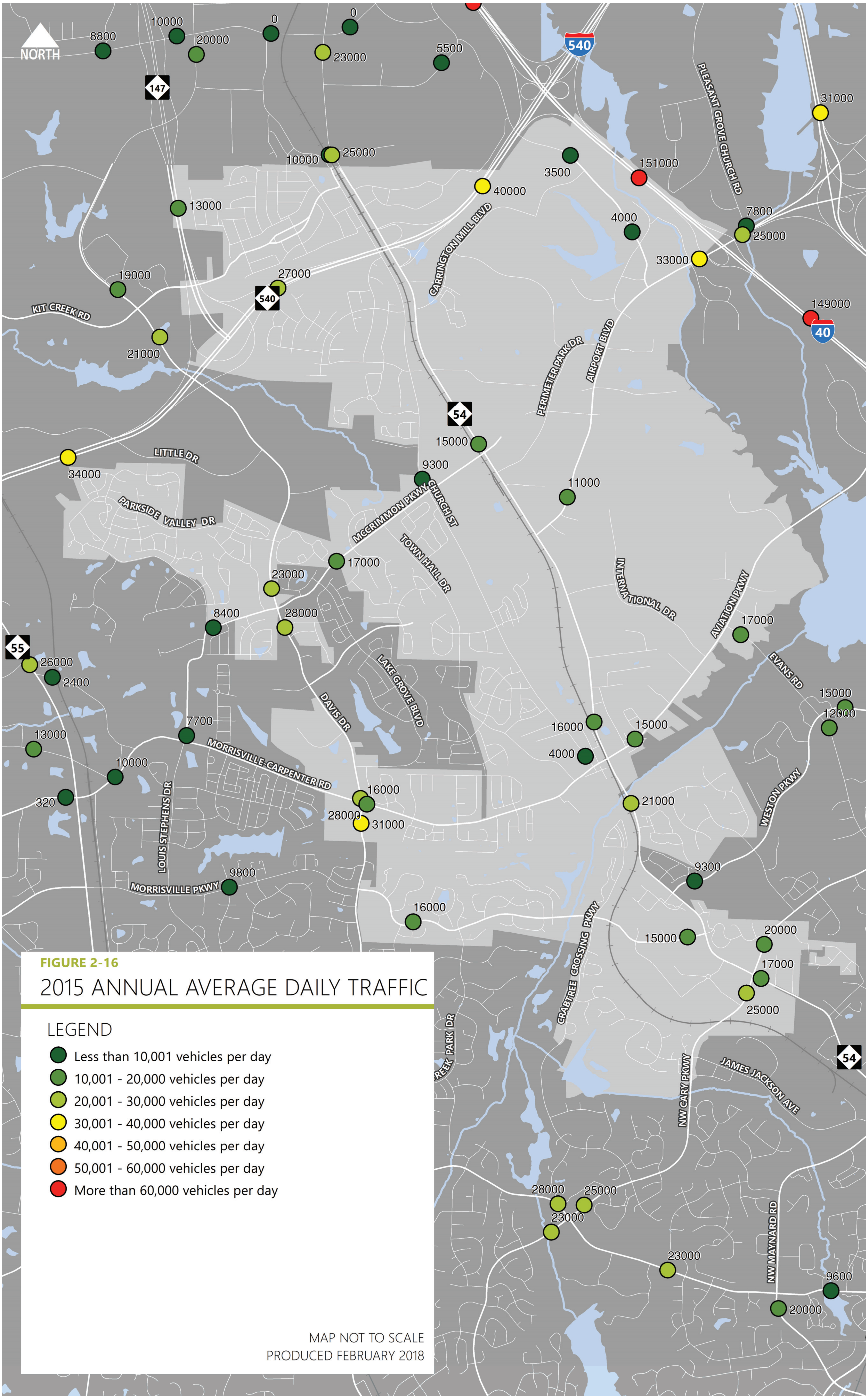


FIGURE 2-16

2015 ANNUAL AVERAGE DAILY TRAFFIC

LEGEND

- Less than 10,001 vehicles per day
- 10,001 - 20,000 vehicles per day
- 20,001 - 30,000 vehicles per day
- 30,001 - 40,000 vehicles per day
- 40,001 - 50,000 vehicles per day
- 50,001 - 60,000 vehicles per day
- More than 60,000 vehicles per day

MAP NOT TO SCALE
PRODUCED FEBRUARY 2018

Modeled Traffic Congestion

Sophisticated models can simulate the interaction of estimated demand and available supply at a regional scale. The Triangle Regional Model comprises both the Raleigh urbanized area and the Durham-Chapel Hill urbanized area. For the purposes of this Existing Conditions Summary, current congestion levels are derived from the Triangle Regional Model 2010 Base Year Model and are symbolized in **Figure 2-17** based on volume-to-capacity ratios. The model represents the roadway network and traffic volumes as they were in 2010 and does not necessarily reflect the impact of intersections and railroad crossings on traffic congestion. Actual congestion near these locations may be greater than what is shown in the travel demand model. However, modeled traffic congestion provides systems-level insight into overall congestion issues and can indicate corridors that warrant higher levels of study and analysis. The information provided in **Table 2-4** provides an overview of volume-to-capacity ratios and descriptions of each category.

Table 2-4: Understanding Volume-to-Capacity Ratios

CATEGORY	DESCRIPTION
Very Below Capacity V/C < 0.50	A roadway with a V/C less than 0.50 typically operates with free-flowing conditions and is underutilizing available roadway capacity.
Below Capacity V/C = 0.50 to 0.85	A roadway with a V/C between 0.50 to 0.85 typically operates with efficiency and is not considered congested.
At Capacity V/C = 0.85 to 1.00	As the V/C nears 1.0, the roadway is becoming more congested. A roadway approaching congestion may operate effectively during non-peak hours but be congested during peak travel periods.
Above Capacity V/C > 1.01	Roadways operating at capacity or slightly above capacity are heavily congested during peak periods and moderately congested during non-peak periods. A change in capacity due to incidents greatly impacts the travel flow on corridors operating within this V/C range.

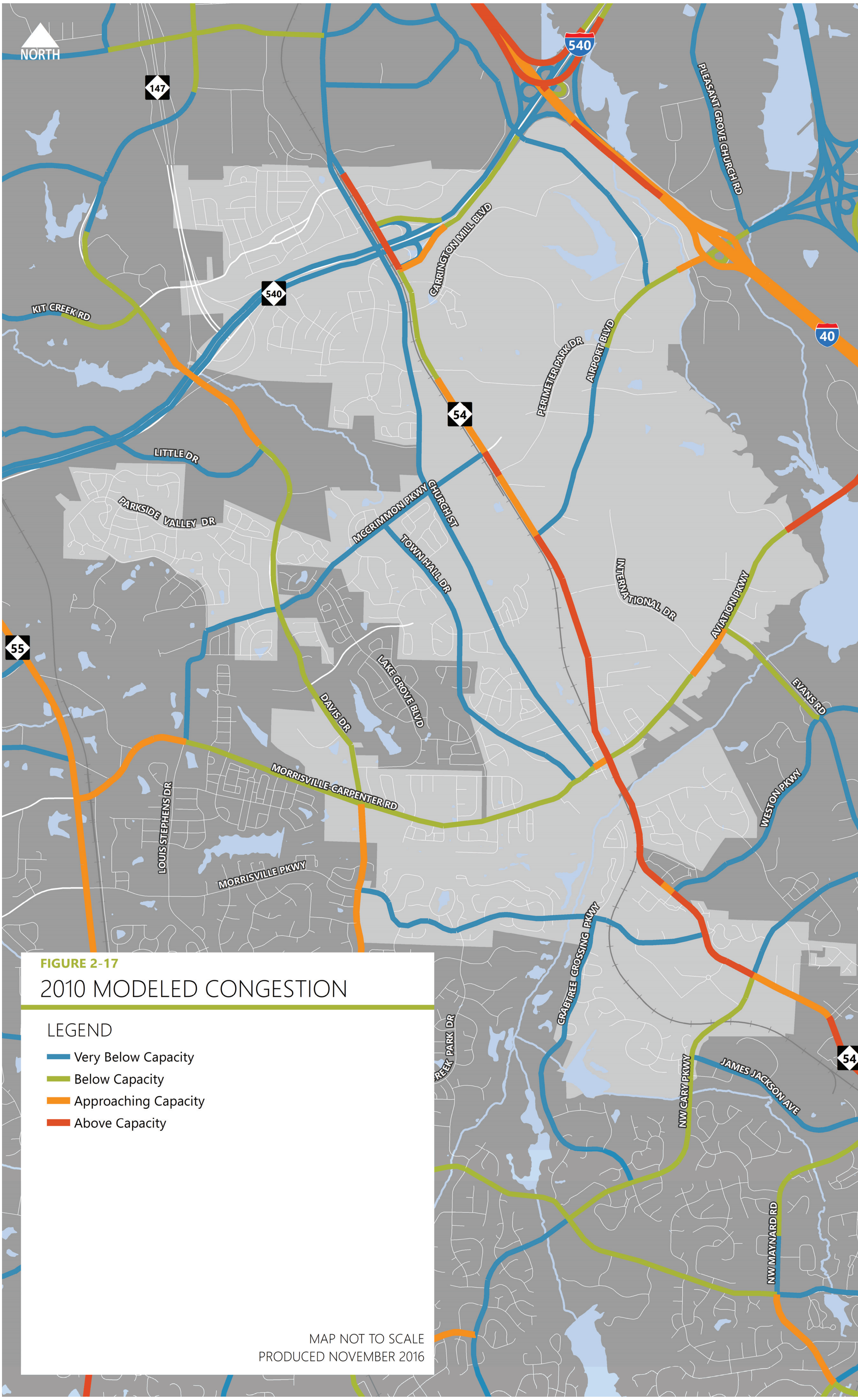
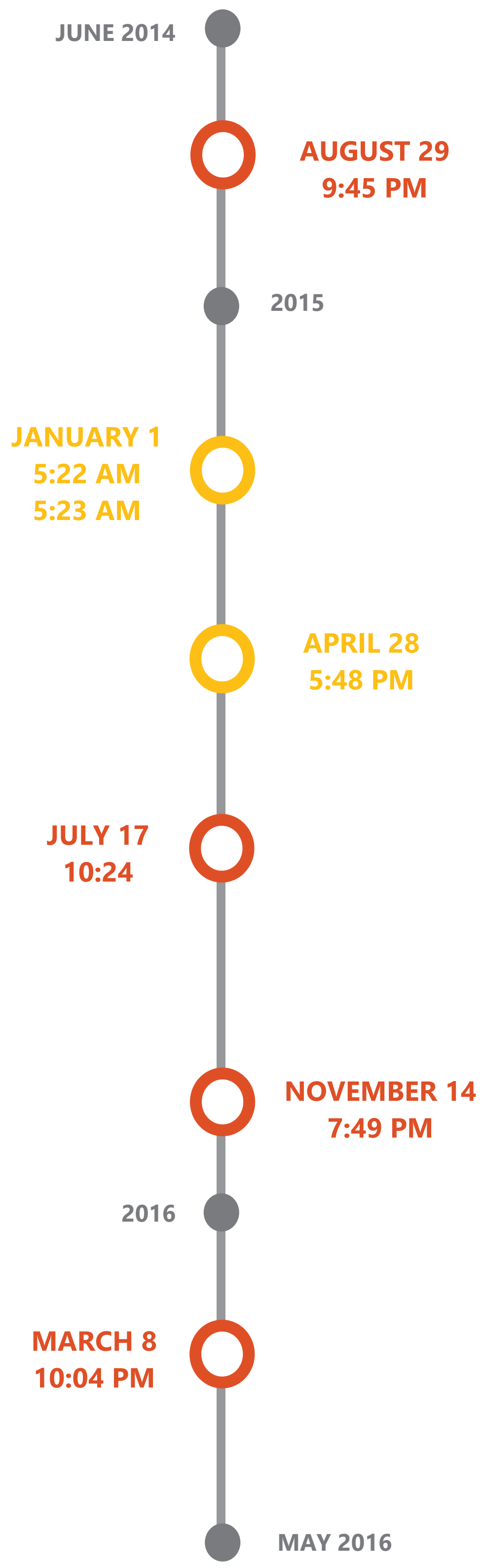


FIGURE 2-17

2010 MODELED CONGESTION

Figure 2-18: Timeline of Crashes Resulting in Fatalities or Disabling Injuries



Crash Statistics

From June 2013 to May 2016, almost 1,300 crashes were reported on state-maintained roadways within Morrisville's jurisdiction. Of the 1,272 crashes, 7 resulted in fatalities or disabling injuries, 271 resulted in evident injuries or possible injuries, 987 resulted in property damage only, and injuries were unknown for 7. Rear end crashes accounted for nearly half of all the crashes. Angle crashes, left turn crashes, and sideswipes combined make up almost a third of the crashes in Morrisville.

The 7 crashes resulting in fatalities or disabling injuries occurred between August 2014 and March 2016 and are further described in **Table 2-5** and **Figure 2-18**.

Table 2-5: Crashes Resulting in Fatalities or Disabling Injuries

Location	Date	Time	Type	Severity
I-40 WB near Airport Blvd	1/1/2015	5:22 AM	Fixed Object	Disabling Injury
I-40 WB near Airport Blvd	1/1/2015	5:23 AM	Rear End, Slow or Stop	Disabling Injury
I-40 WB near Airport Blvd	3/8/2016	10:04 PM	Rear End, Slow or Stop	Fatal
Morrisville-Carpenter Rd at Railroad Crossing near NC 54	8/29/2014	9:45 PM	RR Train, Engine	Fatal
Morrisville-Carpenter Rd at Railroad Crossing near NC 54	11/14/2015	7:49 PM	RR Train, Engine	Fatal
NC 54 at Carrington Mill Blvd	7/17/2015	10:24 PM	Bicyclist	Fatal
NC 54 at Church St	4/28/2015	5:48 PM	Rear End, Slow or Stop	Disabling Injury

Crash rates for intersections are typically reported as the number of crashes per million entering vehicles (MEV) and are commonly calculated with the following equation:

$$\text{CRASH RATE} = \frac{1{,}000{,}000 \times \text{NUMBER OF CRASHES}}{365 \times \text{NUMBER OF YEARS} \times \text{ENTERING AADT}}$$

Table 2-6 shows the crash rates for intersections in Morrisville where AADT data is available. Intersection crash rates are useful in gauging the relative safety of an intersection in comparison to other intersections in the study area. The crash rates are based on 2013 AADTs and 3-year crash data from June 2013 to May 2016. The average crash rate of studied intersections is 0.79 crashes per million entering vehicles. Despite an average entering AADT, the intersection of NC 54 and Morrisville-Carpenter Road has the highest crash rate, due to its higher than average number of crashes.

Table 2-6: Intersection Crash Rates

Intersection	Entering AADT (2013)	Number of Crashes	Crash Rate (per MEV)
Aviation Pkwy & Evans Rd	22,000	2	0.08
Davis Drive & McCrimmon Pkwy	33,850	49	1.32
Davis Drive & Morrisville Pkwy	37,050	32	0.79
Davis Drive & Morrisville-Carpenter Rd	40,000	62	1.42
I-40 NB Ramps & Airport Blvd	30,600	15	0.45
I-40 SB Ramps & Airport Blvd	40,550	9	0.20
NC 54 & Airport Blvd	24,000	23	0.88
NC 54 & Cary Pkwy	40,500	55	1.24
NC 54 & Morrisville Pkwy	27,500	36	1.20
NC 54 & Morrisville-Carpenter Rd	33,500	72	1.96
NC 540 EB Ramps & NC 54	24,100	0	0.00
NC 540 WB Ramps & NC 54	27,400	1	0.03

Figure 2-19 and **Figure 2-20** below depict the number of crashes by severity and by type. Crash type and severity are important factors to consider when performing a granular analysis to identify trends and determine safety countermeasures for intersections and corridor segments.

Figure 2-19: Crashes by Severity

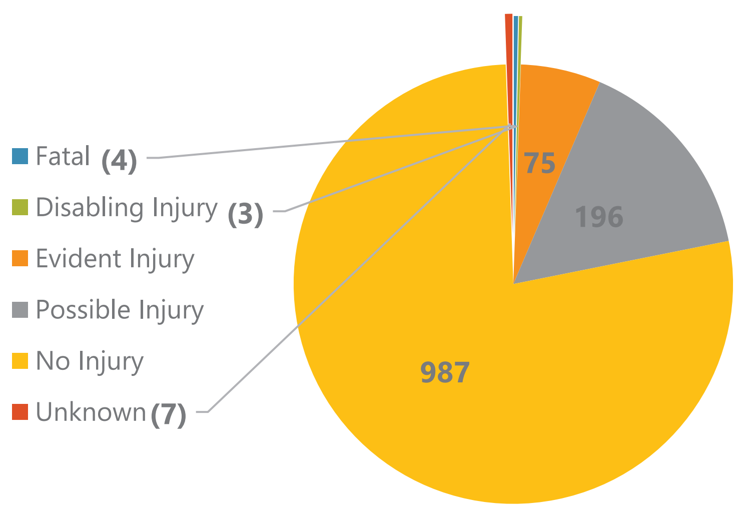
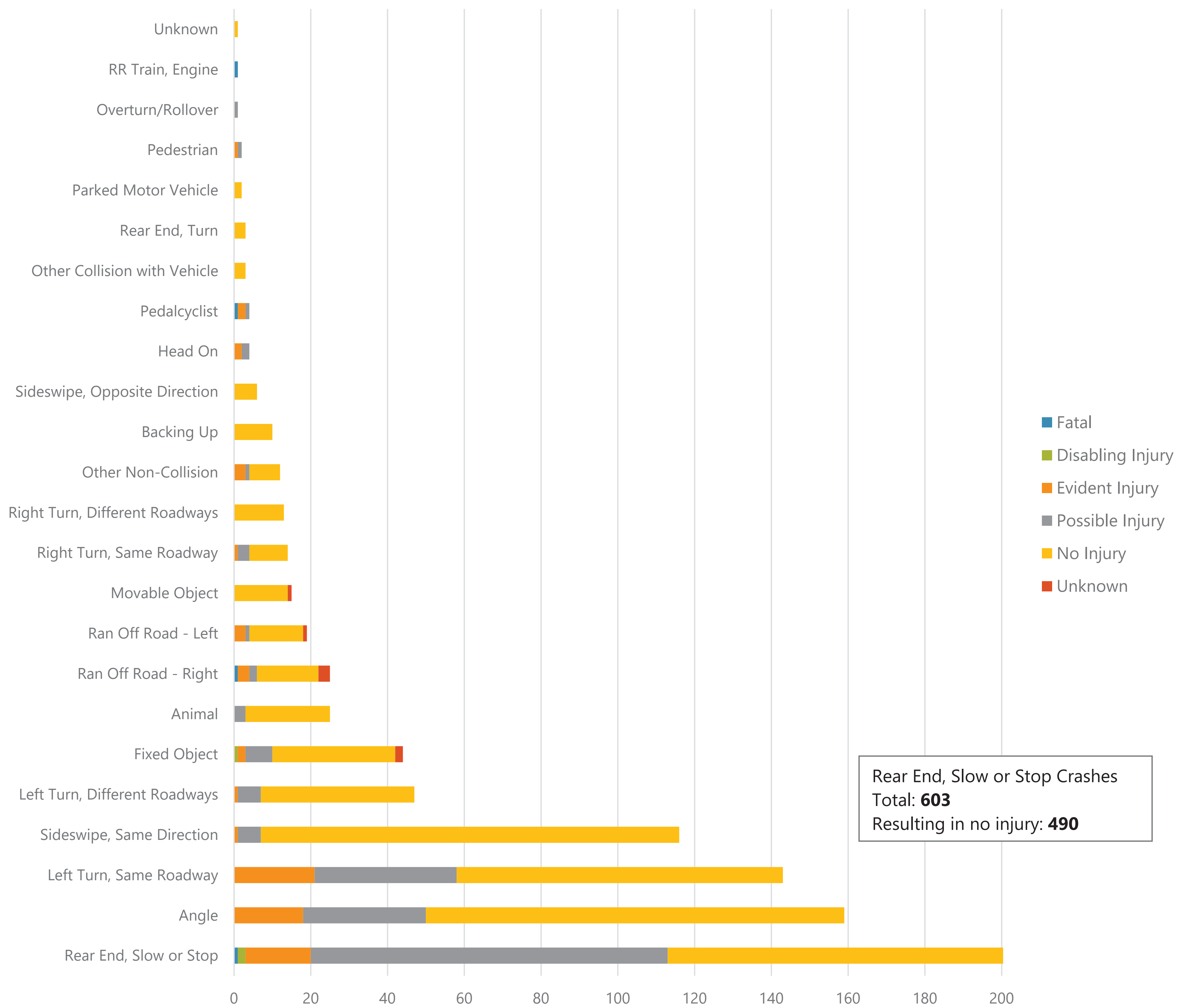


Figure 2-20: Crashes by Type



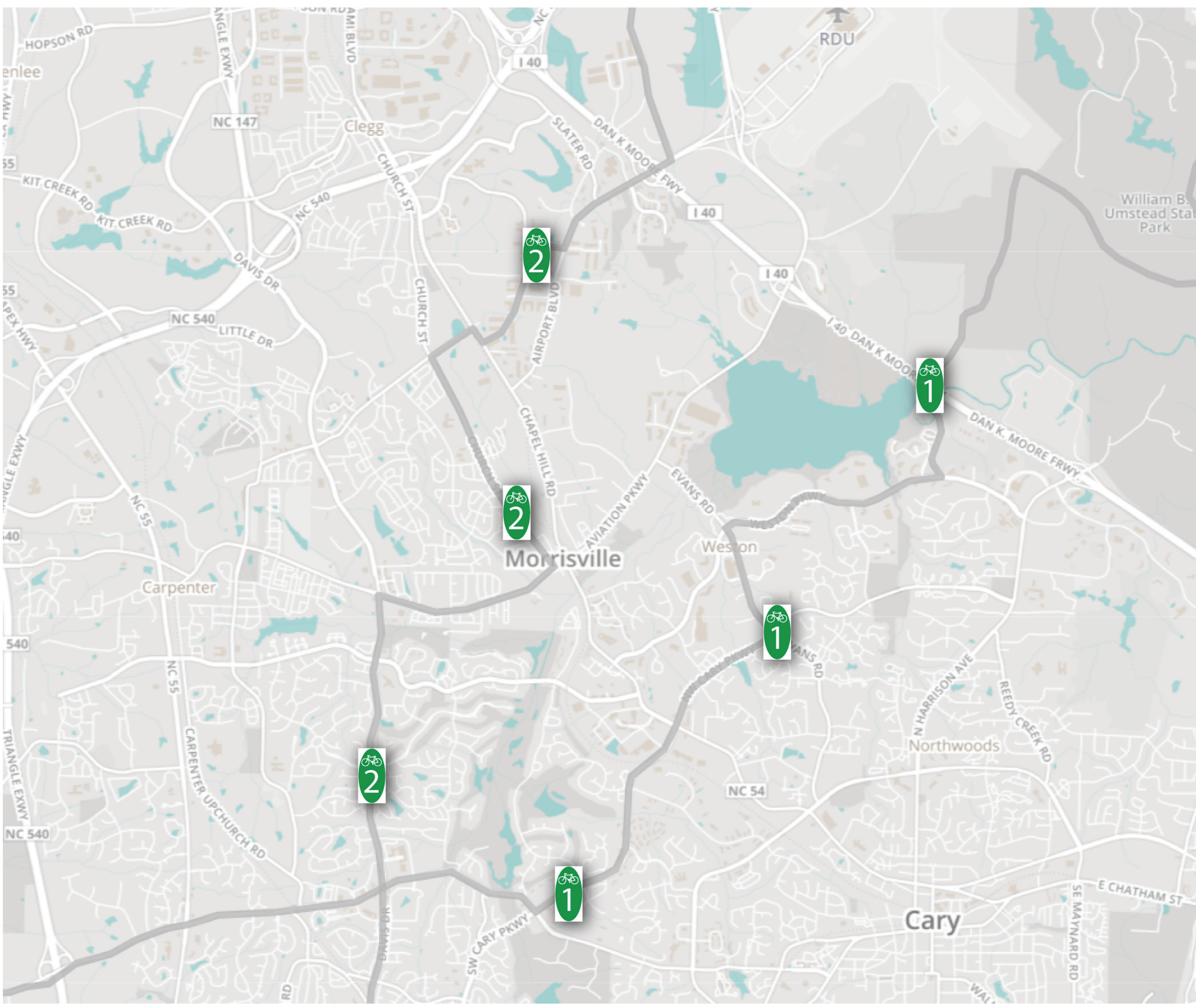
Sidepath and Bicycle Network

Two North Carolina bicycle routes run through Morrisville: Carolina Connection (NC Bike Route 1) and Mountains to Sea (NC Bike Route 2). The Mountains to Sea route spans more than 700 miles from the Town of Murphy in the southwest part of the state to the Town of Manteo in the Outer Banks. In Morrisville, the route follows Morrisville-Carpenter Road, Church Street, Watkins Road, Perimeter Park Drive, and Airport Boulevard. **Figure 2-21** displays the state designated bike routes.

Figure 2-22 shows Morrisville's existing sidepath and bicycle network. The network consists of sidepaths (wide paths adjacent to roadways), greenways (paved trails not adjacent to roadways), and on-street bike facilities.

The pedestrian and bicycle network includes two connected greenways. The Indian Creek Greenway is 1.8 miles in length and runs alongside Town Hall Drive from Morrisville-Carpenter Road to McCrimmon Parkway. The Shiloh Greenway is 1.7 miles in length and runs alongside and through a power easement from McCrimmon Parkway near Town Hall Drive north to Weaver Forest Way near NC 540. Additionally, construction on the Crabtree Creek and Hatcher Creek Greenways began in 2017. The new greenways will provide an east-west connection through Morrisville from Lake Crabtree to the Town of Cary's greenway system.

Figure 2-21: State Designated Bike Routes



Source: https://www.ncdot.gov/bikeped/ncbikeways/about

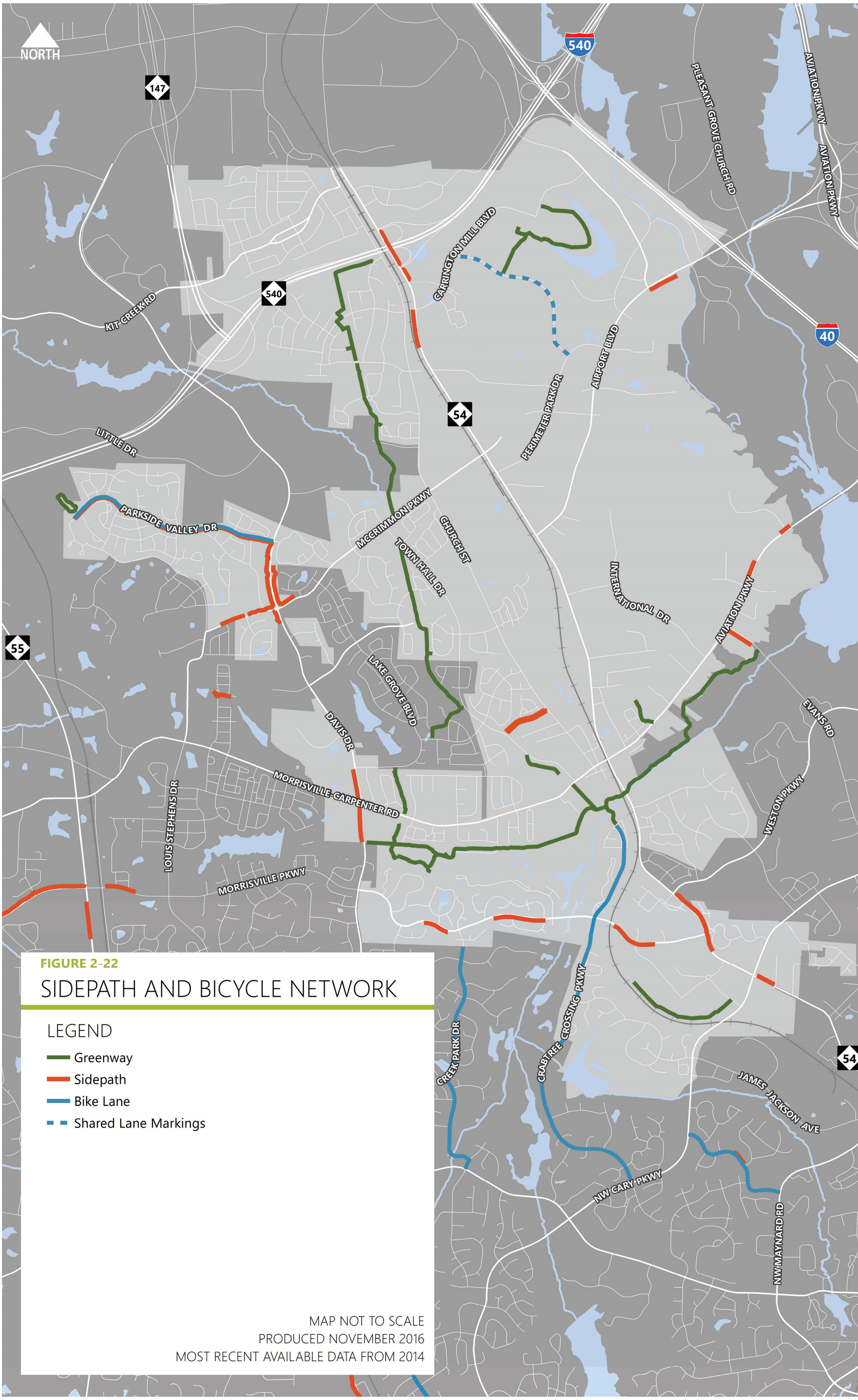


FIGURE 2-22

SIDEPATH AND BICYCLE NETWORK

Public Transit

Morrisville's residents have limited options when it comes to taking public transit. GoTriangle is the only transit service provider that connects directly to the Town. GoDurham and GoCary offer greater connectivity to residents traveling from Morrisville to adjacent locations, while GoWake Access is an option for non-urbanized Wake County residents to travel to Morrisville.

GOTRIANGLE

GoTriangle is the transit service provider for the Triangle region, reaching as far as Mebane to the west and Zebulon to the east. **Figure 2-23** and **Table 2-7** present the GoTriangle routes as of November 2016 that connect to Morrisville and their corresponding bus stops. These routes serve bus stops located in the northern part of Morrisville.

Table 2-7: GoTriangle Routes and Stops Serving Morrisville[1]

Name	Bus Stops in Morrisville
Apex-RTC[3]	NC 54 at Shiloh Glenn Dr
North Raleigh-RTC[3]	
RTP[2] Shuttle	
Cary-Raleigh	3015-3020 Carrington Mill Blvd Carrington Mill Blvd at Paramount Pkwy Paramount Pkwy at Time Warner Cable Paramount Parkway at Perimeter Park Drive
Raleigh-Airport-RTC[3]	Copley Pkwy at Morrisville Outlets
Raleigh-RTC[3]	Factory Shops Drive at Morrisville Outlets

[1] GoTriangle routes as of November 2016
[2] Research Triangle Park
[3] Regional Transit Center

GOCARY

GoCary, formerly known as C-TRAN, provides fixed route bus service along six routes in Cary. However, none of GoCary's routes currently connect to Morrisville. Travelers wishing to ride the bus to Cary from Morrisville or vice versa must use GoTriangle RTC-Cary-Raleigh or transfer between GoTriangle and GoCary routes.

GODURHAM

GoDurham provides transit service to Durham County via 15 bus routes. Taking the bus between Morrisville and Durham requires transferring from a GoTriangle route to a GoDurham route, to the GoTriangle Durham-RTC, or to the GoTriangle route DRX (Durham-Raleigh Express).

GOWAKE ACCESS

GoWake Access provides demand-response transit service on weekdays to residents in non-urbanized Wake County. While GoWake Access isn't available to Morrisville residents, the demand-response transit service is available to those who wish to visit Morrisville but live in unincorporated Wake County.

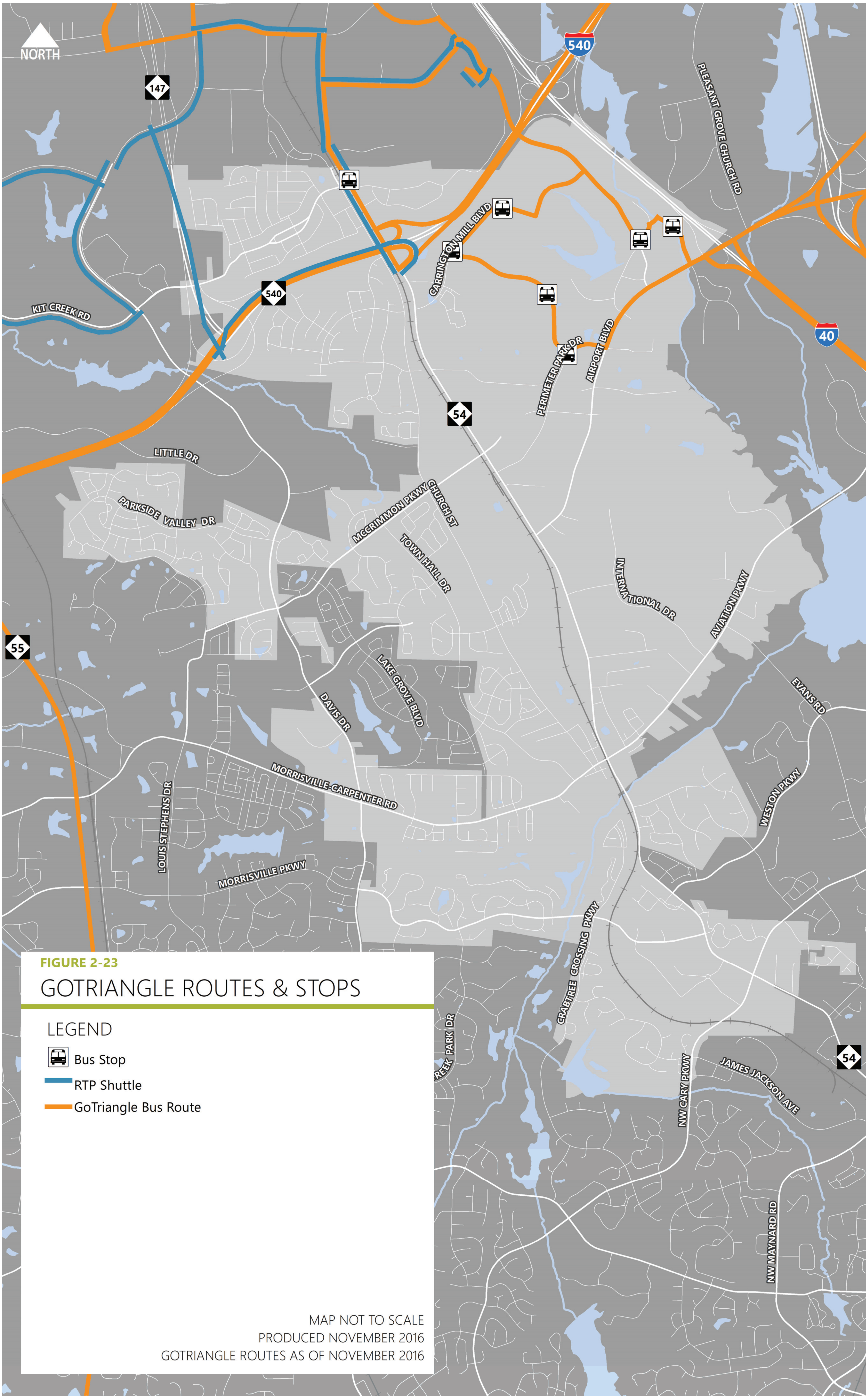


FIGURE 2-23

GOTRIANGLE ROUTES & STOPS

LEGEND

- Bus Stop
- RTP Shuttle
- GoTriangle Bus Route

MAP NOT TO SCALE
PRODUCED NOVEMBER 2016
GOTRIANGLE ROUTES AS OF NOVEMBER 2016

Railroads

The North Carolina Railroad (NCRR) Corridor runs through Morrisville along the west side of NC 54. Operated by Norfolk Southern, the NCRR Corridor connects Charlotte to Morehead City with several other cities in between including Durham and Raleigh. Passenger rail service also runs along this rail line, connecting Charlotte and Raleigh via the Piedmont and Charlotte, Raleigh, and New York City via the Carolinian.

The United States Department of Transportation estimates that 12 trains travel through Morrisville between 6 AM and 6 PM and 4 trains travel through Morrisville between 6 PM and 6 AM on an average day. Six passenger trains travel through Morrisville on a typical day. Detailed in **Table 2-5** of the Crash Statistics section, the most recent motor vehicle-train collision occurred in November 2015 at Morrisville-Carpenter Road near NC 54.

There are six rail crossing locations in Morrisville, shown in **Figure 2-24** and **Table 2-8**. Three are grade-separated and three are at-grade (two public and one private). The at-grade crossing on McCrimmon Parkway has been funded as part of the STIP and is anticipated to become grade-separated in 7 to 10 years.

Table 2-8: Rail Crossing Locations

Location	Type	Crossing ID
McCrimmon Pkwy near NC 54	At-grade	734750N
Morrisville-Carpenter Rd near NC 54	At-grade	734753J
Morrisville Pkwy EB east of Crabtree Crossing Pkwy	Grade-separated	946853A
Morrisville Pkwy WB east of Crabtree Crossing Pkwy	Grade-separated	904436A
NC 540 EB between Church St and NC 54	Grade-separated	946850E
NC 540 WB between Church St and NC 54	Grade-separated	929899U
NW Cary Pkwy NB west of Village Market Place	Grade-separated	946854G
NW Cary Pkwy SB west of Village Market Place	Grade-separated	929902A
Truss Builders Driveway (Private Crossing)	At-grade	N/A

McCrimmon Parkway near NC 54


Morrisville-Carpenter Road near NC 54

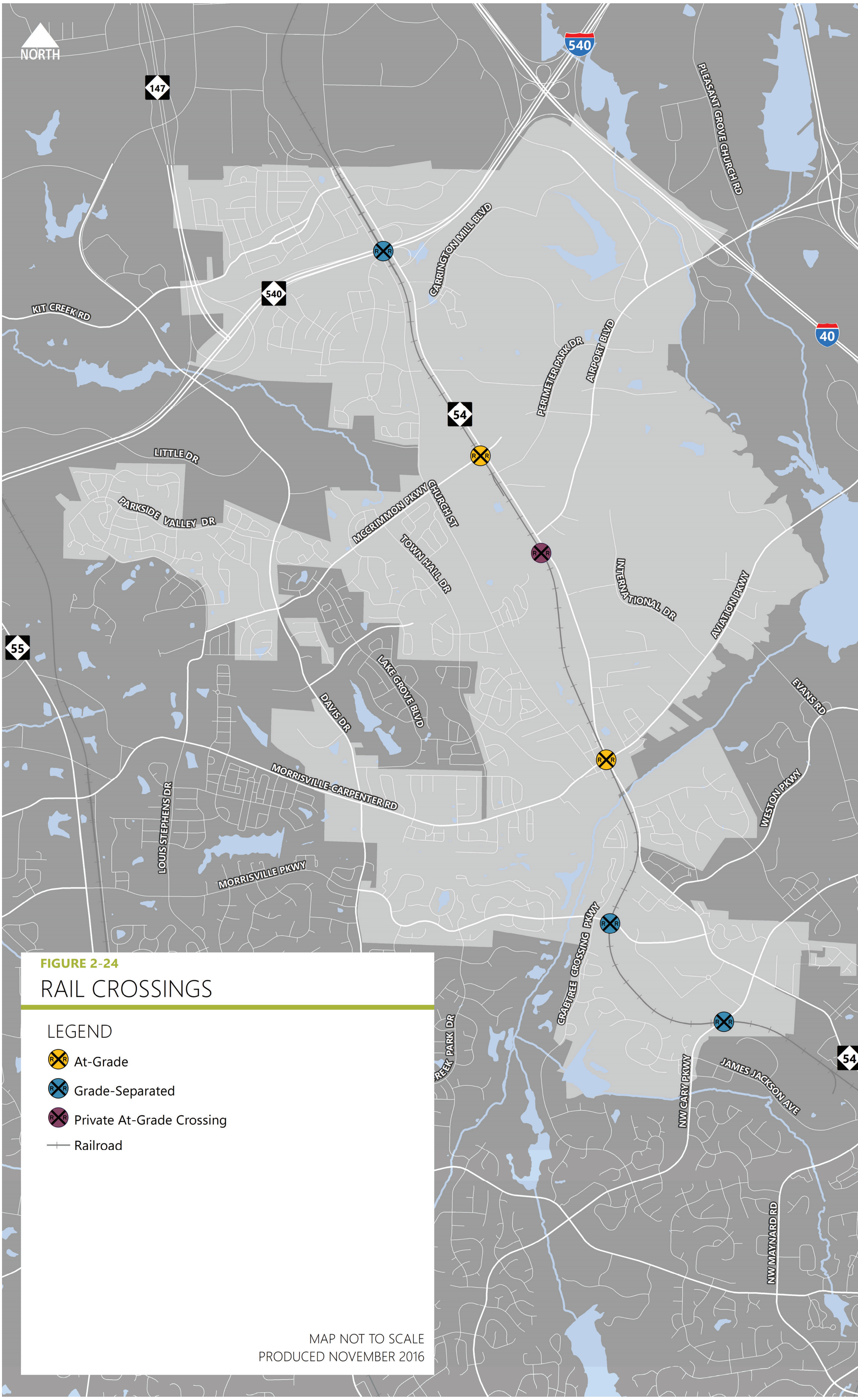


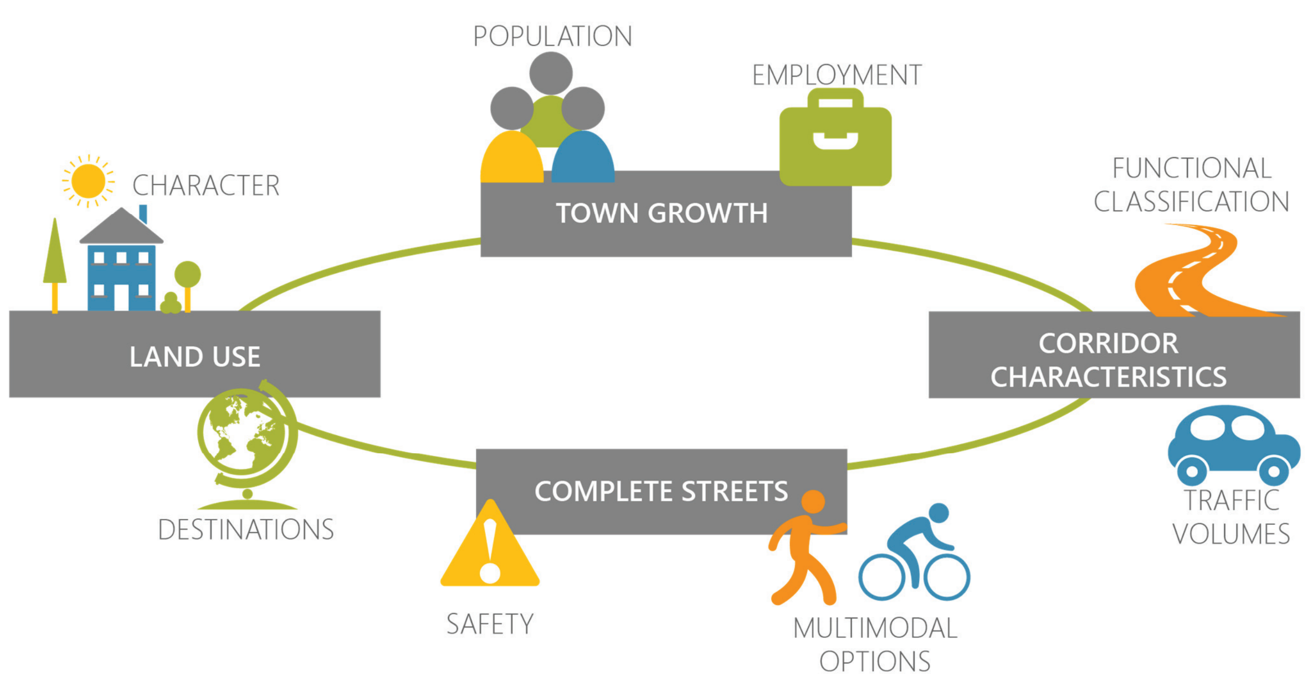
FIGURE 2-24
RAIL CROSSINGS

INTRODUCTION

The interest in creating "complete streets" continues to grow in Morrisville. The National Complete Streets Coalition defines a complete street as a street that enables all users (pedestrians, bicyclists, motorists, and transit riders) of all ages and abilities to safely move along and across a street. Roadways with lower travel speeds and greater access points (e.g. local streets and collectors) provide the greatest opportunities for developing complete streets. However, all functional classifications warrant consideration of multimodal users. Since the Town's last transportation plan, the North Carolina Department of Transportation (NCDOT) has reaffirmed this approach through the development of *Complete Streets Planning and Design Guidelines* in 2012, and more recently in May 2014 through the development of expanded highway cross sections as part of NCDOT's standard cross sections.

Chapter 3: Roadways directly links to **Chapter 4: Alternative Travel Modes** to advance this complete street concept. Recommendations for the future multimodal system consider roadways at a corridor level and provide improvements for all travel modes along the corridor in a way that is compatible with surrounding land uses. **Figure 3-1** below displays the topics considered when developing roadway recommendations for the ***Town of Morrisville Comprehensive Transportation Plan***.

Figure 3-1: Elements Considered for Recommendations Development



TOWN GROWTH

Chapter 2: Existing Conditions describes the current conditions and needs of the region's transportation network. While Morrisville's population growth rate has slowed in more recent years, it still continues to outpace Wake County and the state as a whole, which is one of many indicators that the area will continue to be attractive for potential residents and employers. Projected population and employment growth has been documented within the regional travel demand model, which was run for the future year 2040. This run was performed with the existing transportation network in place, exclusive of those roadway projects that are currently committed or under construction. This model run considers the transportation network as of 2010, which is the approved base year of the model. The map highlights the deficiencies that the transportation network will likely face from a congestion perspective in 2040.

The Town's and greater Triangle Region's growth through 2040 has a dramatic effect on the roadway network. Without improvements to the network, corridors such as McCrimmon Parkway, NC 54, and Davis Drive will experience significant congestion. The plan's roadway recommendations were developed in part to address these congestion needs and allow the roadway network to better serve Morrisville residents.

COMMITTED ROADWAY IMPROVEMENTS

The State Transportation Improvement Plan (STIP) is North Carolina's state and federally-mandated plan that identifies the funding levels, time periods, and project phases for transportation projects throughout the state. This list is updated regularly. The most recent version of the STIP as of the time of this writing (August 2017) was considered for this plan. Several roadway projects in the Town of Morrisville are slated for design, right-of-way acquisition, or construction funding during the life of the STIP. **Table 3-1** lists the projects included in the STIP during the period between 2018-2027. The funding displayed in **Table 3-1** is only the STIP funds allocated to the project, and does not reflect local funds that may be dedicated to these projects.

In addition to leveraging federal and state funding, the Town of Morrisville aggressively looks for additional funding sources. These local funds are used to leverage larger state and federal funding amounts, to increase competitiveness for regional grant funding such as the Locally Administered Projects Program (LAPP), and to fully fund and implement projects locally. Recent success in obtaining local funding can be partially attributed to the $20 million bond referendum approved by citizens in the Town of Morrisville in 2012 to renovate the Morrisville Aquatics and Fitness Center and to extend McCrimmon Parkway to Aviation Parkway at Evans Road.

The roadway projects that are currently committed within the Town of Morrisville are projected to result in a beneficial reduction in congestion levels in the future. The regional travel demand model was updated to reflect the committed projects, and then run with 2040 population and employment growth included. **Figure 3-2** shows the results of this model run. Notable congestion decreases can be seen along committed corridors such as Morrisville-Carpenter Road, Aviation Parkway, McCrimmon Parkway, and NC 54.

Table 3-1: Town of Morrisville Committed Roadway Projects

STIP ID	PROJECT NAME	FROM	TO	YEAR	FUNDING
I-5700	Airport Boulevard Interchange at I-40	Pleasant Grove Church Road	Slater Road	2019	$35,220,000
U-5811	Aviation Parkway Widening	I-40	NC 54	2023	$28,787,000
U-5627	Louis Stephens Drive Extension	South of Little Drive	Poplar Pike Lane	2019	$3,036,000
U-5828[1]	McCrimmon Parkway Extension	Airport Boulevard	Aviation Parkway	2018	$11,870,000
U-5747A	McCrimmon Parkway Widening	Church Street	West of Davis Drive	2021	$13,000,000
U-5618[1]	Morrisville-Carpenter Road Widening	NC 54	Davis Drive	2018	$11,000,000
U-5966[2]	NC 147 Extension	NC 540	Davis Drive at Little Drive	2023	$57,850,000
U-5747B	NC 54 & McCrimmon Parkway Grade Separation	n/a	n/a	2021	$20,702,000
U-5750	NC 54 Widening	NC 540	Perimeter Park Drive	2021	$25,336,000
n/a [1]	Slater Road at Airport Boulevard Traffic Signal	n/a	n/a	2017	$85,750

[1]These projects have Town funding participation.

[2] The NC 147 Extension (U-5966) alignment is shown as adopted in the CAMPO 2045 MTP. The NCDOT has not finalized an alignment for the extension at this time.

Source: NCDOT State Transportation Improvement Program, Adopted August 2017

Other Relevant Committed Roadway Projects

In addition to the above projects, NCDOT has three projects along I-40 that will impact the Town. I-40 interchange improvements at both Aviation Parkway and Airport Boulevard are scheduled to begin construction in 2018 and 2019, respectively. In addition, plans exist to widen the segment of Interstate 40 that lies between the Town of Morrisville and the Raleigh-Durham International Airport, to include auxiliary lanes between Harrison Avenue and Aviation Parkway, and the construction of managed lanes between Wade Avenue and I-540.

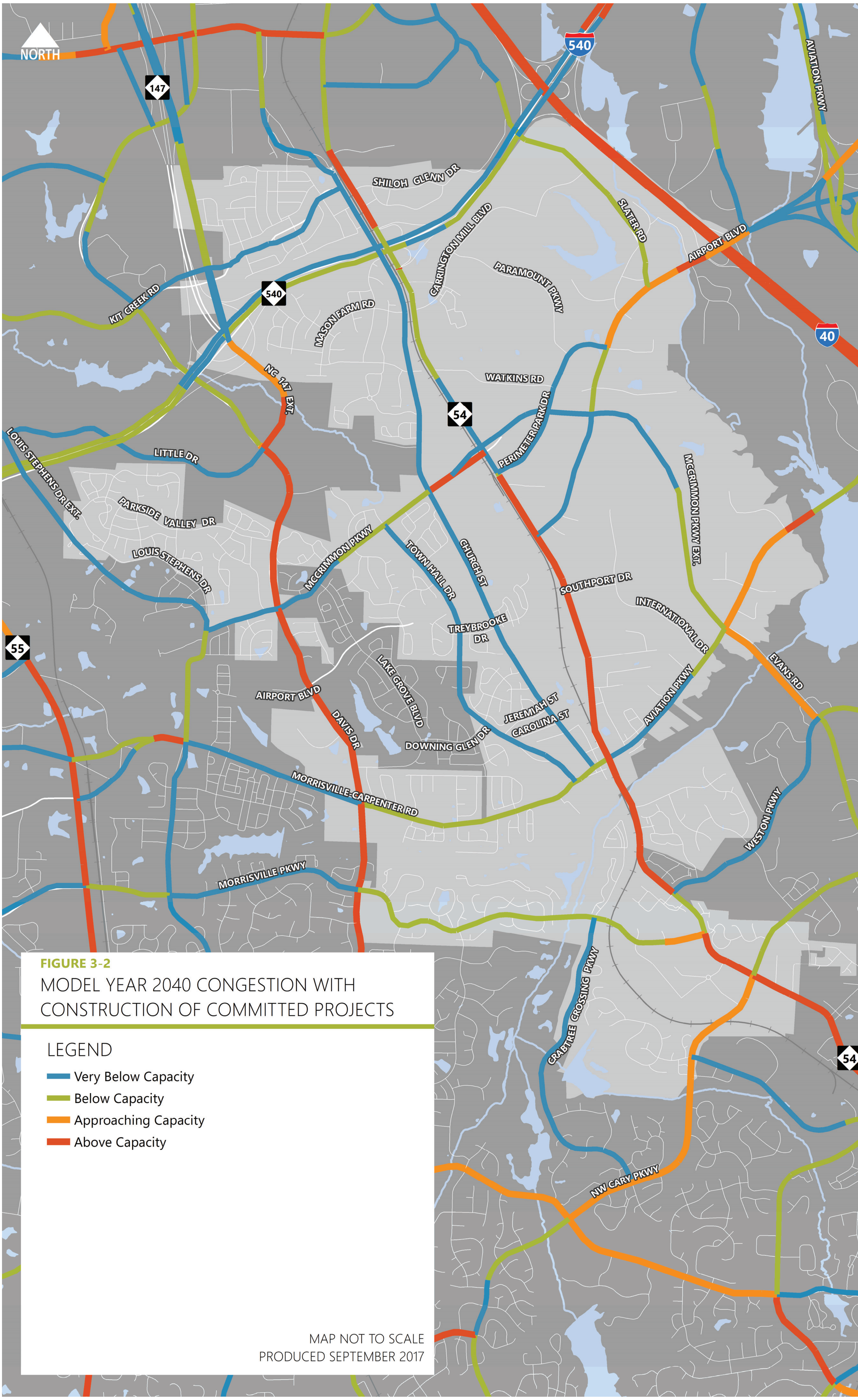


FIGURE 3-2
MODEL YEAR 2040 CONGESTION WITH CONSTRUCTION OF COMMITTED PROJECTS

TRANSPORTATION AND LAND USE

The transportation system influences development patterns by dictating the fastest, most convenient, and safest routes of travel. Available travel modes also influence development patterns. People who desire daily services accessible by foot, bike, or public transit choose to live in different locations than people who prefer to drive to these destinations. As transportation corridors are improved and expanded, new development often follows. This push-pull relationship typically results in concentrated growth along major thoroughfares as residents seek to take advantage of the most convenient transportation facilities. When blended with a supportive policy and investment strategy, the transportation network can serve as an effective tool for guiding Town development.

CORRIDOR CHARACTERISTICS

As the Town's economy expands and people continue to relocate here, the frequency and length of trips on existing roads will increase. This increase will make current delays worse and create new delays where none exist today. Understanding the system's existing characteristics allows us to better anticipate future areas of concern. Once these areas are identified, establishing a set of transportation recommendations requires consideration of how the Town's roads are classified and an understanding of how to balance the needs of multiple users along a given corridor.

Street Hierarchy

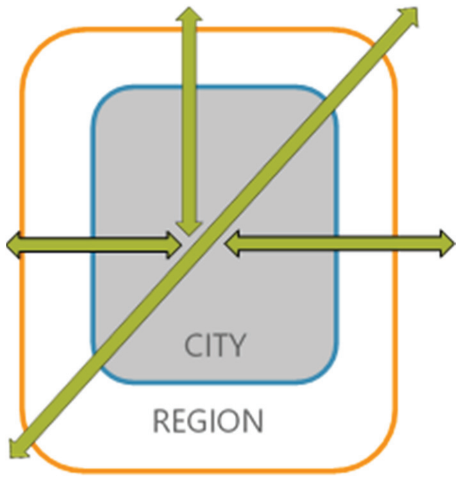
An effective roadway network must manage two competing demands:

- Providing access to specific destinations
- Offering mobility between major employment and activity centers

These two demands are inherently adversarial (e.g. increasing access typically limits mobility along the same corridor). Therefore, it is helpful to instill diversity into the network by providing easy access on some roads and protecting the mobility on others. Balancing access and mobility creates roadways that respond to the unique context and user groups along specific corridors. A functional classification system categorizes roadways based on characteristics such as speeds, vehicular capacities, and relationships with adjacent land uses. Federal funding programs use traditional roadway functional classification to help determine eligibility. For this reason, among others, functional classification will always be necessary and should be consistently updated. Understanding a street's place within the hierarchy of streets offers insight to help balance competing interests between design features, travel modes, and available right-of-way. The Town of Morrisville's street hierarchy is made up of five classes:

- Freeways
- Major Thoroughfares
- Minor Thoroughfares
- Collector Streets
- Local Streets

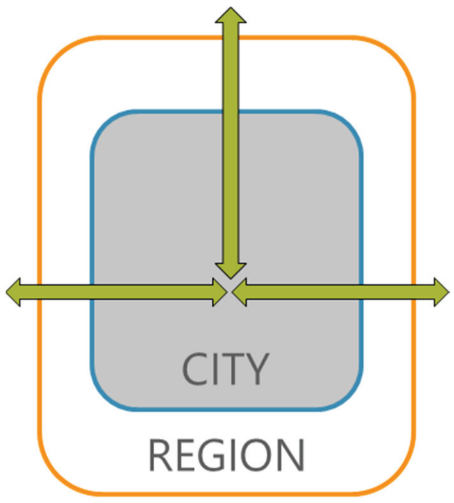
The following graphics and tables provide more detail about the street hierarchy. **Figure 3-3** displays street hierarchy for roadways within the Town of Morrisville. The future street hierarchy reflects proposed changes to the transportation network discussed in this chapter.



FREEWAYS

- Controlled access
- Multi-lane roadways for higher speeds and longer distance travel
- Carry traffic through the Triangle region

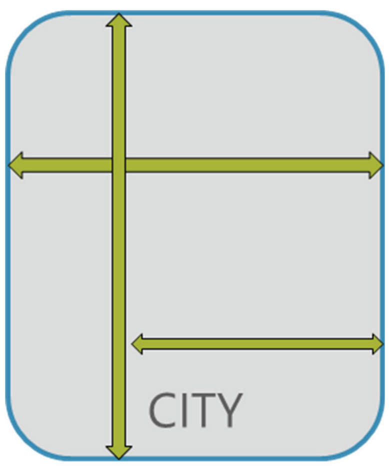
NCDOT Functional Classification	Freeway & Interstate
Local Examples	I-40 & NC 540
Number of Lanes	4+ travel lanes
Other Considerations	Partial or full access control, exclusive to motorized vehicular travel



MAJOR THOROUGHFARES

- Partial or no access control
- Sometimes include a landscaped center median
- Accommodate traffic in and out of the Town

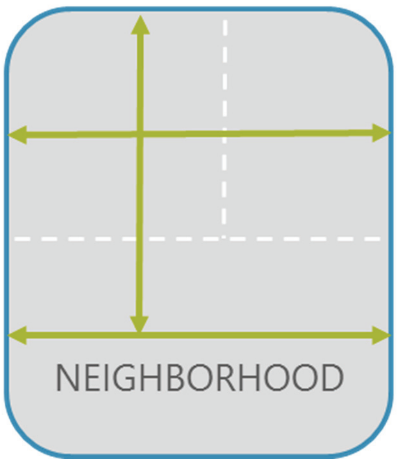
NCDOT Functional Classification	Principal Arterial
Local Examples	NC 54 & Aviation Parkway
Number of Lanes	4+ travel lanes
Other Considerations	Relatively high traffic volumes



MINOR THOROUGHFARES

- Offer balance between providing local land access and moving people and goods
- Have lower travel speeds and traffic volumes than Major Thoroughfares
- Tend to be limited in width by the built environment they serve

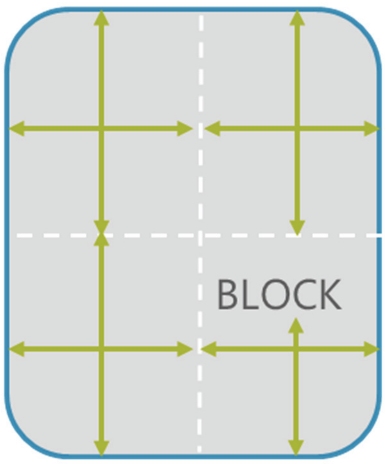
NCDOT Functional Classification	Minor Arterial
Local Examples	Town Hall Drive & Morrisville Parkway
Number of Lanes	2-4 travel lanes
Other Considerations	Logical cap to number of lanes provided



COLLECTOR STREETS

- Connect neighborhood traffic to points within and between existing neighborhoods
- Balance mobility and access by supporting local development at the neighborhood level
- Primarily a conduit for local traffic to connect to thoroughfares
- Include slower travel speeds

NCDOT Functional Classification	Collector
Local Examples	Church Street & Parkside Valley Drive
Number of Lanes	2-3 travel lanes
Other Considerations	Logical cap to number of travel lanes provided



LOCAL STREETS

- Local, slow-moving streets
- Exclusive purpose is to provide block-level, local access, and safe connectivity to higher order streets

NCDOT Functional Classification	Local
Local Examples	Keybridge Drive & Weaver Forest Way
Number of Lanes	2-3 travel lanes
Other Considerations	Logical cap to number of travel lanes provided

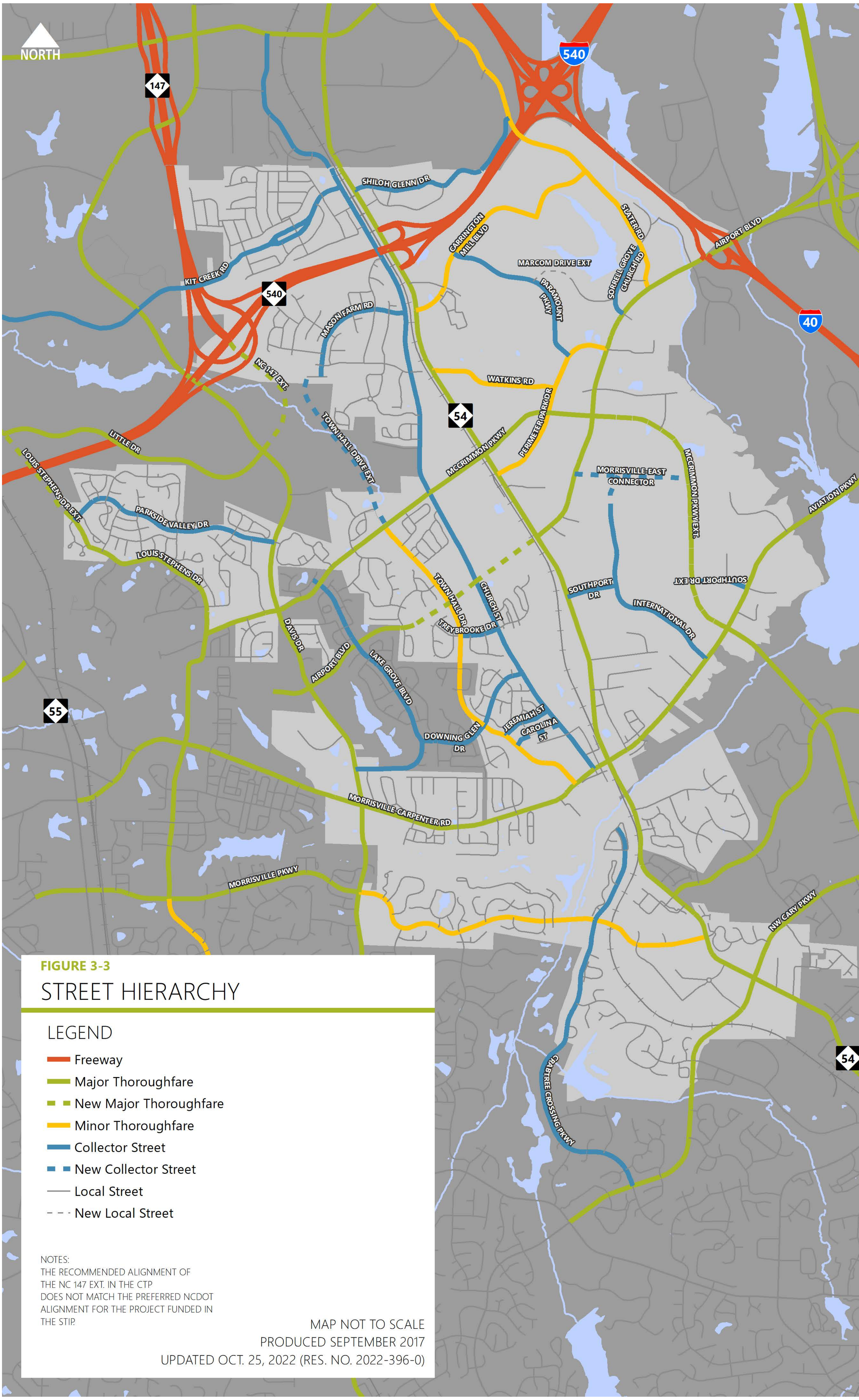


FIGURE 3-3
STREET HIERARCHY

Street Design Guide

As recommendations are identified for the roadway network, it is important to consider their future design and function. The ***Town of Morrisville Comprehensive Transportation Plan*** does this by developing a series of standardized cross-sections consistent with those being used by the Capital Area Metropolitan Planning Organization (CAMPO) and NCDOT. **Table 3-2** presents a context-based guide for the application of these standardized cross-sections in the Town of Morrisville. This table offers a greater understanding of how street design can complement the land use context of a given area, which in turn offers an expression of consistency with stated NCDOT policy for design elements as well as complete street objectives outlined in the *NCDOT Complete Streets Planning and Design Guidelines*. The table is organized around the Town of Morrisville's street hierarchy, shown in **Figure 3-3**. While there are always exceptions, establishing these standardized cross-sections and their appropriate context will be beneficial as future improvements or growth is considered in the Town.

The illustrative cross-sections matching the street hierarchy columns can be found in **Appendix B**.

Table 3-2: Street Design Guide

ID	BICYCLE & PEDESTRIAN	POSTED SPEED	STREET HIERARCHY			
			MAJOR THOROUGHFARE	MINOR THOROUGHFARE	COLLECTOR STREET	LOCAL STREET
2A	5' Sidewalk	35 or less			○	●
2B	5' Bike Lane, 5' Sidewalk	25-45			●	○
2C	Parking Both Sides, 5' Sidewalk	35 or less			●	○
2D	Parking One Side, 5' Sidewalk	35 or less			●	○
2E	Median, 5' Bike Lane, 5' Sidewalk	25-45			●	○
3A	Share the Road, 5' Sidewalk	25-45		○	●	
4A	Median, Wide Outside Lanes, 5' Sidewalks	35-45	○	●		
4B	Median, 5' Sidewalk, Sidepath	35-45	●	●		
4C	Median, Wide Outside Lanes, Sidepaths	35-55	●	○		
5A	Wide Outside Lanes, 5' Sidewalks	35-45	○			
6A	Median, Dedicated Bus Lanes, 10' Sidepaths	35-55	●	○		

● Primary Cross-Section

○ Secondary Cross-Section

RECOMMENDED THOROUGHFARE IMPROVEMENTS

Recommendations along thoroughfares are grouped into three categories:

- Roadway Widening
- Access Management
- New Alignment

The recommendations in this section are intended to alleviate future congestion concerns by adding capacity through roadway widening or new location facilities and easing traffic flow through access management strategies. **Table 3-3** lists improvements to the thoroughfare network, while **Figure 3-4** displays recommended projects along with previously committed projects. More information on the recommendations can be found on individual project sheets in the **Appendix C**.

Table 3-3: Recommended Thoroughfare Improvements

CORRIDOR	FROM	TO	IMPROVEMENT	LENGTH
Airport Boulevard	Factory Shops Rd	Slater Rd	Access Management	0.25 mi
Airport Boulevard	Slater Rd	NC 54	Access Management	1.44 mi
Airport Boulevard Extension Phase 1	NC 54	Church St	New Location	0.43 mi
Airport Boulevard Extension Phase 2	Church St	Current Terminus near Garden Square Lane	New Location	0.34 mi
Davis Drive	Development Dr	Morrisville-Carpenter Rd	Widening	3.88 mi
Louis Stephens Drive	Poplar Pike Ln	McCrimmon Pkwy	Widening	0.89 mi
NC 54	Northern Town Limits near Shiloh Glenn Dr	NC 540	Widening	0.46 mi
NC 54	Perimeter Park Dr	Weston Pkwy	Widening	2.39 mi
NC 54	Weston Pkwy	NW Cary Pkwy	Widening	0.62 mi
NC 54	NW Cary Pkwy	Wilson Rd	Widening	0.30 mi

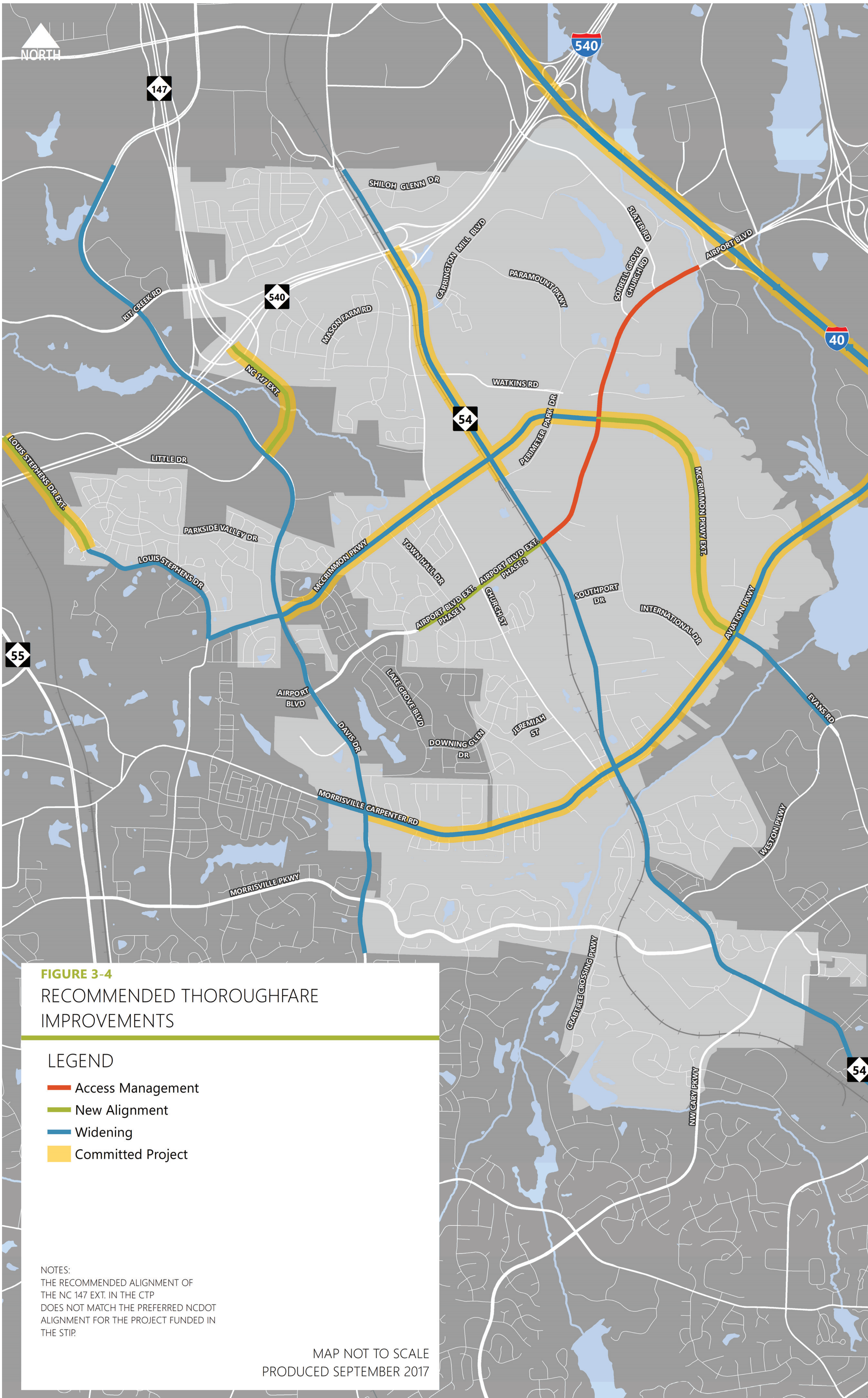


FIGURE 3-4
RECOMMENDED THOROUGHFARE IMPROVEMENTS

INTERSECTION-LEVEL IMPROVEMENTS

Recommendations for the future system include improvements to critical intersections and interchanges. These locations were identified due to operational deficiencies and safety concerns, evaluated based on crash data from a three-year period as well as feedback from the public and stakeholders. Additional details on intersection improvements and appropriate countermeasures will need to be determined through more in-depth safety and traffic analyses as the project progresses to design and construction. **Table 3-5** includes the list of intersections recommended for improvement. These recommendations are in addition to those already included as committed improvements.

Best Practices: Safety Improvements

Enhancing travel safety is an important outcome of any long-range transportation plan. Through consultation with local officials, residents, and Town staff, the ***Town of Morrisville Comprehensive Transportation Plan*** identified intersections for safety improvements. Though the ultimate redesign of an intersection will have to be finalized after a detailed study, there are several standard countermeasures to improve safety and operations. The intersections listed in **Table 3-5** warrant further study, and countermeasures other than those listed in **Table 3-4** may be studied and recommended. While not a comprehensive list of all improvement countermeasures, standard intersection improvement countermeasures are listed in **Table 3-4**.

Table 3-4: Standard Intersection Improvement Countermeasures

COUNTERMEASURE	DESCRIPTION
Realignment	Roadways are realigned to meet as close to a 90-degree angle as possible. This improves visibility and turning radius.
Signalization	Some non-signalized intersections may be eligible for a traffic signal based on full evaluation of the nine MUTCD signal warrants. The signal warrants covered in Chapter 4C of the MUTCD include a variety of factors such as vehicular volume, pedestrian volume, and crash history.
Improved Crossings	Often the danger to pedestrians and bicycles can be reduced by providing improved crossing facilities, such as painted crosswalks and median refuges.
Roundabouts	Replacing a traditional intersection with a roundabout reduces the number of serious crashes while improving traffic flow.
Turn Lanes	Turn lanes allow space for vehicles waiting to turn and reduces the risk of rear-end crashes.
Driveway Consolidation	Curb cuts that are too close to an intersection are consolidated or relocated to reduce the number of turning movements or potential crashes.
Improve/Advance Signage	Providing advanced warning signs or installing reflective backplates on traffic signals can reduce crashes due to reduced visibility.
Restricted Crossing U-Turn Intersection (RCUT)	RCUT intersections, also sometimes referred to as super street intersections, work by redirecting left-turn and through movements from the side street approaches. These movements are accommodated by making a right turn followed by a U-turn maneuver at a median opening downstream. RCUT intersections can improve efficiency and safety of roadways.

Table 3-5: Intersection-Level Improvements

CORRIDOR	IMPROVEMENT
Airport Boulevard & NC 54	Grade Separation
Crabtree Crossing Parkway & Morrisville Parkway	Intersection Improvements
Davis Drive & Parkside Valley Drive	Intersection Improvements
Davis Drive & McCrimmon Parkway	Intersection Improvements
Davis Drive & Morrisville-Carpenter Road	Intersection Improvements
Davis Drive & Morrisville Parkway	Intersection Improvements
McCrimmon Parkway & Church Street	Intersection Improvements
Morrisville-Carpenter Road & NC 54	At-Grade Improvements
Morrisville-Carpenter Road & NC 54	Grade Separation
NC 54 & Keybridge Drive	Intersection Improvements
NC 54 & Morrisville Parkway	Intersection Improvements
NC 54 & NW Cary Parkway	Intersection Improvements
Slater Road & Carrington Mill Boulevard	Intersection Improvements

CONNECTIVITY ENHANCING PROJECTS

Expanding Morrisville's transportation system with an increased number of local and collector streets that connect to other collectors and thoroughfares, in addition to new local to local street connections, will enhance travel for local residents. The ***Town of Morrisville Comprehensive Transportation Plan*** includes a series of recommendations that are primarily intended to address connectivity improvements.

Benefits of Connectivity

A more connected network can relay many benefits to local residents.

- Improved emergency response time.
- Improved options to avoid congested intersections.
- Reduced reliance by local residents on major routes.
- Integrated bicycle and pedestrian facilities.
- Reduced traffic on existing roadways.

Recommended Roadway Extensions

Enhanced connectivity within the Town of Morrisville primarily takes the form of roadway extensions. Within these roadway extensions, there are projects that may serve as attractors for future development, connections between existing neighborhoods, or other linkages between currently disconnected areas. Some of these projects may not respond meaningfully to the full roadway prioritization process, simply because they represent smaller connections. Many of these types of projects can be advanced or considered on a policy level, drawing on feedback from the Town's Planning and Zoning Board and the Town Council.

The roadway extensions identified as needing additional granular level study in order to better understand the potential impacts of improvement are identified in **Table 3-6**. These recommended improvements were identified as part of the public engagement process, included in the 2009 Transportation Plan, or have existing right-of-way for construction.

Table 3-6: Recommended Roadway Extensions

STREET NAME	STREET HIERARCHY	NOTES
International Drive Extension	Collector	International Drive extension is envisioned to be constructed by developers as land develops in this area but may be included in the CIP.
Marcom Drive Extension	Collector	Marcom Drive Extension is envisioned to be constructed by developers as land develops or redevelops in this area but may be included in the CIP.[1]
Mason Farm Road Extension	Collector	Mason Farm Road extension is envisioned to be constructed as a connection to the Town Hall Drive Extension.
Morrisville East Connector	Collector	The Morrisville East Connector is envisioned to be constructed by developers as land develops in this area but may be included in the CIP.
Odyssey Drive Extension	Local	Odyssey Drive Extension is envisioned to be constructed by developers as land develops in this area but may be included in the CIP.
Southport Drive Extension	Collector	Southport Drive Extension is being constructed as part of the McCrimmon Parkway Extension project.
Stockton Gorge Road	Local	The Stockton Gorge Road extension is envisioned to be constructed as a connection to the Town Hall Drive Extension.
Town Hall Drive Extension	Collector	Town Hall Drive extension would provide secondary access to neighborhoods along Church Street between McCrimmon Parkway and NC 540 that currently only have access to one collector street (Church Street).

[1]Resolution 2022-396-0: CTP amendment approved Oct. 25, 2022 removed a portion of Marcom Drive Extension from the plan.

STRATEGIC CORRIDORS

The Town of Morrisville has been growing steadily in recent years, and continued growth is anticipated. The impact of future growth will affect services and reshape geographies. However, the Town's most vulnerable asset very well may be one of the driving factors behind the growth – major transportation corridors. In the future, these roadways will serve as the backdrop for strategies associated with transportation, land use, urban design, and economic development.

Profiles for five of the Town's strategic corridors were designed to provide more detail for these important assets, including a deeper understanding of existing conditions and an assessment of growth and development along and adjacent to the corridors. This information helped shape potential solutions to ease congestion, increase safety, and reflect the vision and goals for a balanced transportation system.

The five corridors shown on the next pages represent conditions found throughout the Town including typical roadway cross-sections, heavy traffic congestion, commercial development adjacent to the roadway, and potential for significant growth. As a result, the solutions illustrated in this section can be applied to other peer corridors that were not evaluated. By taking the proper steps now, these strategic corridors can support new growth, accommodate increases in traffic, and contribute to the success of the overall transportation system.

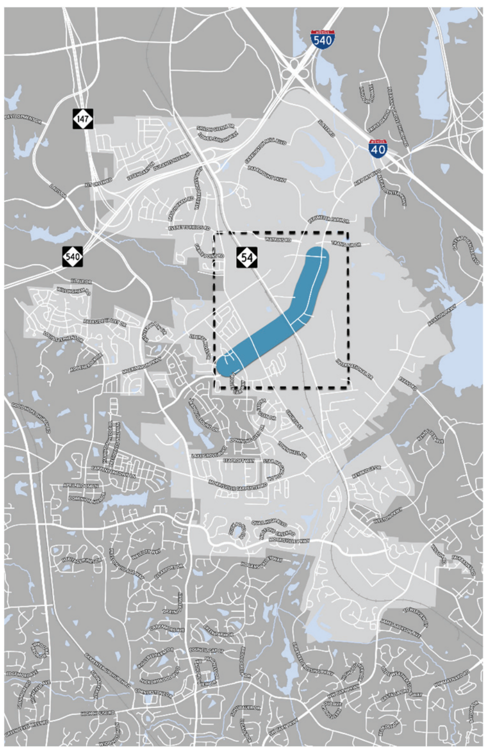
For three of the strategic corridors, the linkage between land use and transportation was explored further in a scenario planning exercise. Town staff worked with the Town Council and the Planning and Zoning Board to identify Town Hall Drive, McCrimmon Parkway, and NC 54 for inclusion in this exercise. Potential changes in growth patterns, densities, or intensities along each corridor were compared with the performance of a trend scenario to better understand how recommended transportation solutions would respond to these changes. Observations from this process are included in the strategic corridor writeups that follow. The scenario planning process is described in detail in **Appendix E**.

Strategic corridor summaries have been prepared for Airport Boulevard, McCrimmon Parkway, Morrisville-Carpenter Road, NC 54, and Town Hall Drive. **Figure 3-5** to **Figure 3-9** show the extents of these strategic corridor sections. These strategic corridor summaries include the following details:

- Corridor Length and Street Hierarchy
- Existing (2010) and Projected (2040) Future Traffic Volumes (vehicles per day) – taken from Triangle Regional Model
- Crash Summary – obtained from NCDOT crash statistics from June 2013 to May 2016
- Priority Served – top three priorities served by the corridor, ranked by members of the public at Public Workshop #2 and by the Planning and Zoning Board
- Existing Conditions – key observations, opportunities, and challenges currently facing the corridor
- Recommendations – recommendations for the corridor, land use scenario planning observations, and supporting graphics

Airport Boulevard

McCrimmon Parkway Extension to Garden Square Lane



Length

1.26 Miles

Street Hierarchy

Major Thoroughfare

Traffic Volume (vpd)

2010 – 5,987

2040 – 26,812

Crash Summary (6/2013-5/2016)

Total Crashes	**32**
Injury	6
Property Damage	26
Fatalities	0
Most Predominant	Rear End

Congestion (v/c ratio)

2010 – 0.25

2040 – 0.57

Priority Served

1. **Congestion**
2. **Safety**
3. **Transit**

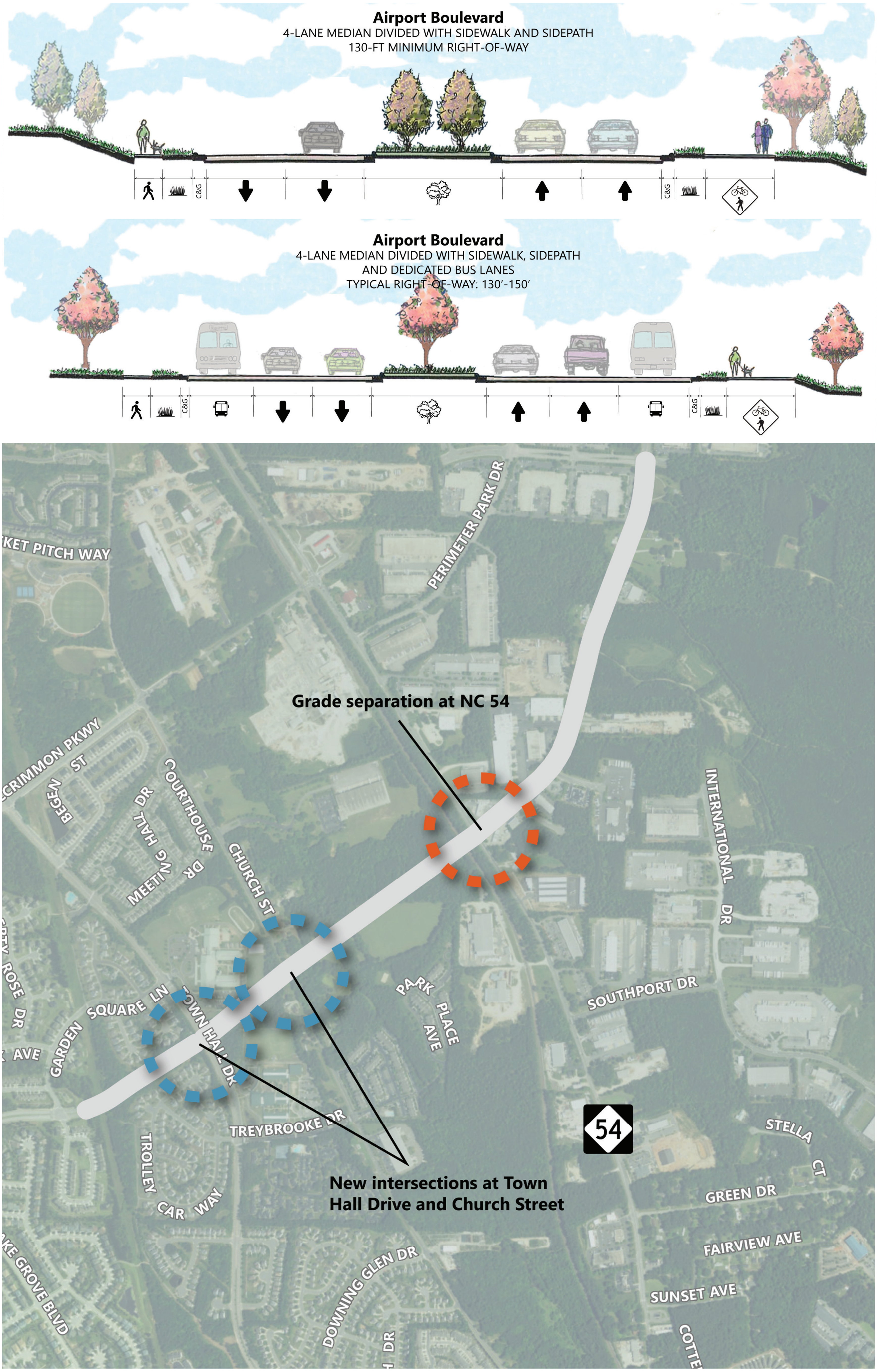
Existing Conditions

Airport Boulevard currently serves as one of Morrisville's primary gateways from I-40. Airport Boulevard currently terminates at NC 54, with a small additional section near Davis Drive. This disconnect creates a convoluted travel pattern, negatively impacting roadways such as NC 54, Aviation Parkway, and McCrimmon Parkway.

Recommendations

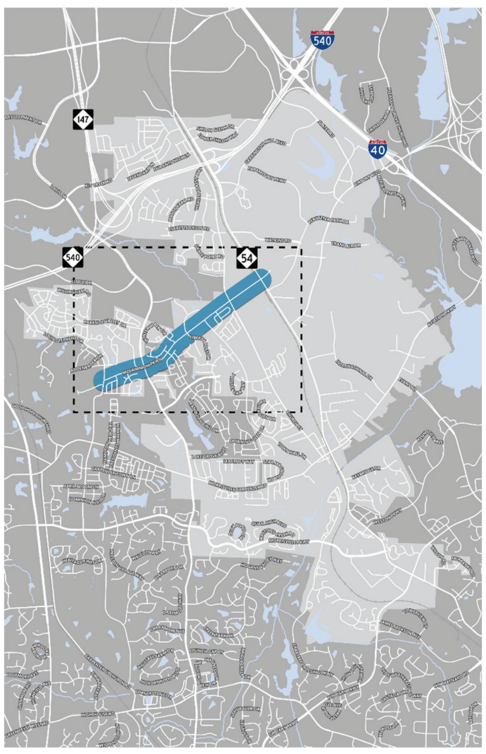
Recommendations for Airport Boulevard include a grade separation at NC 54 and an extension of the roadway to tie in the completed segments on either end. This will lead to two new intersections at Town Hall Drive and Church Street. Additionally, access management enhancements are recommended between McCrimmon Parkway and NC 54 to enhance safety and travel efficiency. The construction of the new roadway may potentially include a phased process: Phase 1 – Garden Square Lane to Church Street and Phase 2 – NC 54 to Church Street. While it is preferable to create the full connection between NC 54 and Garden Square Lane, moving this project forward in phases provides enhancements to local connectivity with reduced financial impacts. The Town should consider securing adequate right-of-way for separate bus lanes. After right-of-way acquisition, the Town can construct a large planted median that will ultimately be converted to dedicated bus lanes.

Figure 3-5: Airport Boulevard Strategic Corridor Recommendations



McCrimmon Parkway

NC 54 to Louis Stephens Drive



Length
1.72 Miles

Street Hierarchy
Major Thoroughfare

Traffic Volume (vpd)
2010 – 4,352

2040 – 19,470

Crash Summary (6/2013-5/2016)

Total Crashes	**154**
Injury	29
Property Damage	124
Fatalities	1
Most Predominant	Rear End

Congestion (v/c ratio)
2010 – 0.38

2040 – 0.35

Priority Served
1. **Congestion**
2. **Safety**
3. **Transit**

Existing Conditions

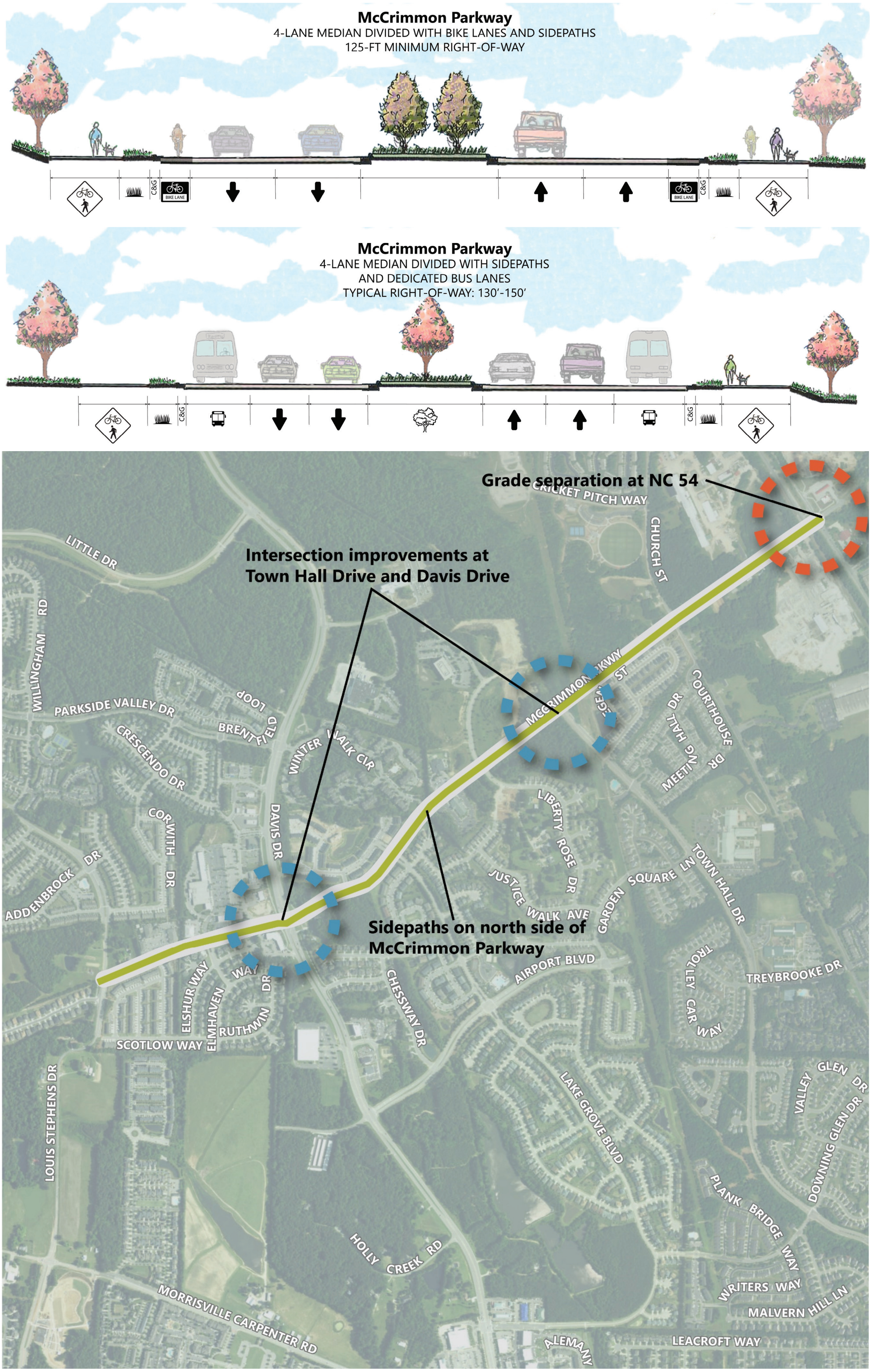
McCrimmon Parkway is in the midst of a significant change. With the extension of the roadway between NC 54 and Aviation Parkway, this facility will provide a major connection through Morrisville. This extension will introduce opportunities for growth and also change the travel characteristics along the exiting section.

Recommendations

The recommended cross-section for McCrimmon Parkway includes a roadway widening from 2- to 4- lanes divided by a median. The widened cross-section will allow for a consistent cross-section between the existing portion of McCrimmon Parkway and the extension that is currently under construction. The widening will include a grade separated intersection at NC 54 and McCrimmon Parkway. Scenario testing increased growth along the corridor, ultimately confirming the proposed cross-section, along with the need for multimodal connectivity.

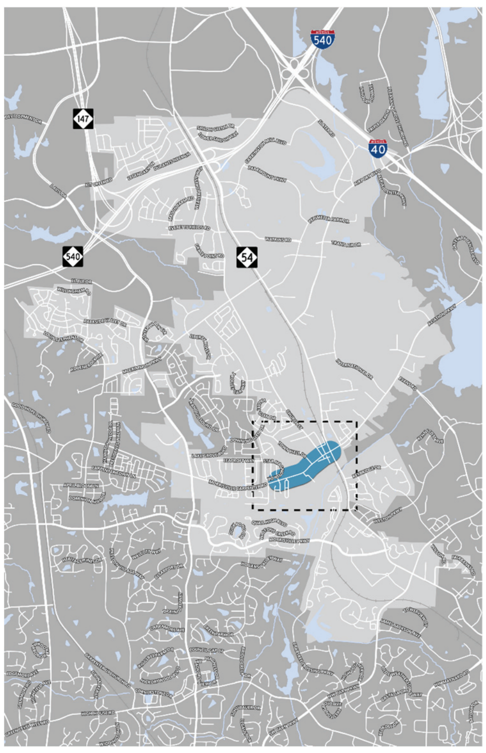
The roadway recommendations for McCrimmon Parkway are complemented by sidepaths on both sides of the roadway, accommodating both bicyclists and pedestrians. The grade separation at NC 54 and McCrimmon Parkway will need quality multimodal enhancements that continue the sidepath recommendation throughout the corridor. The Town should consider securing adequate right-of-way for separate bus lanes. After right-of-way acquisition, the Town can construct a large planted median that will ultimately be converted to dedicated bus lanes.

Figure 3-6: McCrimmon Parkway Strategic Corridor Recommendations



Morrisville-Carpenter Road

Church Street to East of Town Hall Drive



Length

0.55 Miles

Street Hierarchy

Major Thoroughfare

Traffic Volume (vpd)

2010 – 7,762

2040 – 17,535

Crash Summary (6/2013-5/2016)

Total Crashes	**131**
Injury	29
Property Damage	101
Fatalities	1
Most Predominant	Rear End

Congestion (v/c ratio)

2010 – 0.82

2040 – 0.56

Priority Served

1. **Congestion**
2. **Transit**
3. **Appearance**

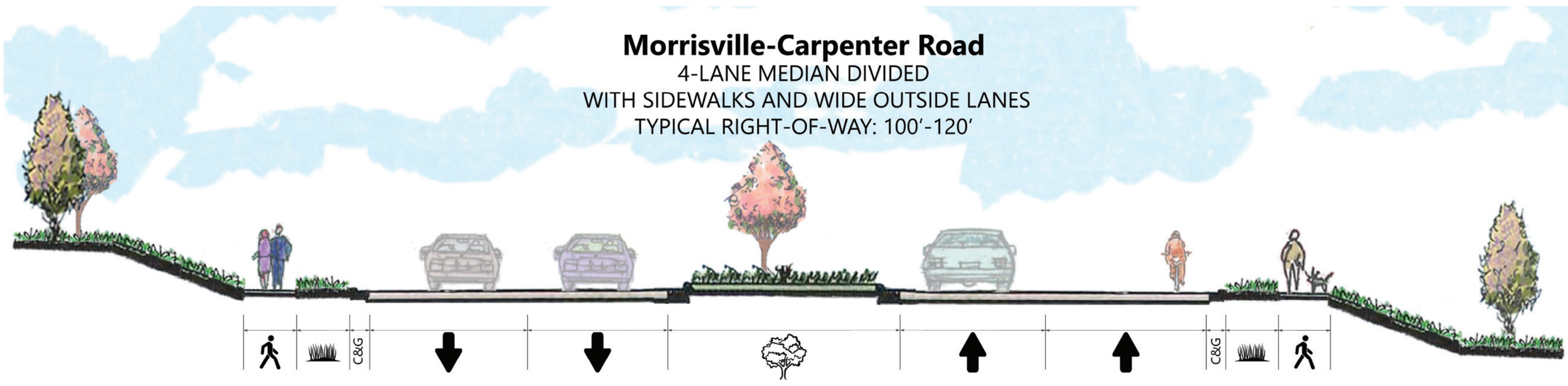
Existing Conditions

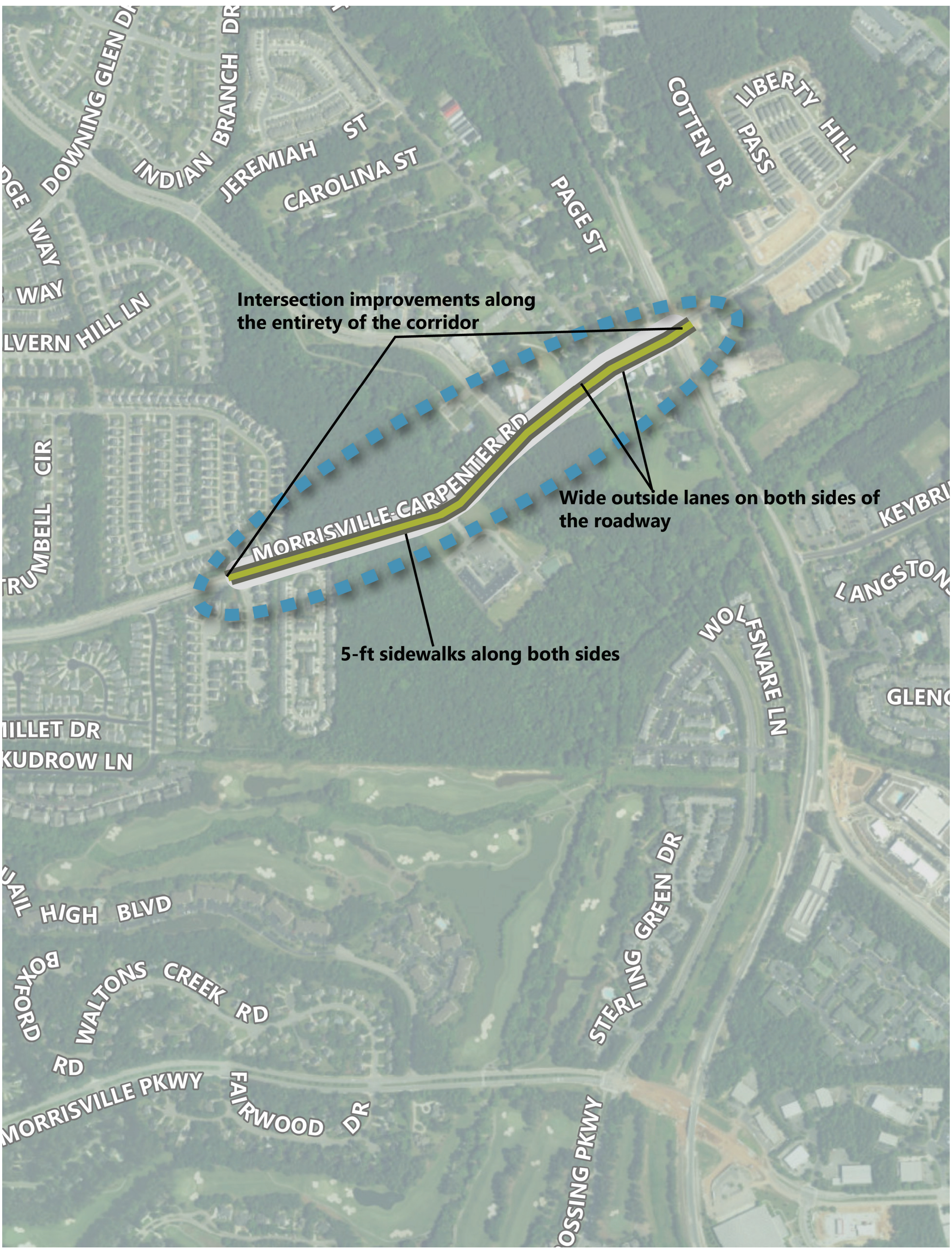
Morrisville-Carpenter Road provides a vital link through the heart of Morrisville, providing connections for local and regional traffic between NC 55 and I-40. The majority of the roadway in Morrisville is two lanes, but in many areas additional pavement has been provided for turn lanes into neighborhoods and commercial development. Pedestrian access along the roadway has been enhanced through mid-block crosswalks featuring rectangular rapid flash beacons that can be activated by pedestrians.

Recommendations

Design plans for widening are underway for Morrisville-Carpenter Road. Key recommendations for this facility include improvements to intersections throughout the section. Changes in turning movements and access will be especially notable for the section of Morrisville-Carpenter Road near NC 54. Bicycle and pedestrian accommodations are recommended to include wide outside travel lanes and 5-ft sidewalks on both sides. Special consideration should be given to connections to future greenways and the trailhead along Town Hall Drive.

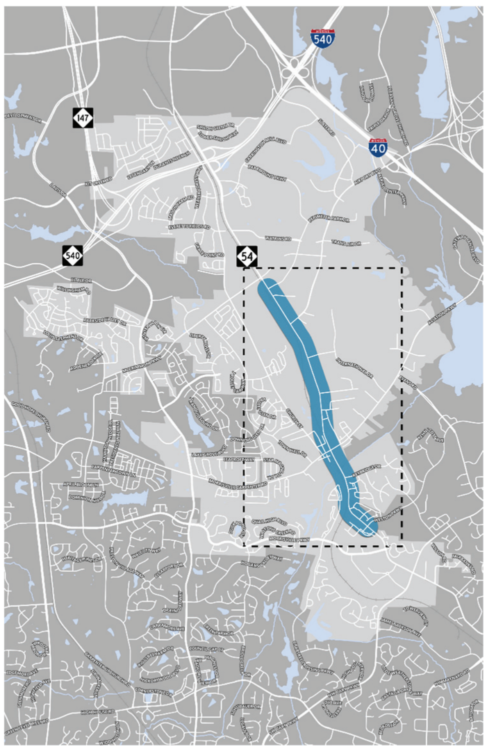
Figure 3-7: Morrisville-Carpenter Road Strategic Corridor Recommendations





NC 54

Perimeter Park Drive to Weston Parkway



Length

2.39 Miles

Street Hierarchy

Major Thoroughfare

Traffic Volume (vpd)

2010 – 9,773

2040 – 33,374

Crash Summary (6/2013-5/2016)

Total Crashes	**221**
Injury	51
Property Damage	169
Fatalities	1
Most Predominant	Rear End

Congestion (v/c ratio)

2010 – 1.07

2040 – 0.90

Priority Served

1. **Congestion**
2. **Safety**
3. **Transit**

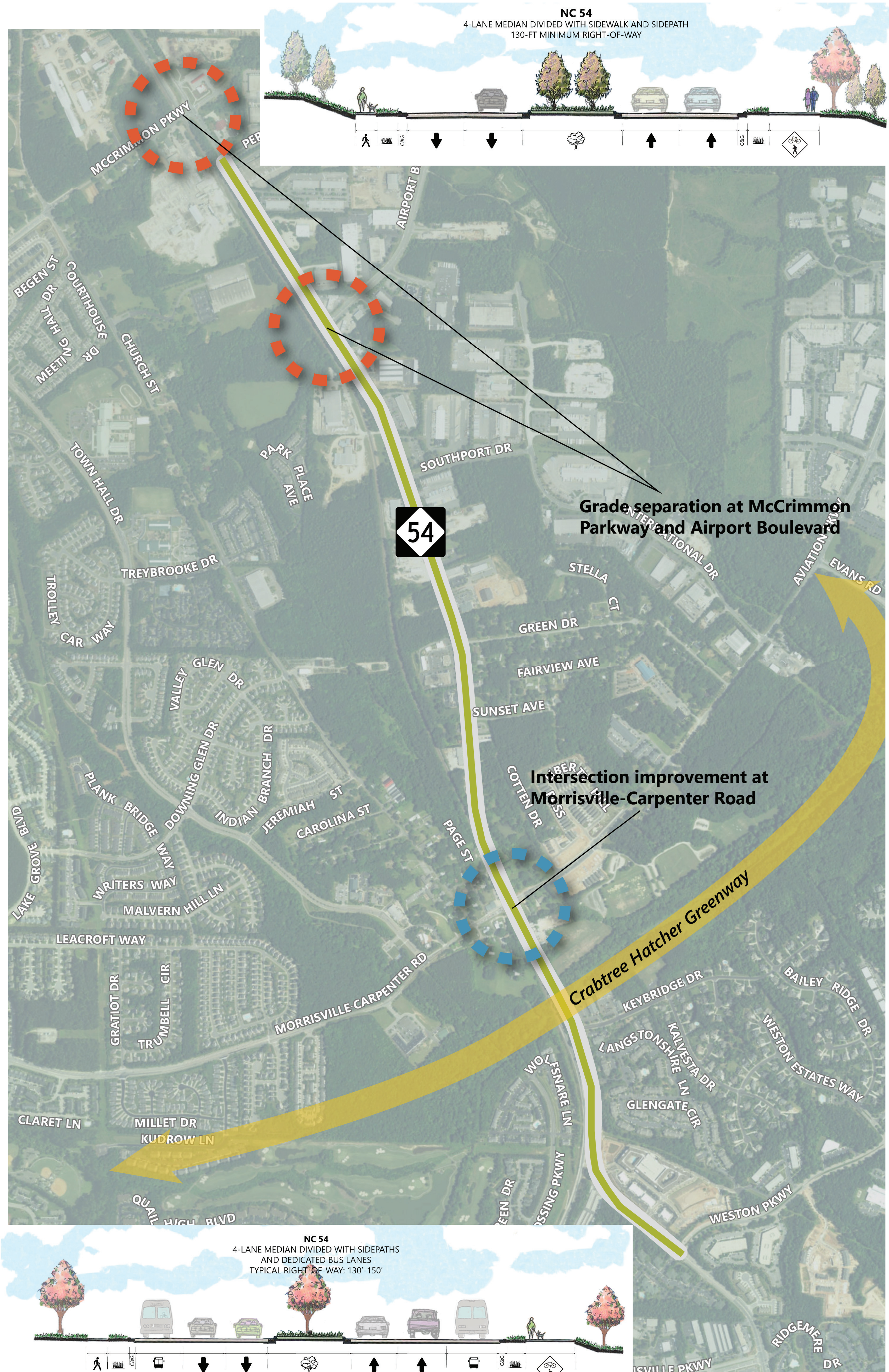
Existing Conditions

NC 54 is one of the most heavily traveled routes in Morrisville, serving a mix of local and regional uses. Congestion issues along NC 54 have spurred the development of corridor and intersection-level studies to determine future improvements to the roadway. Upcoming development such as the Wake Tech Community College campus will encourage additional future growth. In addition, the proposed transit oriented development (TOD) along NC 54 will create a multimodal transportation hub.

Recommendations

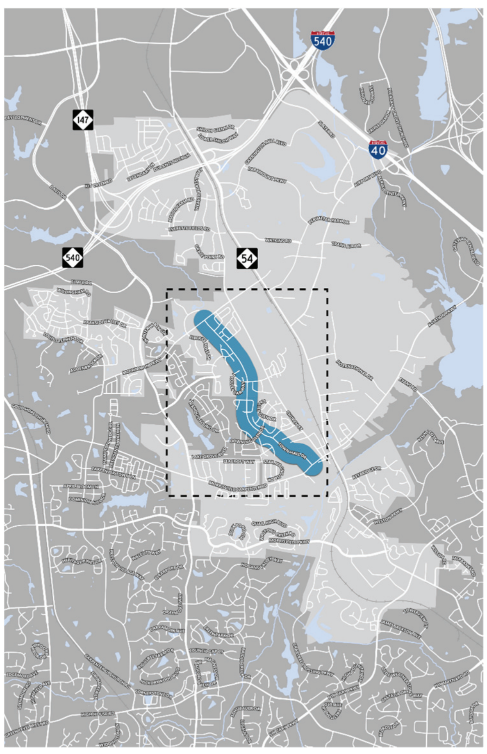
Within this section, NC 54 is recommended to be widened to 4 lanes, transitioning from 6 lanes on either end. The widening will include grade separations at McCrimmon Parkway and Airport Boulevard. It is recommended that the Town should consider conducting a full corridor study for NC 54 focused on access management options. A sidepath recommendation is included for the length of the corridor with a strategic tie-in to the Crabtree Hatcher Greenway. Scenario testing considered the addition of the identified TOD and development growth to determine the viability of the proposed cross-section. The Town should consider securing adequate right-of-way for separate bus lanes. After right-of-way acquisition, the Town can construct a large planted median that will ultimately be converted to dedicated bus lanes.

Figure 3-8: NC 54 Strategic Corridor Recommendations



Town Hall Drive

McCrimmon Parkway to Morrisville-Carpenter Road



Length

1.77 Miles

Street Hierarchy

Minor Thoroughfare

Traffic Volume (vpd)

2010 – 39

2040 – 3,997

Crash Summary (6/2013-5/2016)

Total Crashes	**27**
Injury	3
Property Damage	24
Fatalities	0
Most Predominant	Rear End

Congestion (v/c ratio)

2010 – 0.00

2040 – 0.10

Priority Served

1. **Transit**
2. **Walk**
3. **Appearance**

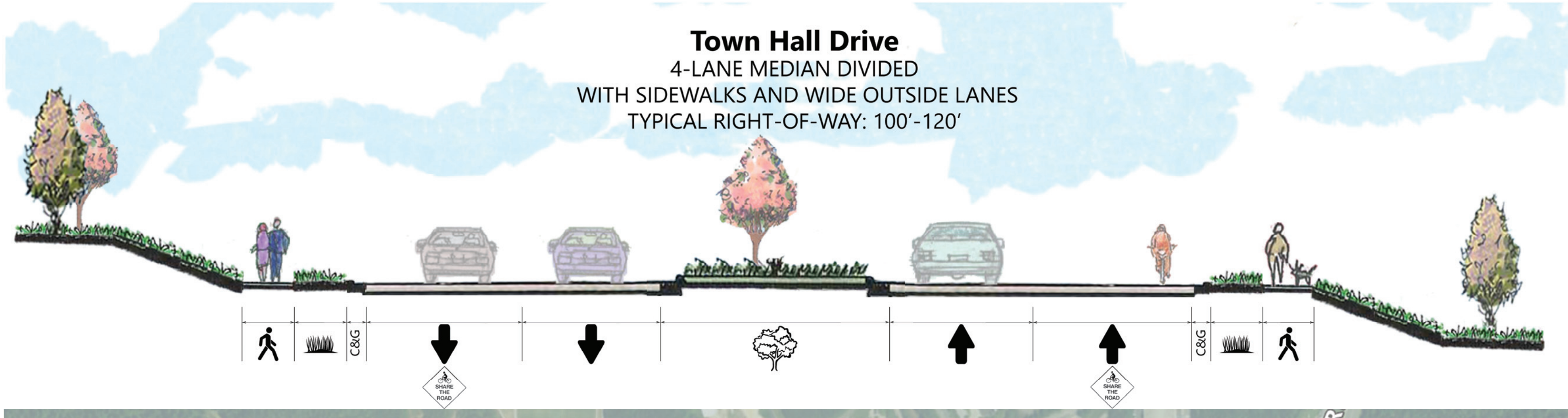
Existing Conditions

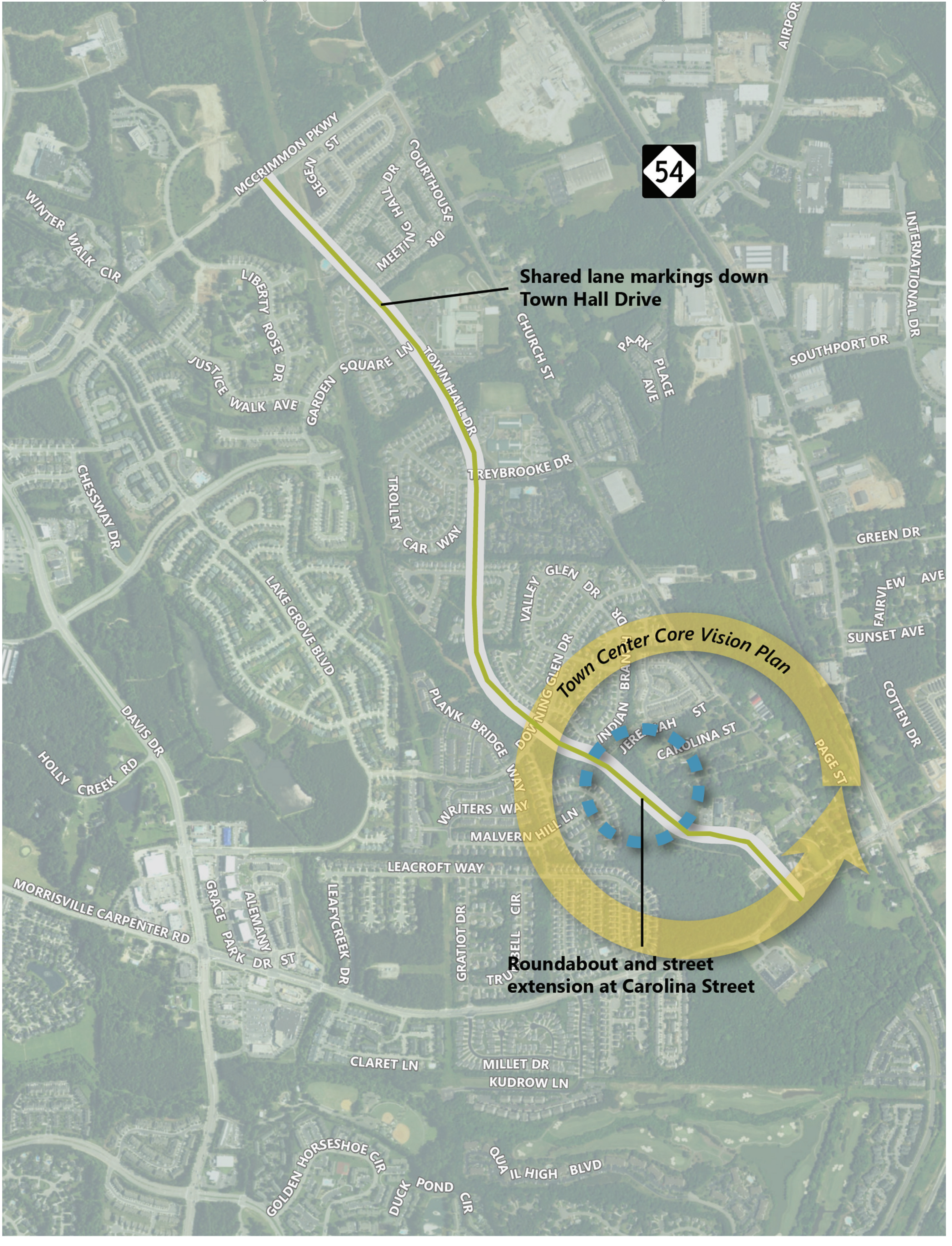
Town Hall Drive serves as the heart of the Town of Morrisville, with numerous civic uses, neighborhood connections, and multimodal accommodations. Proposed growth and improvements along this corridor will need to accommodate potential changes in travel patterns while remaining flexible to serve local needs.

Recommendations

Recommendations for Town Hall Drive are centered around the Town Center Core Vision Plan, which aims to create a central gathering place for the larger Morrisville community. The site is planned to be anchored by various civic uses (Food Hub, Library, Morrisville Town Hall) and the future Town Green. Scenario testing explored the impact of the Town Center Core, the Town Hall Drive extension, and continued mixed-use development growth along the corridor. Preliminary recommendations include a roundabout paired with a street extension at Carolina Street and shared lane markings down Town Hall Drive.

Figure 3-9: Town Hall Drive Strategic Corridor Recommendations





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BENEFITS OF ACTIVE TRAVEL

Health

Transportation

Environmental

Economic

Quality of Life

Social Justice

INTRODUCTION

Communities with successful transportation networks balance multimodal accommodations for different types of trips – recreational and utilitarian. In order to plan for multimodal elements that would enhance the Town's overall livability, the ***Town of Morrisville Comprehensive Transportation Plan*** explores ways to enhance the existing transportation network to truly serve all community transportation users. This alternative travel focus embodies how local decisions can enhance the overall mobility and safety for bicyclists, pedestrians, and transit users. The plan for bicyclist, pedestrian, and transit recommendations coordinates closely with other elements, notably through an emphasis on projects tied to roadway recommendations presented in **Chapter 3** and regional planning efforts through the *Wake County Transit Plan*.

Benefits of Active Travel

The option to bike, walk, or take transit is a key element to any healthy community's transportation system. When an environment is conducive to active transportation, these modes offer a practical transportation choice that provides benefits for both individuals and their communities. The potential for increased walking, in particular, is large since 25% of all trips in the United States are less than one mile in length. Features that contribute to making transportation more active include a healthy mix of land uses, appropriately sized and located facilities, accessibility features such as curb ramps, buffers between vehicular and non-motorized modes, and transit shelters. Slowing traffic, reducing unnecessary exposure to vehicles, and incorporating active transportation features (e.g. signage, crosswalks, and adequate pedestrian phasing at signals) into future roadway design plans also enhance the viability of active travel in the Town.

The bicycle, pedestrian, and transit recommendations in this chapter emphasize the creation of a functional active transportation network throughout the Town. This focus recognizes the variety of benefits of active transportation and how it contributes to the community. These benefits include:

- ***Health*** – Regular physical activity helps prevent or reduce the risk of a variety of chronic diseases, obesity, and mental health problems such as depression.
- ***Transportation*** – Many streets carry more traffic than they were designed to handle, resulting in congestion, wasted time, pollution, and driver frustration. Many of the trips that Americans make every day are short enough to be accomplished on foot or bike, and longer trips made by bus reduce the number of single occupancy vehicles.
- ***Environmental*** – Motor vehicles create substantial air pollution. According to the EPA, mobile transportation sources (cars, trucks, buses, and off-road equipment such as marine engines and construction equipment) are responsible for nearly 80% of carbon monoxide emissions in the U.S.
- ***Economic*** – Car ownership consumes a major portion of many family incomes. When safe facilities are provided to walk, bike, and take transit, more people can rely on active travel and spend less on transportation.
- ***Quality of life*** – The availability of active travel in a community is an indicator of its livability, which helps attract businesses and grow tourism-related activity. Providing bicycle, pedestrian, and transit facilities contributes to a healthy sense of identity and place.
- ***Social justice*** – For those without the option to drive, such as adolescents, elderly, those unable to afford a car, and people with certain disabilities, these facilities provide travel choice and break down barriers to accessing jobs, health care, education, and recreation.

SIDEWALK NETWORK

Walking is a key element to a healthy community's transportation system. Every trip begins and ends as a walking trip, yet walking often remains a lower priority mode during the planning process. The availability of pedestrian facilities and amenities plays an important role in encouraging the use of alternative modes of travel to the automobile. The success of transit greatly depends on the functionality of pedestrian facilities and amenities.

While this Plan does not directly recommend stand-alone sidewalk projects, it is emphasized that all roadway projects in **Chapter 3** adhere to complete street concepts and should include accommodations for pedestrians. However, as roadways are improved and developments are built the Town should continually strive to close gaps in the pedestrian network.

BICYCLE NETWORK

The recommended bicycle network for the ***Town of Morrisville Comprehensive Transportation Plan*** includes a coordinated group of on-street and off-street facilities. Connectivity between bicycle facilities and activity centers was an important consideration as recommendations were developed. The planning process also emphasized vetting previous plans with the updated roadway recommendations. The emphasis was necessary given the limited funds available for stand-alone bicycle and pedestrian projects. The facility recommendations shown in the maps on the pages that follow are coordinated with the roadway recommendations provided in **Chapter 3**.

On-Street Bicycle Facilities

On-street bicycle facilities planned for the Town of Morrisville include bike lanes, shared lane markings, and wide shoulders. Some of these treatments can be eligible for short-term implementation, while others require phased, long-term improvements ancillary to a roadway upgrade. The section below describes the recommended facility types that are shown in **Figure 4-3**.

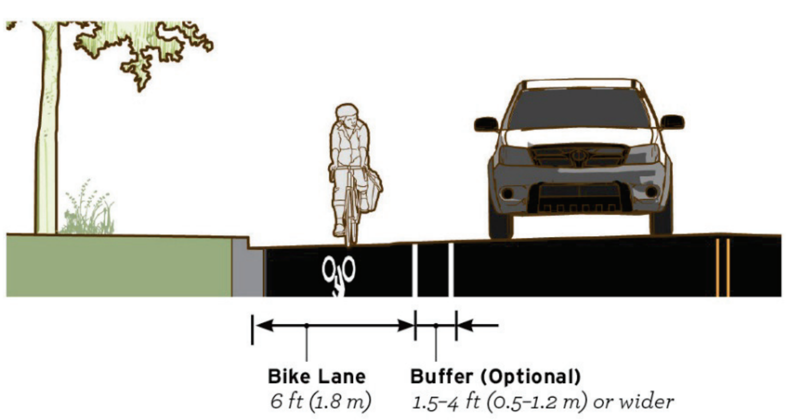
BIKE LANES

Bike lanes are one-way treatments that typically carry bicycle traffic in the same direction as adjacent motor vehicle traffic. Bike lanes are provided for the exclusive or preferential use of bicyclists on a roadway and are identified through signage, striping, and pavement markings as shown in **Figure 4-1**. These lanes allow bicyclists of all skill levels to ride at comfortable speeds and encourage a position with the roadway where they are more likely to be seen by motorists. State and federal guidance should be referenced to handle areas where bicycle lanes may come into conflict with travel lanes such as around turn lanes or merge sections.

General Considerations

- Bike lanes are preferred treatments for urban and suburban thoroughfares, and should be a minimum of five feet wide.
- Lanes should provide a smooth riding surface and be free of debris.
- Lanes should be provided on both sides of a two-way street.
- Bike lanes are most appropriate on streets with higher traffic volumes and posted speeds of 30 mph or greater.

Figure 4-1: Typical Bike Lane Cross Section



Source: FHWA Small Town and Rural Design Guide, Facilities for Walking and Biking

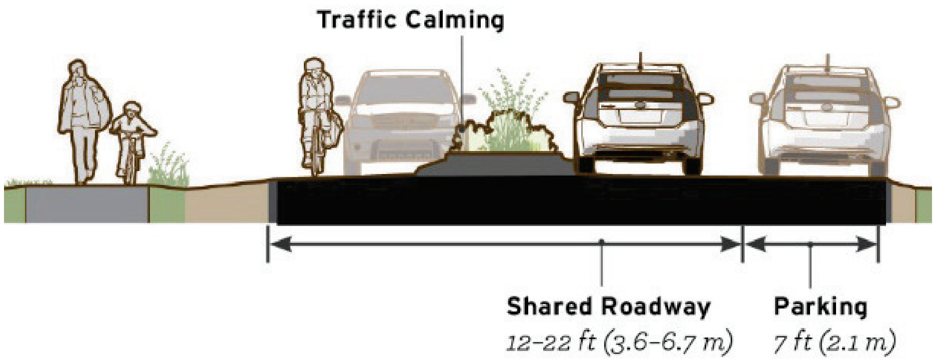
SHARED LANE MARKINGS

Shared lane markings, shown in **Figure 4-2**, can help bicyclists position themselves appropriately in travel lanes and provide wayfinding. The signage and markings provide awareness to motorists of the likely presence of bicyclists and that they must share the road.

General Considerations

- "Share the Road" signs do not indicate a bike route to motorists.
- Shared lanes markings are best used on streets with constraints such as limited rights-of-way.
- Shared lane markings should not be used on roads with speed limits above 35 mph.

Figure 4-2: Typical Shared Lane Marking Cross Section



Source: FHWA Small Town and Rural Design Guide, Facilities for Walking and Biking

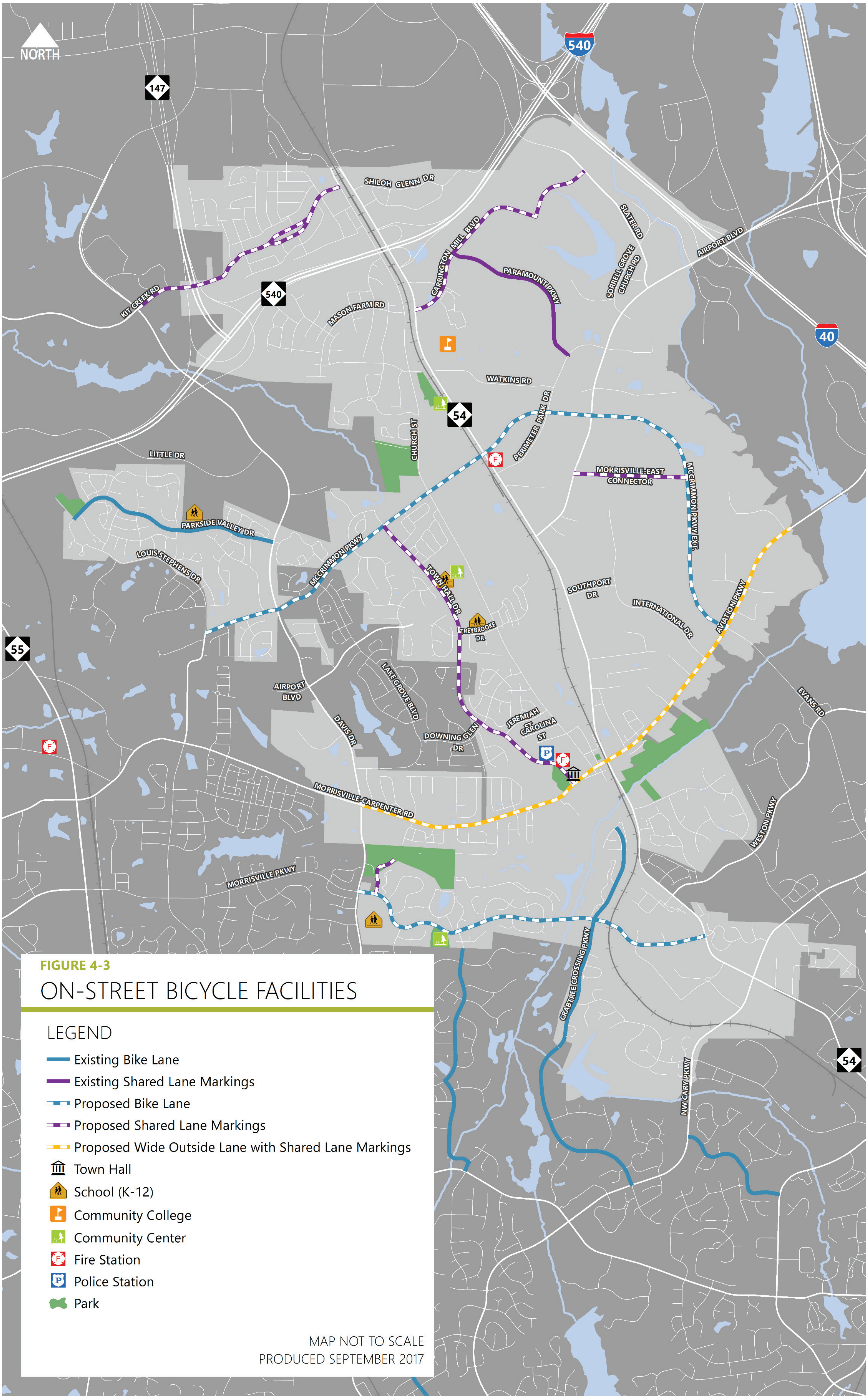


FIGURE 4-3

ON-STREET BICYCLE FACILITIES

LEGEND

- Existing Bike Lane
- Existing Shared Lane Markings
- Proposed Bike Lane
- Proposed Shared Lane Markings
- Proposed Wide Outside Lane with Shared Lane Markings
- Town Hall
- School (K-12)
- Community College
- Community Center
- Fire Station
- Police Station
- Park

MAP NOT TO SCALE
PRODUCED SEPTEMBER 2017

MULTI-USE PATH NETWORK

Multi-use path planning incorporates transportation, recreation, and health elements. Depending on the community, multi-use paths are represented by a variety of forms and uses. Often, a well-connected system of multi-use paths is not utilized solely for recreational purposes, but offers pedestrians and bicyclists the option of using the facilities as commuter corridors. The Town of Morrisville has taken a proactive approach to the planning of multi-use paths through incorporation into the Parks and Recreation Master Plan to encourage non-motorized transportation throughout the Town and to the systems of adjoining municipalities.

Multi-use paths provide a myriad of benefits to the Town: alternative transportation, health promotion, economic development, recreational opportunities, land and habitat conservation, and improved air and water quality. The ***Town of Morrisville Comprehensive Transportation Plan*** includes two variations of multi-use paths that will be designed to provide off-road trails that provide access to parks, neighborhoods, and commercial areas. For this plan, multi-use paths are classified as either a greenway or sidepath. For greater technical detail and design guidance for multi-use paths can be found in **Appendix F**.

Off-Street Facilities

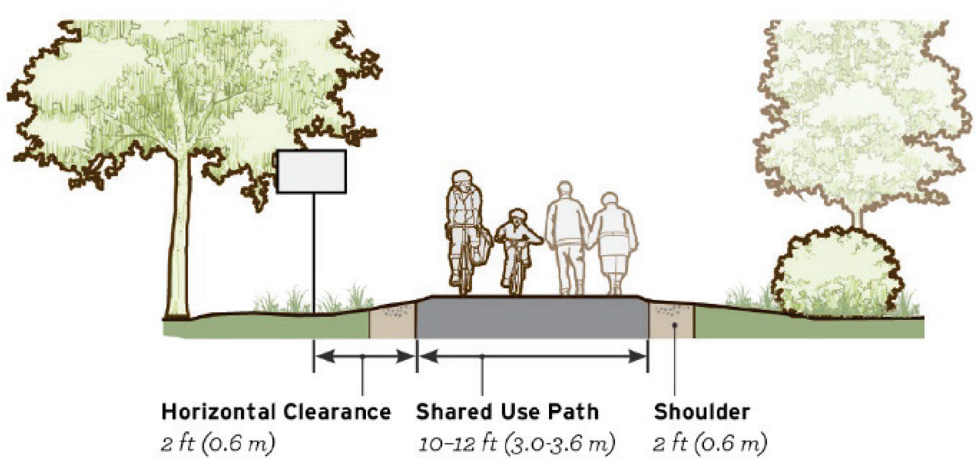
GREENWAY

Greenways are trails that are found in both urban and rural settings that are typically set aside for recreational use or environmental protection. These facilities are comfortable for both bicyclists and pedestrians to travel on. **Figure 4-6** displays the proposed greenway network.

General Considerations

- Greenways should provide a high level of comfort for both bicyclists and pedestrians.
- Greenways can be used for commuting purposes of non-motorists if alignments are strategically placed in a community.

Figure 4-4: Typical Greenway Cross Section



Source: FHWA Small Town and Rural Design Guide, Facilities for Walking and Biking

On-Street Facilities

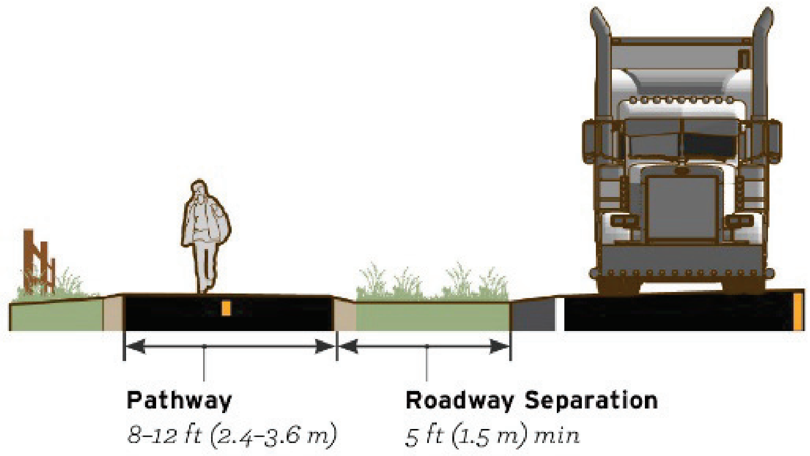
SIDEPATHS

Sidepaths are a type of multi-use facility that is physically separated from motorized vehicular traffic, but still within the roadway right-of-way. Sidepaths provide an extra level of comfort and safety to pedestrians and cyclists from roadways with higher travel speeds and vehicular volumes. **Figure 4-6** shows the proposed sidepath facilities.

General Considerations

- Careful consideration in design should be given to the degree of separation and driveway crossings.
- The inclusion of sidepaths includes a wide roadside environment to provide the appropriate separation and pathway width.

Figure 4-5: Typical Sidepath Cross Section



Source: FHWA Small Town and Rural Design Guide, Facilities for Walking and Biking

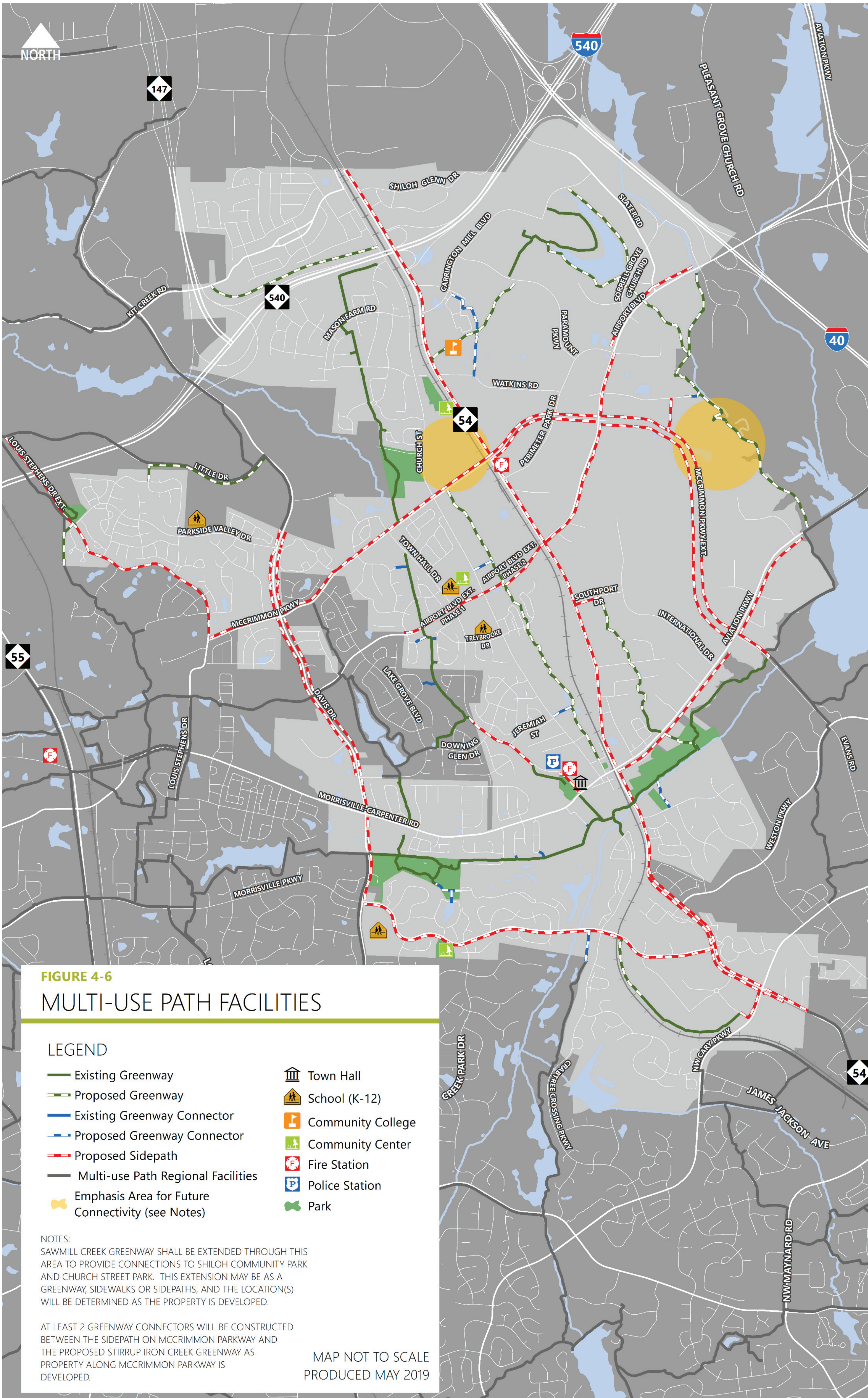


FIGURE 4-6

MULTI-USE PATH FACILITIES

GREENWAY CONNECTORS

Greenway connectors are similar in design and function to greenways or sidewalks, but provide connections to the primary trail system via short spurs. Greenway connectors may vary in width, and may take the form of a short greenway or sidewalk section. Recommended greenway connectors are shown in **Figure 4-6**.

General Considerations

- Greenway connectors should follow ADA accessibility guidelines.

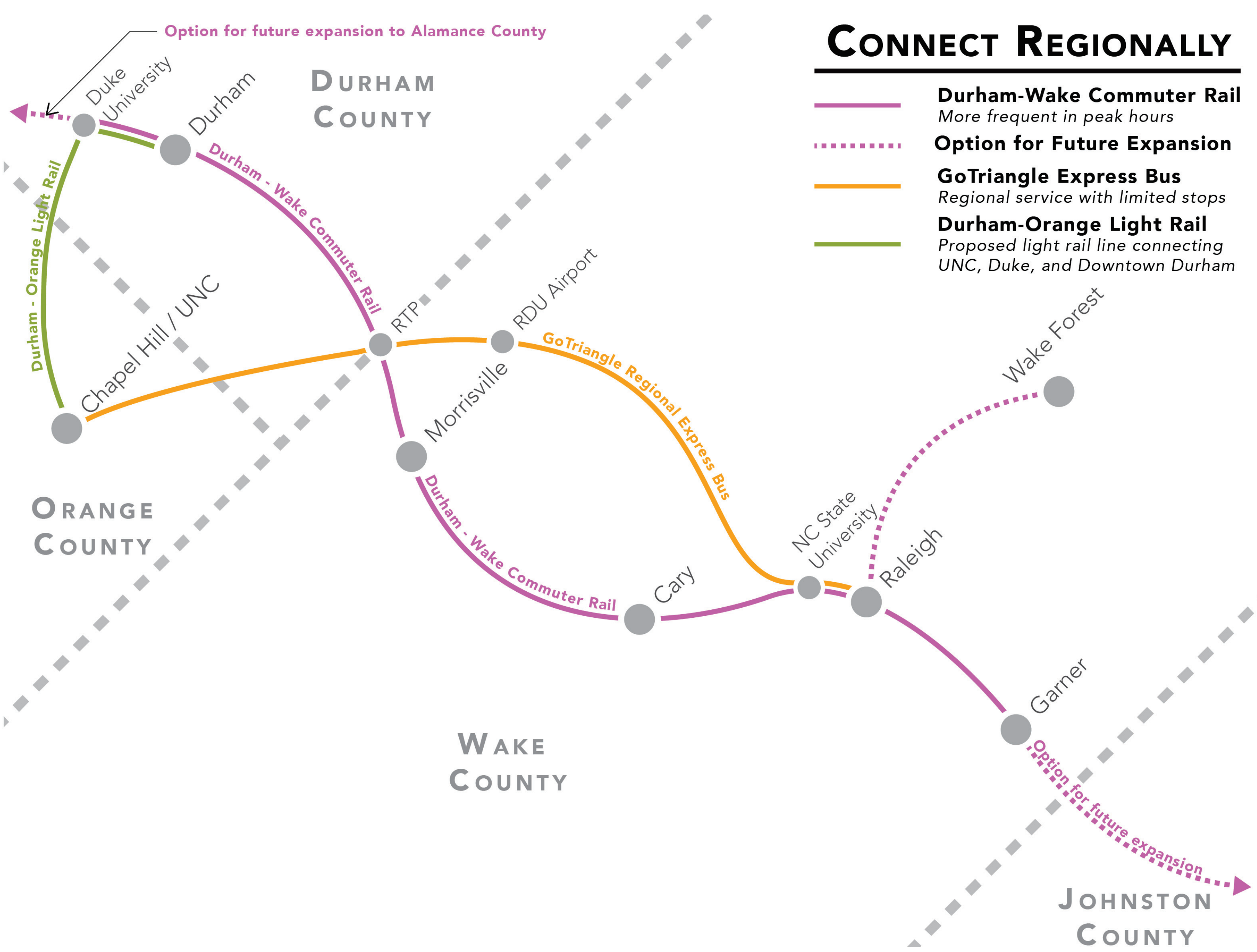
TRANSIT

Like a complete system of roads, sidewalks, and bikeways, transit must provide connections to the places people need or want to go at a time when they need to get there. Potential riders are interested in transit service that is fast, frequent, dependable, and easy to use. As shown in **Chapter 2**, limited transit service in the Town of Morrisville is provided by GoTriangle.

Future Opportunities

The Town of Morrisville is at a unique crossroads that will require balancing many challenges and opportunities to best prepare for future transit expansion. The *Recommended Wake County Transit Plan* (adopted in December 2015) set the stage for a countywide vision for transit service. This plan included an aggressive public outreach effort to gain feedback from citizens, and involved intensive participation by the county's municipalities. In the November 2016 election, Wake County residents approved a one-half cent local sales tax to fund Countywide transit, advancing the recommendations of the *Recommended Wake County Transit Plan*. As part of this plan, the Town of Morrisville will be home to one of the planned stops for the Durham-Wake Commuter Rail planned to stretch from Garner to Duke University, as shown in **Figure 4-7**. **Figure 4-8** shows existing transit services in the Town along with proposed future service discussed in the *Recommended Wake County Transit Plan*.

Figure 4-7: Wake County Transit Plan – Connect Regionally[1]



FUTURE LOCAL SERVICE

Additionally, municipalities like Morrisville are eligible to apply for financial assistance through community funding areas. Community funding areas are eligible for matching funds that will be set aside to create or accelerate new or enhanced service. The current details of the program are still being developed, but it is paramount that the Town of Morrisville plans accordingly and stays involved in the decision-

[1] The Durham-Orange Light Rail project shown in Figure 4-7 has been discontinued.

making process. It is recommended that once the program details have been finalized, the Town pursue a new plan that will study and identify the most viable local option for transit in Morrisville.

TRANSIT-ORIENTED DEVELOPMENT (TOD)

In 2013, the Town of Morrisville completed a local area study creating an action plan for a future transit-oriented development and transit station at the intersection of McCrimmon Parkway and NC 54, following a 2011 resolution passed by Town Council strongly supporting the station. The *McCrimmon Transit Small Area Plan* provides a detailed action plan of the role the Town of Morrisville will need to play to provide the McCrimmon TOD. Continual support of the McCrimmon TOD offers many benefits for the Town of Morrisville including the creation of an important hub for regional transit via the Durham-Wake Commuter Rail, increased viability of local transit through community funding areas, improved connectivity to higher education at Wake Technical Community College, and creating an environment that supports quality mixed-use development. As enhanced transit service makes its way into Morrisville, a secondary TOD could also be considered east of NC 54 to further enhance connectivity to Wake Technical Community College.

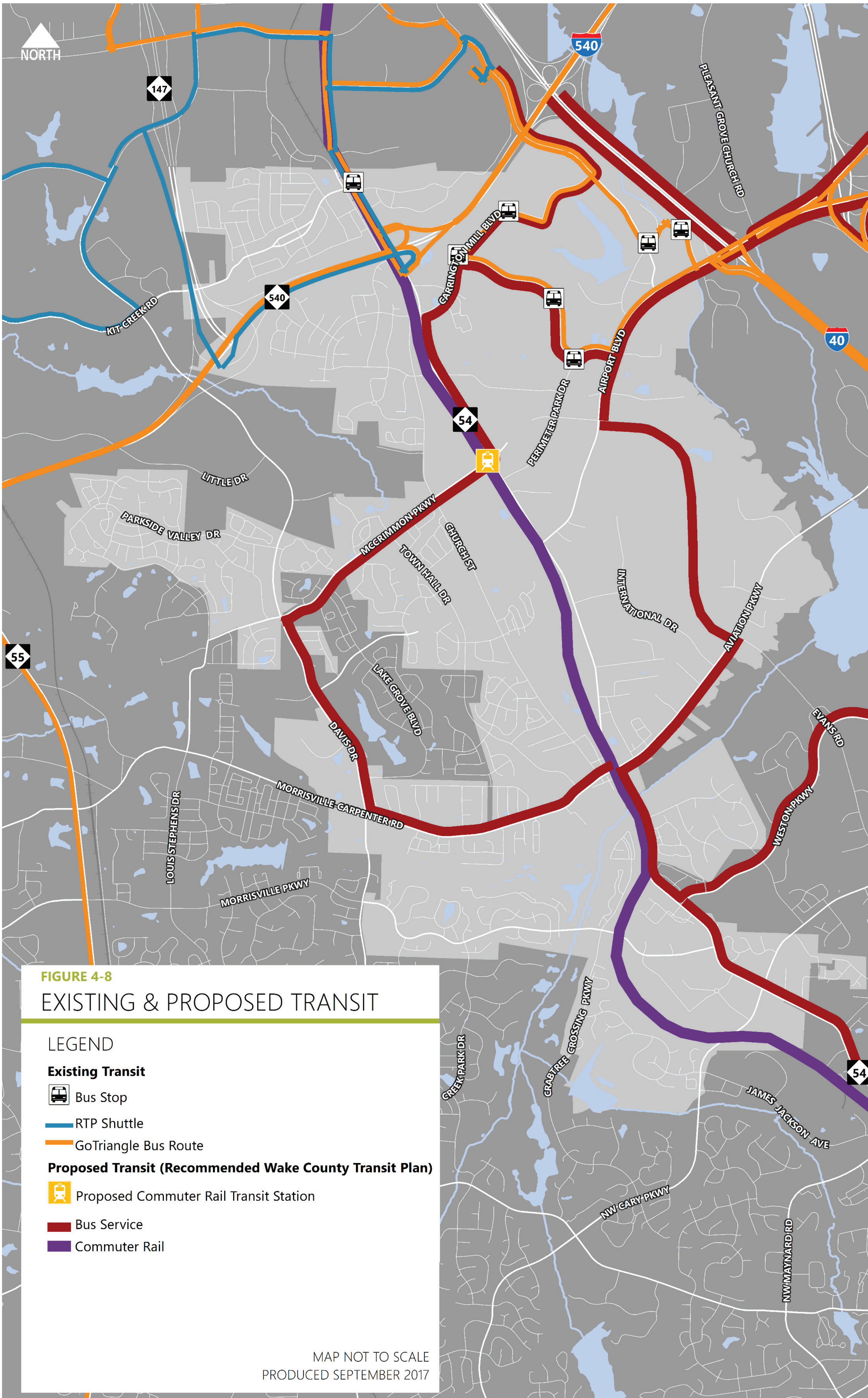


FIGURE 4-8
EXISTING & PROPOSED TRANSIT

INTRODUCTION

The success of the ***Town of Morrisville Comprehensive Transportation Plan*** will hinge on the effective collaboration of local, regional and State officials to implement its projects and policies in a meaningful way. The recommendations in the plan build upon many historic and ongoing efforts by the Town to improve the transportation network through facility improvements, close coordination with agency partners, and Town policies. Completion of this plan represents an important step toward implementing multimodal improvements that affect travel safety, mobility, development patterns, and the aesthetics of the Town of Morrisville. This chapter lays out a simple set of recommendations to help local staff continue to focus their efforts and seek strategic opportunities to expedite the implementation of this plan.

Responsible Agencies

To successfully implement this plan, responsible agencies have been identified that can influence and authorize recommendations. Some of the recommended improvements will be implemented at the local level through the development review process. Major infrastructure improvements most likely will be a product of State and federal funding; however, transportation improvement funds are limited and competition for them is great. The majority of responsibility for implementing these recommendations will be a coordinated effort between NCDOT, CAMPO, the Town of Morrisville, and private developers.

Implementation

The core of the implementation strategy for this document is contained within this chapter, which lays out a concrete set of steps to implement the vision of the ***Town of Morrisville Comprehensive Transportation Plan***. Through well-guided transportation and land use policies as well as leveraging strategic partnerships, each set of recommendations becomes a set of achievable goals with a basis in realistic expectations.

FUNDING OPPORTUNITIES

The funding to implement the recommendations in the ***Town of Morrisville Comprehensive Transportation Plan*** will likely come from a combination of local, State, and federal programs, as well as through the receipt of development contributions. The Town of Morrisville has taken the initiative to explore future funding options and their viability for the area through the Blue Ribbon Commission on Transportation Funding. The findings of this group and their implications for the Town are documented within this chapter.

The construction of a comprehensive transportation network can occur through incremental adoption of local policies and initiatives supplemented by State and federal programs and assistance from the private sector. It will be important for the Town of Morrisville, in collaboration with Wake County and CAMPO, to continue pursuing funding resources to implement the recommendations of this plan. The Town of Morrisville has long understood this reality. Through the creation of the *Blue Ribbon Commission on Transportation Funding*, the Town prepared a report exploring this issue. The report, published in December 2014, provided a review of potential transportation financing strategies and funding sources drawn from examples both locally and in other peer communities. The report then assessed the viability of these financing strategies and funding sources for use within the Town of Morrisville.

The financing strategies and funding sources considered as a part of this study are identified and defined in **Tables 5-1 and 5-2**.

Table 5-1: Potential Transportation Financing Strategies

FINANCING STRATEGY	DEFINITION
General Obligation Bonds	A form of financing with generally lower interest rate than other municipal debt that is secured by the Town's unlimited taxing power, full faith, and credit. Generally the only form of financing that requires a voter referendum.
Installment-Purchase Debt	A form of financing that does not require voter approval (via referendum) and is secured by non-tax revenue or property.
Revenue Bonds	Secured by and paid for by user revenues, such as user fees or tolls on roadways.
Tax Increment Debt	Secured by additional property tax revenue produced by private development. Also known as Tax Increment Financing.
Special Assessment Debt	Financing secured by and paid for from assessments levied against private property.

Source: Town of Morrisville Blue Ribbon Commission on Transportation Funding Report, page i, December 2014.

Table 5-2: Potential Transportation Funding Sources

FUNDING SOURCE	DEFINITION
Property Tax	The primary source of revenue for many municipalities and counties that is levied annually on private property (land, buildings, vehicles) and is based on the value of the private property.
Motor Vehicle License Fee	A fee charged each year when a resident registers a vehicle with the state.
Powell Bill	Funds generated by the state by the state gasoline tax that are distributed by the state to municipalities to help fund transportation projects on municipally-maintained roads. Also known as State Aid to Municipalities funding.
Development Requirements	Requirements the Town places on new development to construct infrastructure to serve that development, including thoroughfare requirements from the adopted Transportation Plan.
NCDOT STIP Funding	The traditional source of transportation funding in North Carolina for state roads – most of this funding comes from vehicle sales tax and state and federal gasoline tax revenues.
CAMPO/Federal Funding	These funds are generally distributed through competitive grant processes and are generated from the federal budget.
CDBG Infrastructure Grants	Provides some infrastructure to the Town for use in areas with low-to-moderate incomes.
Local Sales Tax	Levied by the county and collected by the state on purchases made within a county
Special Assessments – Private Property	Assessments levied on property to pay for public improvements benefitting that property with no related outside financing.
Impact Fees	Fees charged by some jurisdictions to fund certain public infrastructure and facilities. These fees are generally charged per unit.
State Transportation Grants	Miscellaneous funds distributed by the state to municipalities through a competitive grant process.
Permits/Fees/Sales/Service	Miscellaneous revenue generated by many different functions (that are not restricted for use and go into the general fund) within the Town, such as facility rentals, recreation programs, and development fees.

Source: Town of Morrisville Blue Ribbon Commission on Transportation Funding Report, page ii, December 2014.

Following the identification of these potential financing methodologies and funding sources, the Blue Ribbon Commission conducted an assessment of their viability within the Town of Morrisville. Financing methodologies and funding sources were assessed based on their performance against a series of evaluation criteria. These criteria included considerations such as sufficiency, timeliness, predictability, equity, suitability, and cost. **Figure 5-1** is taken from the report and summarizes the findings of this assessment.

Figure 5-1: Summary Evaluation Matrix – Transportation Financing Methodologies and Funding Sources

	FINANCING METHODOLOGIES & FUNDING SOURCES	EVALUATION CRITERIA						COMMISSION RECOMMENDATION
		SUFFICIENCY	TIMELINESS	PREDICTABILITY	EQUITY	SUITABILITY	COST	
FINANCING METHODOLOGIES	GENERAL OBLIGATION BONDS	+	X	O	O	+	+	Continue Use
	INSTALLMENT-PURCHASE DEBT	+	+	O	O	+	X	Review for Future Use
	REVENUE BONDS	X	O	X	+	X	X	Not Recommended
	TAX INCREMENT DEBT	+	+	O	O	O	X	Not Recommended
	SPECIAL ASSESSMENT DEBT	O	X	O	X	O	X	Not Recommended
FUNDING SOURCES	PROPERTY TAX	+	+	+	+	O	O	Continue Use
	MOTOR VEHICLE REGISTRATION FEE	X	O	+	O	O	+	Continue Use
	POWELL BILL	+	+	O	O	+	+	Continue Use
	LOCAL SALE TAX	+	+	+	X	+	+	Review for Future Use
	PERMITS/FEES/SALES/SERVICE	O	+	X	X	X	+	Not Recommended
	DEVELOPMENT REQUIREMENTS	+	O	O	+	+	O	Continue Use
	SPECIAL ASSESSMENTS - PRIVATE PROPERTY	O	X	O	X	O	X	Review for Future Use
	IMPACT FEES	O	+	X	+	X	+	Review for Future Use
	NCDOT STIP FUNDING	O	X	O	+	+	O	Continue Use
	STATE TRANSPORTATION GRANTS	X	O	X	O	O	O	Review for Future Use
	CAMPO/FEDERAL FUNDING	+	+	O	+	+	O	Continue Use
	CDBG INFRASTRUCTURE GRANTS	X	O	X	+	X	O	Continue Use

+ : *Indicates Commission viewed the characteristics of the Financing Methodology/Funding Source* ***positively*** *overall under the evaluation criteria*
x : *Indicates Commission viewed the characteristics of the Financing Methodology/Funding Source* ***negatively*** *overall under the evaluation criteria*
o : *Indicates the Commission agreed that there were both* ***positive and negative*** *characteristics under the evaluation criteria*

Source: Town of Morrisville Blue Ribbon Commission on Transportation Funding, page iii, December 2014.

For those financing methodologies and funding strategies deemed as viable candidates for application in the Town of Morrisville, the Blue Ribbon Commission considered the potential level of investment and recommended project types. **Table 5-3** shows the outcome of this consideration.

Table 5-3: Level of Investment Matrix

FINANCING METHODOLOGIES AND FUNDING SOURCES		APPROXIMATE LEVEL OF INVESTMENT	RECOMMENDED TYPE(S) OF PROJECTS
Financing Methods	General Obligation Bonds	$10,000,000+	New roads; major road widening
	Installment-Purchase Debt	$1,000,000 - $5,000,000	Land acquisition; bike/ped
Funding Sources	Property Tax	$0.01 generates $373,000 (FY 2015 est.)	Bond debt; maintenance; bike/ped; transit
	Motor Vehicle Registration Fee	$15 generates $255,000 (FY 2015 est.)	Maintenance; bike/ped; transit
	Powell Bill	$502,929 (FY 2015)	Maintenance; bike/ped
	Development Requirements	$2,274,000 (FY 2014 est.)	Thoroughfare improvements; bike/ped
	NCDOT STIP Funding	2015-2025 draft STIP: $86,386,000	New roads; road widening; bike/ped; transit
	CAMPO/Federal Funding	Up to $5,000,000/project	Road widening; bike/ped; transit
	CDBG Infrastructure Grants	$333,000 FY 2016-FY 2021	Bike/ped; small roadway projects
	Local Sales Tax	$3,810,000 (FY 2015 est.)	Bond debt; maintenance; bike/ped; transit
	Special Assessments – Private Property	Unknown	Targeted improvements
	Impact Fees	Unknown	Capacity improvements
	State Transportation Grants	Unknown	Bike/ped; transit

Source: Town of Morrisville Blue Ribbon Commission on Transportation Funding, page iv, December 2014.

Going forward, the Town of Morrisville can look to the information generated in the Blue Ribbon Commission report as well as funding guidance provided by CAMPO and NCDOT to continue to assess how best to leverage and implement various transportation financing and funding strategies. Remaining nimble and open to considering different types of funding strategies will enable the Town to be opportunistic and to take advantage of funding as it becomes available. Taking this approach will help Morrisville continue to advance its transportation vision through the strategic advancement of projects, programs, and policies both now and into the future.

ACTION PLAN

This section discusses the appropriate steps for local leaders to implement the recommendations of this plan and key agencies that should be involved with the task. These recommendations attempt to address existing or anticipated future needs in the study area. As a result, some needs are more urgent, while others will assume greater importance as the area continues to grow and travel characteristics change. The action items in this chapter are recommended to occur either in the near-term (less than 15 years), mid-term (15 to 24 years), or long-term (25 or more years). The process for near-term tasks should be initiated quickly post adoption to best take advantage of the momentum gained with the development of this plan.

Policy Measures

Morrisville's status as a desirable area for growth and development and as a major draw for regional traffic creates a tension between the needs of land use and transportation. The Town works closely with neighboring jurisdictions, CAMPO, and NCDOT to ensure that the integrity of transportation plans is maintained as development applications are considered. Town staff will continue to work cooperatively with these agency partners to review proposed development applications and seek reasonable alternatives where necessary. In an effort to carry this collaboration forward, copies of the adopted plan also should be forwarded to CAMPO, Wake County, NCDOT, the Town of Cary, and the City of Durham. Additional copies should be made available for public review at Town offices and online.

Before outlining a strategy for new policy and program recommendations, it is important to first reflect on the policies and programs that are already in place within the Town or are currently under development. An inventory of plans and policies with content relevant to the advancement of the ***Town of Morrisville Comprehensive Transportation Plan*** was performed as part of the information gathering phase of the plan development. This information is included in **Appendix H**. **Table 5-4** documents the policies or programs that are currently being used to address transportation needs within the Town. Policies or programs in this table and the table on the next page are sorted by the travel mode they most greatly impact. In addition, the relationship of each policy or program to the guiding principles outlined in **Chapter 1** are noted in the table. For reference, these guiding principles are provided as a legend under each table.

Table 5-4: Existing Policies or Programs

TRAVEL MODE	EXISTING POLICIES OR PROGRAMS	GUIDING PRINCIPLES ADDRESSED
All	In April 2018, Morrisville recently completed and adopted the Town's first Strategic Plan. This plan is intended to assess current Town policies and practices and make recommendations on how to better coordinate, schedule, or collaborate on these efforts.	
Bicycle & Pedestrian	Bicycle safety campaigns are conducted annually as a collaborative effort between Town departments such as Fire, Police, and Planning. These bike rodeos take children through a course that teaches them about bicycle safety. This program should continue to be a Town priority. Integration with related Town planning efforts should be promoted during each event.	
Bicycle & Pedestrian	As stipulated in sections 5.8.7 and 5.8.8, the Town's Unified Development Ordinance (UDO) specifies the provision of facilities such as bike lanes and sidewalks within new developments and connecting to adjacent facilities.	
Bicycle & Pedestrian	The Town's UDO allows for the provision of off-street neighborhood connectors in section 5.8.8.C.2. These cut-throughs benefit all non-motorized travelers.	
Bicycle & Pedestrian	The Town of Morrisville completed an update to the Parks and Recreation Master Plan in 2018, and the update was adopted by the Town Council in April 2018. Recommendations made within the ***Town of Morrisville Comprehensive Transportation Plan*** were incorporated into this plan, which will then provide additional detail about future destinations and activities. Multi-use path recommendations in this plan have been developed in coordination with Parks and Recreation staff, and these recommendations were translated directly into that plan. Supporting bicycle and pedestrian facilities developed in this plan will also be referenced for their linkage to park and open space locations.	
Roadway	The 2009 Comprehensive Transportation Plan is used as a tool to communicate desired roadway connectivity as development projects are proposed. The plan notes preferred locations for these connections as well as potential multimodal enhancements. This approach is supported by section 5.8.4 of the Town's UDO.	
Roadway	As stipulated in section 5.8.5 of the Town's UDO, new developments are required to reserve right-of-way for and construct future collector streets.	
Transit	The Town has identified a Transit-Oriented Development (TOD) as a unique district within its UDO (section 5.2.2), and has provided details for multimodal accommodation that will support future transit implementation and appropriate site layout and design.	

The Town of Morrisville currently has several supportive policies or programs under development that will further enhance the transportation network and its connection the growth and quality of life of the Town. **Table 5-5** lists these policies and programs along with their related travel modes and applicable guiding principles.

Table 5-5: Policies or Programs Currently Under Development

TRAVEL MODE	EXISTING POLICIES OR PROGRAMS	GUIDING PRINCIPLES ADDRESSED
Roadway	The Town of Morrisville is currently updating their TIA requirements. These requirements outline the level of traffic analysis and assessment required for different types and magnitudes of development.	
Transit	The Town is actively involved with the development and implementation of the Wake County Transit Plan.	

GUIDING PRINCIPLES LEGEND

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Economic Vitality
Support the local economy by making it easier to move people and freight around and through the Town.

Mobility & Accessibility
Provide a balanced transportation system that makes it easier to walk, ride a bike, and take transit.

System Preservation
Improve the transportation system's longevity by emphasizing maintenance and operational efficiency.

POLICY AND PROGRAM RECOMMENDATIONS

The Town of Morrisville has been proactive in incorporating these key transportation considerations into its requirements, leading to a more connected and multimodal system. Moving forward, these efforts can be continued and augmented by considering the policy or program recommendations shown in **Table 5-6**. Each recommendation is classified by travel mode and the applicable guiding principles. The recommended policies and programs in **Table 5-6** are not in a prioritized order.

Table 5-6: Recommended Policies or Programs

TRAVEL MODE	POLICY OR PROGRAM RECOMMENDATION	GUIDING PRINCIPLES ADDRESSED
All	**Update the CTP every five years to ensure the plan's recommendations and objectives remain relevant.** Morrisville is growing rapidly, and will likely look and feel very different just a few short years from now. While the CTP should be amended regularly to comply with emergent information, a formal update process every five years will allow the plan to remain consistent with future goals and objectives, take into account emerging technology, and allow the community to respond to changing conditions.	
All	**Consider adjustments to the Unified Development Ordinance to accommodate recommendations in the CTP.** The UDO is a major vehicle for advancing the Town's goals and objectives through development opportunities. While the UDO primarily governs land use and development guidelines, transportation projects are often advanced incrementally through incidental improvements attached to development projects. Therefore, it is critical that bicycle and pedestrian connectivity requirements, future roadway connections, and transit expansion plans are all considered.	
All	**Develop and adopt an official Town policy to guide the funding of "betterments" associated with NCDOT projects.** Though most roadway improvements on state-maintained roadways are funded through State and federal dollars, each project generally requires a local contribution for construction of bicycle and pedestrian accommodations or aesthetic improvements. Occasionally, things such as landscaping, sidewalks, and multi-use paths may require a higher local match in order to implement these enhancements during the roadway improvement process. The Town should develop a policy that guides the level of local funding that should be applied to fund these elements. This policy could help guide implementation of the full street section to the extent prescribed by the CTP, thereby improving the safety, aesthetics, and bicycle and pedestrian environment of corridors within the Town.	
All	**Conduct an audit and revision of the Capital Investment Program (CIP) annually to ensure that all major transportation projects are consistent with CTP recommendations.** The CIP is a powerful tool to advance and fund the Town's long-term transportation goals. Therefore, it is crucial that consistency with the CTP become a major consideration for the prioritization of major transportation improvement projects. Projects designated as short-term priorities in the CTP should also be prioritized within the CIP, and evaluated for the necessary funding obligations. Planning and coordination should begin immediately with NCDOT to ensure that adequate local funding is allocated for state-managed projects. Each proposed project should be evaluated for consistency with the recommendations, alignment with community objectives, and the potential for alternative funding sources.	
All	**Review the list of committed and priority projects on an annual basis to re-classify projects as necessary.** In an environment of funding challenges and shifting priorities, it is not unusual for the list of funded projects to change from year to year, with some projects having their funding withdrawn. An annual review allows Town staff to re-focus their planning efforts each year with up-to-date information, and to work closely with NCDOT and regional planning staff to advocate for current local priority projects. These modifications should be reflected in Chapter 5 of the CTP as deemed necessary by Town staff.	
All	**Amend the Comprehensive Transportation Plan annually to include new transportation network enhancements as they are identified during the development review process.** The CTP should be updated annually to take into account new developments, completed projects, and changing conditions. This amendment may include updates to figures and tables in Chapters 2, 3, or 4, as determined by Town staff based on the types of enhancements to be added.	
Bicycle & Pedestrian	**Continue to follow efforts promoting the Triangle Bikeway, and work with NCDOT to ensure proper connections to Town bike facilities on Airport Boulevard.** The proposed Triangle Bikeway is envisioned to run roughly parallel to I-40 to connect Raleigh, Cary, RDU, RTP, and Morrisville. This facility will greatly impact mobility in Morrisville and the surrounding region. Town staff should continue to actively engage in regional bicycle and pedestrian planning efforts to advocate for local needs, and partner with other local communities and advocacy organizations to raise awareness of the plan and seek public support. Additional modifications may be needed once the alignment for the Triangle Bikeway has been finalized.	
Bicycle & Pedestrian	**Incorporate the streamlined nomenclature for multi-use paths described in Chapter 4 to all Town documents, plans, and ordinances.** The CTP classifies multi-use paths as either greenways or sidepaths, depending on their function and location. Incorporating this language within all Town ordinances, documentation, and signage can provide clarity and certainty throughout the community.	
Bicycle & Pedestrian	**Evaluate all unsignalized greenway trail crossings to determine whether crossing enhancements such as high-visibility crosswalks or signage should be added, as well as study potential locations for mid-block crosswalks throughout Town.** Crossing enhancements are cost-effective ways to mark pedestrian and bicycle crossings that may not warrant a traffic signal. Town Planning, Parks and Recreation, and Public Works staff should collaborate to determine how best to identify which locations should have enhancements added.	
Bicycle & Pedestrian	**Conduct an audit of all existing crosswalks for ADA accessibility.** Develop an inventory of existing crosswalks and identify the level of improvement needed for each location.	

GUIDING PRINCIPLES LEGEND

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Improve the transportation system's longevity by emphasizing maintenance and operational efficiency.

TRAVEL MODE	POLICY OR PROGRAM RECOMMENDATION	GUIDING PRINCIPLES ADDRESSED
Bicycle & Pedestrian	**Prioritize the construction of greenway connections between existing facilities and adjacent neighborhoods.** The construction of short connections has the ability to greatly improve connectivity through cost-effective minor improvements, rather than major investments. Increased connections to the greenway system can provide crucial recreational connections, as well as increased functional mobility throughout the community for neighborhoods built in a curvilinear development pattern (characterized by streets with multiple curves, typical of many modern subdivisions), encouraging active transportation for short trips.	
Bicycle & Pedestrian	**Revisit the non-motorized recommendations within the Comprehensive Transportation Plan to determine if adjustments should be made to better accommodate the vision of the 2018 Parks and Recreation Master Plan.** Amend or update the plan's recommendations to reflect the priorities of the Parks and Recreation Master Plan if necessary, including greenway connections, bicycle and pedestrian facilities, and prioritizing connectivity to community parks.	
Bicycle & Pedestrian	**Advance the recommendations of the Active Kids Strategic Plan.** Support development of strategies such as creating a Safe Routes to School Program, walk and bike to school days, and safety audits. Also promote the concept of complete streets through better coordination between Town staff.	
Bicycle & Pedestrian	**Evaluate Church Street cross-section to provide 14' lanes with shared lane markings.** Review the existing conditions along Church Street to determine if revising the recommended cross-section to include 14-foot wide lanes with sharrows would be appropriate.	
Bicycle & Pedestrian	**Develop a standard cross-section for greenways designed to accommodate emergency vehicles.** As the greenway network continues to expand in Morrisville, it will be important to ensure that emergency vehicles can efficiently access the greenway in the event of an emergency.	
Bicycle & Pedestrian	**Develop a plan for implementation and sign template(s) for signage to inform and educate the community about the purpose and rules of a sidepath, greenway, etc.** Education and enforcement is a major component of promoting active transportation throughout the community. Informational signage and events to introduce the basics of greenway rules and etiquette will create a confident community that takes pride in their active transportation system and encourages others to do the same.	
Bicycle & Pedestrian	**Create wayfinding signage that details the trip length to community destinations by bike or on foot to encourage travelers to step outside their vehicle.** This popular way to promote active transportation is a cost-effective measure that can be completed by Town staff, in collaboration with a community advocacy group, or with the cooperation of a local business organization. Similar signage is currently in place along greenways in portions of Raleigh and Charlotte.	
Bicycle & Pedestrian	**During road projects, develop a methodology to determine appropriate crossings to enhance with marked crosswalks, pedestrian signal phasing, and ADA-compliant accessibility features.** Completing safety improvements at the same time as a major roadway project is less costly and disruptive than funding it as a standalone project, and designing the pedestrian facility in tandem with the roadway can ensure they work together safely for improved mobility. However, not every intersection benefits equally from these improvements. Town Planning and Public Works staff should collaborate to determine how best to identify locations needing bicycle and pedestrian crossing improvements to help more effectively allocate Town resources.	
Bicycle, Pedestrian, & Roadway	**Develop an Intersection Safety Improvements Study Program for all intersections in Town.** In order to address smaller intersections throughout Town that are not specifically identified in the CTP, develop an Intersection Safety Improvements Study Program that can be used by staff to prioritize and study street intersections in Town for additional safety improvements, including but not limited to signalization, crosswalks, clearing vegetation from sight lines and additional signage.	
Bicycle, Pedestrian, & Roadway	**Complete a study of transportation-related green infrastructure opportunities.** Incorporating green infrastructure in transportation planning can yield significant environmental and cost benefits, as well as direct impacts to human well-being and quality of life. Examples of green infrastructure in the transportation sector include elements such as permeable pavement, bioswales, planter boxes, trees, and ecosystem services (climate regulation, water purification, etc.).	
Bicycle, Pedestrian, & Roadway	**Review the Engineering, Design, and Construction Manual (EDCM) and UDO to account for recommendations made in the Plan for multi-use paths.** Updating the Town of Morrisville Comprehensive Transportation Plan provides staff an opportunity to review the EDCM and UDO for potential amendments based on recommendations in the Plan.	
Roadway	**Develop an access management strategy for Morrisville Parkway.** Conduct a study for the Morrisville Parkway corridor to evaluate current curb cuts, intersection safety, and multimodal connectivity.	
Roadway	**Emphasize network connectivity during the review of all development proposals for consistency with the approved collector street recommendations and section 5.8.5 of the Town's UDO.** Collector street recommendations are intended to primarily focus on the location of connection points rather than specific alignments through a proposed development.	

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TRAVEL MODE	POLICY OR PROGRAM RECOMMENDATION	GUIDING PRINCIPLES ADDRESSED
Roadway	**Where appropriate, consider implementation of access management strategies for both public and private sector improvements.** The types of access management improvements for state roadways should be based upon coordination with NCDOT. Access management improvements can be considered in areas with changing development patterns, increasing traffic, or existing safety concerns as potential mitigation measures. More information on access management can be found in **Chapter 3.**	
Roadway	**Support efforts by partner agencies and other public and private entities to promote intelligent transportation systems and transportation demand management improvements.** The Triangle region is growing, and the transportation system is feeling the squeeze. The best future solution to mitigate congestion is not to widen every highway, but instead to utilize advanced technology to manage traffic operations, and develop coordinated strategies to manage demand. In 2016, drivers in the Triangle area reduced their commute by over 61 million miles through the use of travel demand management (TDM). TDM efforts are uniquely suited to this region due to the clustering of many large employers that make programs like carpooling, transit, and flexible work weeks extremely beneficial. The Town should continue to work cooperatively with Triangle J Council of Governments, CAMPO, and NCDOT to support current efforts, plan for future needs, and support innovative pilot projects to advance emerging technologies.	
Roadway	**Ensure design standards to maintain pedestrian activity when building large medians.** Proposed cross-sections developed to plan for dedicated bus lanes include wide center medians. In the future, the median will be reduced in width to add a dedicated bus lane in the roadway. In the near term, it is essential to design the medians in a way to prevent excessive speeding and dangerous behavior by vehicles. Features such as, but not limited to, landscaping, curb and gutter, crosswalks, and pedestrian havens need to be included in the design to ensure safer pedestrian access.	
Roadway	**Coordinate with NCDOT to determine the location and scope of recommended intersection improvements, and update or amend the plan accordingly.** Several intersection recommendations are identified in this CTP, but for state-maintained roadways, the final scope and location of any intersection improvements or realignment projects will be determined through coordination with NCDOT. A comprehensive safety and operations analysis should be completed at all locations to determine the unique needs of each location, and the CTP project list will be updated accordingly as each project progresses to design and construction.	
Roadway	**Rename the segment of Southport Drive between NC 54 and International Drive.** The removal of the proposed Southport Drive Extension, between McCrimmon Parkway and International Drive, from the Plan eliminates the opportunity to connect the existing sections of Southport Drive between Aviation Parkway and McCrimmon Parkway and NC 54 and International Drive. Renaming of the roadway will improve clarity for both the Town and residents by reducing the confusion caused by having two disconnected streets with the same name.	
Roadway	**Study future additional crossings and grade separations of the railroad corridor parallel to NC 54.** As the Town continues to provide enhanced east-west connectivity, understanding feasible locations for future access across the rail corridor adjacent to NC 54 will be critical.	
Roadway	**Create a policy for the provision of landscaping and aesthetic elements as part of new roundabout construction.** Landscaping of roundabouts plays an important role in improving the aesthetics of an area; however, landscaping has a number of functional purposes. Functional purposes include making the center island more conspicuous, focusing driver attention on key conflict areas by blocking the view of other areas, and discouraging pedestrian traffic through the center island.	
Roadway	**Create a stacking and access policy for new schools located in Town.** While NC G.S. 136-18 (29A) already requires coordination with the local Division Engineer upon acquiring land for new schools or relocating/expanding an existing school to evaluate driveway access and traffic, operational, and safety impacts, the Town should consider a stacking and access policy for new schools located in Town with access to Town-owned streets. Requirements should consider the provision of right-in/right-out access for carpool lines, as well as time windows that carpool lines can begin forming.	
Roadway	**Study the future Morrisville-Carpenter Road and NC 54 grade separation.** The Town should work with CAMPO, NCDOT, and other regional transportation partners to study the future Morrisville-Carpenter Road and NC 54 grade separation to arrive at the best alternative and ensure the consideration of impacts to historic structures, existing residences, and government facilities/parks.	
Roadway	**Evaluate incentivizing parking decks for private development.** As the Town of Morrisville continues to attract development, the Town should evaluate the benefits of incentivizing the construction of parking decks as part of higher density developments. Incentives can include, but are not limited to, partial construction funds, public leases of private spaces, and operation and maintenance support.	
Roadway	**Study potential emergency access points throughout Town.** The Town of Morrisville has limited railroad crossings that impede on street connectivity. To ensure effective emergency response services, the Town should study the need for and costs of emergency access points throughout Town.	

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TRAVEL MODE	POLICY OR PROGRAM RECOMMENDATION	GUIDING PRINCIPLES ADDRESSED
Roadway	**The Town will coordinate and work with NCDOT, CAMPO, and other local and regional partners, as appropriate, on roadway and intersection improvements funded by the state.**	
Roadway	**Evaluate the implementation or improvement of coordinated traffic signal systems on major corridors in the Town.** Morrisville has several small coordinated, closed-loop signal systems; however, there is not a Town-wide coordinated system. The Town should evaluate the existing coordinated systems to determine if re-timing is necessary, identify corridors without existing coordination and evaluate the feasibility of introducing coordination, and evaluate the possibility of implementing a Town-wide coordinated signal system.	
Roadway	**Evaluate and develop electric vehicle (EV) charging station policy and ordinance requirements.** As the growth of electric mobility continues to gain momentum, the Town should consider developing UDO language that is more accommodating of EV charging. For example, the City of Atlanta requires that 20 percent of the spaces in all new commercial and multi-family structures be EV-ready and requires all new development of residential homes to be equipped with the infrastructure needed to install EV charging stations, such as conduit, wiring, and electrical capacity.	
Roadway	**Develop standard cross-section(s) for Emergency Accessways and incorporate into the Engineering Design and Construction Manual (EDCM).** To ensure the efficient delivery of emergency services to Morrisville residents, a responsible design and construction standard should be developed to guide design features such as unobstructed width, vertical clearance, maximum grade, sight distance, and turning radius.	
Roadway and Transit	**Evaluate and support joint public/private parking options such as park and ride lots.** By partnering with organizations such as Research Triangle Park, GoTriangle, and the Morrisville Chamber of Commerce, the Town can pursue public/private parking opportunities that provide convenient ties to the regional transit system and have the potential to alleviate congestion.	
Transit	**Remain engaged with the identification and prioritization of transit improvements at the County level.** As Wake County looks toward major transit improvements with the implementation of the Wake County Transit Plan, Town staff should continue to remain active at the regional level to advocate for local interests. Staff should assist the regional efforts by coordinating local planning activities to the region's long-range goals.	
Transit	**Study potential routing, stop locations, ridership, and costs of a transit circulator with the intent to apply for funding through the Wake County Transit Community Funding Area Program.** As Morrisville grows, so does the demand for transit service within the community. The Town should continue to develop plans for a local circulator, including several operational alternatives. Coordination with Wake County should continue to determine the Town's eligibility for the program, and to maintain communication throughout the planning process. Local businesses, schools, and employers should also be engaged in the development process. Other towns with similar types of transit service include Wake Forest and Statesville. The Town should also explore allocating local monies to use as a match for this program.	
Transit	**Advocate and provide support for expansion of bus service town-wide.** In order to support enhanced fixed-route, on-demand, and express bus service within the Town, staff and elected officials should advocate for expanded service. Additionally, support should be provided for expanded roadway cross-sections to accommodate bus-only lanes on select corridors.	
Transit	**Evaluate on-demand transit service for Town.** In addition to advocating for the expansion of bus service town-wide and studying the potential for a Town circulator bus, the Town should also study the feasibility of on-demand transit service.	

GUIDING PRINCIPLES LEGEND

Culture & Environment
Enhance the Town's quality of life by preserving and promoting its valued places and natural assets.

Growth & Development
Make travel more efficient by coordinating transportation investments with land use decisions.

Safety & Security
Promote a safe and secure transportation system by reducing crashes and improving emergency response.

Economic Vitality
Support the local economy by making it easier to move people and freight around and through the Town.

Mobility & Accessibility
Provide a balanced transportation system that makes it easier to walk, ride a bike, and take transit.

System Preservation
Improve the transportation system's longevity by emphasizing maintenance and operational efficiency.

Roadway Project Prioritization

The assessment of roadway projects for the ***Town of Morrisville Comprehensive Transportation Plan*** includes both quantitative and qualitative metrics. The metrics used were defined using feedback from Town staff, the Morrisville Planning and Zoning Board, CAMPO, and NCDOT. National resources such as Transportation for America's *The Innovative MPO and their Transportation Performance Measures: 2017 Survey* were consulted to pull from national best practices. In addition to each metric, the importance of each metric to the prioritization process and how much weight each should carry was evaluated through a coordinated effort including Town staff, the Morrisville Planning and Zoning Board, and the public. The following sections define the metrics used in the prioritization process.

RELATIONSHIP TO GUIDING PRINCIPLES

During the development of prioritization criteria, the relationship to the Plan's guiding principles was closely considered. Each of the prioritization criteria identified responds to one or more guiding principles. The relationship between prioritization criteria and guiding principles is detailed in **Figure 5-2**.

Figure 5-2: Prioritization and Guiding Principles Relationship

PRIORITIZATION CRITERIA	APPLICABLE GUIDING PRINCIPLES	PRIORITIZATION CRITERIA	APPLICABLE GUIDING PRINCIPLES
Crash History		Schools and Community Facilities	
Existing Volume to Capacity Ratio		Activity Centers	
Volume to Capacity Reduction		Supports Transit Routes	

GUIDING PRINCIPLES LEGEND

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QUANTITATIVE METRICS

Crash History

To ensure that project recommendations best serve areas with existing safety concerns, crash data from June 2013 to May 2016 was analyzed relative to crash severity and frequency. Crash frequency includes a raw count of crashes along roadway project segments and within 300 ft. of intersection projects.

The crash severity metric was calculated using NCDOT's methodology that converts each crash to a "property damage only" equivalency. This is called the equivalent property damage only (EPDO) index, and gives greater weight to more severe crashes. The **Table 5-7** shows the coefficients used by NCDOT to weight crashes by severity.

Table 5-7: NCDOT Crash Weighting Coefficients

SEVERITY	DESCRIPTION	WEIGHT
K	fatality	76.8
A	incapacitating injury	76.8
B	evident non-incapacitating injury	8.4
C	injury not evident, but complaint of pain or lapse in consciousness	8.4
PDO	property damage only	1

$$EPDO = 76.8(K + A) + 8.4(B + C) + 1(PDO)$$

Existing Volume to Capacity Ratio

Existing volume to capacity ratios (V/C) were scored using the Locally Administered Projects Program (LAPP) methodology. The existing V/C for each linear project was obtained from the 2010 Triangle Regional Model and scaled using a point system. For new location roadways, parallel facilities that would be improved by the project were identified and the V/C of the parallel facility was used. The scoring system is defined below.

V/C < 0.2 0.0 points

V/C < 0.4 0.2 points

V/C < 0.6 0.6 points

V/C < 0.8 0.8 points

V/C > 0.8 1.0 point

Volume to Capacity Reduction

Each linear project is scored based on the volume to capacity reduction from year 2010 to 2040. V/C ratios for the existing year were obtained from the approved regional travel demand model (Triangle Regional Model v5) base year 2010 model network with 2040 socio-economic data, and future year V/C ratios were obtained from a 2040 full build-out model.

QUALITATIVE MEASURES

Schools and Community Facilities

Projects within ½ mile of schools and community facilities were awarded 1 point. Community facilities include parks, community centers, and greenway trailheads.

Activity Centers

Projects that serve an area designated as Business Activity Center, Neighborhood Activity Center, or Regional Activity Center in the Town's existing zoning classifications were awarded 1 point.

Supports Transit Routes

Projects that align with existing and proposed transit routes were awarded 1 point.

PRIORITIZATION RESULTS

The outcomes of this prioritization process are reflected in **Table 5-8** and **Figure 5-3**. It is important to note that the prioritized projects shown here are not financially constrained – this list is independent of potential revenues and should be used as a guide to help advocate for future funding. The prioritization process is intended to serve as a tool that allows for flexibility in the order in which projects are implemented. This flexibility allows funding partners such as the Town, NCDOT, and CAMPO to be opportunistic and to take advantage of future revenue as it becomes available.

Roadway Facility Improvements

Members of Town Council and the Planning and Zoning Board were shown the results of the roadway prioritization process discussed above, and used the results to inform the classification of projects as near-term, mid-term, and long-term. The full list of prioritized roadway recommendations is included in **Table 5-8** and shown in **Figure 5-3**. Prioritization is an effective way to help guide the allocation of future resources. However, the ultimate timeline for implementing these improvements is subject to funding availability. Responsibility for implementing these improvements will be a blend of State, local, and private funding and management.

Table 5-8: Prioritized Roadway Improvements[1]

CORRIDOR	EXTENTS	IMPROVEMENT	GUIDING PRINCIPLES ADDRESSED
Near-Term Recommendations (less than 15 years)			
Airport Boulevard Extension Phase 1	NC 54 to Church Street	New Location and Grade Separation	
Airport Boulevard Extension Phase 2	Church Street to Current Terminus near Garden Square Lane	New Location	
Crabtree Crossing Parkway & Morrisville Parkway		Intersection Improvements	
Davis Drive	Wake County Northern Limits to Morrisville-Carpenter Road	Widening	
Davis Drive & Parkside Valley Drive		Intersection Improvements	
Davis Drive & McCrimmon Parkway		Intersection Improvements	
Davis Drive & Morrisville-Carpenter Road		Intersection Improvements	
Davis Drive & Morrisville Parkway		Intersection Improvements	
McCrimmon Parkway & Church Street		Intersection Improvements	
NC 54	Perimeter Park Drive to Weston Parkway	Widening	
NC 54	Weston Parkway to NW Cary Parkway	Widening	
NC 54	NW Cary Parkway to Wilson Road	Widening	
NC 54 & Morrisville-Carpenter Road		At-Grade Intersection Improvements	
NC 54 & Keybridge Drive		Intersection Improvements	
Slater Road & Carrington Mill Boulevard		Intersection Improvements	

GUIDING PRINCIPLES LEGEND

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[1] Project sheets for select projects are available in Appendix C.

CORRIDOR	EXTENTS	IMPROVEMENT	GUIDING PRINCIPLES ADDRESSED
Mid-Term Recommendations (15 to 24 years)			
Airport Boulevard	Factory Shops Road to Slater Road	Access Management	
Airport Boulevard	Slater Road to NC 54	Access Management	
Evans Road	Aviation Parkway to Weston Parkway	Widening	
Louis Stephens Drive	Poplar Pike Lane to McCrimmon Parkway	Widening	
Mason Farm Road Connection	Ferntree Court to Town Hall Drive Extension	New Location	
NC 54	Northern Town Limits near Shiloh Glenn Drive to NC 540	Widening	
NC 54 & Morrisville Parkway		Intersection Improvements	
NC 54 & NW Cary Parkway		Intersection Improvements	
Town Hall Drive Extension	Ferntree Court to McCrimmon Parkway	New Location	
Long-Term Recommendations (greater than 25 years)			
International Drive	Southport Drive to Current Terminus	Widening	
International Drive Extension	Current Terminus to Morrisville East Connector (proposed)	New Location	
Marcom Drive Extension	Current Terminus near Sorrell Grove Church Road to Paramount Parkway[2]	New Location	
Morrisville-Carpenter Road & NC 54[3]		Grade Separation	
Morrisville-East Connector	McCrimmon Parkway to Airport Boulevard	New Location	
Odyssey Drive Extension	Current Terminus near Trans Air Drive to McCrimmon Parkway	New Location	
Southport Drive Extension	Current Terminus near Southcenter Court to McCrimmon Parkway	New Location	
Stockton Gorge Road Extension	Stockton Gorge Road to Town Hall Drive Extension (proposed)	New Location	

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[2] Resolution 2022-396-0: CTP amendment approved Oct. 25, 2022 removed a portion of Marcom Drive Extension from the plan.

[3] Project design of the Morrisville-Carpenter Road and NC 54 grade separation project must include consideration of impacts to historic structures, existing residences, and government facilities/parks.

(Res. No. 2022-396-0, 10/25/2022)

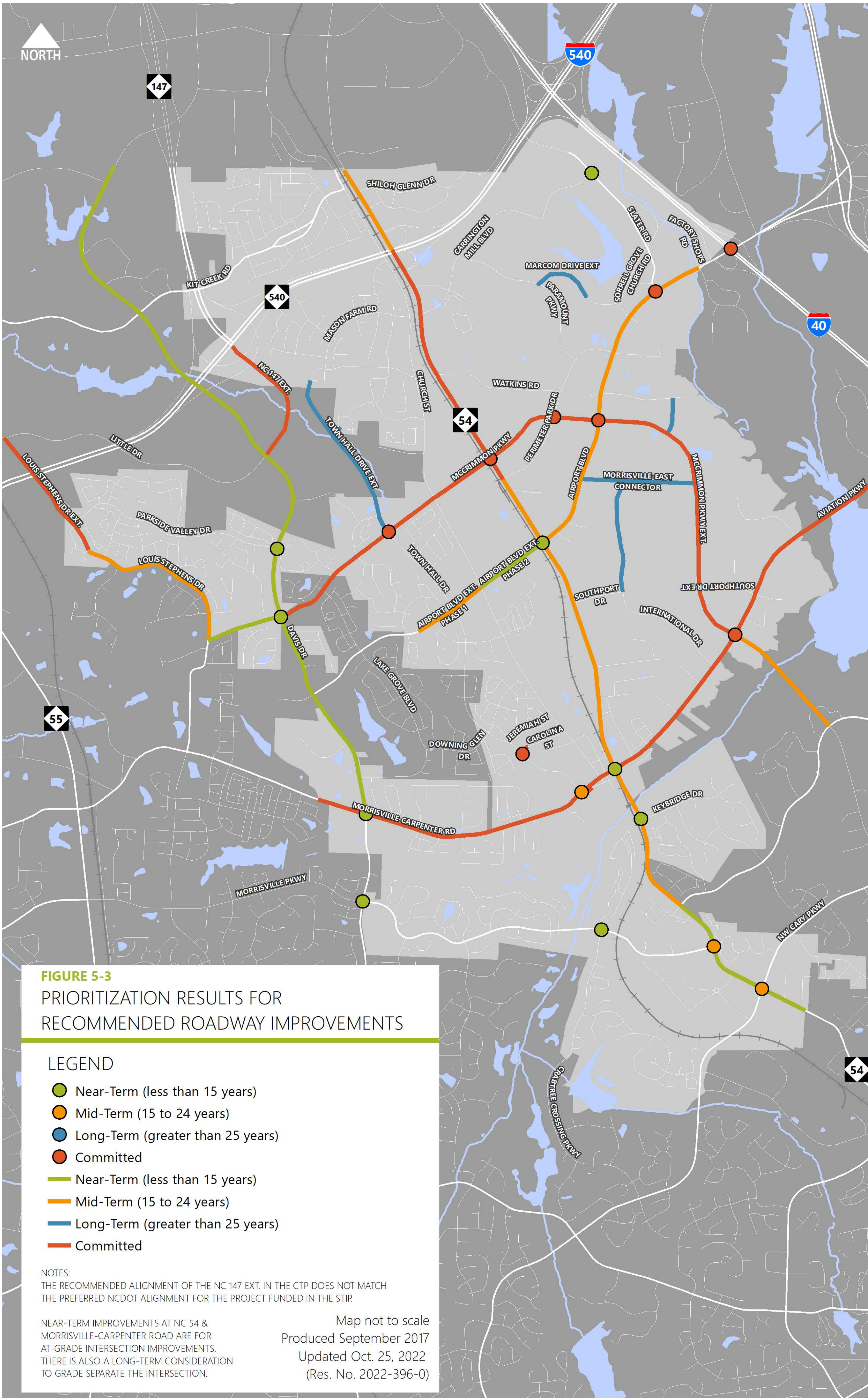

FIGURE 5-3
PRIORITIZATION RESULTS FOR RECOMMENDED ROADWAY IMPROVEMENTS

LEGEND

- Near-Term (less than 15 years)
- Mid-Term (15 to 24 years)
- Long-Term (greater than 25 years)
- Committed
- Near-Term (less than 15 years)
- Mid-Term (15 to 24 years)
- Long-Term (greater than 25 years)
- Committed

NOTES:
THE RECOMMENDED ALIGNMENT OF THE NC 147 EXT. IN THE CTP DOES NOT MATCH THE PREFERRED NCDOT ALIGNMENT FOR THE PROJECT FUNDED IN THE STIP.

NEAR-TERM IMPROVEMENTS AT NC 54 & MORRISVILLE-CARPENTER ROAD ARE FOR AT-GRADE INTERSECTION IMPROVEMENTS. THERE IS ALSO A LONG-TERM CONSIDERATION TO GRADE SEPARATE THE INTERSECTION.

Map not to scale
Produced September 2017
Updated Oct. 25, 2022
(Res. No. 2022-396-0)

Alternative Travel Modes

Identifying facility needs and improvement types is only one part of the recommendations development process. Given the existing and anticipated funding sources available for bicycle, pedestrian, and transit projects in the region, there is a possibility that all the projects recommended here may not be built within the next 30 years. As a result, it is important when addressing implementation to consider projects from alternative travel modes in a different way than roadway projects.

Alternative travel mode projects can be divided into two types: independent and incidental. Independent projects are those that are independent of scheduled roadway projects, while incidental projects are multimodal accommodations that are constructed as a part of a roadway project. Both types of projects should be pursued and implemented to arrive at a well-connected and user-friendly network in Morrisville. The Town has done a good job of coordinating with NCDOT to advance these projects with roadway improvements in recent years. The majority of the recommended multimodal recommendations discussed in **Chapter 4** are on roadways that have improvements recommended in the plan. As a result, most bicycle, pedestrian, and transit projects are not independently prioritized. Where these projects align with roadway projects, the Town should seek to implement bicycle, pedestrian, and transit improvements concurrent with roadway enhancements. This approach is most cost-effective and minimizes construction impacts to the surrounding network.

INDEPENDENT MULTI-USE PATH PROJECTS

A subset of the multi-use path recommendations in **Chapter 4** have been identified as independent projects. Independent projects will have funding and implementation strategies primarily led by the Town. As a result, these projects warrant further analysis to determine how they impact key criteria important to the success and viability of the facilities. The range of criteria considered in this analysis of independent multi-use paths includes:

- Connections to existing and proposed facilities
- Activity centers served
- Feasibility of construction
- Funding partners

Independent multi-use paths are not grouped into near-term, mid-term, or long-term priorities. Rather, the four criteria for this assessment can be used as a guide to strategically advance projects, depending on the specific needs of the Town at that time. **Table 5-9** shows the results of this prioritization exercise. Prioritization criteria are scored using a star system, with five stars indicating that the facility performs very well, and one star indicating that the facility does not perform well for that specific factor. Each of the independent multi-use path projects are shown in **Figure 5-4**.

The funding partners column indicates where the Town may be able to seek additional funding opportunities to advance certain multi-use paths. State and federal partners include NCDOT, CAMPO, and FHWA, while private partners typically include the development community or private grant opportunities.

★★★★★ PERFORMS VERY WELL
★★★★
★★★
★★
★ DOES NOT PERFORM WELL

Table 5-9: Independent Multi-Use Path Projects

	CONNECTIVITY	ACTIVITY CENTERS SERVED	FEASIBILITY OF CONSTRUCTION	FUNDING PARTNERS	GUIDING PRINCIPLES ADDRESSED
Airport Boulevard Sidepath (N side)	★★★	★★★	★★	State | Federal | Private	
Breckenridge Loop Greenway [4]	★★★★	★	★★★	State | Federal | Private	
Fairview Greenway	★★★★	★★	★★★	State | Federal | Private	
Kit Creek Greenway Extension	★★★★★	★★★	★★★	State | Federal | Private	
Kitts Creek Greenway	★★★★	★	★★★	State | Federal	
Mills Spring Greenway	★★★	★★★★	★★★★	State | Federal | Private	
Morrisville Parkway Sidepath (S side)	★★★★	★★★★★	★★	State | Federal | Private	
Park West Greenway Extension	★★★★★	★★★★	★★★★	Private	
Sawmill Creek Greenway	★★★	★★★★★	★★	State | Federal | Private	
Stirrup Iron Creek Greenway	★★★★★	★★	★★★	Private	
Town Hall Drive Sidepath (W side)	★★★★★	★★★★	★★★★	N/A	

[4] The Breckenridge Loop Greenway will be constructed to provide access for emergency vehicles from Little Drive to Willingham Road.

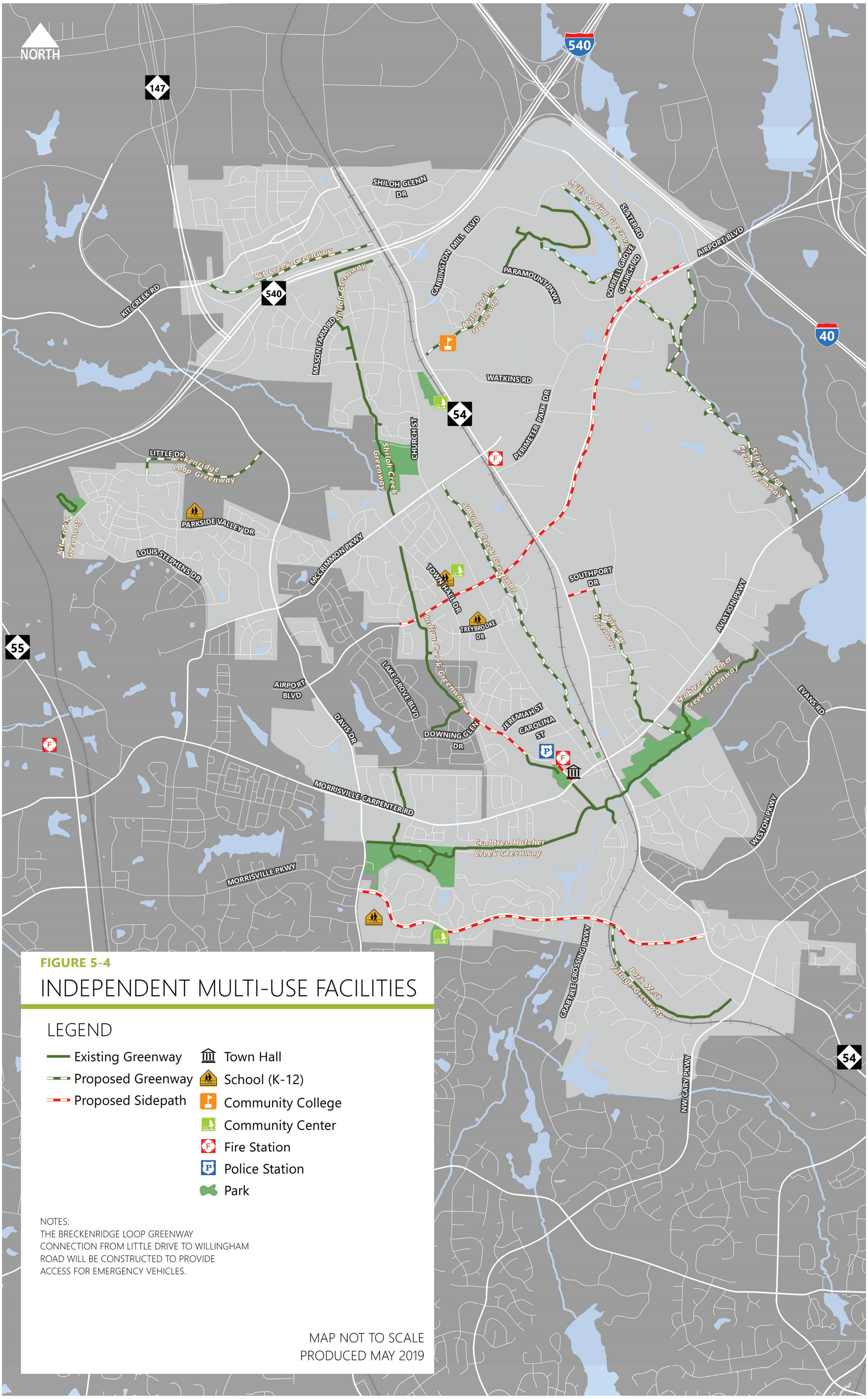

FIGURE 5-4

INDEPENDENT MULTI-USE FACILITIES

LEGEND

- Existing Greenway
- Proposed Greenway
- Proposed Sidepath
- Town Hall
- School (K-12)
- Community College
- Community Center
- Fire Station
- Police Station
- Park

NOTES:
THE BRECKENRIDGE LOOP GREENWAY CONNECTION FROM LITTLE DRIVE TO WILLINGHAM ROAD WILL BE CONSTRUCTED TO PROVIDE ACCESS FOR EMERGENCY VEHICLES.

MAP NOT TO SCALE
PRODUCED MAY 2019

In addition to the policy, program, and facility recommendations discussed in this section, it is vital to the success of this plan that the Town of Morrisville continues to work with and educate local citizens and businesses. While public support can encourage implementation, opposition can significantly delay a project. It will be important to encourage advocacy and maintain focus on those issues identified as important during preparation of the plan. Advocacy at the regional and state levels will also be essential as Morrisville seeks to fund and implement the action items identified in this plan.

CONCLUSION

The ***Town of Morrisville Comprehensive Transportation Plan*** provides a vision for transportation recommendations that considers existing and future needs and priorities for all travel modes. The creation of this Action Plan helps staff and elected officials advocate for projects and policies that will have the greatest positive impact to the Town. The Town has many identified transportation needs, and fully funding and implementing the recommendations will take a number of years. As projects move forward into funding and implementation, The Town will work with CAMPO and NCDOT to determine how best to advance recommended projects. The Town will also continue to monitor emerging needs and changes in the way projects can be funded and implemented. Project priorities will be reassessed through subsequent updates to this plan. This dynamic process will help the Town of Morrisville continue to effectively address its transportation needs both now and into the future.

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ACRONYM/TERM	ACRONYM DEFINITION	DEFINITION
303(d)	N/A	303(d) is a program established under the Clean Water Act (CWA) that allows states to identify water bodies with impaired water quality and the measures necessary to attain water quality restoration and protection.
AADT	Annual Average Daily Traffic	The total volume of traffic on a highway segment for one year, divided by the number of days in the year.
AASHTO	American Association of State Highway and Transportation Officials	The American Association of State Highway and Transportation Officials (AASHTO) is a nonprofit, nonpartisan association representing highway and transportation departments in the United States, the District of Columbia, and Puerto Rico. AASHTO is an international leader in setting technical standards for design, construction, and many other technical areas.
Access Management	N/A	The planning, design, and implementation of land use and transportation strategies that maintain a safe flow of traffic while accommodating the access needs of adjacent development. The goal of access management is to balance the need to provide efficient, safe, and timely travel with the desired ability to allow access to the individual destination. Examples of access management include median installation and driveway consolidation.
ADA	Americans with Disabilities Act	A federal law that requires public facilities and services to be accessible to persons with disabilities, including those with mental disabilities, temporary disabilities and conditions related to substance abuse.
AV	Automated Vehicles	Automated Vehicles (AV) perform a driving function, with or without a human actively monitoring the driving environment and is further defined by an associated level of autonomy. See **Appendix G** for more information.
Betterment	N/A	Betterments are the ancillary improvements (e.g. sidewalks, sidepaths, bike lanes, curb and gutter, street lights, and additional right-of-way) associated with roadway and bridge/grade separation projects.
Bike Lane	N/A	A portion of the roadway that has been designated by striping, signing, and pavement markings for the preferential and exclusive use of bicyclists
CAMPO	Capital Area Metropolitan Planning Organization	A regional transportation planning organization serving communities in the Raleigh Urbanized Area. CAMPO serves as the coordinating agency between local governments, NCDOT, and FHWA.
CIP	Capital Improvement Plan	A CIP details the infrastructure improvements (streets, water and sewer facilities, as well as police and fire stations) that the Town will need to meet the needs of growth over the next five years.
CMAQ	Congestion Mitigation/Air Quality	A program born out of the Intermodal Surface Transportation Efficiency Act that provides funding for projects which contribute to the attainment of the National Ambient Air Quality Standards. CMAQ funds can be used for constructing bicycle/pedestrian facilities, intersection improvements, transportation management organization operations, transit vehicle acquisition, traffic signal system upgrades and the funding of studies that lead to the reduction of traffic congestion.
Collector Street	N/A	Collects traffic from local roads and connects with thoroughfares. Lower speeds and shorter distances than thoroughfares are typical.
Committed Project	N/A	A committed project is defined by the Capital Area Metropolitan Planning Organization as any project within the dedicated funding in the first 5 years of the State Transportation Improvement Program (STIP).
Cross-section	N/A	A basic description of a type of roadway. Includes attributes such as the number of lanes, bicycle and pedestrian accommodations, and median type.
CTP	Comprehensive Transportation Plan	The CTP includes community consensus on future transportation needs required to support anticipated growth and development. It is a multi-modal plan that identifies the future transportation system needs and includes highways, public transportation, rail, and bicycle facilities needed to serve the anticipated travel demand. It strengthens the connections between an area's transportation plan, adopted local land development plan, and community vision.
Curvilinear	N/A	A development pattern characterized by streets with multiple curves, typical of many modern subdivisions.

ACRONYM/TERM	ACRONYM DEFINITION	DEFINITION
CV	Connected Vehicles	Connected Vehicles (CV) are vehicles equipped with technology that allows the vehicle to communicate with road infrastructure to share real-time transportation information between systems. See **Appendix G** for more information.
EDCM	Engineering, Design, and Construction Manual	The Town of Morrisville Engineering, Design, and Construction Manual (EDCM) helps design professionals, developers, contractors, property owners, and residents comply with the United Development Ordinance (UDO) and other Federal, State, and Local laws and regulations.
EPA	Environmental Protection Agency	The Federal regulatory agency responsible for administering and enforcement of Federal environmental laws including the Clean Air Act, the Clean Water Act, and others.
EPDO	Equivalent Property Damage Only	A severity metric that converts each crash to a "property damage only" equivalency. This is called the equivalent property damage only (EPDO) index, and gives greater weight to more severe crashes.
ETJ	Extra-Territorial Jurisdiction	An ETJ is the area adjacent to and outside of the Town limits in which the municipality has authority to exercise planning, zoning, and subdivision regulation.
Federal Functional Classification	N/A	The process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide.
FHWA	Federal Highway Administration	The federal agency that develops regulations, policies and guidelines to achieve safety, economic development, and other goals of FHWA programs through the construction and improvement of the nation's transportation infrastructure and highway system.
Freeway	N/A	Multi-lane roadway with limited access and relatively high speeds. The word freeway is often used interchangeably with interstate.
Greenway	N/A	A corridor of undeveloped land, usually in an urban area, which is set aside or used for conservation and/or recreation. Greenways can also serve as pedestrian and bicycle facilities for recreation and transportation. In this region, the term is often used to mean a Multi-Use Path, rather than the more complete definition of greenway.
ITS	Intelligent Transportation System	A system that uses modern electronic, communication and control technologies to provide travelers with better information on traffic condition, provide vehicles with safety equipment and improve the transportation infrastructure. Also includes technologies that identify, monitor, or control vehicles.
LAPP	Locally Administered Projects Program	The Locally Administered Projects Program (LAPP) was adopted by the NC Capital Area MPO on October 20, 2010. The program is used by the MPO to prioritize and program all projects in the region that will utilize federal funding such as Surface Transportation Block Grant Program – Direct Allocation (STBGP-DA), Congestion Mitigation for Air Quality (CMAQ), etc. The process involves a once-a-year call for all local roadway, transit, bicycle, and pedestrian projects, and will result in an annual program of projects in the Transportation Improvement Program (TIP).
Multimodal	N/A	Refers to the availability of multiple transportation options, especially within a system or corridor. A multi-modal approach to transportation planning focuses on the most efficient way of getting people or goods from place to place, be it by truck, train, bicycle, automobile, airplane, bus, or foot.
MTP	Metropolitan Transportation Plan	The Metropolitan Transportation Plan is the guiding document for future investments in roads, transit services, bicycle and pedestrian facilities and related transportation activities and services for a metropolitan area. The Plan must identify how the metropolitan area will manage and operate a multi-modal transportation system to meet the region's economic, transportation, development and sustainability goals – among others – for a 20+-year planning horizon, while remaining fiscally constrained.
MUTCD	Manual on Uniform Traffic Control Devices	The MUTCD is a compilation of national standards for all traffic control devices, including road markings, highway signs, and traffic signals.
NC DEQ	North Carolina Department of Environmental Quality	The North Carolina Department of Environmental Quality promotes the management of the State's air, land, and water resources to support a sustainable environment, healthy communities, and vibrant economy.

ACRONYM/TERM	ACRONYM DEFINITION	DEFINITION
NCDOT	North Carolina Department of Transportation	The North Carolina Department of Transportation is the agency responsible for construction, operation, and maintenance of the State's multimodal transportation system.
NWI	National Wetlands Inventory	The National Wetlands Inventory is an inventory of America's wetlands and is maintained by the US Fish and Wildlife Service.
PHB	Pedestrian Hybrid Beacon	The pedestrian hybrid beacon (PHB) is a light installed at mid-block crossings that remains dark until a pedestrian presses the pushbutton to activate the system.
PROWAG	Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way	PROWAG provides standards for newly designed and constructed streets and sidewalks that are governed by the ADA. Example facilities covered by PROWAG include pedestrian street crossings, accessible signals and pushbuttons, handrails, and many more.
RDU		Raleigh-Durham International Airport
RTC	Regional Transit Center	The Regional Transit Center is adjacent to Research Triangle Park and is managed by GoTriangle.
RTP	Research Triangle Park	Research Triangle Park is located just on the fringe of Morrisville, spanning both Wake and Durham Counties. The research and technology park is approximately 7,000 acres and is home to more than 26000 businesses and nearly 50,000 employees.
Sharrow	N/A	Sharrows are pavement markings used to denote that bicycles "share" the travel lane with motorized traffic.
STIP	State Transportation Improvement Program	A staged, multiyear, statewide intermodal program of transportation projects which is consistent with the statewide transportation planning processes, Metropolitan Transportation Plans (MTP), Transportation Improvement Programs (TIP).
Superfund	N/A	The common name used for the trust fund or process established under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) to clean up hazardous waste sites across the U.S.
TDM	Transportation Demand Management	A system of actions whose purpose is to alleviate traffic problems through improved management of vehicle trip demand. These actions, which are primarily directed at commuter travel, are structured to either reduce the dependence on and use of single-occupant vehicles, or to alter the timing of travel to other, less congested time periods.
Thoroughfare	N/A	A facility with a functional purpose of moderate to low mobility and high access. The facility has no control of access, traffic signals, driveways with full movements, and a minimum of 2 travel lanes without a median. Connections are provided primarily at at-grade intersections.
TIP	Transportation Improvement Program	The Transportation Improvement Program identifies the transportation projects that the Capital Area MPO and NCDOT plan to complete over the next 10 years. The TIP is incorporated directly into North Carolina's State Transportation Improvement Program (STIP).
TRM	Triangle Regional Model	The Triangle Regional Model is a state of the practice travel demand model developed and maintained by the Travel Behavior Modeling Group and four stakeholder sponsors: NC Department of Transportation, Durham-Chapel Hill-Carrboro Metropolitan Planning Organization, Capital Area Metropolitan Planning Organization, and GoTriangle. The Triangle Regional Model is used to plan transportation investments in the Triangle region of North Carolina.
UDO	Unified Development Ordinance	A Unified Development Ordinance is a local policy instrument that combines traditional zoning and subdivision regulations, along with other desired Town regulations, such as design guidelines, sign regulations, and stormwater management into one document.
USAB	United States Access Board	The U.S. Access Board (USAB) is a federal agency that promotes equality for people with disabilities through leadership in accessible design and the development of accessibility guidelines and standards.
V/C	Volume to Capacity Ratio	A ratio of volume to capacity: A ratio >1 indicates the facility is carrying more traffic than it can handle and improvements may be needed.

ACRONYM/TERM	ACRONYM DEFINITION	DEFINITION
VPD	Vehicles per day	The total number of vehicles that pass a particular point on the road during a period of 24 consecutive hours.
WakeTRACS	Wake Coordinated Transportation Services Transportation and Rural Access	WakeTRACS is a demand-response transit service for residents of unincorporated Wake County.
Wetlands	N/A	Areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.
Zoning	N/A	Zoning is a tool used to govern the principle "uses" (e.g. residential, commercial, or industrial) of land and how this relates to building sizes, open spaces, and streets.

STANDARDIZED CROSS-SECTIONS

As recommendations are identified for the roadway network, it is important to consider their future design and function. The ***Town of Morrisville Comprehensive Plan*** attempts to do this by developing a series of standardized cross-sections based on those being used by the Capital Area Metropolitan Planning Organization (CAMPO) and the North Carolina Department of Transportation (NCDOT). **Table B-1** presents a context-based guide for the application of these standardized cross-sections in the Town of Morrisville. This table offers a greater understanding of how street design can complement the land use context of a given area, which in turn offers an expression of consistency with stated NCDOT policy for design elements as well as complete street objectives outlined in the *NCDOT Complete Streets Planning and Design Guidelines*. The table is organized around the Town of Morrisville's street hierarchy described in **Chapter 3** and **Figure 3-2**. While there are always exceptions, establishing these standardized cross-sections and their appropriate context will be beneficial as future improvements and growth are considered in the Town.

Table B-1: Street Design Guide

ID	BICYCLE & PEDESTRIAN	POSTED SPEED	STREET HIERARCHY			
			MAJOR THOROUGHFARE	MINOR THOROUGHFARE	COLLECTOR STREET	LOCAL STREET
2A	5' Sidewalk	35 or less			○	●
2B	5' Bike Lane, 5' Sidewalk	25-45			●	○
2C	Parking Both Sides, 5' Sidewalk	35 or less			●	○
2D	Parking One Side, 5' Sidewalk	35 or less			●	○
2E	Median, 5' Bike Lane, 5' Sidewalk	25-45			●	○
3A	Share the Road, 5' Sidewalk	25-45		○	●	
4A	Median, Wide Outside Lanes, 5' Sidewalks	35-45	○	●		
4B	Median, 5' Sidewalk, Sidepath	35-45	●	●		
4C	Median, Wide Outside Lanes, Sidepaths	35-55	●	○		
5A	Wide Outside Lanes, 5' Sidewalks	35-45	○			
6A	Median, Dedicated Bus Lanes, 10' Sidepaths	35-55	●	○		

● Primary Cross-Section

○ Secondary Cross-Section

The pages that follow display the standardized cross-sections that have been developed for use within the ***Town of Morrisville Comprehensive Plan***. Dimensions provided with the cross-sections are based upon the standard cross-sectional element dimensions in the NCDOT "Typical" Highway Cross Sections Memo (dated May 5, 2014). The Town of Morrisville reserves the right to modify the cross-sections as needed, including but not limited to requiring larger rights-of-way, more substantial bicycle and pedestrian accommodations, or reallocating use of the paved travel way. Coordination with the Town will be needed to determine the preferred details for each corridor, and their application within the Town's existing and proposed street network. The Town's standard cross-sections include curb and gutter. A range of different bicycle and pedestrian accommodations are displayed in the cross-sections. Coordination with **Chapter 4** of this document as well as with Town staff will be needed to determine the most appropriate bicycle and pedestrian accommodations for a corridor. When a sidepath is included on one or both sides of the road, it will take the place of a sidewalk in that location. The lane widths provided on pages B-2 to B-7 are preferred by the Town. Narrower dimensions may be considered based on coordination with Town staff, and are subject to approval by NCDOT along state-maintained roadways. Similarly, the typical right-of-way dimensions may be influenced by the surrounding land use or function of the road. **Table B-2** provides an inventory of Morrisville roadways, their street hierarchy, and the most applicable standard cross-section. **Table B-2** on the following page is intended to be a useful tool for developers choosing to locate in the Town of Morrisville. The inventory of roadways and their corresponding cross-section will provide certainty for developers as to the required roadway improvements and needed rights-of-way for the improvements. It is anticipated that developers will begin with the standard cross-sectional minimums, and that the Town of Morrisville may require alternative elements to ensure that the roadways best serve both residents and development. The Town of Morrisville's standard dimensions for outside curb-and-gutter is 2.5 feet and for median curb is 1.5 feet.

Table B-2: Morrisville Roadway Inventory

STREET NAME	EXTENTS	OWNER	STREET HIERARCHY	STANDARD CROSS-SECTION
Airport Boulevard	I-40 to NC 54	State	Major Thoroughfare	See pg. C-3 and C-4[1]
Airport Boulevard Extension Phase 1	NC 54 to Church Street	State	Major Thoroughfare	See pg. C-5[1]
Airport Boulevard Extension Phase 2	Church Street to Garden Square Lane	State	Major Thoroughfare	See pg. C-5[1]
Aviation Parkway	Town boundary to NC 54	State	Major Thoroughfare	4C[1]
Carrington Mill Boulevard	Slater Road to NC 54	Morrisville	Minor Thoroughfare	4B
Carolina Street	Church Street to Town Hall Drive	Morrisville	Collector Street	2C
Church Street	northern Town boundary to Morrisville-Carpenter Road	State	Collector Street	2A
Crabtree Crossing Parkway	Stardale Road to Hampton Pines Drive	Morrisville	Collector Street	2B
Davis Drive	Morrisville-Carpenter Road to northern Town boundary	State	Major Thoroughfare	See pg. C-7[1]
Davis Drive	Parkside Valley Drive to Morrisville-Carpenter Road	State	Major Thoroughfare	Modified 4A[1]
Downing Glen Drive	Church Street to Union Ridge Drive	Morrisville	Collector Street	2A
Evans Road	Aviation Parkway to Crabtree Creek	State	Major Thoroughfare	4A
Factory Shops Road	Copley Parkway to Airport Boulevard	Private	Local Street	2A
International Drive	Southport Drive to Aviation Parkway	Morrisville	Collector Street	3A
International Drive Extension	Morrisville East Connector to Southport Drive	Morrisville	Collector Street	3A
Jeremiah Street	Church Street to Town Hall Drive	Morrisville	Collector Street	Modified 2C
Kit Creek Road	Church Street to Davis Drive	Morrisville/State	Collector Street	2A/2E[2]
Lake Grove Boulevard	McCrimmon Parkway to Davis Drive	Morrisville/Cary	Collector Street	Modified 4A
Lichtin Boulevard	Carrington Mill Boulevard to NC 54	Morrisville	Local	2E
Louis Stephens Drive	Little Drive or NC 540 to McCrimmon Parkway	State	Major Thoroughfare	4A
Marcom Drive	Sorrell Grove Church Rd to Paramount Pkwy[7]	Private	Local	2A
Mason Farm Road	Church Street to Ferntree Court	Morrisville	Collector Street	2A
McCrimmon Parkway	NC 54 to Louis Stephens Drive	State	Major Thoroughfare	4C[1]
McCrimmon Parkway Extension	NC 54 to Aviation Parkway	State	Major Thoroughfare	4C[1,3]
Morrisville-Carpenter Road	NC 54 to West of Davis Drive	State	Major Thoroughfare	4A[1,4]
Morrisville East Connector	McCrimmon Parkway Extension to Airport Boulevard	Morrisville	Collector Street	3A
Morrisville Parkway	NC 54 to Davis Drive	State	Minor Thoroughfare	4B
NC 54 (Chapel Hill Road)	North of Shiloh Glenn Drive to NC 540	State	Major Thoroughfare	See pg. C-12[1]
NC 54 (Chapel Hill Road)	NC 540 to Perimeter Park Drive	State	Major Thoroughfare	See pg. C-13[1]
NC 54 (Chapel Hill Road)	Perimeter Park Drive to Weston Parkway	State	Major Thoroughfare	See pg. C-14[1]
NC 54 (Chapel Hill Road)	Weston Parkway to Cary Parkway	State	Major Thoroughfare	See pg. C-15[1]
NW Cary Parkway	Wilson Road to Darrington Drive	State	Major Thoroughfare	Modified 4B
Paramount Parkway	Carrington Mill Boulevard to Perimeter Park Drive	Morrisville	Collector Street	Modified 4A
Parkside Valley Drive	Davis Drive to Louis Stephens Drive	Morrisville	Collector Street	2E/3A
Perimeter Park Drive	Airport Boulevard to NC 54	Morrisville	Minor Thoroughfare	4A
Shiloh Glenn Drive	Slater Road to NC 54	Durham/Morrisville	Collector Street	2A/2E
Slater Road	Copley Parkway to Airport Boulevard to	State	Minor Thoroughfare	4-Lane Undivided[5]
Slater Road	Carrington Mill Road to Copley Parkway	State	Minor Thoroughfare	2B
Slater Road	NC 540 to Carrington Mill Road	State	Minor Thoroughfare	3A
Slater Road	Shiloh Glenn Drive to NC 540	State	Minor Thoroughfare	2A
Sorrell Grove Church Road	Slater Road to Airport Boulevard	State	Collector Street	2A
Southport Drive	Aviation Parkway to McCrimmon Parkway	Morrisville	Collector Street	2A/3A
Southport Drive	International Drive to NC 54	Morrisville	Collector Street	3A
Town Hall Drive	McCrimmon Parkway to Morrisville-Carpenter Road	Morrisville	Minor Thoroughfare	Modified 4A
Town Hall Drive Extension	Ferntree Court to McCrimmon Parkway	Morrisville	Collector Street	5A/4A/2A[6]
Treybrooke Drive	Church Street to Town Hall Drive	Morrisville	Collector Street	Modified 2C
Watkins Road	Perimeter Park Drive to NC 54	State	Minor Thoroughfare	4A

[1] Airport Boulevard, Airport Boulevard Extension, Aviation Parkway, Davis Drive, McCrimmon Parkway, McCrimmon Parkway Extension, Morrisville-Carpenter Road, and NC 54 are corridors in which the Town has expressed a strong interest in future dedicated bus lanes. Any alternative cross-section shall have enough dedicated right-of-way for the inclusion of a 12-ft dedicated bus lane.

[2] Kit Creek Road has intermittent sections of cross-section 2E, but is predominantly 2A.

[3] The McCrimmon Parkway Extension has a 117-ft right-of-way. Expansion of this to include bus lanes would only occur with Wake Transit funds.

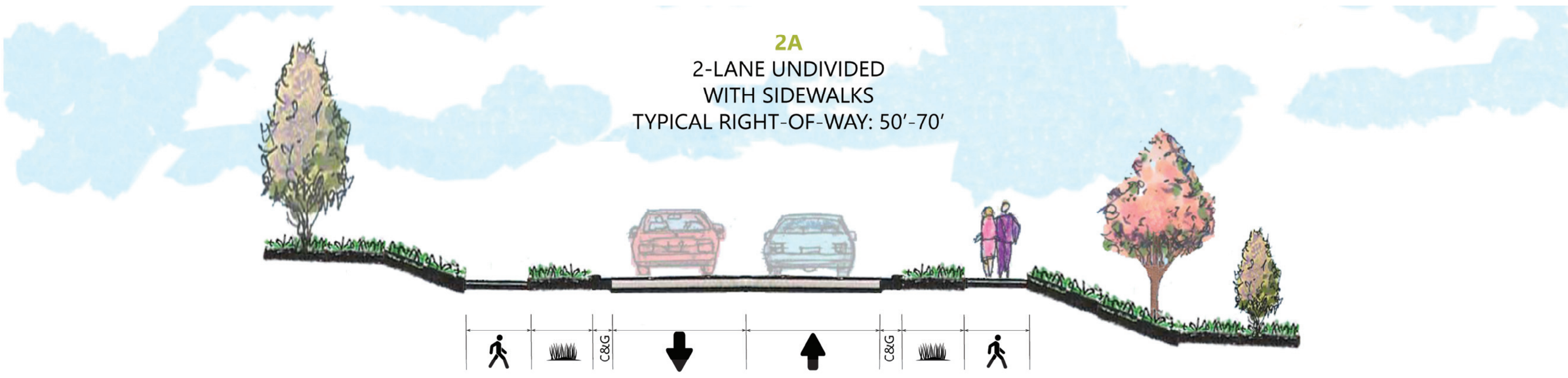
[4] Morrisville-Carpenter Road from Davis Drive to NC 54 is a modified 4A cross-section with a narrower median, 11-ft inside lanes, and 14-ft outside lanes.

[5] Slater Road is a-typical and is not a divided roadway. The Town of Morrisville standard cross-sections do not support a 4-lane undivided cross-section. Any future improvements along Slater Road shall include a 10-ft sidepath to accommodate the Triangle Bikeway.

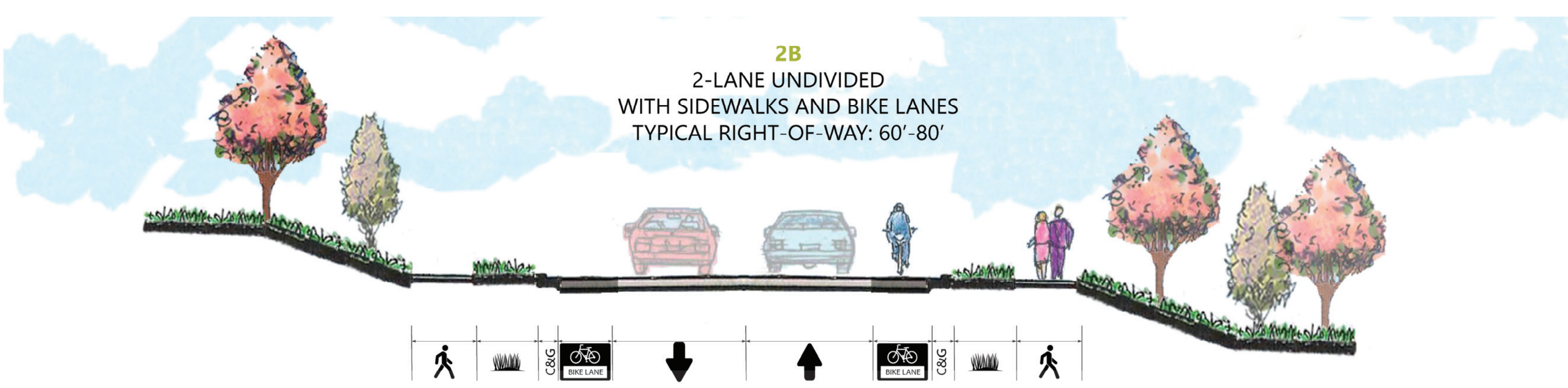
[6] Town Hall Drive Extension has a 5A cross-section from McCrimmon Parkway to Harris Mill Road, a 4A cross-section from Harris Mill Road to the Town/RTP Boundary, and a 2A cross-section from the Town/RTP Boundary to Ferntree Court.

[7] Resolution 2022-396-0: CTP amendment approved Oct. 25, 2022 removed a portion of Marcom Drive Extension from the plan.

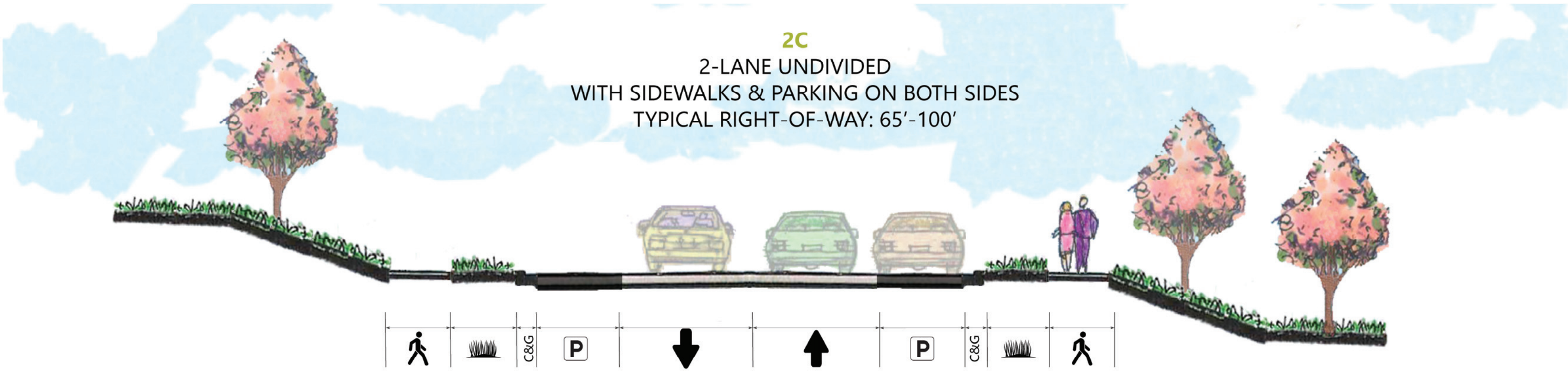
(Res. No. 2022-396-0, 10/25/2022)



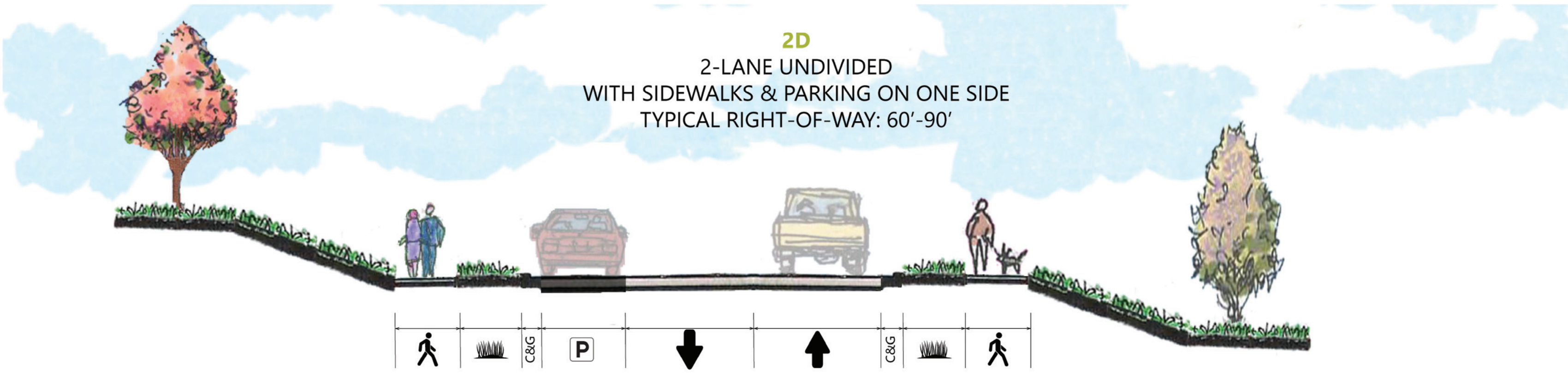
KEY	STANDARD DIMENSIONS	ALTERNATIVE DIMENSIONS	NOTES:
	12-ft lanes	11-ft to 14-ft lanes	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians. Sharrows shall be provided if 14-ft lanes are constructed.
	5-ft minimum verge	0-ft to 10-ft verge	
	N/A	10-ft sidepath(s)	
	5-ft sidewalks	5-ft to 8-ft sidewalks	



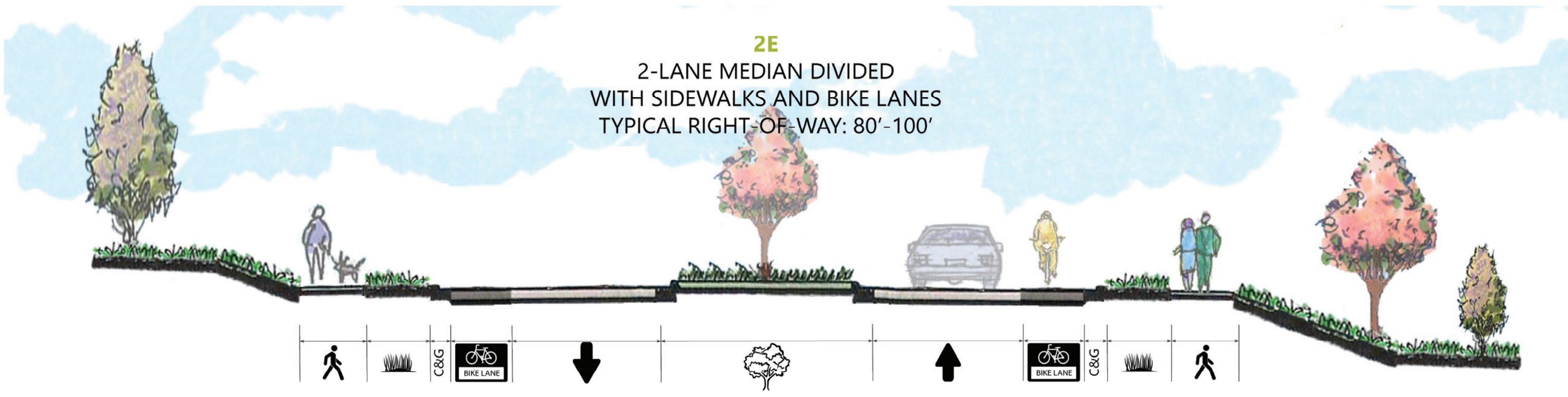
KEY	STANDARD DIMENSIONS	ALTERNATIVE DIMENSIONS	NOTES:
	11-ft lanes	12-ft to 14-ft lanes	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians. Sidepaths can be provided in lieu of on-street bicycle accommodations. Sharrows shall be provided if 14-ft lanes are constructed.
	5-ft minimum verge	0-ft to 10-ft verge	
	N/A	10-ft sidepath(s)	
	5-ft sidewalks	5-ft to 8-ft sidewalks	
BIKE LANE	5-ft bike lanes	5-ft to 6-ft bike lanes with optional buffers	



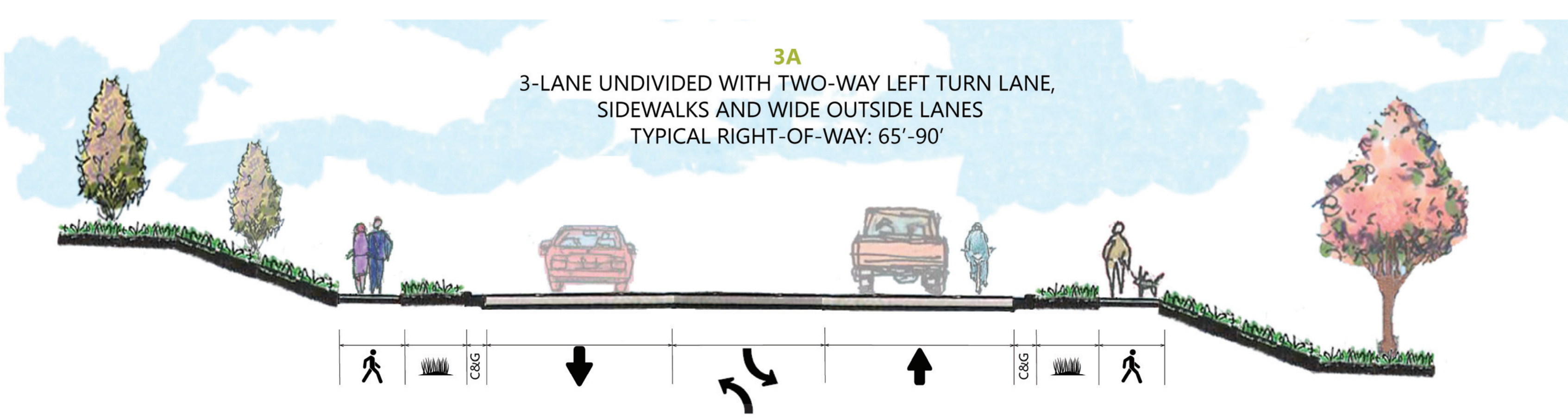
KEY	STANDARD DIMENSIONS	ALTERNATIVE DIMENSIONS	NOTES:
Lanes	11-ft lanes	12-ft to 14-ft lanes	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians. Sidepaths can be provided in lieu of on-street bicycle accommodations. Sharrows shall be provided if 14-ft lanes are constructed.
Verge	5-ft minimum verge	0-ft to 10-ft verge	
Sidepath	N/A	10-ft sidepath(s)	
P	8-ft parallel parking	No parking or 45° parking (front-in or back-in)	
Sidewalk	5-ft sidewalks	5-ft to 8-ft sidewalks	
BIKE LANE	N/A	5-ft to 6-ft bike lanes with optional buffer	



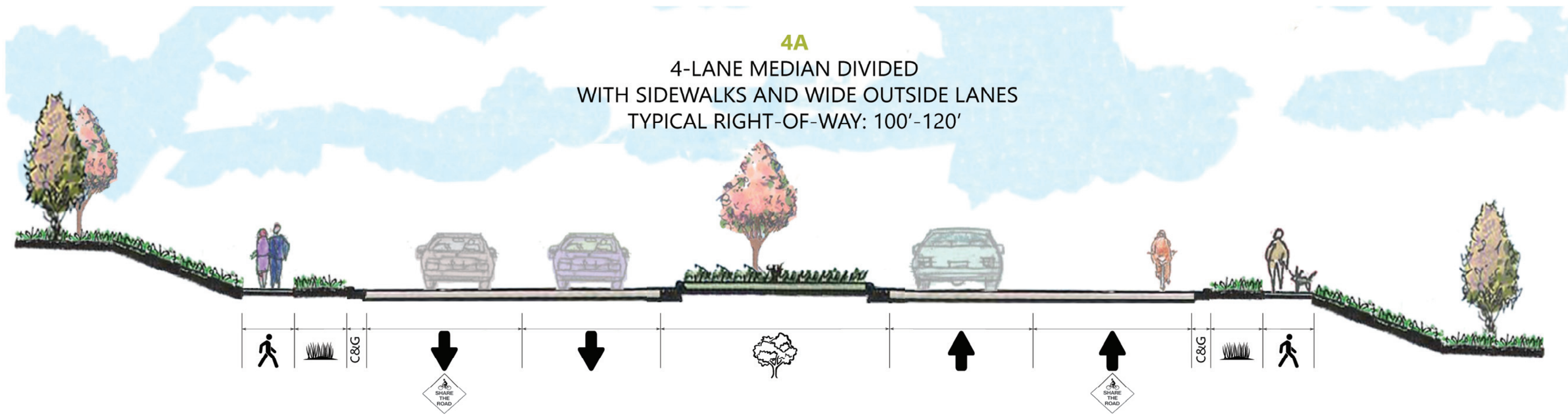
KEY	STANDARD DIMENSIONS	ALTERNATIVE DIMENSIONS	NOTES:
Lanes	11-ft lanes	12-ft to 14-ft lanes	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians. Sidepaths can be provided in lieu of on-street bicycle accommodations. Sharrows shall be provided if 14-ft lanes are constructed.
Verge	5-ft minimum verge	0-ft to 10-ft verge	
Sidepath	N/A	10-ft sidepath(s)	
P	8-ft parallel parking	No parking or 45° parking (front-in or back-in)	
Sidewalk	5-ft sidewalks	5-ft to 8-ft sidewalks	
BIKE LANE	N/A	5-ft to 6-ft bike lanes with optional buffer	



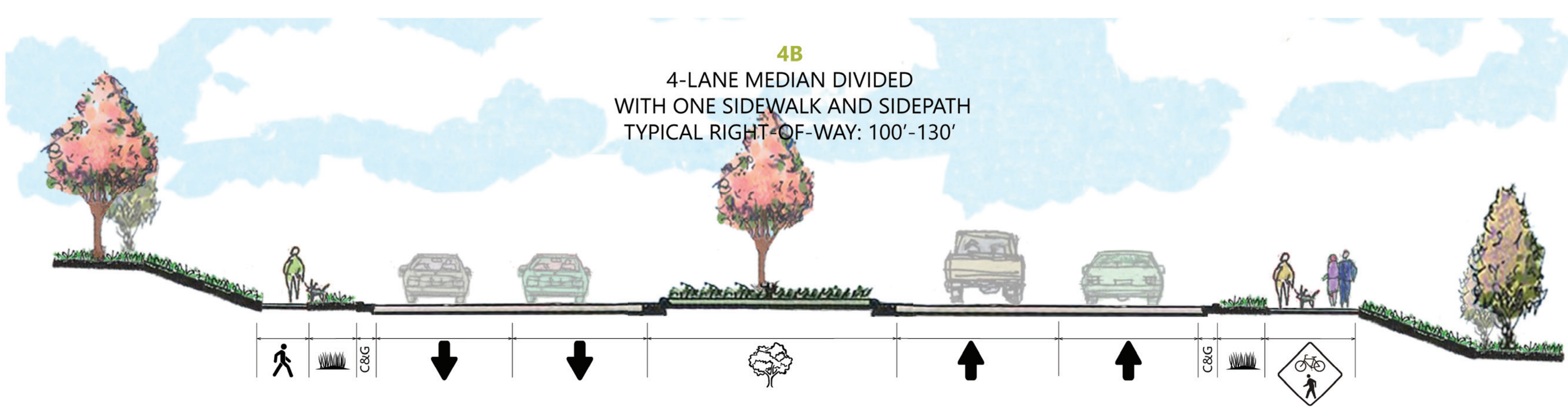
KEY	STANDARD DIMENSIONS	ALTERNATIVE DIMENSIONS	NOTES:
	11-ft lanes	12-ft to 14-ft lanes	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians. Sidepaths can be provided in lieu of on-street bicycle accommodations. Sharrows shall be provided if 14-ft lanes are constructed.
	17.5-ft planted median	17.5-ft to 23-ft planted median	
	5-ft minimum verge	0-ft to 10-ft verge	
	N/A	10-ft sidepath(s)	
	5-ft sidewalks	5-ft to 8-ft sidewalks	
BIKE LANE	5-ft bike lanes	5-ft to 6-ft bike lanes with optional buffer	



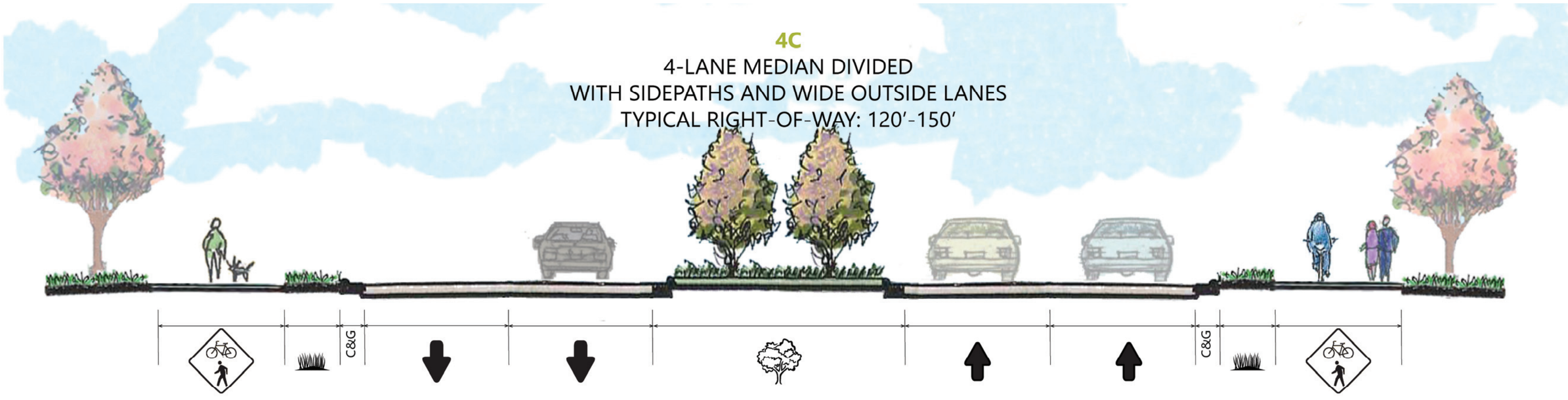
KEY	STANDARD DIMENSIONS	ALTERNATIVE DIMENSIONS	NOTES:
	12-ft lanes	14-ft lanes with sharrows	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians.
	12-ft two way left turn lane	11-ft to 12-ft two way left turn lane	
	5-ft minimum verge	0-ft to 10-ft verge	
	N/A	10-ft sidepath(s)	
	5-ft sidewalks	5-ft to 8-ft sidewalks	



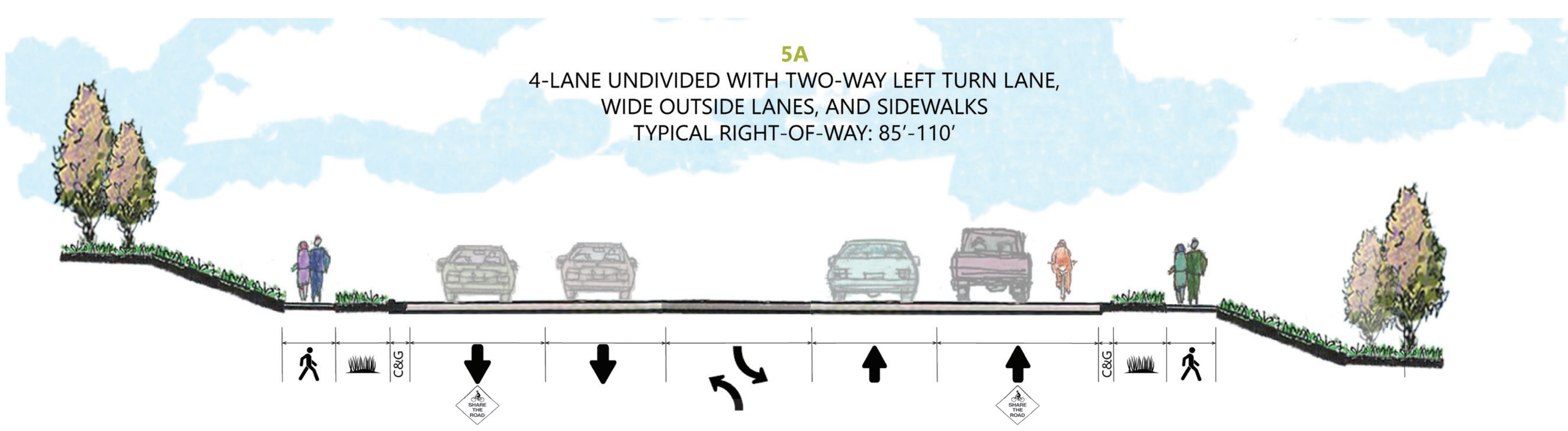
KEY	STANDARD DIMENSIONS	ALTERNATIVE DIMENSIONS	NOTES:
	11-ft inside lanes 14-ft outside lanes with sharrows	11-ft to 14-ft lanes	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians. Sharrows shall be provided if 14-ft lanes are constructed.
	23-ft planted median	17.5-ft to 23-ft planted median	
	5-ft minimum verge	0-ft to 10-ft verge	
	N/A	10-ft sidepath(s)	
	5-ft sidewalks	5-ft to 8-ft sidewalks	
BIKE LANE	N/A	5-ft to 6-ft bike lanes with optional buffer	



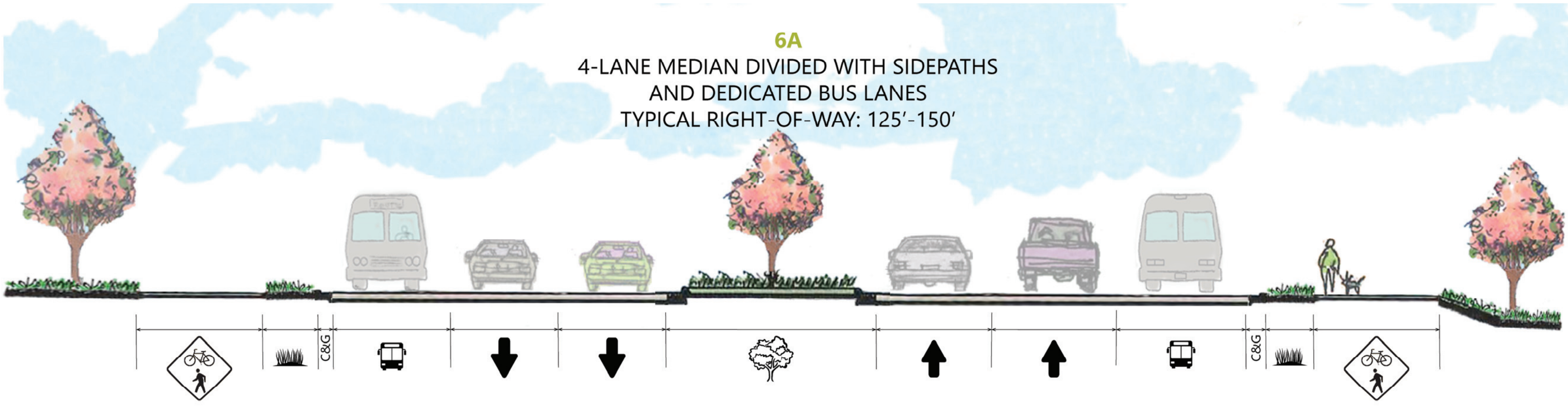
KEY	STANDARD DIMENSIONS	ALTERNATIVE DIMENSIONS	NOTES:
	11-ft lanes	11-ft to 14-ft lanes	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians. Sharrows shall be provided if 14-ft lanes are constructed.
	23-ft planted median	17.5-ft to 23-ft planted median	
	5-ft minimum verge	0-ft to 10-ft verge	
	10-ft sidepath on one side	10-ft sidepath(s)	
	5-ft sidewalk on one side	5-ft to 8-ft sidewalks	
BIKE LANE	N/A	5-ft to 6-ft bike lanes with optional buffer	



KEY	STANDARD DIMENSIONS	ALTERNATIVE DIMENSIONS	NOTES:
	12-ft inside lane 15-ft wide outside lane	11-ft to 15-ft lanes	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians. For speeds below 35 MPH, sharrows shall be provided in the wide outside lanes. The provision of a wide median is intended to reduce future construction costs along corridors that may need widening to 6-lanes to accommodate dedicated bus lanes.
	31.5-ft planted median	17.5-ft to 31.5-ft planted median	
	5-ft minimum verge	0-ft to 10-ft verge	
	10-ft sidepaths	10-ft sidepath(s)	
	N/A	5-ft to 10-ft sidewalks	
BIKE LANE	N/A	5-ft to 6-ft bike lanes with optional buffer	



KEY	STANDARD DIMENSIONS	ALTERNATIVE DIMENSIONS	NOTES:
	12-ft inside lanes 14-ft outside lanes	11-ft to 14-ft lanes	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians. For speeds below 35 MPH, sharrows shall be provided in the wide outside lanes. Travel lane width can be reallocated to include more narrow lanes and 5-ft bike lanes.
	12-ft two way left turn lane	11-ft to 12-ft two way left turn lane	
	5-ft minimum verge	0-ft to 10-ft verge	
	N/A	10-ft sidepath(s)	
	5-ft sidewalks	5-ft to 8-ft sidewalks	



KEY	STANDARD DIMENSIONS	NOTES:
	11-ft inside lanes	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians. Bus lanes can be center-running or in the outside lanes as shown in the cross-section.
	12-ft dedicated bus lanes	
	17.5-ft planted median	
	0-ft to 10-ft verge	
	10-ft sidepath	

PROJECT SHEET DATA

This page outlines further information about the data displayed in the following project sheets. Where applicable, the data source, definitions, and process are described.

Traffic Volumes (VPD)

Traffic volumes for the project sheets were obtained from the regional travel demand model. Volumes for the year 2010 were obtained from the Capital Area Metropolitan Planning Organization's Triangle Regional Model for the current 2010 base year. Traffic volumes for the year 2040 were obtained from a final run of the CTP network and considers the construction of the proposed project and the associated improvements.

Congestion (V/C Ratio)

Congestion values for the project sheets were obtained from the regional travel demand model. Congestion values for the year 2010 were obtained from the Capital Area Metropolitan Planning Organization's Triangle Regional Model for the current 2010 base year. Anticipated congestion for the year 2040 was obtained from a final run of the CTP network and considers the construction of the proposed project and the associated improvements. Congestion is identified by using volume-to-capacity (V/C) ratios. V/C ratios are calculated by dividing the traffic volume of a roadway segment by the theoretical capacity of the roadway. Although V/C can be tied to level of service (LOS), V/C allows for a more specific analysis. The result is a universal quantitative measurement. The information provided in **Table C-1** provides an overview of volume-to-capacity ratios and descriptions of each category.

Table C-1: Understanding Volume-to-Capacity Ratios

CATEGORY	DESCRIPTION
Very Below Capacity V/C < 0.50	A roadway with a V/C less than 0.50 typically operates with free-flowing conditions and is underutilizing available roadway capacity.
Below Capacity V/C = 0.50 to 0.85	A roadway with a V/C between 0.50 to 0.85 typically operates with efficiency and is not considered congested.
At Capacity V/C = 0.85 to 1.00	As the V/C nears 1.0, the roadway is becoming more congested. A roadway approaching congestion may operate effectively during non-peak hours but be congested during peak travel periods.
Above Capacity V/C > 1.01	Roadways operating at capacity or above capacity are heavily congested during peak periods and moderately congested during non-peak periods. A change in capacity due to incidents greatly impacts the travel flow on corridors operating within this V/C range.

Street Hierarchy

The street hierarchy reflects potential changes to the transportation network discussed in **Chapter 3**. Street hierarchy allows the Town to balance competing interests between design features, travel modes, and available rights-of-way. To read more about the different street hierarchies see **Chapter 3: Roadways**.

Planning Cost Estimates

Planning cost estimates were obtained using NCDOT's per mile cost tables and approved methodology for long range planning. This method is to prepare planning level estimations only, and are subject to change as the project moves into preliminary engineering, design, and delivery phases. The estimates shown are reflective of construction costs, estimated right-of-way costs, and a percentage based estimate of engineering and contingency costs.

Step 1: Multiply the proposed typical section by the total project length.

Step 2: Add the costs for bicycle and pedestrian facilities, bridges, and grade separations.

Step 3: Add the cost for water and sewer line relocations. Cost estimates are determined by multiplying the project length by the NCDOT-provided costs per linear foot.

Step 4: Sum the values for Steps 1-3 and multiply by 0.30 (30%). This is the NCDOT approved Miscellaneous Factor, added to reflect potential additional cost categories (e.g. historical preservation, archaeology, etc.) that may impact the project. This subtotal is the contract cost.

Step 5: Multiply Step 4 by 15% on Federal funded projects and 10% on State funded projects. These values represent the engineering and contingency costs.

Step 6: Apply the Terrain Adjustment Factor by multiplying the factor by the sum of Step 4 and Step 5. Morrisville falls within the Piedmont region, which has a Terrain Adjustment Factor of 1.15. This factor is added to account for additional project costs typically associated with topography, and differs for North Carolina's mountain and coastal regions. This is the construction cost.

Step 7: Apply NCDOT's Right-of-Way "Rule of Thumb" calculation to include right-of-way costs equivalent to 40-50% of the project cost. This range was vetted through discussions with roadway design engineers with recent experience in the Town of Morrisville.

Step 8: Sum the results of Step 6 and Step 7 to obtain an overall project cost. This is the value shown on the project sheets in **Appendix B**.

Crash History

To ensure that project recommendations best serve areas with existing safety concerns, crash data from June 2013 to May 2016 was analyzed relative to crash severity and frequency. Crash frequency includes a raw count of crashes along roadway project segments.

The crash severity metric (EPDO Score) was calculated using NCDOT's methodology (**Equation C-1**) that converts each crash to a "property damage only" equivalency. This is called the equivalent property damage only (EPDO) index, and gives greater weight to more severe crashes. **Table C-2** below shows the coefficients used by NCDOT to weight crashes by severity.

Equation C-1: EPDO Index Calculation

$$EPDO = 76.8(K + A) + 8.4(B + C) + 1(PDO)$$

Table C-2: EPDO Coefficients

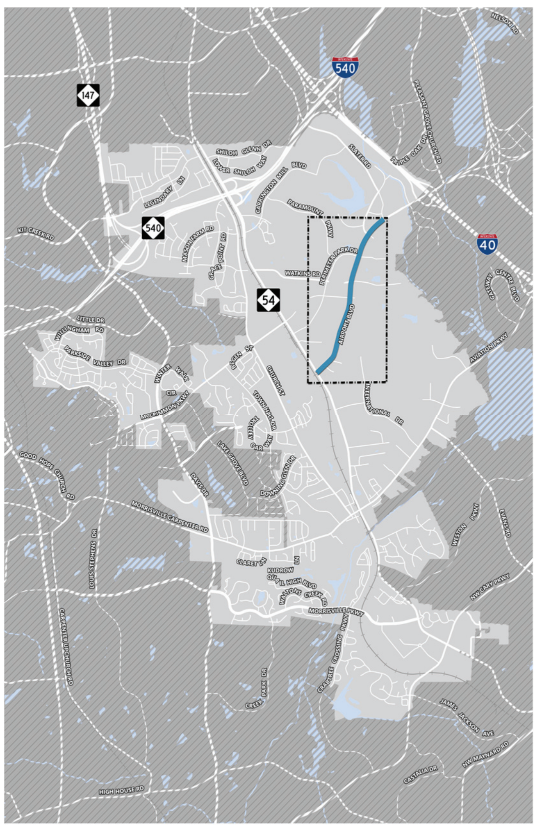
SEVERITY	DESCRIPTION	WEIGHT
K	fatality	76.8
A	incapacitating injury	76.8
B	evident non-incapacitating injury	8.4
C	injury not evident, but complaint of pain or lapse in consciousness	8.4
PDO	property damage only	1

Cross Section

Each project sheet has a cross section that is reflective of the specific roadway elements proposed as a part of that project. These specific cross sections were developed to be consistent with recommendations shown in **Chapters 3 and 4**, and by relying on past plans and coordination with NCDOT. The generalized cross sections shown in **Appendix B** were used as a reference point during this exercise.

Airport Boulevard

Access Management



Length
1.44 miles

Project Extents
From: Slater Road
To: NC 54

Traffic Volume (vpd)
2010 – 26,972
2040 – 32,586

Street Hierarchy
Major Thoroughfare

Congestion (v/c ratio)
2010 – 0.38
2040 – 0.80

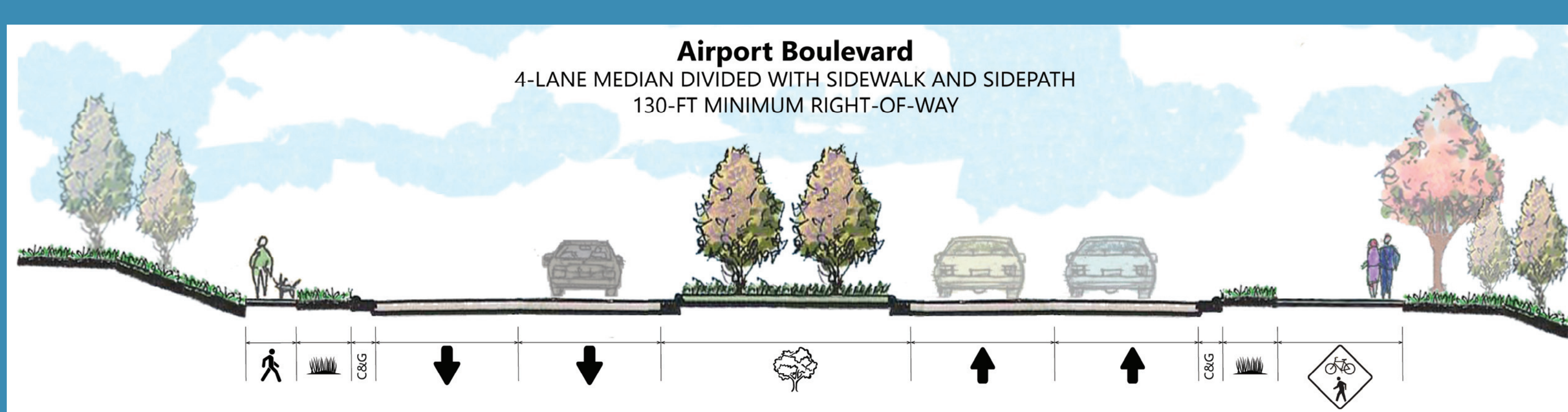
Planning Cost Estimate
July 2017

$3,702,000

Crash Summary
(June 2013 to May 2016)

Total Crashes – 20
EPDO Score – 101.4

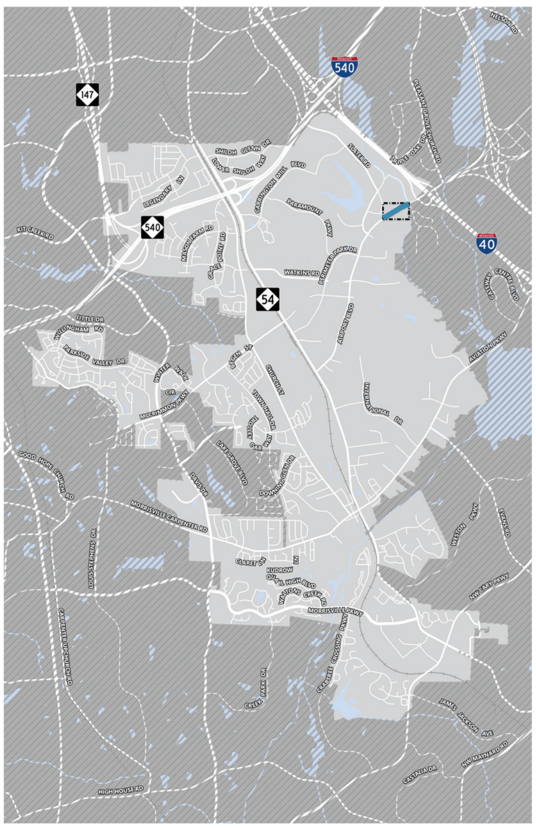
CROSS-SECTION



KEY	INTERIM BUILD DIMENSIONS	FULL BUILD-OUT DIMENSIONS	NOTES:
	12-ft inside lane 15-ft wide outside lane	2 11-ft inside lanes 1 12-ft dedicated bus lane	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians. For speeds below 35 MPH, sharrows shall be provided in the wide outside lanes. The provision of a wide median is intended to reduce future construction costs along corridors that may need widening to 6-lanes to accommodate dedicated bus lanes.
	31.5-ft planted median	17.5-ft planted median	
	5-ft minimum verge	0-ft to 10-ft verge	
	10-ft sidepath south side of roadway	10-ft sidepath	
	5-ft sidewalk	5-ft sidewalk	
BIKE LANE	N/A	N/A	

Airport Boulevard

Access Management



Length
0.25 miles

Traffic Volume (vpd)
2010 – 26,972
2040 – 41,374

Congestion (v/c ratio)
2010 – 0.69
2040 – 1.06

Project Extents
From: Factory Shops Road
To: Slater Road

Street Hierarchy
Major Thoroughfare

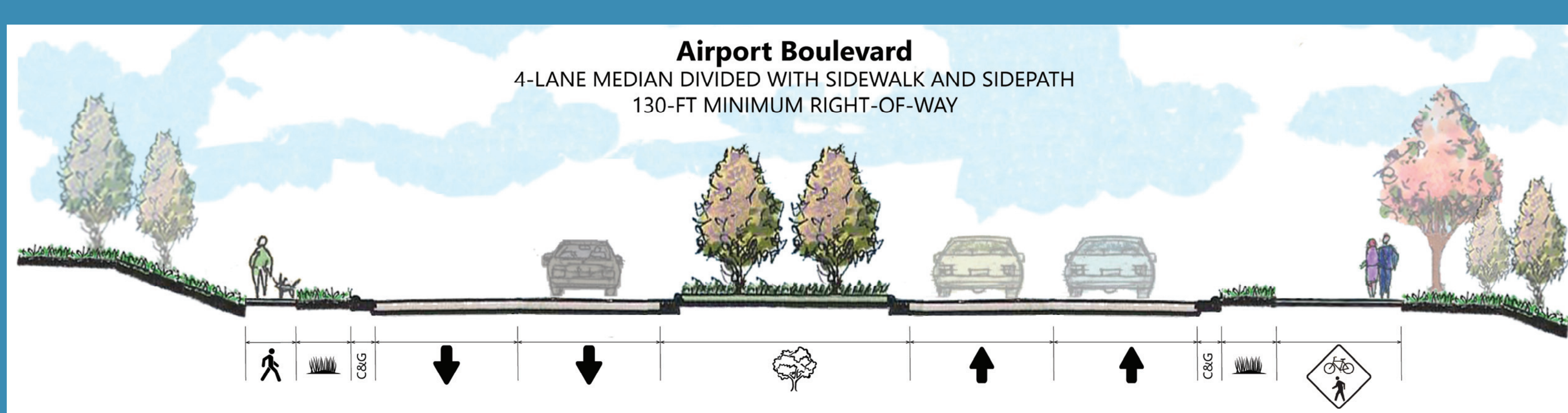
Planning Cost Estimate
July 2017

$712,500

Crash Summary
(June 2013 to May 2016)

Total Crashes – 15
EPDO Score – 126

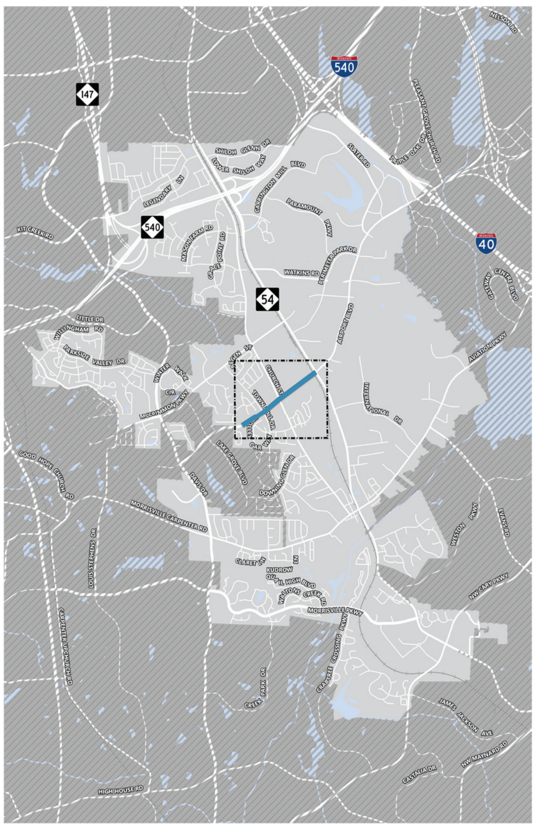
CROSS-SECTION



KEY	INTERIM BUILD DIMENSIONS	FULL BUILD-OUT DIMENSIONS	NOTES:
	12-ft inside lane 15-ft wide outside lane	2 11-ft inside lanes 1 12-ft dedicated bus lane	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians. For speeds below 35 MPH, sharrows shall be provided in the wide outside lanes. The provision of a wide median is intended to reduce future construction costs along corridors that may need widening to 6-lanes to accommodate dedicated bus lanes.
	31.5-ft planted median	17.5-ft planted median	
	5-ft minimum verge	0-ft to 10-ft verge	
	10-ft sidepath south side of roadway	10-ft sidepath	
	5-ft sidewalk	5-ft sidewalk	
BIKE LANE	N/A	N/A	

Airport Boulevard Extension

New Location and Grade Separation



Length
0.77 miles

Project Extents
Phase 1: NC 54 to Church Street
Phase 2: Church Street to Garden Square Lane

Traffic Volume (vpd)
2010 – N/A
2040 – 28,971

Street Hierarchy
Major Thoroughfare

Congestion (v/c ratio)
2010 – N/A
2040 – 0.63

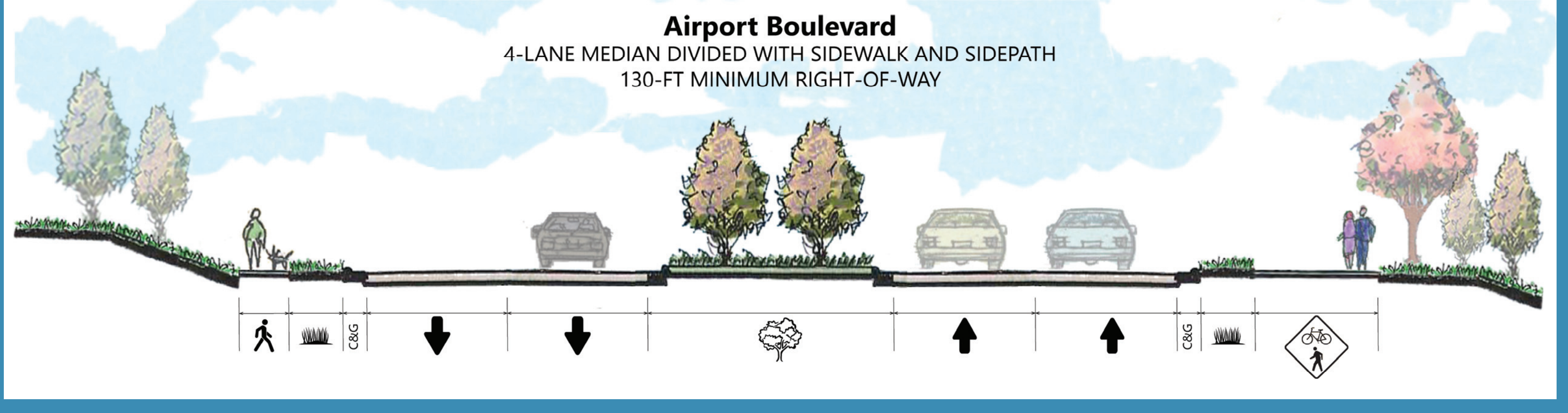
Planning Cost Estimate
July 2017

Phase 1: $25,383,000
Phase 2: $5,525,520

Crash Summary
(June 2013 to May 2016)

N/A

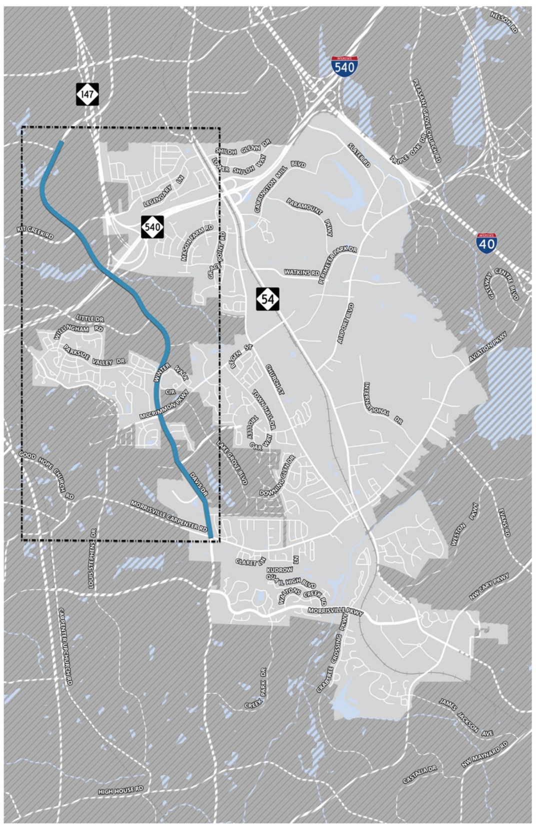
CROSS-SECTION



KEY	INTERIM BUILD DIMENSIONS	FULL BUILD-OUT DIMENSIONS	NOTES:
	12-ft inside lane 15-ft wide outside lane	2 11-ft inside lanes 1 12-ft dedicated bus lane	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians. For speeds below 35 MPH, sharrows shall be provided in the wide outside lanes. The provision of a wide median is intended to reduce future construction costs along corridors that may need widening to 6-lanes to accommodate dedicated bus lanes.
	31.5-ft planted median	17.5-ft planted median	
	5-ft minimum verge	0-ft to 10-ft verge	
	10-ft sidepath south side of roadway	10-ft sidepath	
	5-ft sidewalk	5-ft sidewalk	
BIKE LANE	N/A	N/A	

Davis Drive

Widening



Length
3.88 miles

Traffic Volume (vpd)
2010 – 31,500
2040 – 37,100

Congestion (v/c ratio)
2010 – 0.66
2040 – 0.78

Project Extents
From: Development Drive
To: Morrisville-Carpenter Road

Street Hierarchy
Major Thoroughfare

Planning Cost Estimate
July 2017

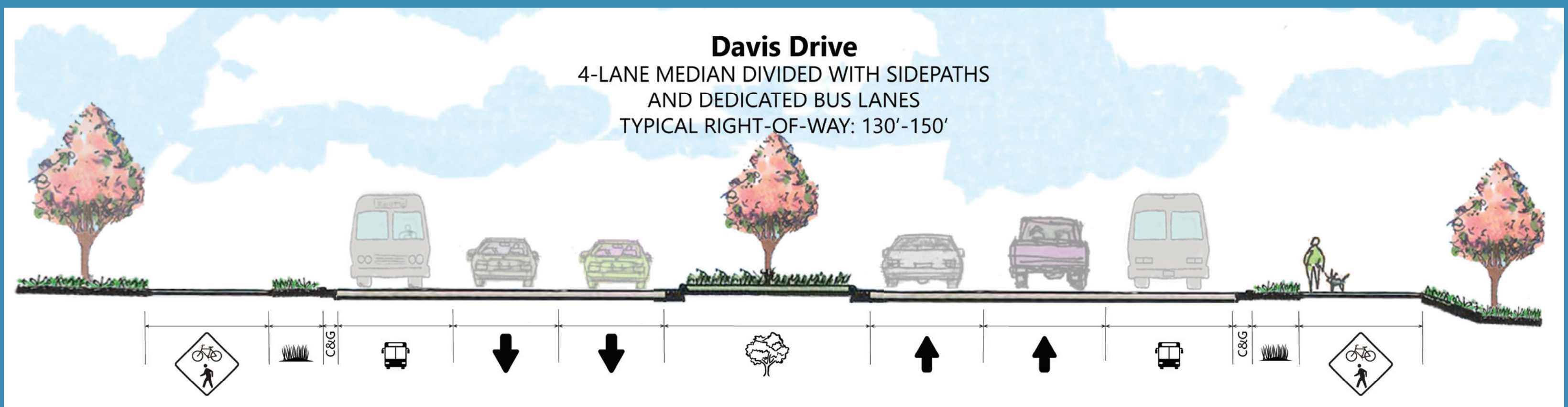
$62,595,000[1]

[1] This cost is for the full 3.88 miles. Only 1.4 miles is within the Town's jurisdiction, resulting in approximately $23 million.

Crash Summary
(June 2013 to May 2016)

Total Crashes – 201
EPDO Score – 646.8

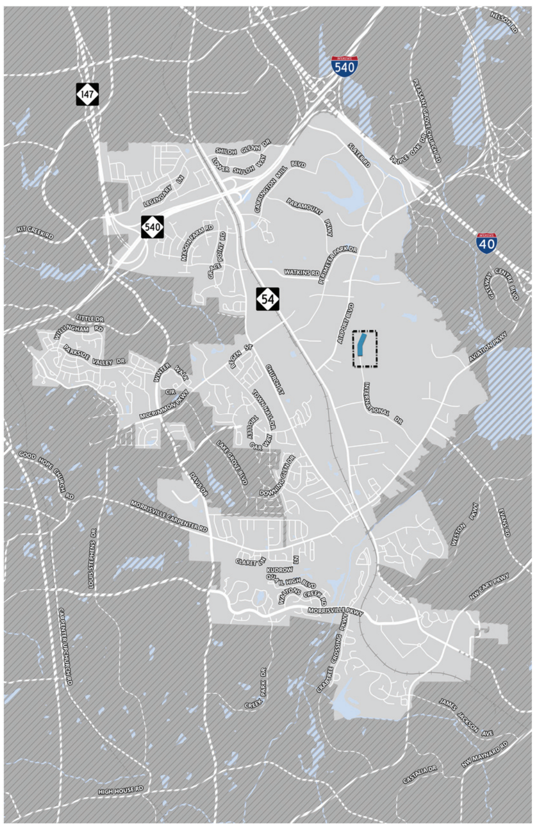
CROSS-SECTION



KEY	STANDARD DIMENSIONS	NOTES:
	11-ft inside lanes 12-ft dedicated bus lane	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians. Bus lanes can be center-running or in the outside lanes as shown in the cross-section.
	12-ft dedicated bus lanes	
	17.5-ft planted median	
	0-ft to 10-ft verge	
	10-ft sidepath	

International Drive Extension

New Location



Length
0.18 miles

Project Extents
From: Morrisville East Connector (proposed)
To: Southport Drive

Traffic Volume (vpd)
2010 – N/A
2040 – N/A

Street Hierarchy
Collector Street

Congestion (v/c ratio)
2010 – N/A
2040 – N/A

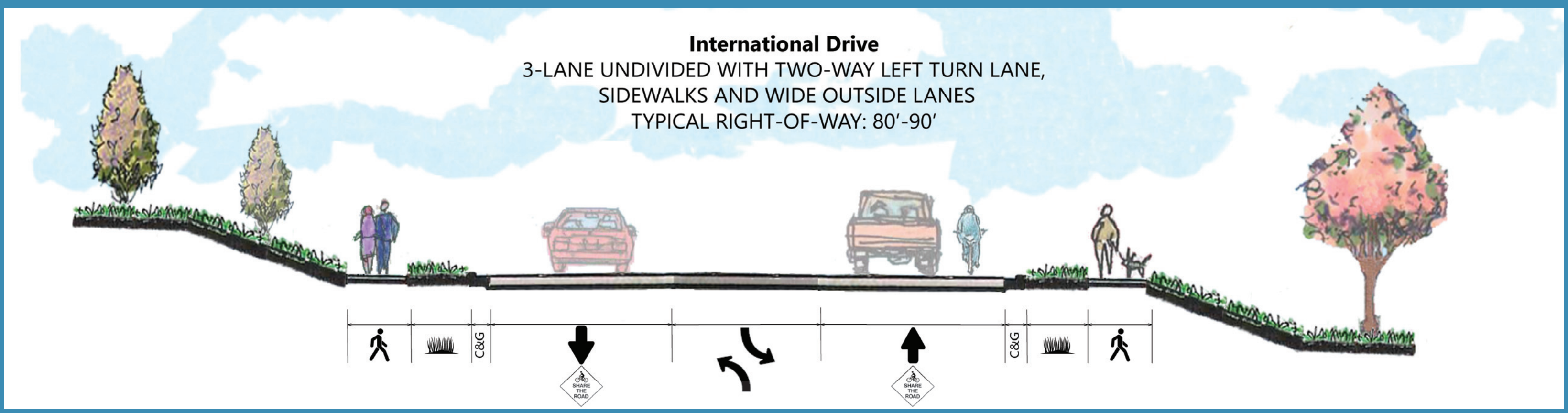
Planning Cost Estimate
July 2017

$1,660,000

Crash Summary
(June 2013 to May 2016)

N/A

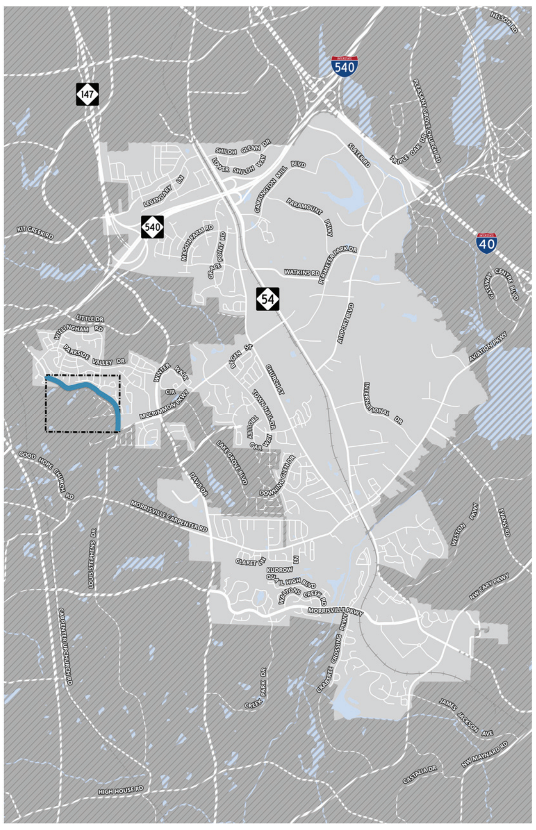
CROSS-SECTION



KEY	STANDARD DIMENSIONS	ALTERNATIVE DIMENSIONS	NOTES:
	14-ft lanes with sharrows	11-ft to 14-ft lanes	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians.
	12-ft two way left turn lane	11-ft to 12-ft two way left turn lane	
	5-ft minimum verge	0-ft to 10-ft verge	
	N/A	10-ft sidepath(s)	
	5-ft sidewalks	5-ft to 8-ft sidewalks	

Louis Stephens Drive

Widening



Length
0.89 miles

Traffic Volume (vpd)
2010 – N/A
2040 – 3,263

Congestion (v/c ratio)
2010 – N/A
2040 – 0.07

Project Extents
From: Poplar Pike Lane
To: McCrimmon Parkway

Street Hierarchy
Major Thoroughfare

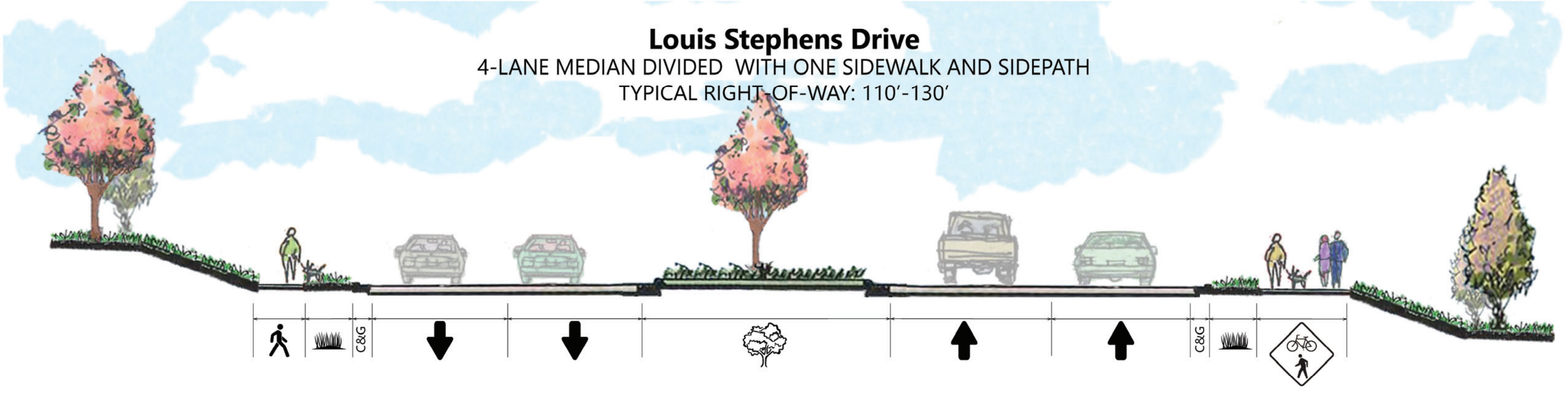
Planning Cost Estimate
July 2017

$15,252,000

Crash Summary
(June 2013 to May 2016)

Total Crashes – 1
EPDO Score – 8.4

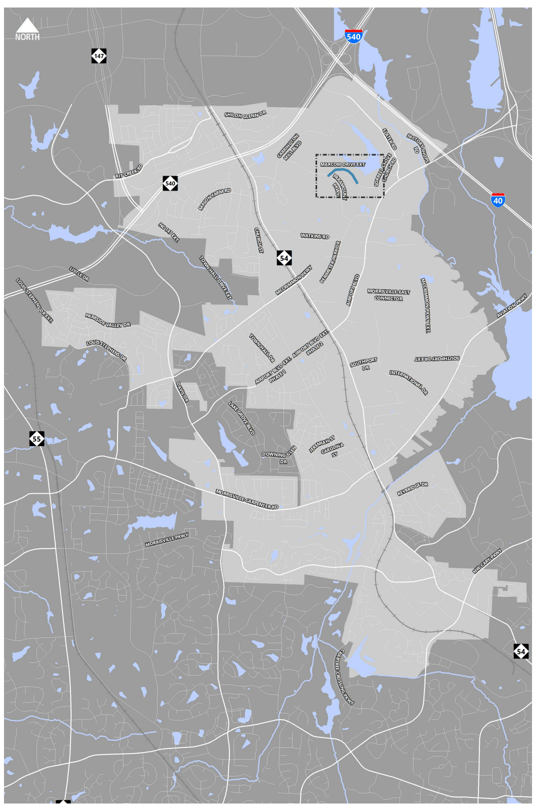
CROSS-SECTION



KEY	STANDARD DIMENSIONS	ALTERNATIVE DIMENSIONS	NOTES:
	11-ft lanes	11-ft to 14-ft lanes	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians.
	23-ft planted median	17.5-ft to 23-ft planted median	
	5-ft minimum verge	0-ft to 10-ft verge	
	10-ft sidepath north side of roadway	10-ft sidepath(s)	
	5-ft sidewalk	5-ft to 8-ft sidewalks	

Marcom Drive Extension

New Location



Length

0.90 miles

Project Extents

From: Current Terminus near Sorrel Grove Church Road

To: Paramount Parkway

Traffic Volume (vpd)

2010 – N/A

2040 – N/A

Street Hierarchy

Collector Street

Planning Cost Estimate

July 2017

$ 2,508,000

Congestion (v/c ratio)

2010 – N/A

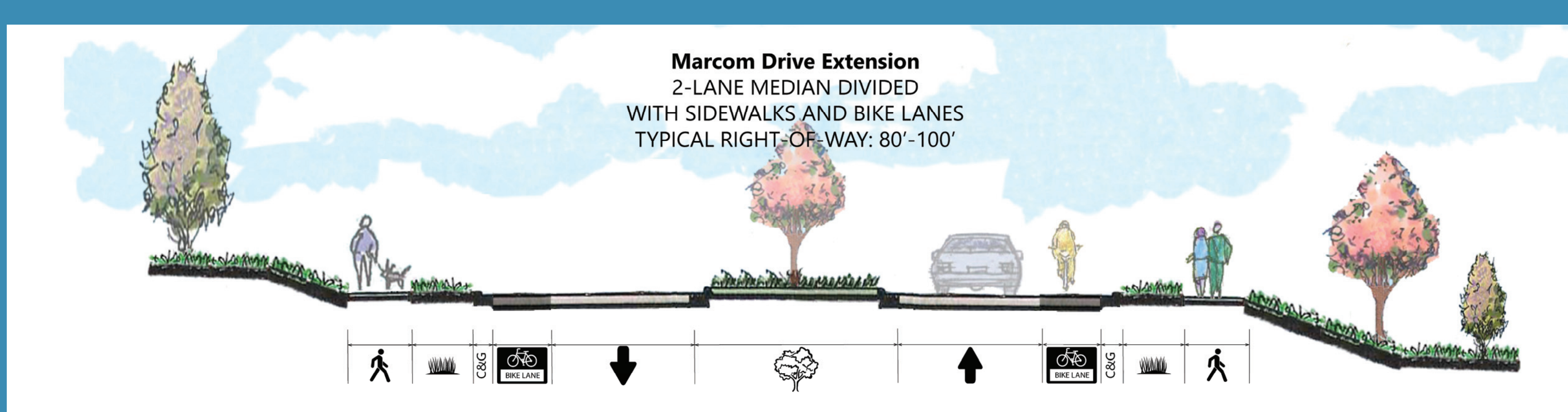
2040 – N/A

Crash Summary

(June 2013 to May 2016)

N/A

CROSS-SECTION



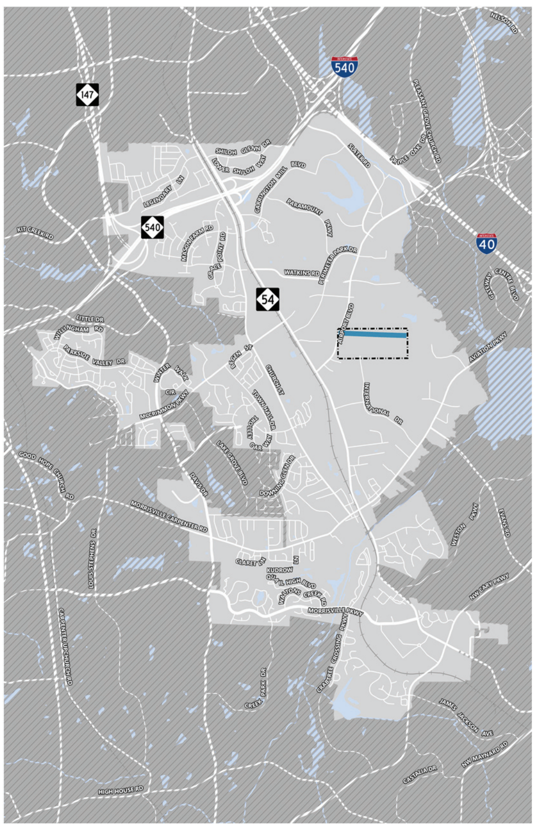
KEY	STANDARD DIMENSIONS	ALTERNATIVE DIMENSIONS	NOTES:
	11-ft lanes	12-ft to 14-ft lanes	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians. Sidepaths can be provided in lieu of on-street bicycle accommodations. Sharrows shall be provided if 14-ft lanes are constructed.
	17.5-ft planted median	17.5-ft to 23-ft planted median	
	5-ft minimum verge	0-ft to 10-ft verge	
	N/A	10-ft sidepath(s)	
	5-ft sidewalks	5-ft to 8-ft sidewalks	
BIKE LANE	5-ft bike lanes	5-ft to 6-ft bike lanes with optional buffer	

[1]Resolution 2022-396-0: CTP amendment approved Oct. 25, 2022 removed a portion of Marcom Drive Extension from the plan.

(Res. No. 2022-396-0, 10/25/2022)

Morrisville-East Connector

New Location



Length
0.58 miles

Project Extents
From: McCrimmon Parkway
To: Airport Boulevard

Traffic Volume (vpd)
2010 – N/A
2040 – N/A

Street Hierarchy
Collector Street

Congestion (v/c ratio)
2010 – N/A
2040 – N/A

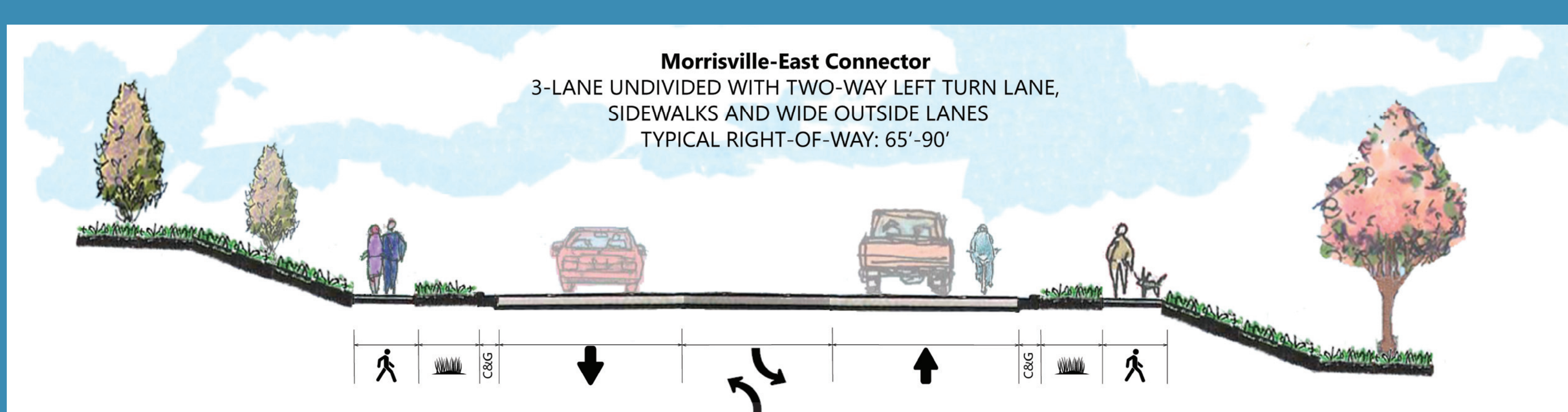
Planning Cost Estimate
July 2017

$ 5,121,352.50

Crash Summary
(June 2013 to May 2016)

N/A

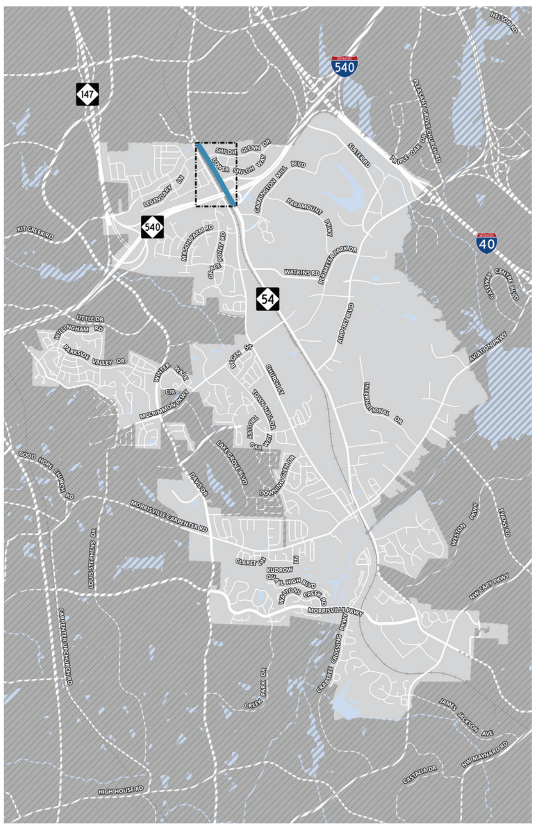
CROSS-SECTION



KEY	STANDARD DIMENSIONS	ALTERNATIVE DIMENSIONS	NOTES:
	12-ft lanes	14-ft lanes with sharrows	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians.
	12-ft two way left turn lane	11-ft to 12-ft two way left turn lane	
	5-ft minimum verge	0-ft to 10-ft verge	
	N/A	10-ft sidepath(s)	
	5-ft sidewalks	5-ft to 8-ft sidewalks	

NC 54 (Chapel Hill Road)

Widening



Length
0.46 miles

Project Extents
From: Northern Town Limits near Shiloh Glenn Drive

To: NC 540

Traffic Volume (vpd)
2010 – 21,956

2040 – 51,730

Street Hierarchy
Major Thoroughfare

Planning Cost Estimate
July 2017

$10,302,000

Congestion (v/c ratio)
2010 – 0.60

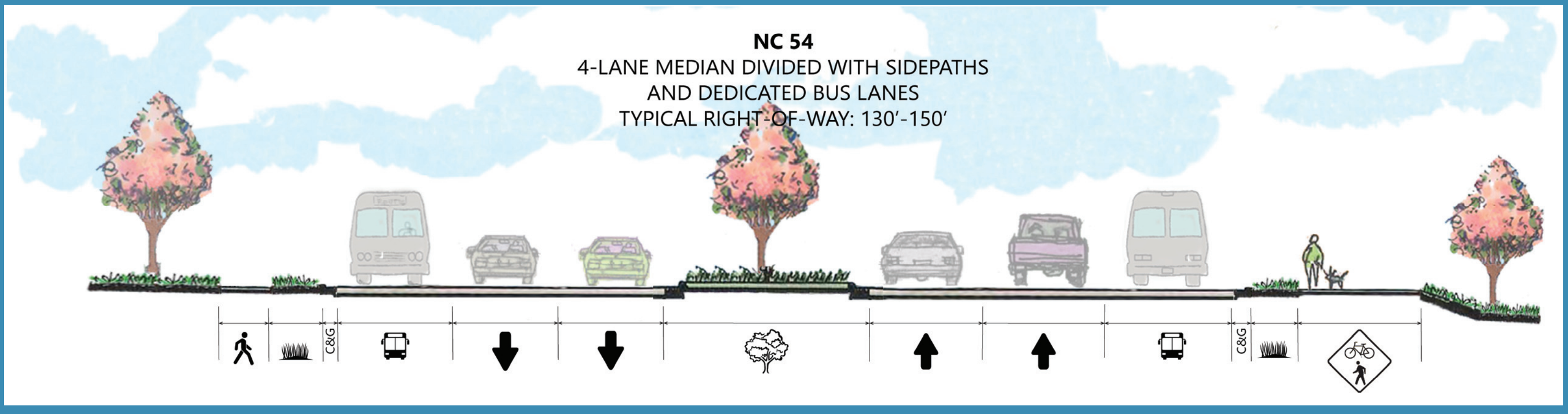
2040 – 0.68

Crash Summary
(June 2013 to May 2016)

Total Crashes – 15

EPDO Score – 120.4

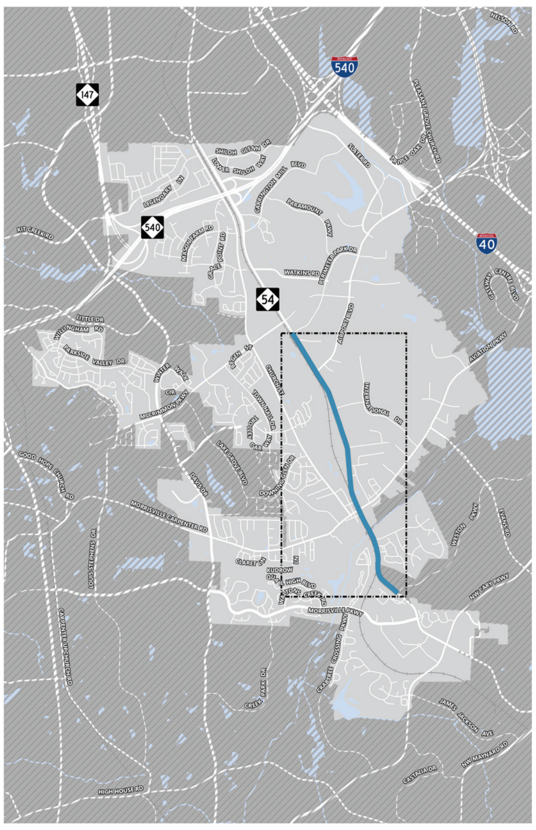
CROSS-SECTION



KEY	STANDARD DIMENSIONS	NOTES:
(inside lanes icon)	11-ft inside lanes	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians. Bus lanes can be center-running or in the outside lanes as shown in the cross-section.
(bus icon)	12-ft dedicated bus lane	
(tree icon)	17.5-ft planted median	
(grass icon)	0-ft to 10-ft verge	
(sidepath icon)	10-ft sidepath east side of roadway	
(pedestrian icon)	5-ft sidewalk	

NC 54 (Chapel Hill Road)

Widening



Length
2.39 miles

Traffic Volume (vpd)
2010 – 19,737
2040 – 32,783

Congestion (v/c ratio)
2010 – 1.05
2040 – 0.88

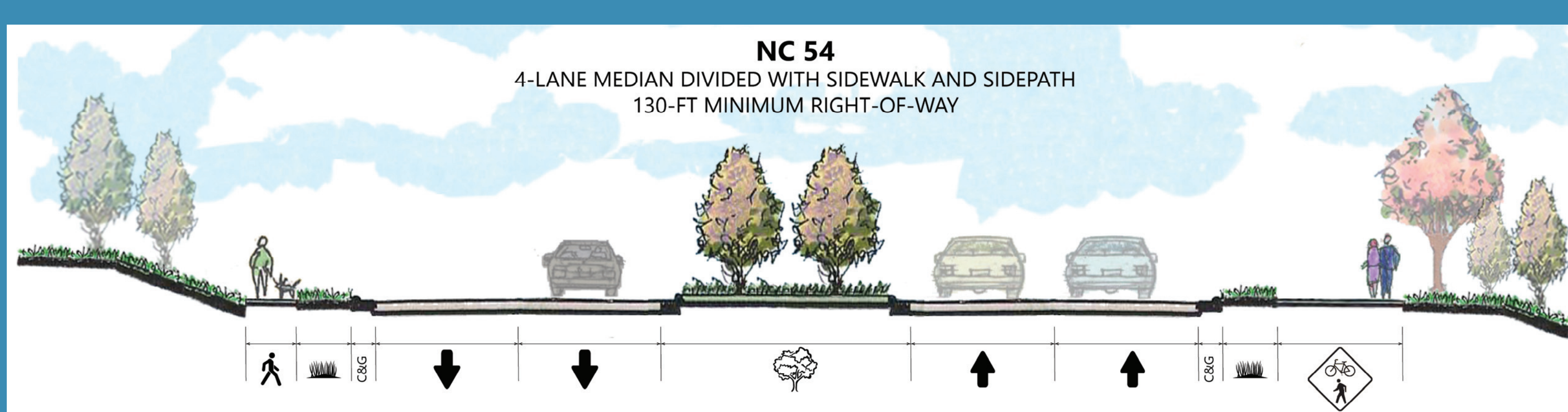
Project Extents
From: Perimeter Park Drive
To: Weston Parkway

Street Hierarchy
Major Thoroughfare

Planning Cost Estimate
July 2017
$30,519,000

Crash Summary
(June 2013 to May 2016)
Total Crashes – 51
EPDO Score – 489.4

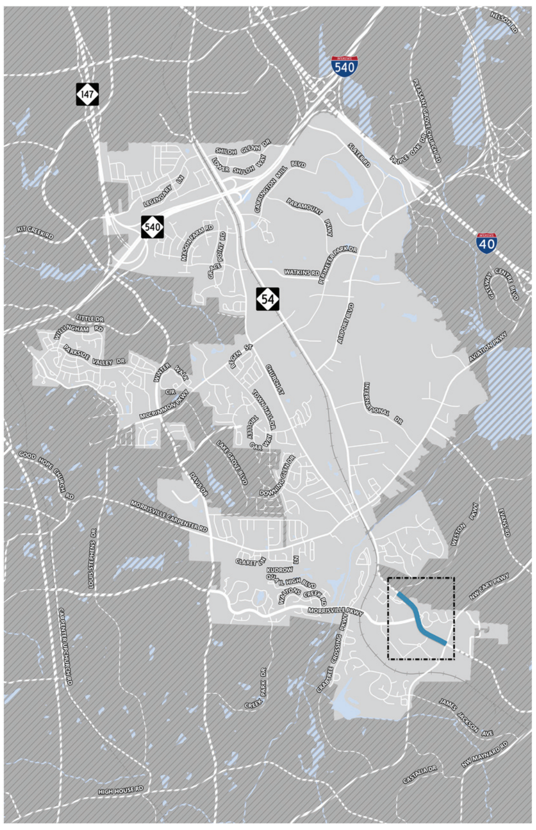
CROSS-SECTION



KEY	INTERIM BUILD DIMENSIONS	FULL BUILD-OUT DIMENSIONS	NOTES:
	12-ft inside lane 15-ft wide outside lane	2 11-ft inside lanes 1 12-ft dedicated bus lane	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians. For speeds below 35 MPH, sharrows shall be provided in the wide outside lanes. The provision of a wide median is intended to reduce future construction costs along corridors that may need widening to 6-lanes to accommodate dedicated bus lanes.
	31.5-ft planted median	17.5-ft planted median	
	5-ft minimum verge	0-ft to 10-ft verge	
	10-ft sidepath east side of roadway	10-ft sidepath	
	5-ft sidewalk	5-ft sidewalk	
BIKE LANE	N/A	N/A	

NC 54 (Chapel Hill Road)

Widening



Length
0.62 miles

Project Extents
From: Weston Parkway
To: NW Cary Parkway

Traffic Volume (vpd)
2010 – 22,412
2040 – 36,398

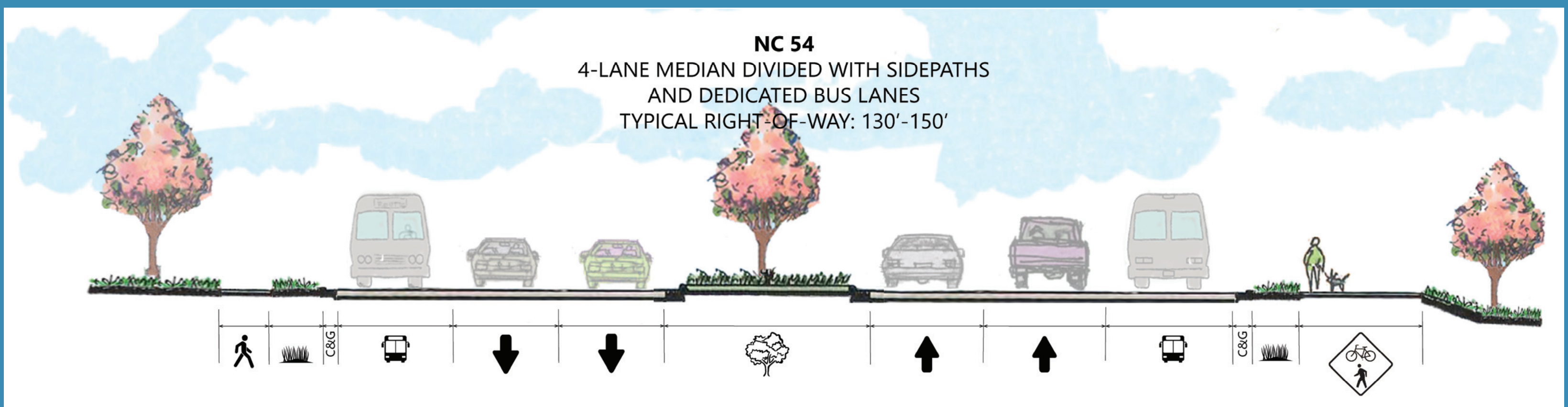
Street Hierarchy
Major Thoroughfare

Congestion (v/c ratio)
2010 – 0.96
2040 – 0.82

Planning Cost Estimate
July 2017
$7,822,000

Crash Summary
(June 2013 to May 2016)
Total Crashes – 28
EPDO Score – 193.2

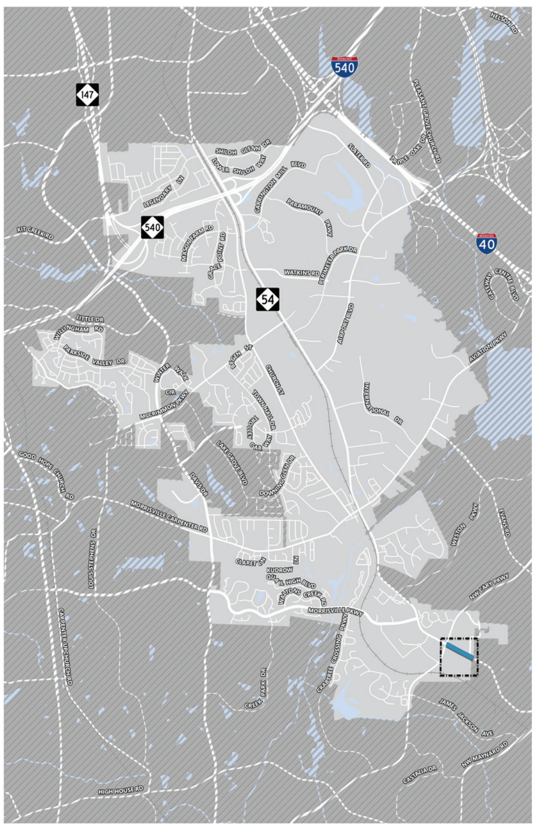
CROSS-SECTION



KEY	STANDARD DIMENSIONS	NOTES:
	11-ft inside lanes	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians. Bus lanes can be center-running or in the outside lanes as shown in the cross-section.
	12-ft dedicated bus lanes	
	17.5-ft planted median	
	0-ft to 10-ft verge	
	10-ft sidepath east side of roadway	
	5-ft sidewalk	

NC 54 (Chapel Hill Road)

Widening



Length
0.30 miles

Traffic Volume (vpd)
2010 – 24,366
2040 – 26,566

Congestion (v/c ratio)
2010 – 1.31
2040 – 1.43

Project Extents
From: NW Cary Parkway
To: Wilson Road

Street Hierarchy
Major Thoroughfare

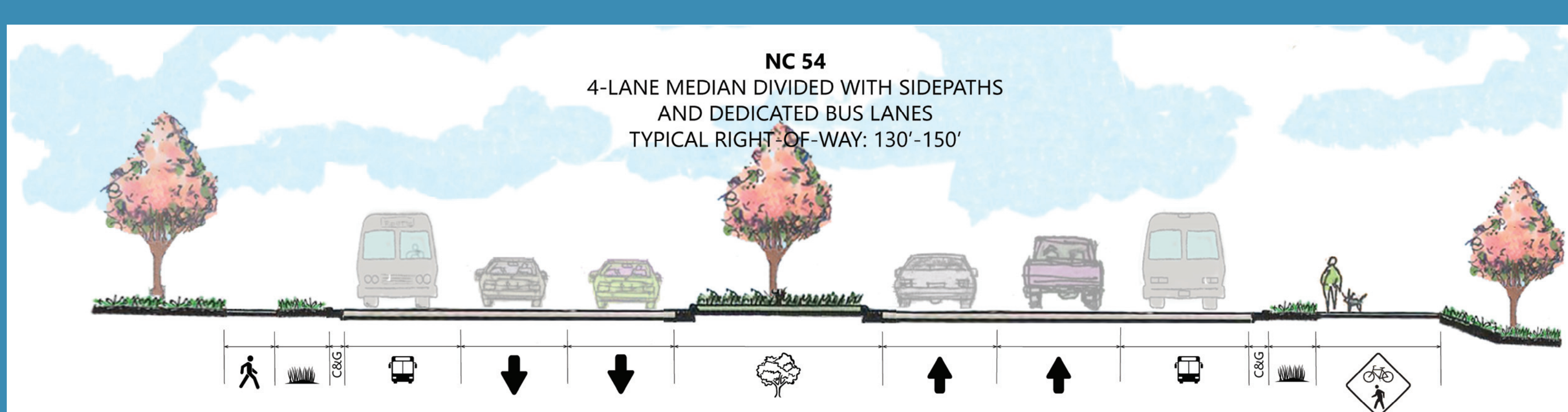
Planning Cost Estimate
July 2017

$ 5,152,000

Crash Summary
(June 2013 to May 2016)

Total Crashes – 27
EPDO Score – 226.8

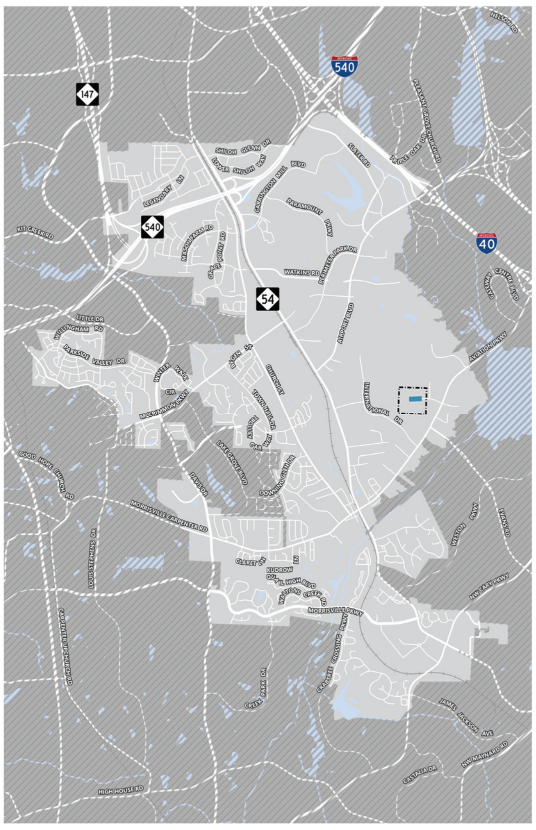
CROSS-SECTION



KEY	STANDARD DIMENSIONS	NOTES:
	11-ft inside lanes	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians. Bus lanes can be center-running or in the outside lanes as shown in the cross-section.
	12-ft dedicated bus lanes	
	17.5-ft planted median	
	0-ft to 10-ft verge	
	10-ft sidepath east side of roadway	
	5-ft sidewalk	

Southport Drive Extension

New Location



Length
0.10 miles

Project Extents
From: Current Terminus near Southcenter Court
To: McCrimmon Parkway Extension

Traffic Volume (vpd)
2010 – N/A
2040 – N/A

Street Hierarchy
Collector Street

Planning Cost Estimate
July 2017

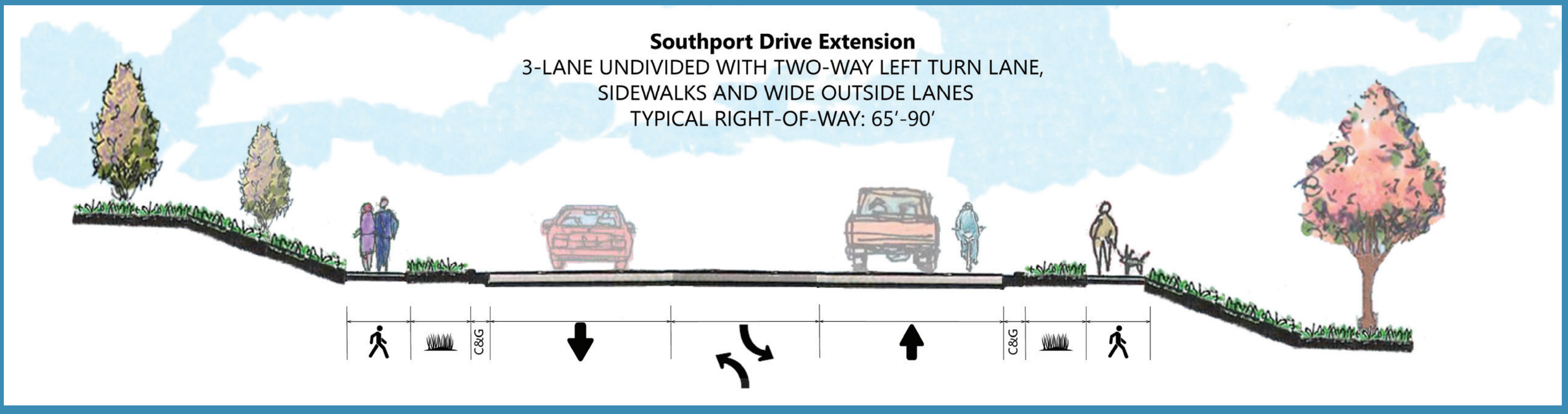
$ 973,400

Congestion (v/c ratio)
2010 – N/A
2040 – N/A

Crash Summary
(June 2013 to May 2016)

N/A

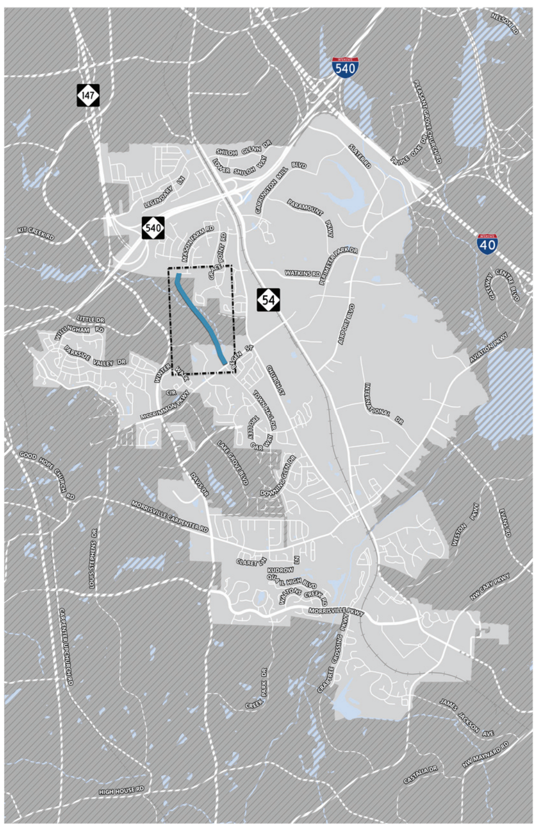
CROSS-SECTION



KEY	STANDARD DIMENSIONS	ALTERNATIVE DIMENSIONS	NOTES:
	12-ft lanes	14-ft lanes with sharrows	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians.
	12-ft two way left turn lane	11-ft to 12-ft two way left turn lane	
	5-ft minimum verge	0-ft to 10-ft verge	
	N/A	10-ft sidepath(s)	
	5-ft sidewalks	5-ft to 8-ft sidewalks	

Town Hall Drive Extension

New Location



Length
0.70 miles

Traffic Volume (vpd)
2010 – N/A
2040 – N/A

Congestion (v/c ratio)
2010 – N/A
2040 – N/A

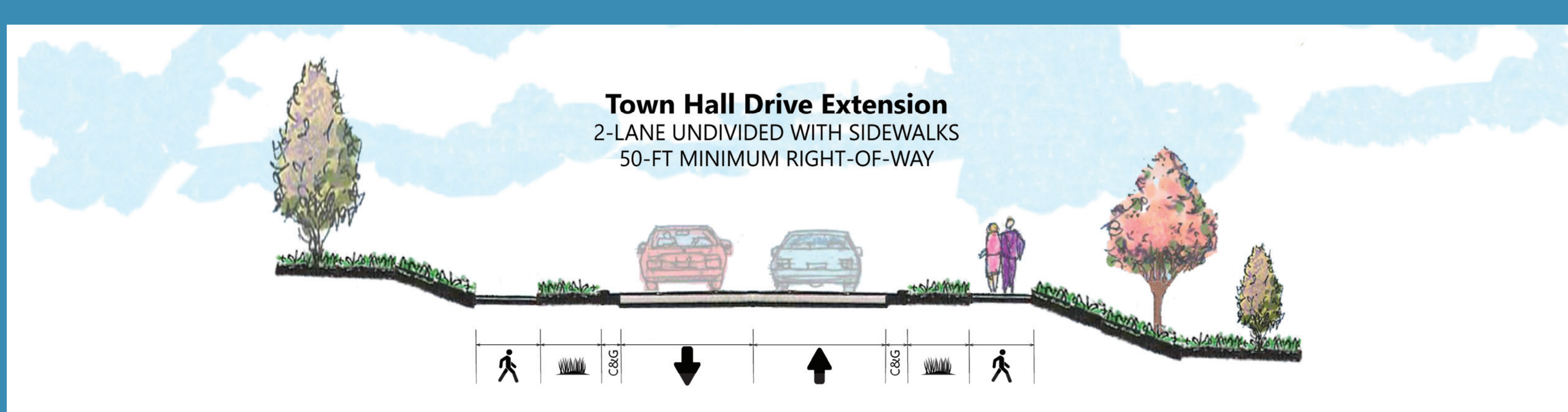
Project Extents
From: Ferntree Court
To: McCrimmon Parkway

Street Hierarchy
Collector Street

Planning Cost Estimate
July 2017
$ 6,582,000

Crash Summary
(June 2013 to May 2016)
N/A

CROSS-SECTION



KEY	STANDARD DIMENSIONS	ALTERNATIVE DIMENSIONS	NOTES:
(lanes)	12-ft lanes	11-ft to 14-ft lanes	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians. Sharrows shall be provided if 14-ft lanes are constructed.
(verge)	5-ft minimum verge	0-ft to 10-ft verge	
(sidepath)	N/A	10-ft sidepath(s)	
(sidewalk)	5-ft sidewalks	5-ft to 8-ft sidewalks	

PUBLIC ENGAGEMENT OPPORTUNITIES

Community Event Outreach at SpringFest
May 14, 2016

Community Event Outreach at Bike Safety Rodeo
June 4, 2016

Town Council Work Sessions
August 23, 2016
September 19, 2017
October 17, 2017

Planning and Zoning Board Work Sessions
September 8, 2016
February 16, 2017
September 21, 2017

Town Council Plan Update Presentations
February 28, 2017
August 22, 2017

Developers Council Presentation
August 9, 2017

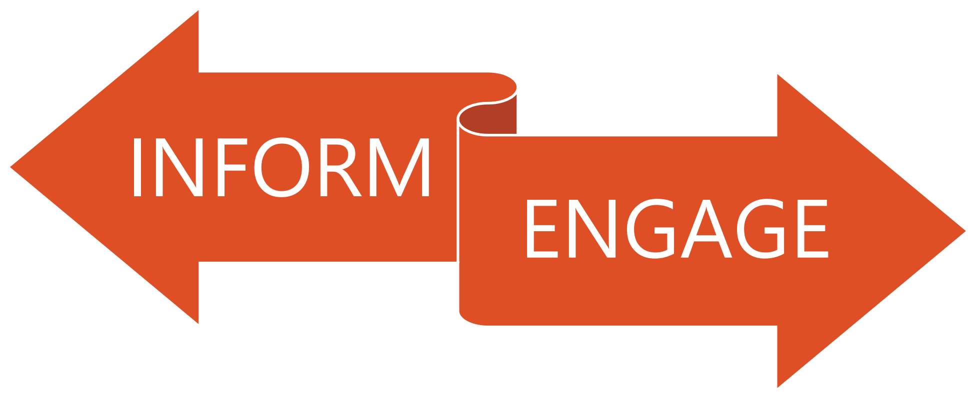
Public Workshops and Open Houses
October 6, 2016
February 28, 2017
June 29, 2017
August 22, 2017

Online Survey
October to December 2016

Spring 2018 Outreach
April 4, 2018
April 7, 2018
April 11, 2018
April 17, 2018
April 24, 2018
April 27, 2018
May 3, 2018
May 7, 2018
May 12, 2018
May 17, 2018
May 19, 2018
May 23, 2018

PUBLIC OUTREACH SUMMARY

Public outreach – whether through direct engagement or by input of community proxies – is an important part of a successful transportation plan. The two primary goals of engagement for the ***Town of Morrisville Comprehensive Transportation Plan*** were to inform and engage the public.



Informing the public requires the thoughtful translation of engineering and planning vernacular into common English. The initial step of informing the public is to communicate the purpose of the Transportation Plan and how it affects them. Once the public understands the value of the plan and its goals and objectives, they can then engage the planning process.

Engaging the public necessitates empowering them to speak up paired with listening to their thoughts and opinions. Those who have the most to gain or lose from investments in the transportation system have perspectives that must be valued when developing project, policy, and program recommendations. The planning process included several avenues of public engagement to improve the likelihood that the feedback obtained was representative of the entire community.

Engagement Strategies

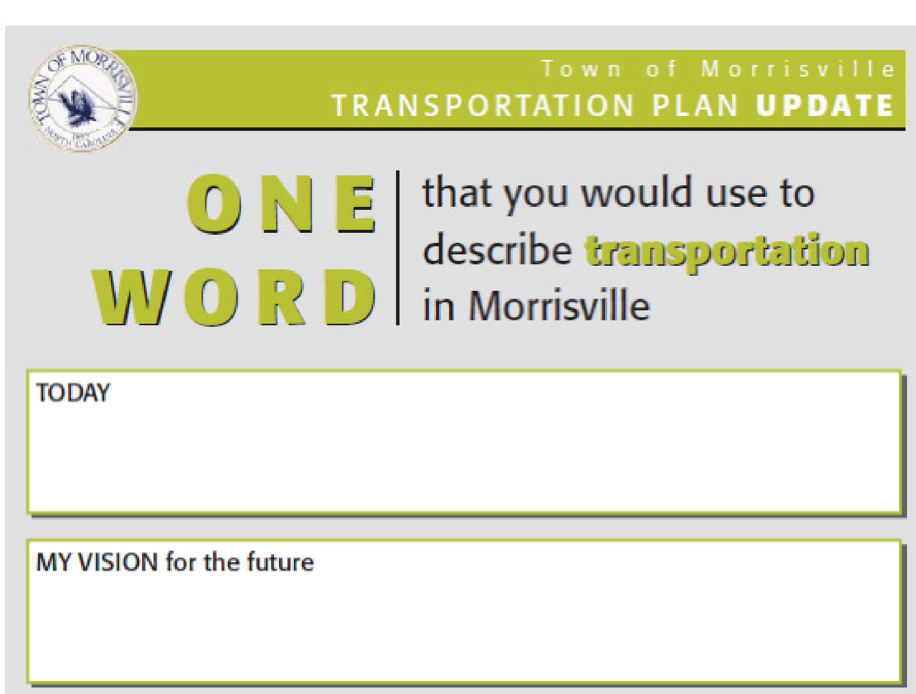
The ***Town of Morrisville Comprehensive Transportation Plan*** included a variety of strategies that intended to capture feedback from a cross-section of those who live, work, recreate, or have a stake in the Plan's recommendations. The engagement strategies included are shown to the left.

The following sections provide details about information conveyed and the data collected using these engagement strategies. Presentations used at the listed Planning and Zoning Board and Town Council meetings are attached at the end of this Appendix. A summary of the public engagement process is also contained in **Chapter 1**.

Community Event Outreach at SpringFest and Bike Safety Rodeo

The Town of Morrisville Planning Department had a booth at SpringFest, held on May 14, 2016 and the Morrisville Fire/Rescue Department's Bike Safety Rodeo held on June 4, 2016. Information was provided to introduce the update to Comprehensive Transportation Plan. In addition, attendees were asked to complete a short exercise (**Figure D-1**) intended to better understand their perception of existing conditions and vision for the future. Results from this exercise can be found in **Table D-1**.

Figure D-1: One Word Exercise


Town of Morrisville
TRANSPORTATION PLAN **UPDATE**

ONE WORD that you would use to describe transportation in Morrisville

TODAY

MY VISION for the future

Table D-1: One Word Exercise Results - Public

TRANSPORTATION IN MORRISVILLE TODAY	MY VISION FOR THE FUTURE
Good	Expecting More Greenways
Congested Roads	Broader Roads
Lack of Public Transportation	Transportation to local Universities would be awesome
No response provided	Separate Bicycle lanes on Church St/54
Traffic	Less Traffic
Congested	More Lanes
No response provided	No Bus Depot or Train/Light Rail Station
Busy Intersections	Light Rail to RTP & Downtown
Too much traffic congestion	More green trails, more lanes
Bus Transportation	*No response provided*
Automobiles	Options
Traffic	Widening major roads
Traffic (Town Hall, Morrisville-Carpenter, NC 54)	Less Traffic
Congestion	Connected
All cars and Trucks	Trains, Trolleys, Trams, Walks
More Traffic	Town of Morrisville will overcome it easily
Bottle Neck Roads	Widen Roads, Train Trestle
Morrisville-Carpenter	Greenways!!
Illustrations of bottleneck	Illustration of straighten alignment
Remote	Star Network
Bottleneck	Expand Chapel Hill Road, not for buses, for cars
Congested	Transit to RTP (so we can have one car)
One Lane	Greenways!!!
Slow	Convenient
Busy	Ease
Beautiful	I'll like this place!!
McCrimmon Parkway at the tracks	Under the tracks and 54
Disastrous!	Wish you would stop approving apartment complexes/housing projects before making sure the roads are big enough

Town Council Work Session #1 – August 23rd, 2016

The purpose of the first Town Council work session was to provide an overview of the planning process, discuss existing conditions, and to complete a series of interactive activities. The priority pyramid, thought card, and catch phrase activities are shown here along with a summary of comments received.

PRIORITY PYRAMID

Activity: Rank the guiding statements of the plan, with your highest priority at the top and your lowest priorities at the bottom. This activity was completed using the gameboard and stickers shown in **Figure D-2**. Results of the activity are shown in **Table D-2**.

Figure D-2: Priority Pyramid Gameboard and Stickers

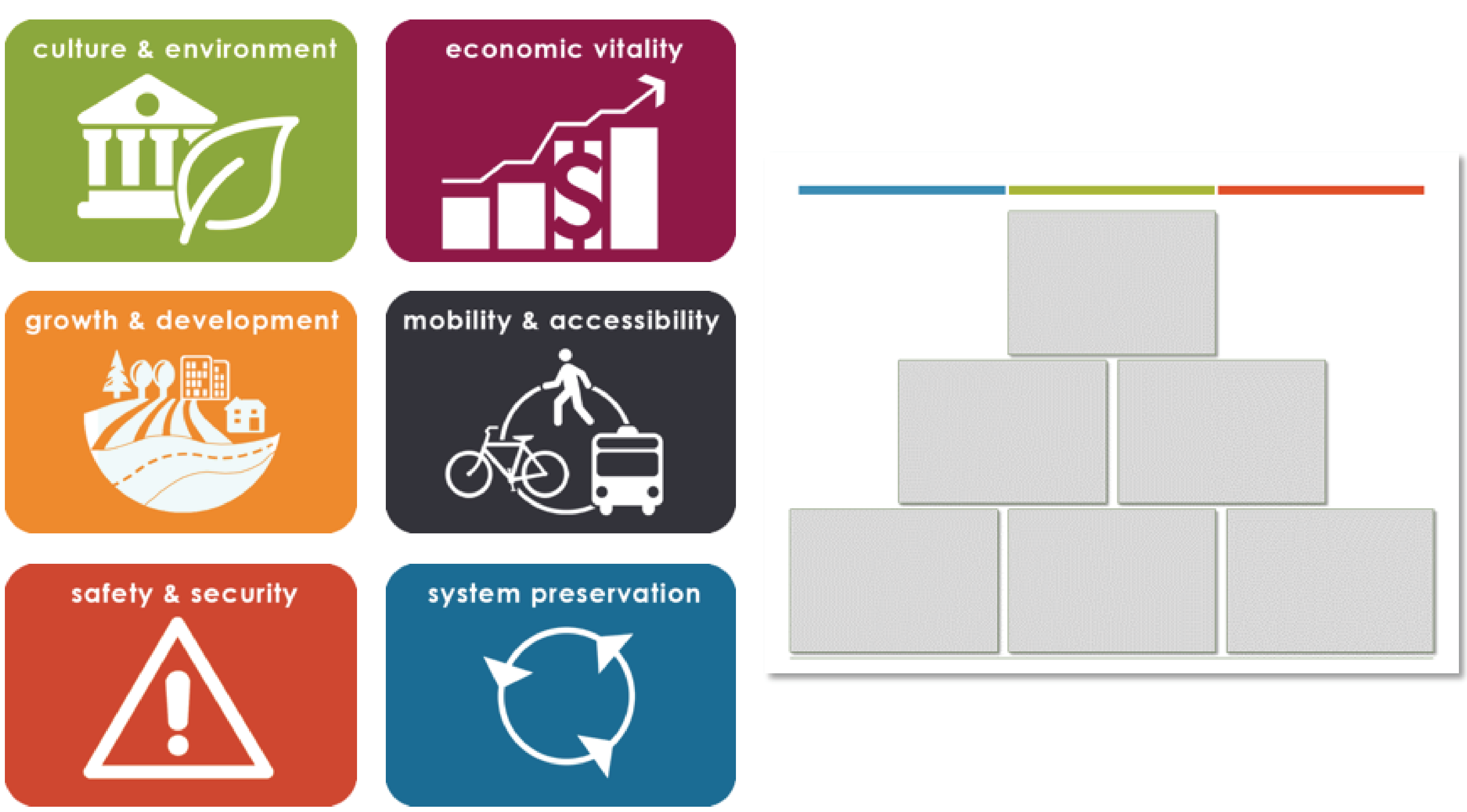


Table D-2: Priority Pyramid Results – Town Council

GUIDING PRINCIPLE	Culture & Environment			Economic Vitality			Growth & Development			Mobility & Accessibility			Safety & Security			System Preservation		
TOTAL RESPONSES	0	1	6	1	4	2	1	2	4	5	2	0	0	4	3	0	1	6
PERCENT (%)	0.0	14.3	85.7	14.3	57.1	28.6	14.3	28.6	57.1	71.4	28.6	0.0	0.0	57.1	42.9	0.0	14.3	85.7
WEIGHTED AVERAGE	2.86			11.29			7.57			19.00			8.43			2.86		
RANK	5			2			4			1			3			5		

PRIORITY TIER	WEIGHT
Top Priority	3
Second Tier Priority	2
Third Tier Priority	1

THOUGHT CARDS

Activity: Participants were given three index cards and instructed to write a comment on each. The blue index card was reserved for their most important thought. **Figure D-3** displays the activity instructions, while **Table D-3** shares the results.

Figure D-3: Thought Card Activity

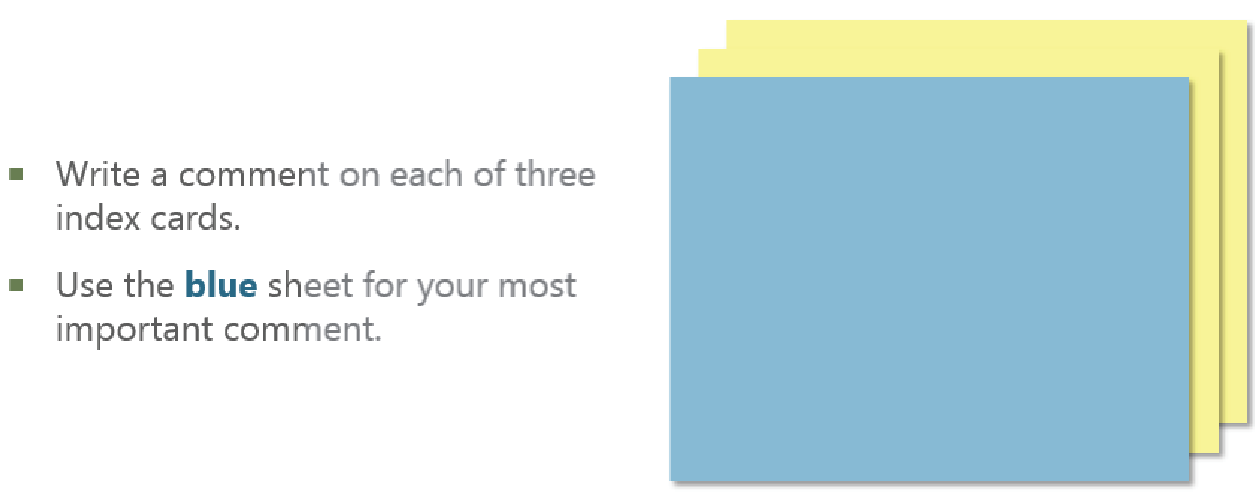


Table D-3: Thought Card Activity Results – Town Council

THOUGHT CARD RESULTS
NC 54 Hwy
NC 54 Hwy
Airport Blvd Church to Davis Drive
ID more road connection opportunities
TOD Transit
NC 54 Hwy
Funding
Bus
Access to/along Church Street
Greenway and Sidewalks
147 Toll Road
Commuter Rail Station
We need buses
too small for budget to fund state road projects (communicating to public)
McCrimmon Parkway
Widen NC 54
Train and Rapid Transport
Less pass thru traffic
Crabtree Crossing
an alternative to cars; bus routes
safe bike and pedestrian connectivity
more connections to parallel 54, Davis, 40

CATCH PHRASES

Activity: List key considerations that should be explored within each guiding statement. **Figure D-4** shows the gameboard used for this activity.

Figure D-4: Catch Phrases Gameboard

Table D-4: Catch Phrases Results – Town Council

GUIDING PRINCIPLES					
Culture & Environment	Economic Vitality	Growth & Development	Mobility & Accessibility	Safety & Security	System Preservation
CATCH PHRASES					
moving on greenways	road connections	Federal and state funding	more bike lanes	Walk and Bike safely through town	efficient use of resources
Cricket is the destination	Faster Commutes	leverage	greenways/connections	improve safety response time	most bang for your buck
walk to farmer's market	RR separation (M/C)	get more jobs and development	more connector roads	safely move around town without a car	
	Transit Station	support infrastructure growth	reason to get out of car	safety for drivers	
	Funding needed	" drive in "	make it easy	Sidewalk	
	state's help	planning ahead	connectivity	greenways	
	lapp awards	payment in lieu	easy access roads	get there safely	
	less congested roads help employees	growing too fast	walkway/greenways	watch for bikes	
	transit oriented development	developments paying for roads	less commute	first responders quickly to your door	
	enhance commerce	transportation bonds	Mass transit		
	build roads first		NC 54		
	improve access		less pass thru traffic		
	walk to work		options to get around		
			options for others so they don't cut through MVL		
			improve quality of life		
			connect the south to the center		
			anywhere in 15 minutes w/o car		

Planning and Zoning Board Work Session #1 – September 8th, 2016

The purpose of the first Planning and Zoning Board Town Council work session was to provide an overview of the planning process, discuss existing conditions, and to complete a series of interactive activities. The activities mirrored those used in the first Town Council work session. Each activity is shown here along with a summary of comments received.

PRIORITY PYRAMID

Activity: Rank the guiding statements of the plan, with your highest priority at the top and your lowest priorities at the bottom.

Table D-5: Priority Pyramid Results – Planning and Zoning Board

GUIDING PRINCIPLE	Culture & Environment			Economic Vitality			Growth & Development			Mobility & Accessibility			Safety & Security			System Preservation		
TOTAL RESPONSES	1	1	2	0	2	2	1	0	3	2	2	0	0	2	2	0	1	3
PERCENT (%)	25.0	25.0	50.0	0.0	50.0	50.0	25.0	0.0	75.0	50.0	50.0	0.0	0.0	50.0	50.0	0.0	25.0	75.0
WEIGHTED AVERAGE	5.50			4.50			3.75			10.00			4.50			2.75		
RANK	2			3			5			1			3			6		

PRIORITY TIER	WEIGHT
Top Priority	3
Second Tier Priority	2
Third Tier Priority	1

THOUGHT CARDS

Activity: Participants were given three index cards and instructed to write a comment on each. The pink index card was reserved for their most important thought. **Figure D-5** displays the activity instructions, while **Table D-6** shares the results.

Figure D-5: Thought Card Activity

- Write a comment on each of three index cards.
- Use the **pink** sheet for your most important comment.

Table D-6: Thought Card Activity Results – Planning and Zoning Board

THOUGHT CARD RESULTS
there are no intersections on North Church Street to get to NC 54
There are no walk overs for pedestrians to cross NC 54 & the RR in the northern parts of town
Through traffic is destroying the small-town character of Morrisville
Reducing congestion
%/# of roads under state control is very high; don't seem to be high on State DOT priority list
System Preservation - Perimeter Park Road
Not enough alternatives to private (car) transport
Hate share the lane bike routes
not convinced there have been bus routes added
great light rail plans; no idea when they will actually occur
Not enough emphasis on alternative transportation
more sidewalks
completion of the greenway networks
sidewalks on all streets and roads in Morrisville

CATCH PHRASES

Activity: List key considerations that should be explored within each guiding statement.

Table D-7: Catch Phrases Results – Planning and Zoning Board

GUIDING PRINCIPLES					
Culture & Environment	Economic Vitality	Growth & Development	Mobility & Accessibility	Safety & Security	System Preservation
CATCH PHRASES					
widen streets in developments	create bypass around Morrisville	add transportation between developments	bike lanes on each street	timers for pedestrians at stop lights	clear cut the road ditches
place the pear trees along streets	van pools	transit station at McCrimmon	more electric charging stations for cars	crosswalks at lights	maintain street repairs
completion of greenway system	Marketing/Advertising TDM	Impact fees (or similar) to pay for infrastructure	more sidewalks	better street lighting	use roundabouts instead of stop lights
recognize cultural shift towards walking	separated grade rail crossing at McCrimmon/54	we need better control of (US/STATE) roads	more public transit	more marked pedestrian crossings	fix the bumps on Perimeter Pkwy
make more road improvements (help improve quality of life)	ECO pass or vouchers TDM	on making priority decisions	encourage employees to have flex time, work from home, etc	more police patrols	do something about 54
	Get major road improvements	we need higher prioritization w/ State/Campo on Morrisville thoroughfares	consider autonomous vehicles	make roadways narrower to discourage speed but make visibility greater	
			start planning for that in anticipation for more efficient use of the roadways we have today	many more flashy on demand crosswalks near schools (like the one near Town Hall at Downing Glen)	
			traffic increasing, more bus/rail in and thru town		
			change road/bike configuration with either striped or separated bike paths		
			more greenway trails		

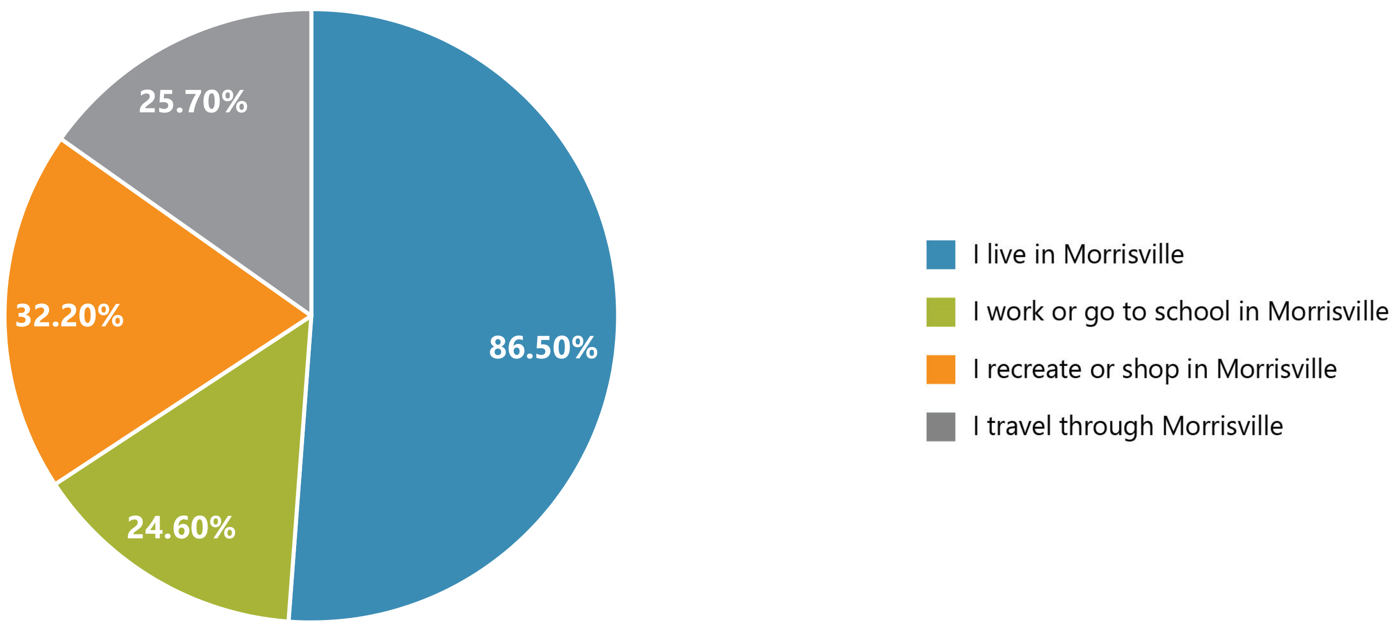
Online Survey Results

An online survey was developed and made available between October 2016 and December 2016. Notification of the public survey was made available on the Town of Morrisville's website and social media, as well as at the October 6, 2016 public workshop and the October 17, 2016 Town Council work session. The online survey was prepared using the platform Wikimapping, a survey tool that enables respondents to provide input on community preferences, opinions, and issues for the various transportation modes. Participants also identified issues and potential solutions by placing icons on a map. Respondents were also given a chance to enter their email address. Those that provided this information were notified of future outreach opportunities for the plan.

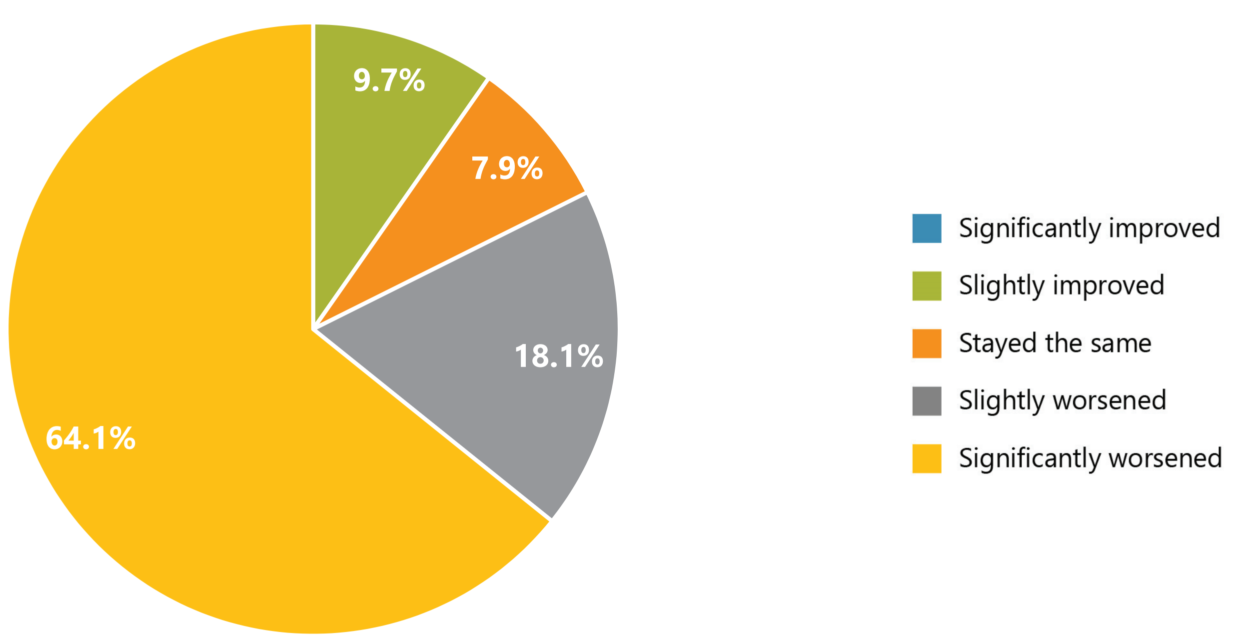
This section includes a summary of the results of the transportation improvement online survey. A total of 276 participants responded to the survey during the development of the ***Town of Morrisville Comprehensive Transportation Plan***. The results of the question-based portion of the survey are included first, followed by two maps that display the results of the map-based portion.

SURVEY QUESTION RESULTS

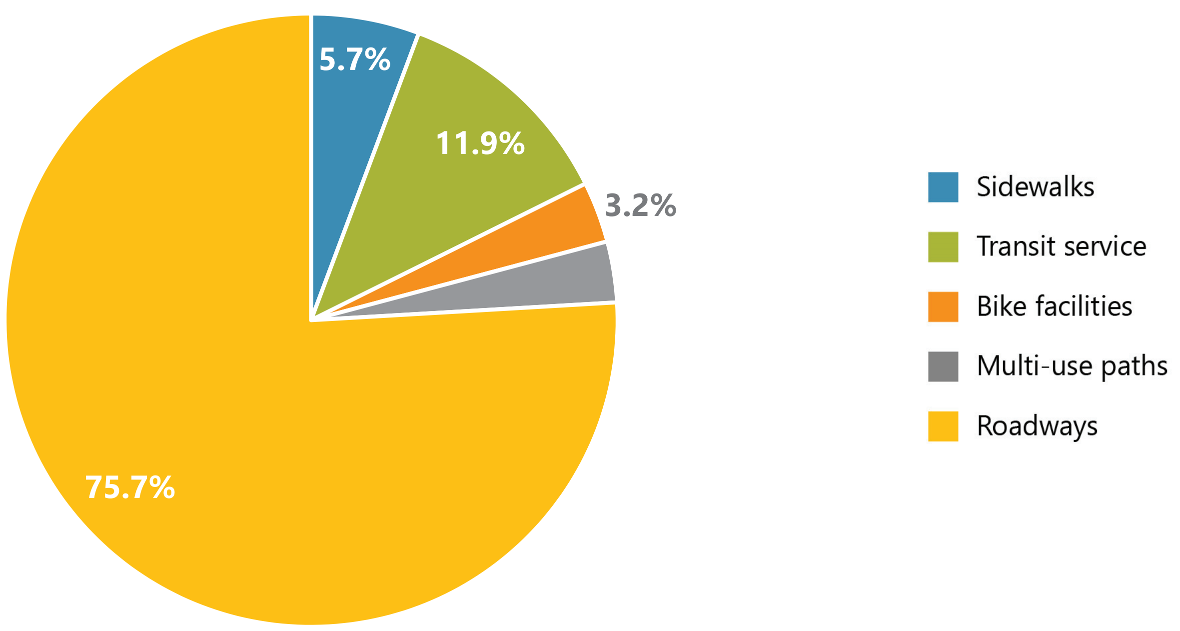
1. What is your relationship to Morrisville? (*pick all that are applicable*)
    a. I live in Morrisville
    b. I work or go to school in Morrisville
    c. I recreate or shop in Morrisville
    d. I travel through Morrisville



2. Over the last five years, transportation in Morrisville has... (*choose one*)
    a. Significantly improved
    b. Slightly improved
    c. Stayed the same
    d. Slightly worsened
    e. Significantly worsened

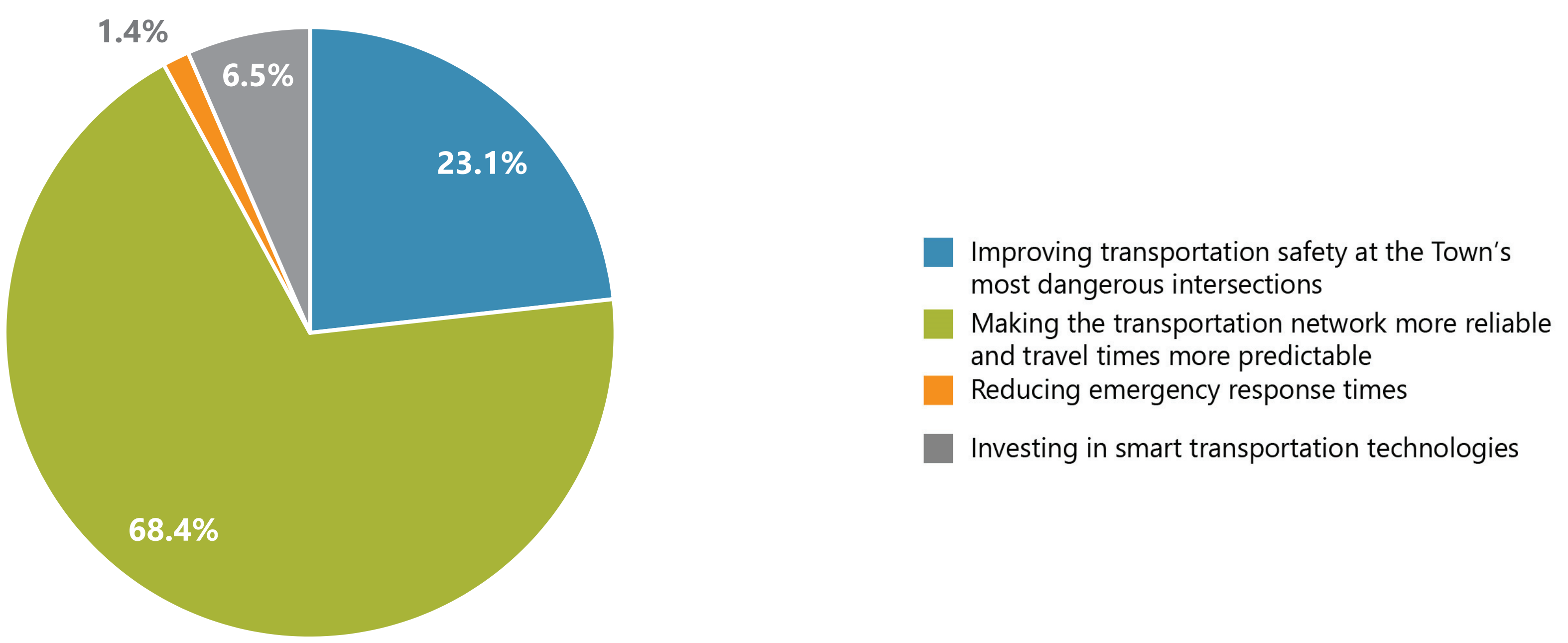


3. In general, what is the biggest transportation need in Morrisville? (*pick one*)
    a. Sidewalks
    b. Transit service
    c. Bike facilities
    d. Multi-use paths
    e. Roadways



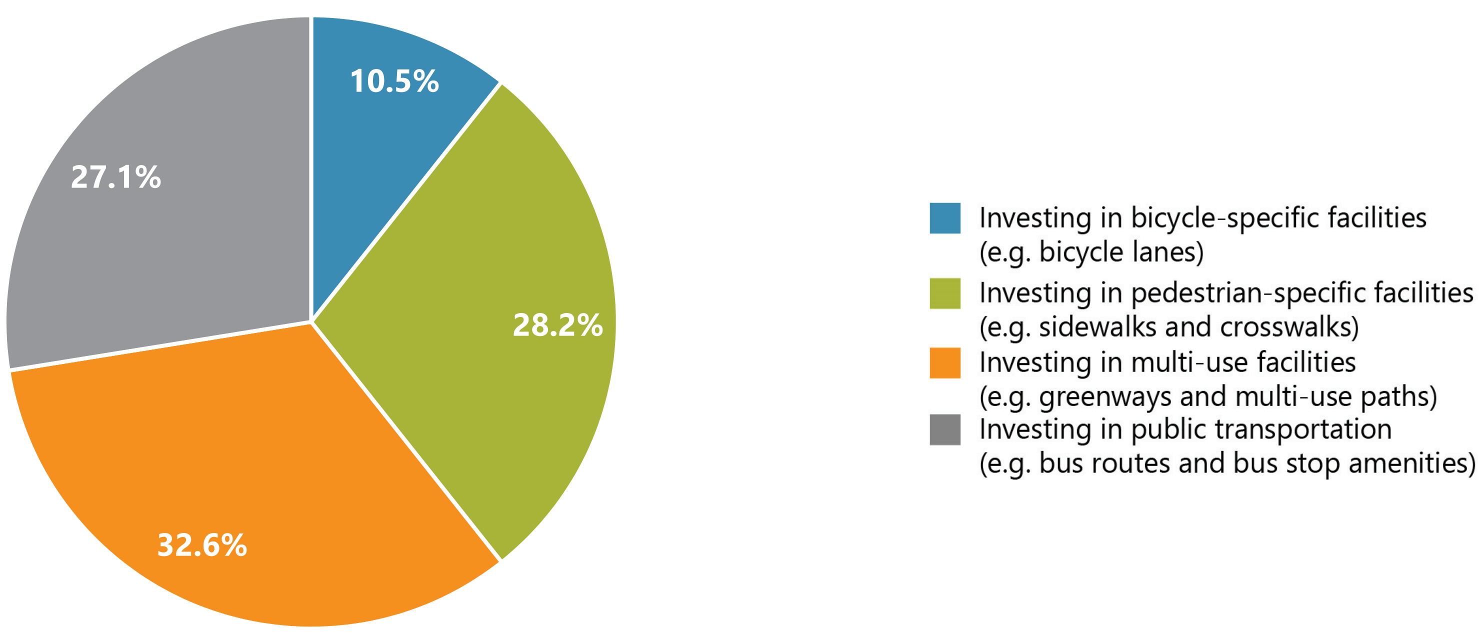
Safety and Security

4. Which of the following is the most important to you? (*choose one*)
    a. Improving transportation safety at the Town's most dangerous intersections
    b. Making the transportation network more reliable and travel times more predictable
    c. Reducing emergency response times
    d. Investing in smart transportation technologies



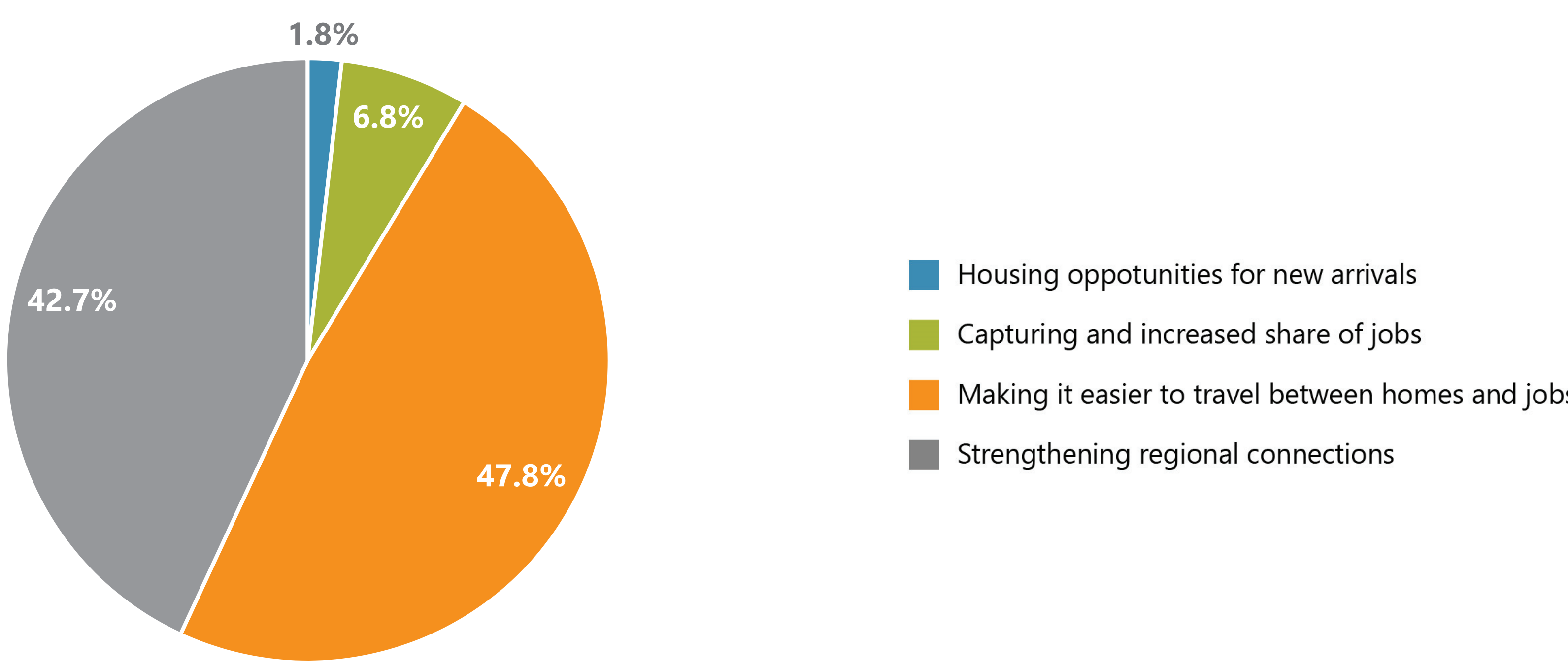
Mobility and Accessibility

5. Which of the following is most important to you? (*choose one*)
    a. Investing in bicycle-specific facilities (e.g. bicycle lanes)
    b. Investing in pedestrian-specific facilities (e.g. sidewalks and crosswalks)
    c. Investing in multi-use facilities (e.g. greenways and multi-use paths)
    d. Investing in public transportation (e.g. bus routes and bus stop amenities)



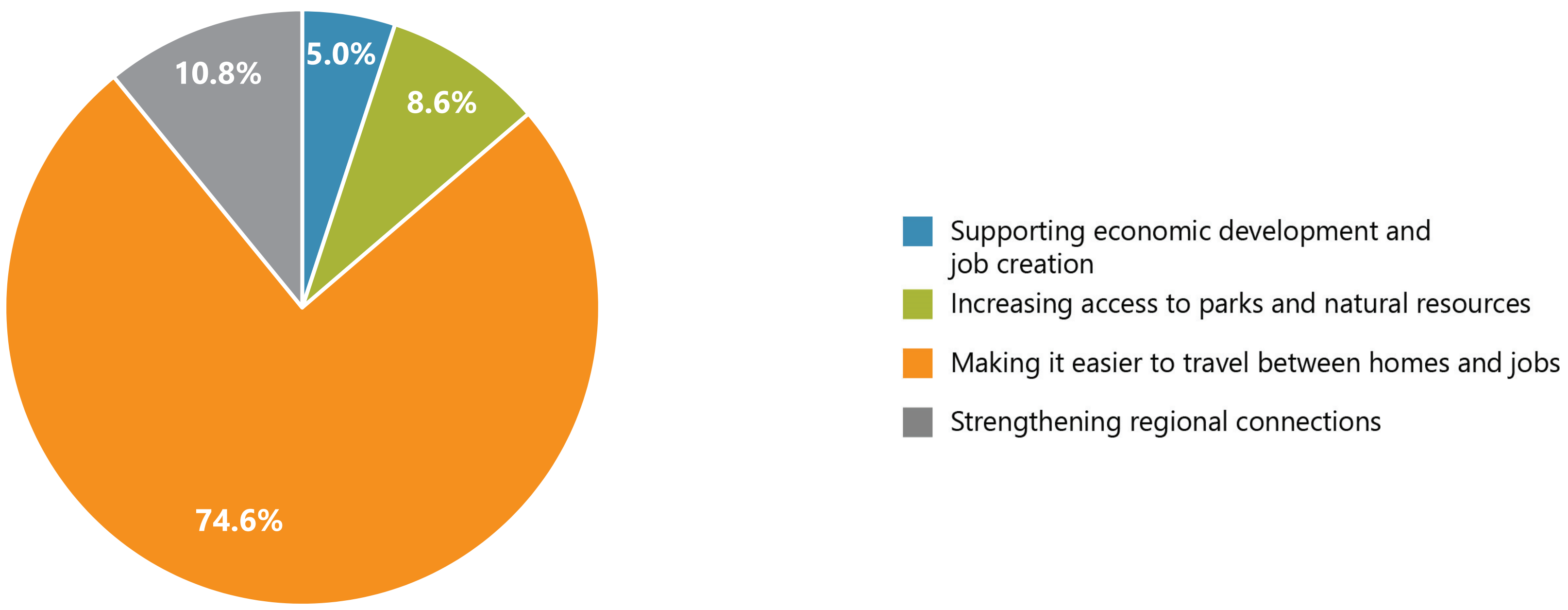
Economic Vitality

6. Economic growth in the study area should prioritize... (*choose one*)
    a. Housing opportunities for new arrivals
    b. Capturing an increased share of jobs
    c. Striking a balance between housing and jobs
    d. Promoting only modest growth



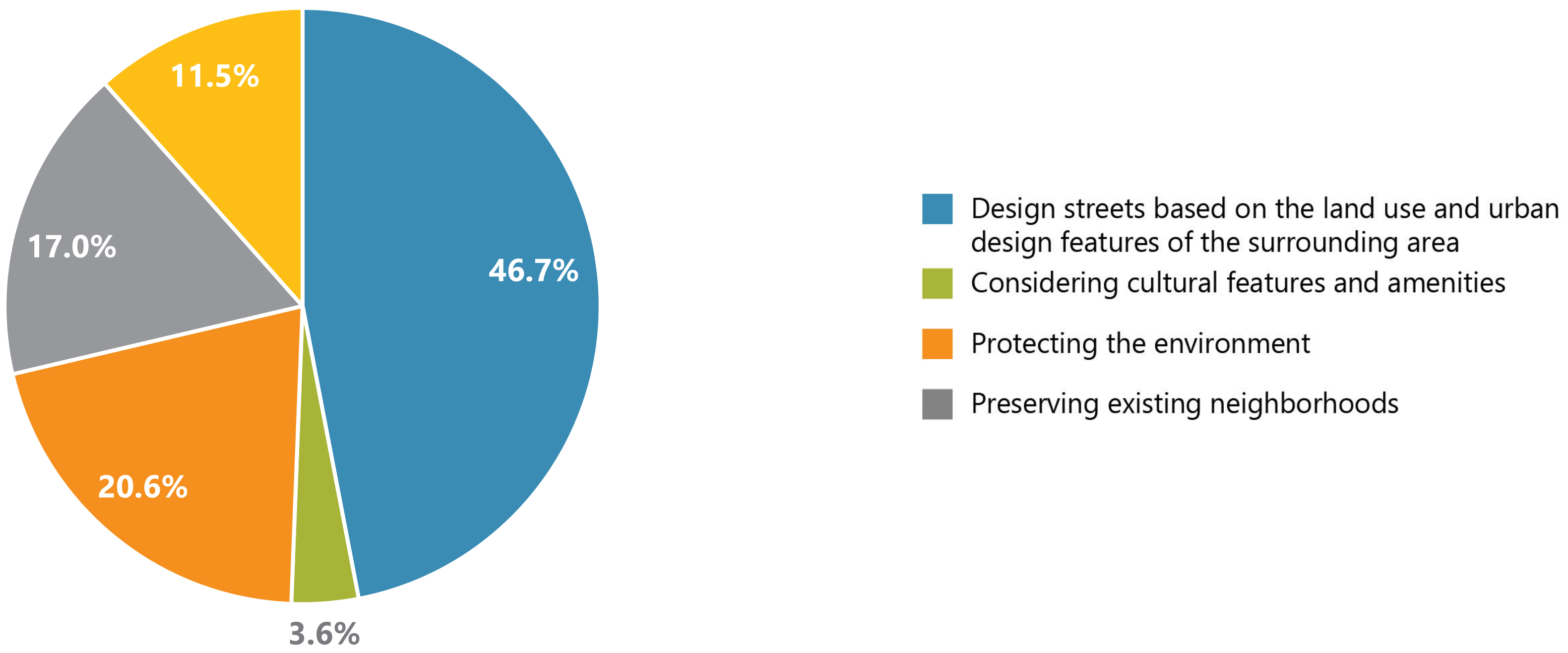
Land Use and Transportation

7. When planning transportation improvements, we should focus on... (*choose one*)
   a. Supporting economic development and job creation
   b. Increasing access to parks and natural resources
   c. Making it easier to travel between homes and jobs
   d. Strengthening regional connections



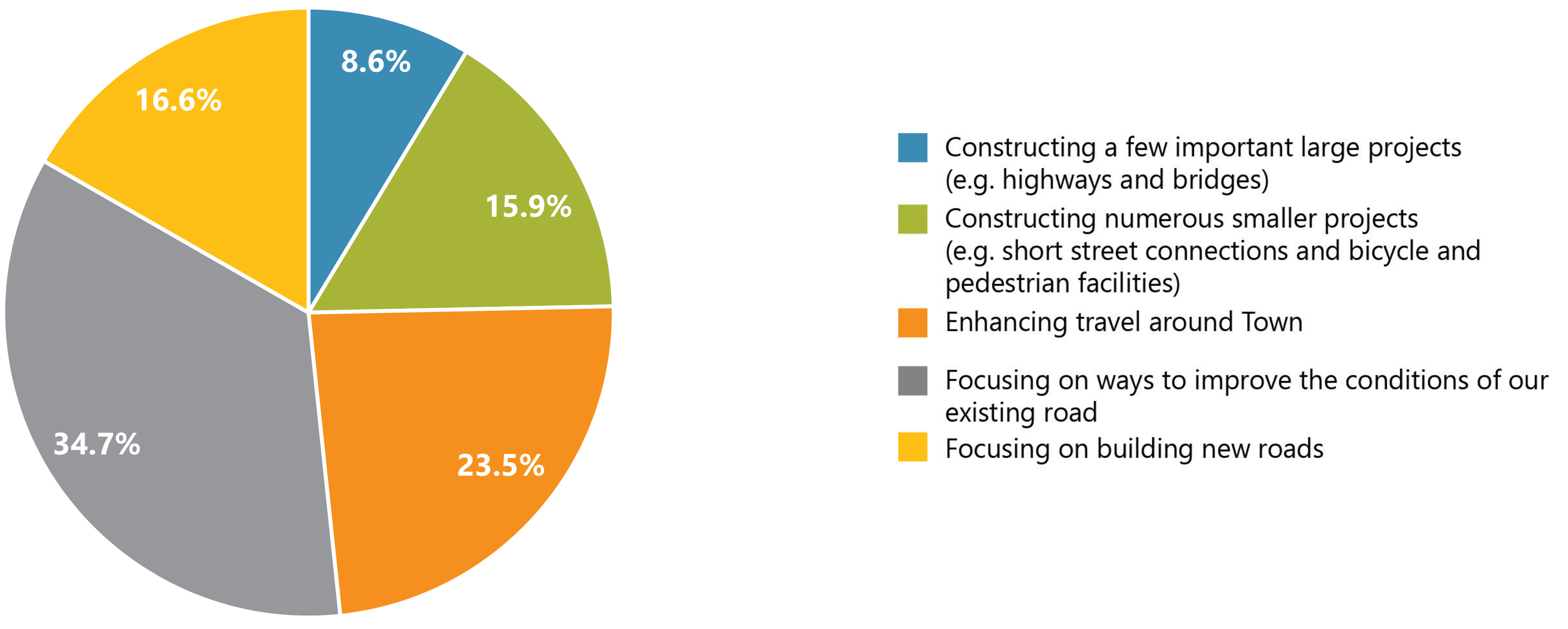
Culture and Environment

8. When planning transportation improvements, we should focus on... (*choose one*)
   a. Design streets based on the land use and urban design features of the surrounding area
   b. Considering cultural features and amenities
   c. Protecting the environment
   d. Preserving existing neighborhoods
   e. Providing access to people of all socioeconomic backgrounds and physical abilities



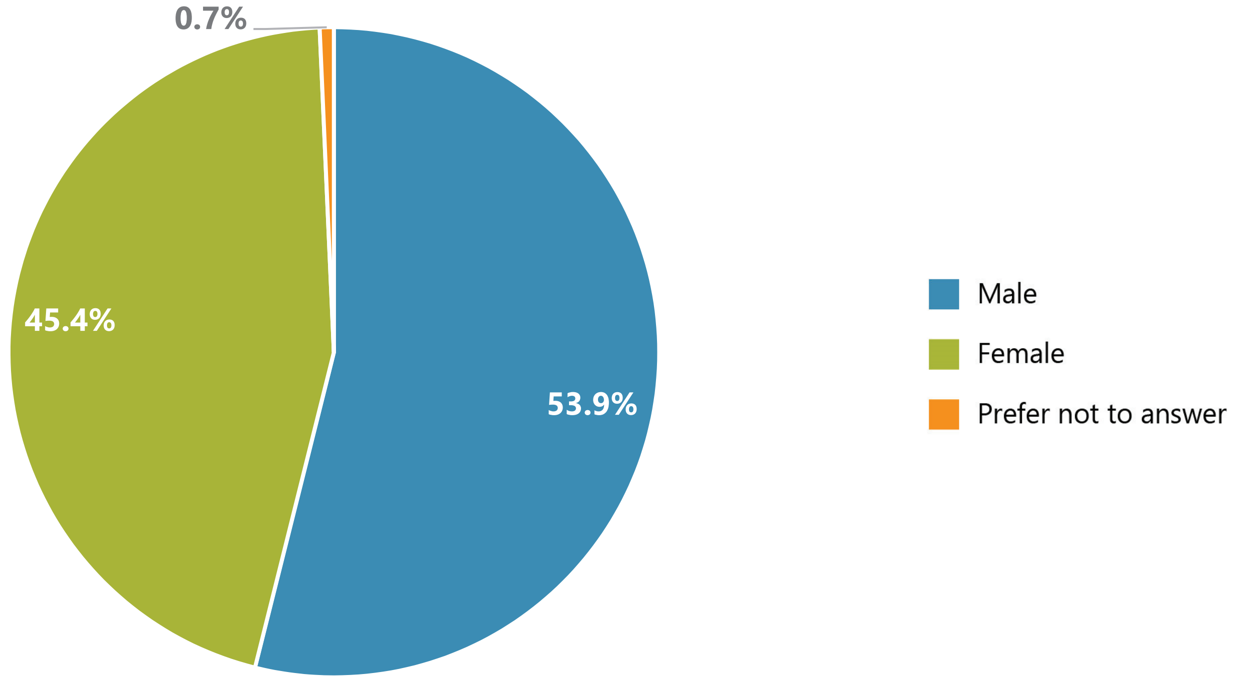
System Preservation

9. Which of the following is most important to you? (*choose one*)
    a. Constructing a few important large projects (e.g. highways and bridges)
    b. Constructing numerous smaller projects (e.g. short street connections and bicycle and pedestrian facilities)
    c. Enhancing travel within the Town
    d. Focusing on ways to improve the conditions of our existing roads
    e. Focusing on building new roads

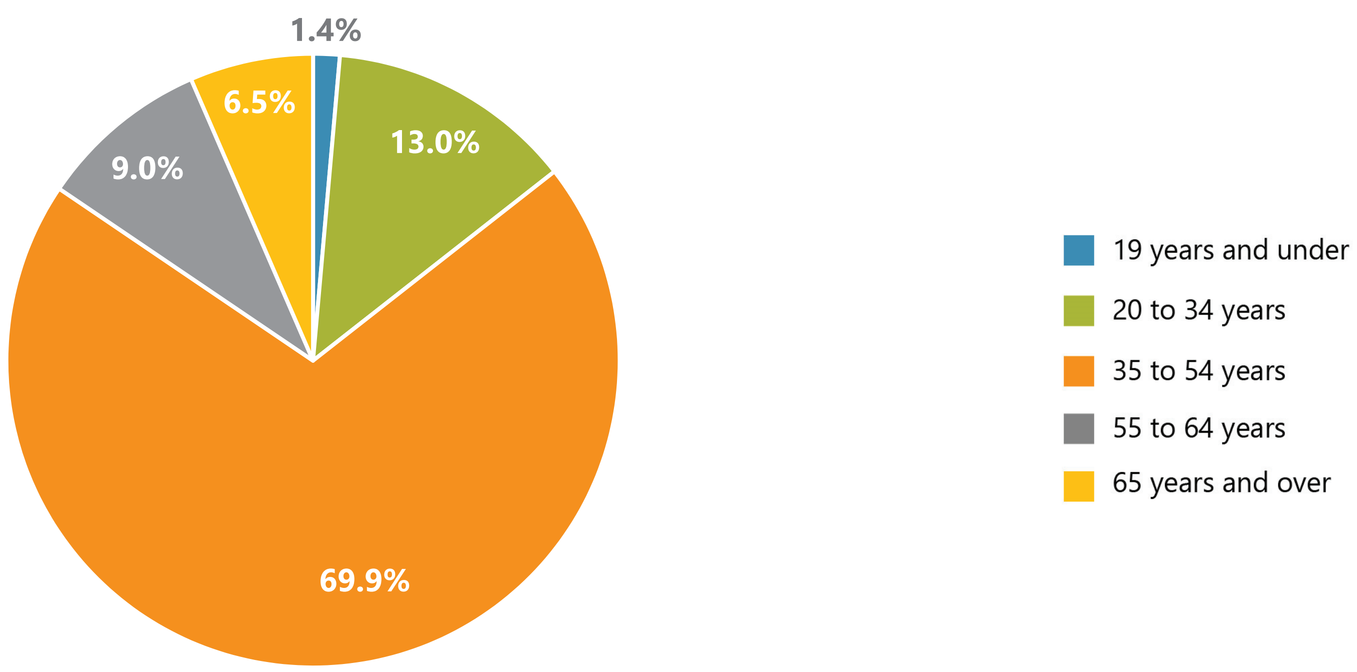


Thanks for your input! You have the option to answer these demographic questions to help us understand your input better.

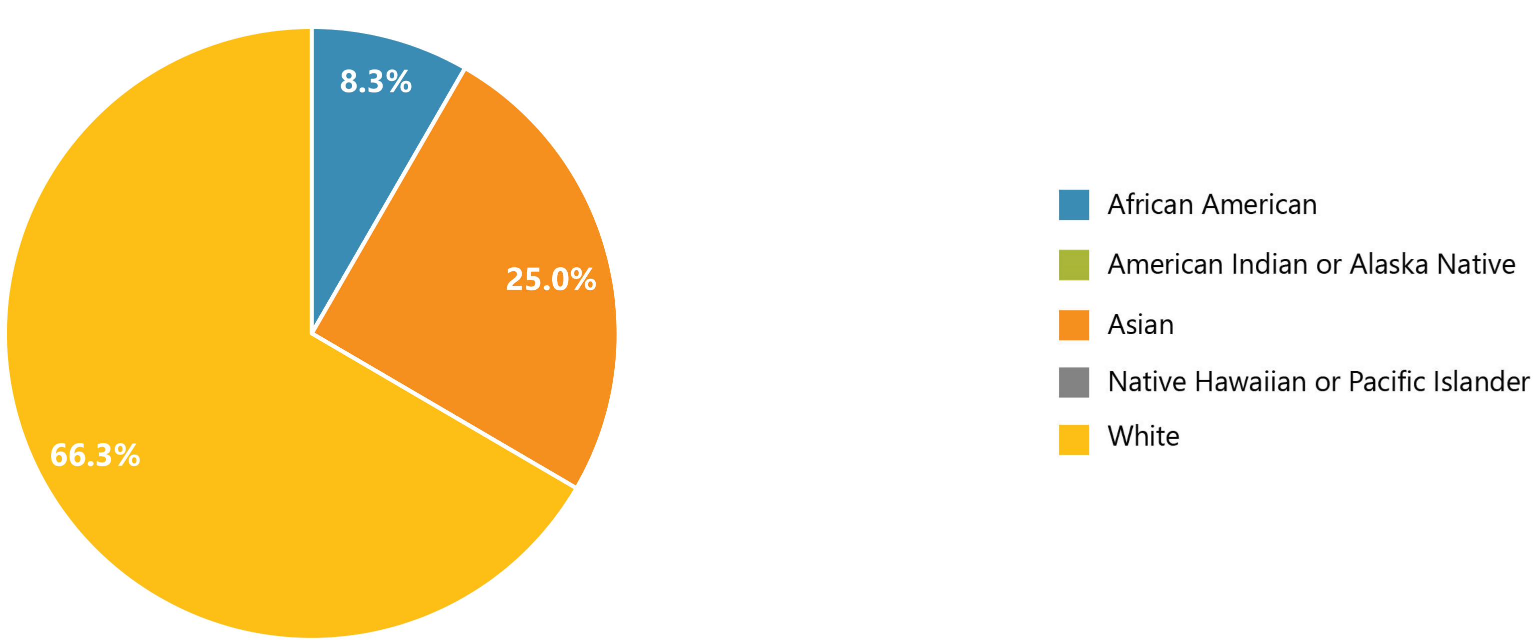
10. What is your gender?
    a. Male
    b. Female
    c. Prefer not to answer



11. What is your age?
    a. 19 years and under
    b. 20 to 34 years
    c. 35 to 54 years
    d. 55 to 64 years
    e. 65 years and over



12. What is your race?
    a. African American
    b. American Indian or Alaska Native
    c. Asian
    d. Native Hawaiian or Pacific Islander
    e. White



SURVEY MAPPING INPUT

The online survey included an opportunity for respondents to select lines or points that represent transportation issues or opportunities. Once these facilities were mapped, respondents were given the opportunity to specify the travel mode and to leave comments. **Figure D-6** on the following page document the points and lines that were noted as part of the online survey. It should be noted that as part of the survey functionality, participants could see the map results of others.

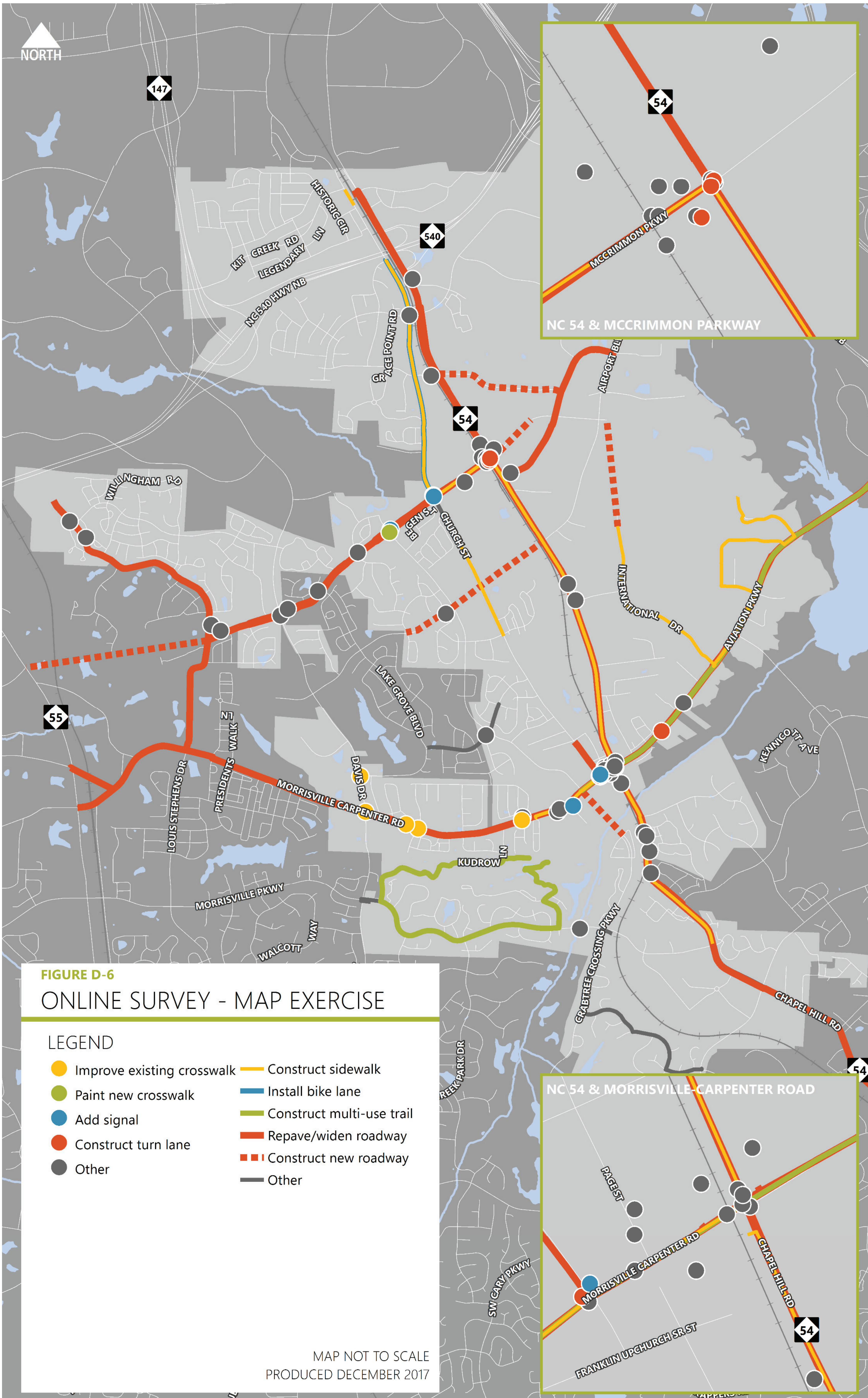


FIGURE D-6
ONLINE SURVEY - MAP EXERCISE

PUBLIC WORKSHOPS AND OPEN HOUSES

Gathering input from the public throughout the planning process is critical to understanding local needs, identifying projects of importance, and gaining community support to see projects progress from planning to implementation. Citizens recognize the strengths and shortcomings of their transportation system, and transportation decisions affect them daily. To fully utilize the knowledge of Morrisville residents, the project team conducted two public workshops and two public open houses. Meeting attendees were updated about the plan and encouraged to participate in the interactive activities.

PUBLIC WORKSHOP #1 – OCTOBER 6TH, 2016

The objective of the first public workshop was to educate the public about the ***Town of Morrisville Comprehensive Transportation Plan*** and to obtain input regarding their priorities and goals, mobility issues, and desired routes and destinations. This workshop was promoted through flyers that were posted on the Town's website and social media accounts. Eleven people attended and participated in the workshop. This workshop was a drop-in session with several interactive activities. Activities used at this workshop mirrored those used in earlier Planning and Zoning Board and Town Council work sessions, as well as the SpringFest Community Event. Participants were provided with a handout to help guide them through the activities and to provide additional information on how to participate.


Town of Morrisville
COMPREHENSIVE TRANSPORTATION PLAN UPDATE

Help us make Morrisville a better place to live, work, and play!

The Town of Morrisville invites the public to help the project team and Town staff create a community-wide vision and shape the future of safety and mobility for all users of the transportation system, including people who bike, walk, drive, or take the bus. Engage in the planning process by coming to the first open house event. Drop in at any time to learn about the Comprehensive Transportation Plan Update, engage in interactive activities, and provide your input.

Date: October 6th, 2016
Time: 5:00 PM to 7:00 PM (drop in)
Location: Town Hall, Council Chambers
100 Town Hall Drive
Morrisville, NC 27560

Benjamin Howell, AICP, CZO
Town of Morrisville
Planner
919-463-2967

Kimley»Horn

TOWN OF MORRISVILLE
COMPREHENSIVE TRANSPORTATION PLAN UPDATE
OPEN HOUSE #1 – OCTOBER 6, 2016

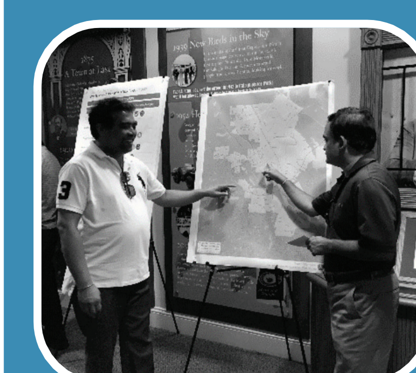
Thank you for attending the first open house for Morrisville's Comprehensive Transportation Plan Update! Use the checklist below to keep track of which activities you've completed.

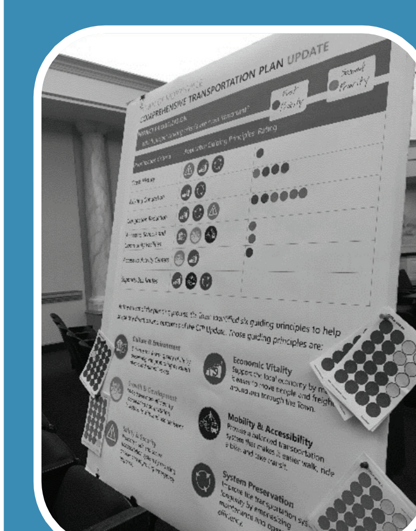
TONIGHT

- ☐ Sign in at the check-in table.
- ☐ Complete the **Live, Work, Play** exercise.
  - Place **red**, **green**, and **blue** stickers on the map to show where you **LIVE**, **WORK**, and **PLAY**.
- ☐ Peruse the informational posters and maps.
  - Pay particular attention to the Guiding Statements poster; the information will come in handy when you're working on the **Priority Pyramid** and **Thought Wall** exercises.
- ☐ Chat with project team members.
- ☐ Complete the **One Word** exercise.
  - Write a word or phrase that represents how you feel about transportation in Morrisville today.
  - Write a word or phrase that represents your vision for transportation in Morrisville in the future.
  - Use a sticker to attach your completed One Word card to the wall.
- ☐ Complete the **Priority Pyramid** exercise.
  - Place Guiding Statement stickers on the pyramid, with the most important ones at the top.
  - Use a sticker to attach your completed Priority Pyramid to the wall under the Guiding Statement banner that matches your top priority.
- ☐ Complete the **Thought Wall** exercise.
  - Write three responses to the question "*What is the biggest transportation issue in Morrisville?*" on your three index cards, with the most important issue on the **purple** index card.
  - Use stickers to attach your index cards to the wall under the Guiding Statement banners.
- ☐ Complete the **Issues Identification** exercise.
  - Write and draw on the map to explain where Morrisville's transportation issues are.

AFTER TONIGHT

- ☐ Complete the online survey at www.wikimapping.com/wikimap/morrisvillectp.html.
- ☐ Promote the Comprehensive Transportation Plan on social media using **#morrisvillectp**.





One Word Exercise

Table D-8: One Word Exercise Results – Public

TRANSPORTATION IN MORRISVILLE TODAY	MY VISION FOR THE FUTURE
Frustrating	Options
Hindered	Sufficient
Disconnected	Integrated
Grid Lock	Connectivity
	Accessible
Stuck	Connectivity
Challenging	Integrated
Private Vehicles	Transit
Inefficient	Flowing
Bottleneck	Options

Priority Pyramid

Table D-9: Priority Pyramid Results – Public

GUIDING PRINCIPLE	Culture & Environment			Economic Vitality			Growth & Development			Mobility & Accessibility			Safety & Security			System Preservation		
TOTAL RESPONSES	0	5	6	1	2	8	4	4	3	4	6	1	1	4	6	1	1	9
PERCENT	0.0%	45.5%	54.5%	9.1%	18.2%	72.7%	36.4%	36.4%	27.3%	36.4%	54.5%	9.1%	9.1%	36.4%	54.5%	9.1%	9.1%	81.8%
WEIGHTED AVERAGE	10.55			7.73			20.27			24.09			11.55			5.82		
RANK	4			5			2			1			3			6		

PRIORITY TIER	WEIGHT
Top Priority	3
Second Tier Priority	2
Third Tier Priority	1

Thought Wall

Table D-10: Thought Card Activity Results – Public

THOUGHT CARD RESULTS
get traffic to slow down. Become more pedestrian friendly
sidewalks all along Church Street
Build roads big enough to facilitate the volume coming through at peak times
being able to access places in Raleigh. My daughter goes to a magnet school; I can see someday a child take public transportation to school.
close the town center walking loop
need more road connections to enhance accessibility and movement across and through town
McCrimmon & 54 need additional lanes and turn lanes
Improve NC 54
Alleviate Congestion
Congestion: additional lanes for peak travel time movements
Connectivity - connecting all the segments of highways already constructed
improve traffic congestion on 54 and Morrisville-Carpenter Road
Connect Town Hall Drive to Crabtree Crossing Parkway
more greenways and bike path connections to get to work
NC 54 is horribly congested
more connectivity greenway or motorized
Sidewalks everywhere
safe cycling
ADA stds for blind on greenways are good for bikes too
Develop/Educate on traffic Route alternatives
Don't penalize current residents by adding new increases to already overcrowded streets
Make roads strong enough to support volume. Louis Stephens between Morrisville-Carpenter and Breckenridge is a constant mess

Issues Identification

The issues identification exercise invited participants to record their feedback on issues and opportunities on a map. Image copies of these maps are included in **Figure D-7** and **Figure D-8**.

Figure D-7: Issues Identification Map #1 - Public

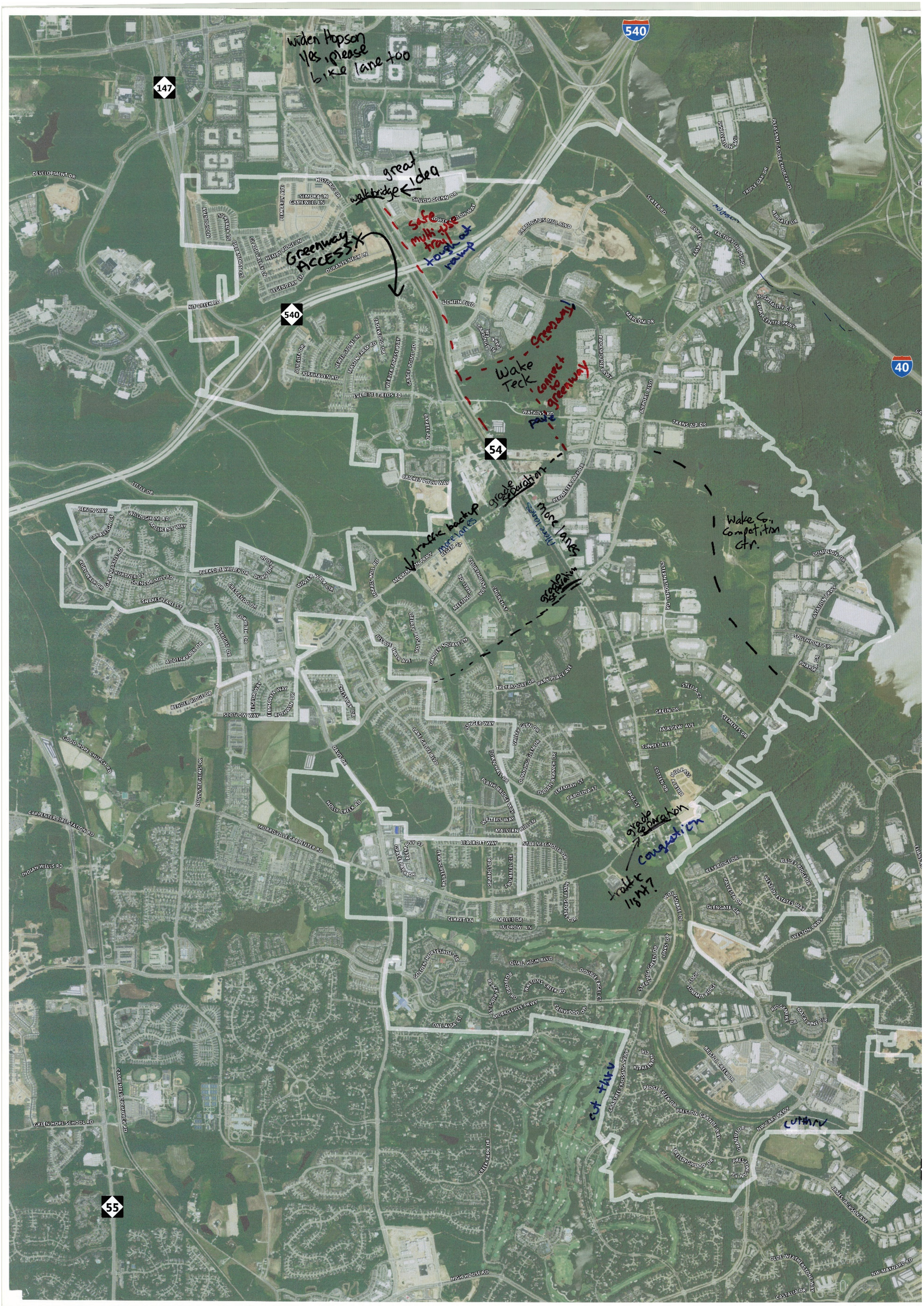
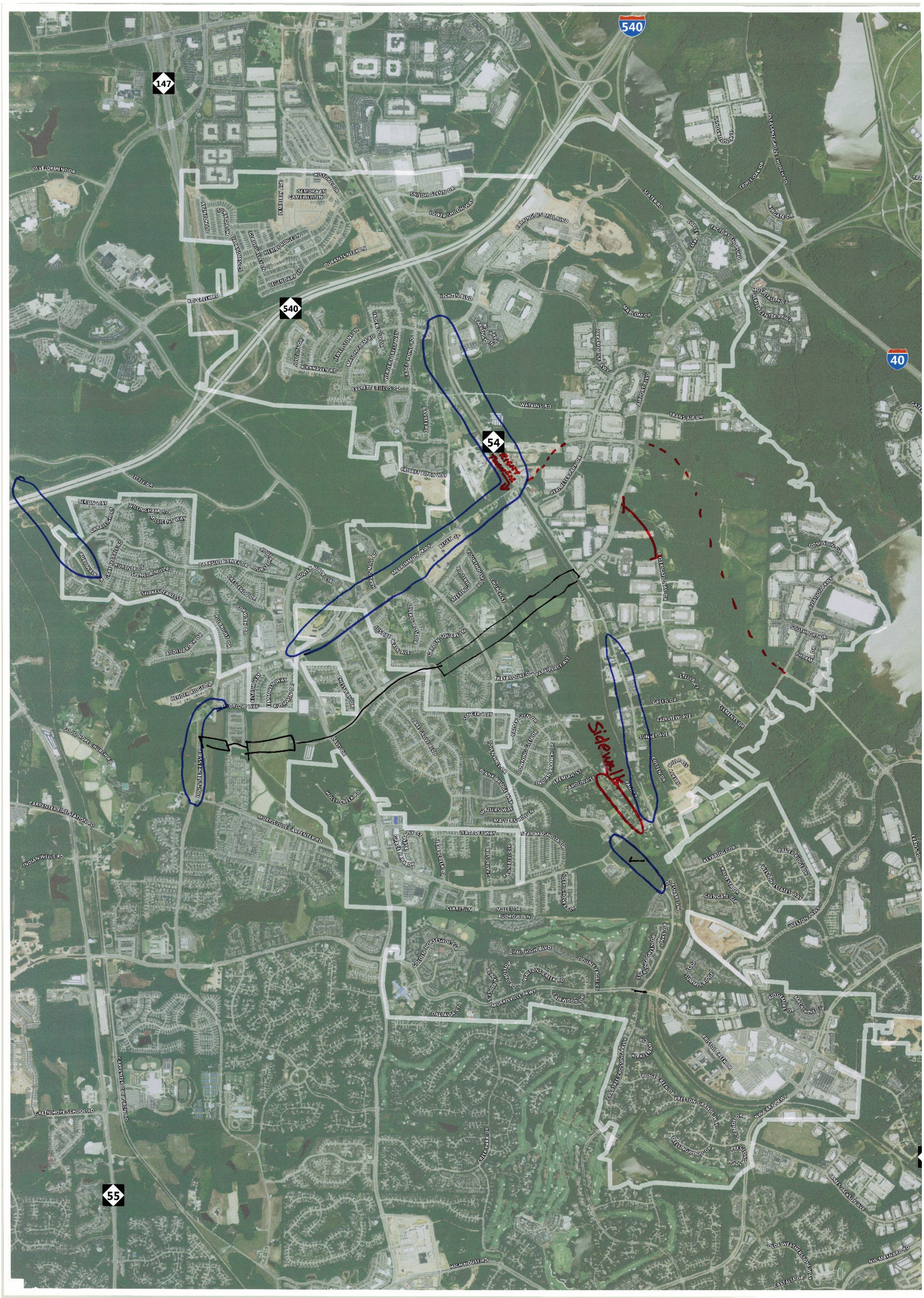


Figure D-8: Issues Identification Map #2 - Public



OPEN HOUSE #1 – FEBRUARY 28TH, 2017

The first open house event was structured to inform the public about the process of developing recommendations. Participants visited stations around the room to follow the "Roadway to Recommendations." Stations included a series of exhibits showing the following information:

Roadway to Recommendations Stations

Public Outreach:

- Results of the public input exercise from the first public workshop.
- A map depicting the results of the online survey map component.

Previous Planning Efforts:

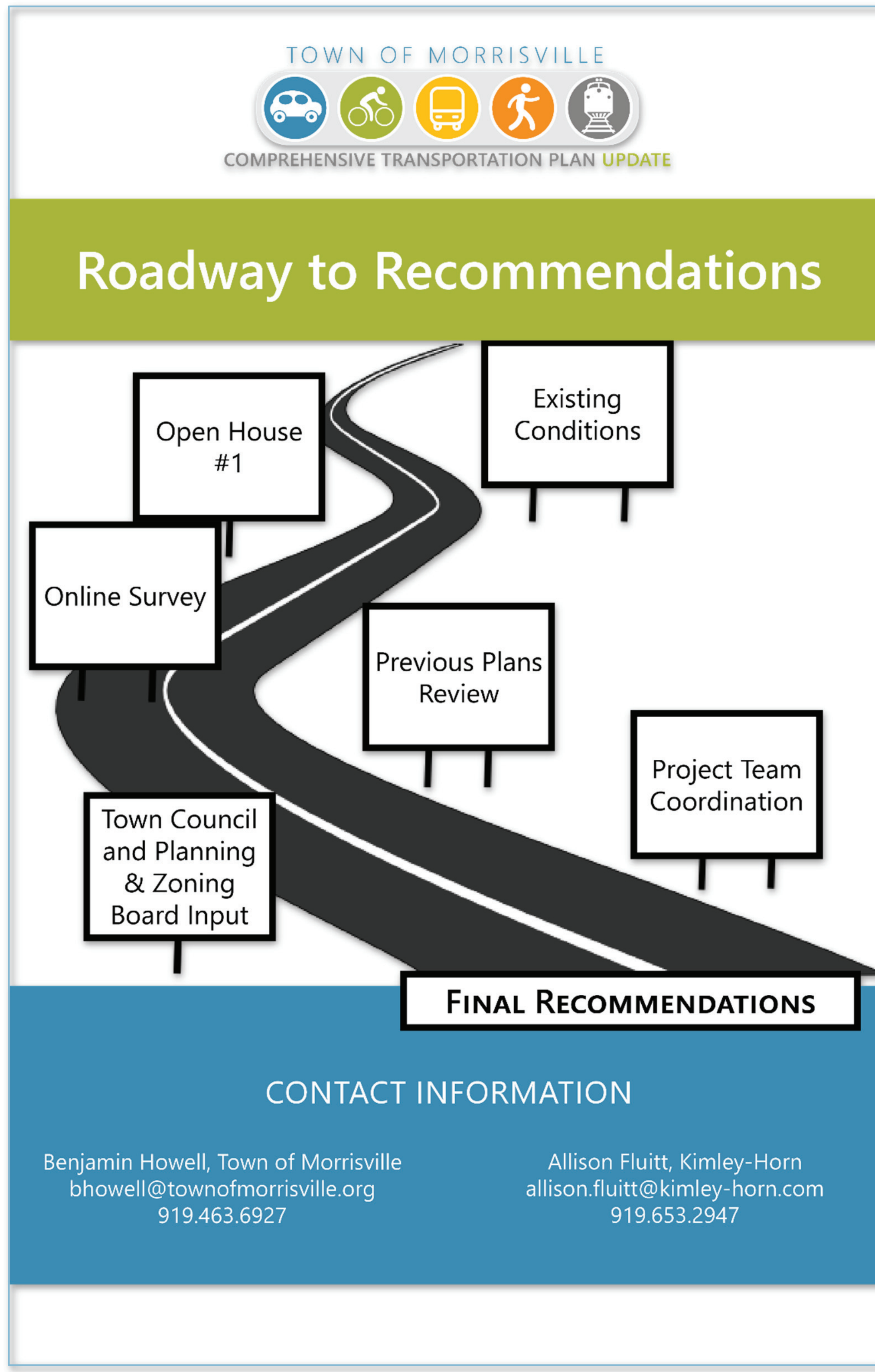
- A map showing the summary findings from the Wake County Transit Plan.
- Maps showing roadway, bicycle and pedestrian, and transit recommendations from the 2009 Morrisville Comprehensive Transportation Plan.

Existing Conditions:

- Maps showing existing bicycle, pedestrian, and transit facilities within the Town.
- A map with existing traffic volume levels within the Town.
- A map with existing congestion levels within the town, based on 2010 congestion levels reflected in the Triangle Regional Model.
- A figure showing information about crashes within the Town, including crash locations, crash severity, and crash types.

Next Steps:

- Opportunity to speak with Town and consultant team members about the recommendations development process for the Plan.



PUBLIC WORKSHOP #2 – JUNE 29TH, 2017

The second public workshop introduced members of the public to the preliminary recommendations for all modes of transportation, solicited feedback on prioritization metrics, and sought guidance in development of priorities for the key corridors. The event was advertised through social media blasts on the Town's official accounts with the flier, shown in **Figure D-9**, and details of the event. In addition, emails were sent out to the Citizens Interested in Transportation email group—a Town email group with over 1,100 addresses—alerting them of the upcoming event. The Town also displayed the flier at both Town facilities and the event was advertised on the Town website.

Draft versions of roadway, bicycle and pedestrian, and transit recommendations were displayed at this meeting for attendees to view and offer comments. Thirty-one people attended this workshop. Participants were asked to participate in a prioritization exercise that sought to explore how different types of criteria should be weighted for roadway recommendations. Participants were also asked to provide their thoughts on recommendations for strategic corridors within the Town. Each of these activities and results are summarized in this section.

Figure D-9: Public Workshop #2 Flyer

Roadway Project Prioritization

Activity: Participants were shown a board with prioritization criteria for roadway projects, and their relationship to the guiding statements of the plan. This exercise asked participants to weigh in on which prioritization criteria they felt were the most important. Participants were given three dots to put on their top choices, with their number one choice noted in a different color. The gameboard used is shown in **Figure D-10**. The Planning and Zoning Board was also given the chance to engage in this activity during a meeting in July 2017. Results from both groups are shown in **Table D-11**.

Figure D-10: Roadway Project Prioritization Criteria Activity Gameboard

Table D-11: Roadway Project Prioritization Criteria Activity Results - Public

PRIORITIZATION CRITERIA	PUBLIC		PZB		WEIGHTED PERCENTAGE
	PRIMARY	SECONDARY	PRIMARY	SECONDARY	
Crash History	1		1	1	8%
Existing Conditions	9	2			33%
Future Congestion Reduction	4	7	2	2	35%
Access to Schools and Community Facilities		2			3%
Access to Activity Centers	2	2	1		13%
Supports Bus Routes		2		2	7%

Strategic Corridors

Activity: The information below was provided to participants to guide the strategic corridors exercise. Participants were asked to select a corridor, and then prioritize the key considerations for each corridor using the gameboard shown in **Figure D-11**. Results from this activity are summarized in **Table D-12**.

Figure D-11 Strategic Corridors Gameboard

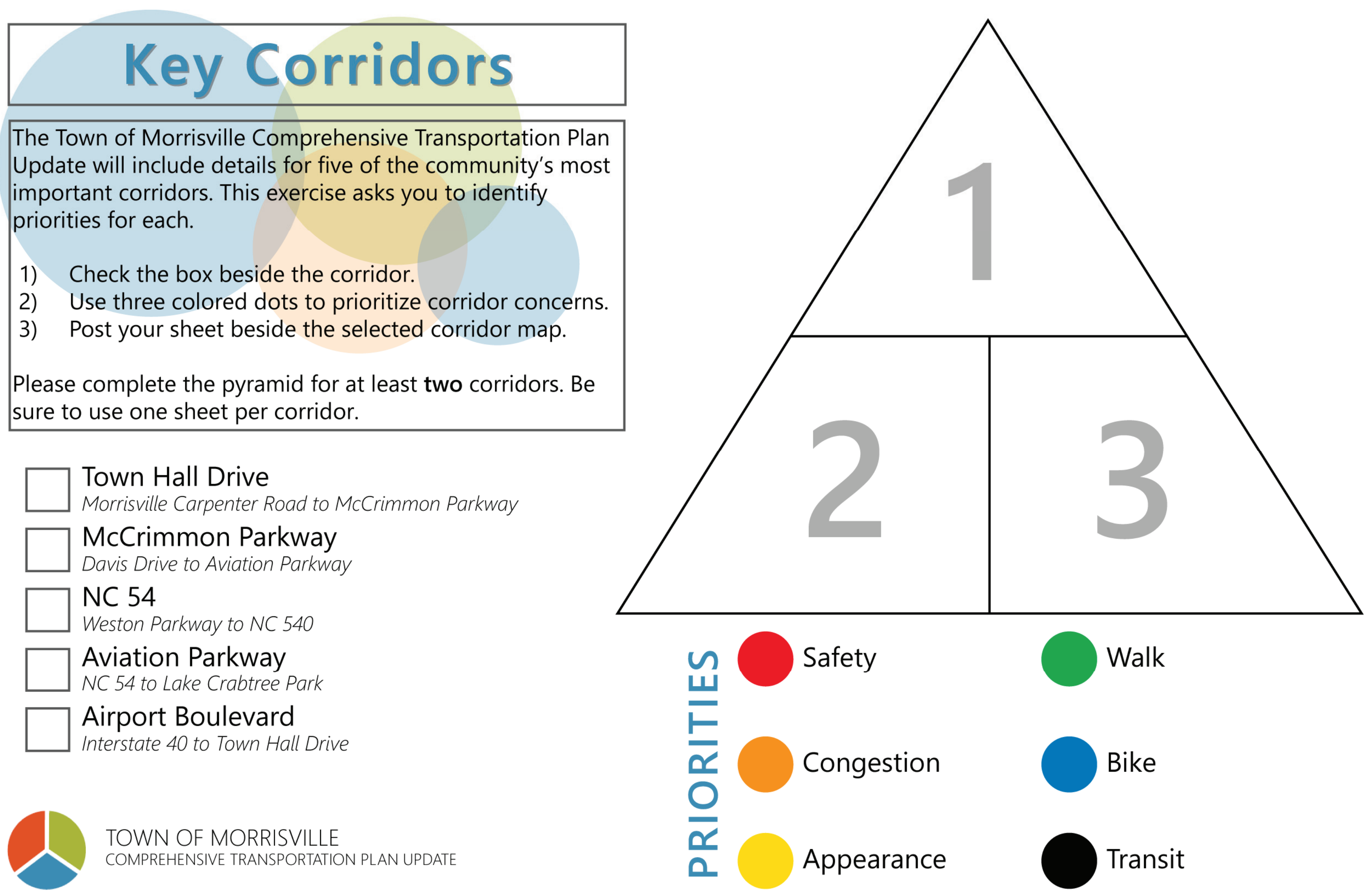


Table D-12: Strategic Corridors Priority Results - Public

	SAFETY	CONGESTION	APPEARANCE	WALK	BIKE	TRANSIT
AIRPORT BOULEVARD	2	1				3
	2	1				3
	2	1	3			
	2	3	1			
	3	1				2
	1	2				3
	1	2	3			
	SAFETY	CONGESTION	APPEARANCE	WALK	BIKE	TRANSIT
AVIATION PARKWAY		1	3			2
		1			3	2
	2	1				3
	1	2				3
		1	3			2
	2	1				3
	1	3			2	
		3			1	2
	3	1			2	
		1		2	3	
	2	1	3			
	2	1	3			
		1		2		3
	1	3				2
	1			2		3
	SAFETY	CONGESTION	APPEARANCE	WALK	BIKE	TRANSIT
MCCRIMMON PARKWAY			2	1	3	
		1		3	2	
	3	1			2	
	3			1	2	
		1			3	2
		2		1		3
	2	1		3		
	2	1		3		
	2	1				3
		3		1		2
	1	2				3
	1	2				3
	SAFETY	CONGESTION	APPEARANCE	WALK	BIKE	TRANSIT
NC 54	2	1			3	
		1			3	2
	1	2				3
	2	1				3
	1	3		2		
	2	1			3	
	2	1				3
	2	1			3	
	2	1				3
		2	3			1
	1	2				3
		1		2	3	
	3	1			2	
		1		3	2	
		1			3	2
	2	1	3			
	2	1				3
		1		2		3
	1	2				3
	1		2	3		
	SAFETY	CONGESTION	APPEARANCE	WALK	BIKE	TRANSIT
TOWN HALL DRIVE	2	1			3	
		2			3	1
		2	3	1		
	2		1			3
		3		2		1
	1		3	2		
	1		3	2		

Public Comments

Attendees were encouraged to also provide written comments if they had specific items they wished to discuss. The written comments received as part of this workshop are included in **Table D-13**.

Table D-13: Written Comments - Public

COMMENT CARD	THE PROJECT MOST IMPORTANT TO ME IS…
I would love to see the Townhall Extension completed. It would open up a path from Morrisville to Target/Movie Theater without getting on 54	McCrimmon Parkway project
Very informative- town and Kimley-Horn staff presented detailed plans, answered all questions. Ben was a fountain of information.	Morrisville-Carpenter widening
I really appreciate the time and people here to explain things and all the maps. I'm disappointed that the entrance to my community will be blocked, but will relay my concerns separately. Thank you for this opportunity and for the conversation.	Morrisville-Carpenter Road
N/A	Crabtree Crossing Extension (at least a greenway)
A short term greenway along McCrimmon Parkway to connect Church to 54 for bikes and pedestrians	N/A
Maps and website very useful- personal explanations and step-by-step projections tonight were excellent.	Morrisville-Carpenter/54/Davis Drive projections for traffic improvements

OPEN HOUSE #2 – AUGUST 22ND, 2017

The final open house meeting focused on displaying draft multimodal recommendations and the results of the prioritization process. Attendees were invited to provide comments about the content of the mapping and to interact with Town and consultant team members. Comments related to the content of the open house were received before, during, and after the meeting. These comments have been recorded in **Table D-14**.

Table D-14: Written Comments - Public

NAME	ADDRESS	COMMENT
Margaret Braodwell	109 Stella Court Morrisville, NC 27560	As a former Town council member (Morrisville), I was on Council when the issue of removing (permanently) the road connection from Clements Drive through to Green Drive (a residential subdivision was heard and citizen input & petition was received), almost all of the residents of the subdivision signed against the cut through and the Town Council unanimously voted to have this taken off the Transportation Plan at its next update. I am counting on the present Town Council to make it happen in its commitment to the citizens affected. In my view: 1. Benefits of having the cut through = 0 2. Negatives of having the cut through = a. Public safety hazard to the families and their children (of all ages currently), some have basketball goals at their driveways. b. Noise at all hours. c. Destruction of property lots due to increased width of road required to meet current road standards. Note: this subdivision was the first one created in Morrisville. I have lived on Stella Court since 1984. Please remove this cut through from the Transportation Plan. Thank you.
Srinivas Vasa	503 Spencor Mill Road Morrisville, NC 27560	Reg: with proposal to open Little Dr. and Millicent, I disagree to the proposal for security and increased traffic reason.
Prasad Rao		Reg-Proposal to Open Intersection Between Millicent Road and Little Road We do not agree for this proposal as per our family concerns and safety since traffic will increase in our neighborhood.
Praveen Chakraraj	605 Spencor Mill Road Morrisville, NC 27560	Reg-Millicent and Little Road Intersection Proposal As we see increase in traffic in our community due to this new proposal, many of kids play in yards so we don't want to see increase in traffic. I disagree with this proposal.
Sam Ghosh	701 Willingham Road Morrisville, NC 27560	I will appreciate if the town will remove from the plan the option to connect Little Drive with Millicent Drive. It is a high concern for the residents of Breckenridge Subdivision as it increases concerns of security and safety. Having a connection will affect the safety of the children and the residents.
Sreekanth Maddoju	906 Sutter Gate Lane Morrisville, NC 27560	Reg-Proposal of Millicent and Little Road Intersection As most parents of kids play in front of home and yards, we really don't want more traffic through our community so I disagree for the proposal of this new intersection between Millicent and Little Road.
Narayana Chinthapatla	700 Willingham Road Morrisville, NC 27560	With the proposal to develop Little Drive and provide connectivity to Millicent Way, I disagree to this development citing safety and security concerns.
Sunil Battula	501 Willingham Road Morrisville, NC 27560	Re-Proposed Little Dr. X Millicent Intersection In my opinion I have to disagree with the proposal. Please reconsider your decision.

NAME	ADDRESS	COMMENT
Vasanth Alle	313 Millicent Way Morrisville, NC 27560	With the proposal to open Little Drive and its connection to Millicent Way, in my opinion this road will add to the safety and security concerns to residents (kids, elders alike), I do not agree to the development of this road.
Gowri Tanikella	305 Millicent Way Morrisville, NC 27560	To oppose: Millicent-Little Dr. Connector As a resident, we strongly oppose the connection. This will create safety and security concerns and also does not serve any additional purpose.
Veera Boya	301 Bradson Road Morrisville, NC 27560	Reg: Proposed Little Dr. and Millicent Connecting Road In my opinion, I have to disagree with proposal for safety and security concern.

SPRING 2018 PUBLIC OUTREACH

Following the release of the ***Draft Comprehensive Transportation Plan*** in February 2018, the Town held 14 Community Outreach Events throughout Town to provide opportunities for the public to ask questions and give feedback on the draft Plan. The events, held during March, April, and May, attracted over 100 citizens and resulted in several suggested changes to the draft Plan that was under review by the Planning and Zoning Board. The Town sent a postcard to every household in Town to advertise the events, and provided five handouts, seven posters and a comment card at each event to help the citizens learn more about the Plan.

Figure D-12: Postcard Advertising Spring 2018 Outreach

TOWN OF MORRISVILLE
COMPREHENSIVE TRANSPORTATION PLAN UPDATE

The DRAFT **COMPREHENSIVE TRANSPORTATION PLAN UPDATE** is now ready for review! After incorporating over 700 changes into the draft Plan based on valuable feedback from the community, we are ready for the next phase of the update.

View the draft Plan at:
www.townofmorrisville.org/transportationplanupdate

A Comprehensive Transportation Plan serves as a roadmap to guide multiple modes of transportation development in Morrisville. Your voice is important, so the Town has scheduled several public meetings to provide opportunities for you to ask questions and give feedback.
For more details see the back of this card or visit the Town's website at www.townofmorrisville.org.

Morrisville
Planning

Town of Morrisville
100 Town Hall Drive
Morrisville, NC 27560

YOU'RE INVITED!

TOWN OF MORRISVILLE
COMPREHENSIVE TRANSPORTATION PLAN UPDATE

Below are the locations, dates, and times of the public meetings.

LOCATION	DATE	TIME
April 2018		
Cedar Fork Community Ctr. - 1050 B Town Hall Dr.	April 4	5:30 p.m. - 7 p.m.
Bike Safety Rodeo - Fire Station 1, 200 Town Hall Dr.	April 7	10 a.m. - 12 p.m.
Kitts Creek Clubhouse - 1649 Kit Creek Rd.	April 11	5:30 p.m. - 7 p.m.
Perimeter Park - 3025 Carrington Mill Blvd., Suite 130	April 17	12 p.m. - 1:30 p.m.
Morrisville Town Hall - 100 Town Hall Dr.	April 24	5 p.m. - 6 p.m.
Cedar Fork Community Ctr. - 1050 B Town Hall Dr.	April 27	10 a.m. - 12:30 p.m.
May 2018		
Park West Village Concert Series - Market Center Dr.	May 3	6 p.m. - 8 p.m.
Morrisville Aquatics & Fitness Ctr. - 1301 Morrisville Pkwy.	May 7	10 a.m - 12:30 p.m.
Morrisville Aquatics & Fitness Ctr. - 1301 Morrisville Pkwy.	May 7	5:30 p.m. - 7 p.m.
Morrisville Community Park - 1520 Morrisville Pkwy.	May 12	1 p.m. - 2:30 p.m.
Breckenridge Clubhouse - 101 Redwood Park Dr.	May 17	5:30 p.m. - 7 p.m.
SpringFest - Town Hall Dr.	May 19	4 p.m. - 9 p.m.
Triangle Rock Club - 102 Pheasant Wood Ct.	May 23	1 p.m. - 3 p.m.

Figure D-13: General FAQ Handout Front

Draft Comprehensive Transportation Plan Update

General FAQ

What is a Comprehensive Transportation Plan?
A Comprehensive Transportation Plan, or CTP, serves as a road map to guide multiple modes of transportation development in Morrisville. Keeping a CTP up-to-date is important to address changing demographics, development patterns, and changing transportation policies and technology.

Why is an Update Needed?
The 2009-2035 Comprehensive Transportation Plan, known as the 2009 Transportation Plan, was adopted in 2009 and much has changed in Morrisville since that time. There have been shifts in population and employment, new developments built, and some changes to transportation policies. In addition, many transportation improvements identified in the previous plan have already been advanced to funding and implementation.

Where can I go to find out more information about the Draft Comprehensive Transportation Plan Update?
Visit the Town's web-page for the latest version of the Draft Comprehensive Transportation Plan Update.
www.townofmorrisville.org/transportationplanupdate

How can I provide feedback on the Draft Comprehensive Transportation Plan Update?
Feedback can be provided in person at a community event listed below or formal input sessions at the April and May Planning and Zoning Board meetings. For anyone not able to attend one of these events, an online comment form is available at the Transportation Plan Update webpage.
www.townofmorrisville.org/transportationplanupdate

The online portal is actively monitored by staff and will be open for comment until the Planning and Zoning Board closed the comment session, which is expected to occur at the May Planning and Zoning Board meeting. The portal will re-open once Town Council receives the Board's recommendation on the Draft Plan, and will remain open until the Town Council closes the Public Hearing.

When did the Comprehensive Transportation Plan Update process begin?
The process to update the 2009 Transportation Plan began in April 2016. The process included public outreach at two community events, four public workshops and open houses, six work session with Town Council and the Planning and Zoning Board, and technical analysis.

Below are the locations, dates, and times of the public meetings.

LOCATION	DATE	TIME
April 2018		
Cedar Fork Community Ctr. - 1050 B Town Hall Dr.	April 4	5:30 p.m. - 7 p.m.
Bike Safety Rodeo - Fire Station 1, 200 Town Hall Dr.	April 7	10 a.m. - 12 p.m.
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SpringFest - Town Hall Dr.	May 19	4 p.m. - 9 p.m.
Triangle Rock Club - 102 Pheasant Wood Ct.	May 23	1 p.m. - 3 p.m.

Want More Information? Scan the QR Code Below

General FAQ - 04.04.18

Figure D-14: General FAQ Handout Back

Draft Comprehensive Transportation Plan Update

General FAQ

What public outreach did the Town conduct as part of the Comprehensive Transportation Plan Update?
Prior to preparing the Draft Comprehensive Transportation Plan Update, the public provided feedback at two community events, two public workshops, two open houses, and an online survey. Town Council and the Planning and Zoning Board also held work sessions. Detailed information on the public engagement activities is located in **Appendix D** of the Draft Comprehensive Transportation Plan Update.

In addition to roads, are other modes of transportation included in the Draft Comprehensive Transportation Plan Update?
While automobiles are the most common form of transportation in Morrisville, the draft Plan includes greenways, sidewalks, sidepaths, bike lanes, and public transit. Detailed information is located in **Chapter 4** of the Draft Comprehensive Transportation Plan Update.

Are impacts such as construction costs and environmental features considered when proposing new or widened roadways, intersection improvements, greenways, and other infrastructure improvements?
The Draft Comprehensive Transportation Plan Update establishes a framework for potential road, greenway, bikeway, and transit projects. Town wide development constraints (e.g. environmental features) and planning cost estimates for some roadway projects are included in the **Draft Comprehensive Transportation Plan, 2/23/2018 version**.

While potential environmental or fiscal impacts are an important component of a transportation plan, neither preclude the inclusion of new roads, intersection improvements, greenways, and other infrastructure improvements. There are several reasons why. First, some roadway improvements are simply too cost prohibitive for the Town to construct with only Town dollars. For example, the Morrisville Parkway grade separation project alone cost $13.6 million dollars. For comparison, the Town's current total annual operating budget is $34 million.

Second, without an adopted Comprehensive Transportation Plan the Town would be ineligible for some federal and State funding. For example, the Crabtree-Hatcher Creek Greenway and the future widening of Morrisville-Carpenter Road were both funded through competitive federal grant programs.

Lastly, some very important road widening projects, such as NC54, would have to be removed from the Draft Comprehensive Update if cost an environmental impacts prohibited project inclusion since this the planning cost estimate for NC 54 exceeds the Town's annual budget and a new bridge is required over Crabtree Creek.

Are new or widened roadways, intersection improvements, greenways, and other infrastructure improvements shown on an adopted Transportation Plan guaranteed to be built?
An adopted transportation plan simply states an elected body has voted in favor of using the plan as the official guidance for future transportation investments and decisions. Showing new or widened roadways, intersection improvements, greenways, and other infrastructure improvements on an adopted Transportation Plan does not guarantee construction; rather it allows the Town to:
1) seek funds from other entities for design and/or construction,
2) require a developer to construct specific road improvements, and/or
3) make informed capital improvement project decisions.

What is the process for reviewing and adopting the plan?
The Draft Plan has been presented to the Planning and Zoning Board, which will receive public comments on the Draft Plan and make a recommendation to the Town Council. Once Council receives the Board's recommendation, they will review the Draft Plan, hold a Public Hearing on the Draft, and potentially make changes to the Draft Plan before ultimately adopting the final Comprehensive Transportation Plan Update.

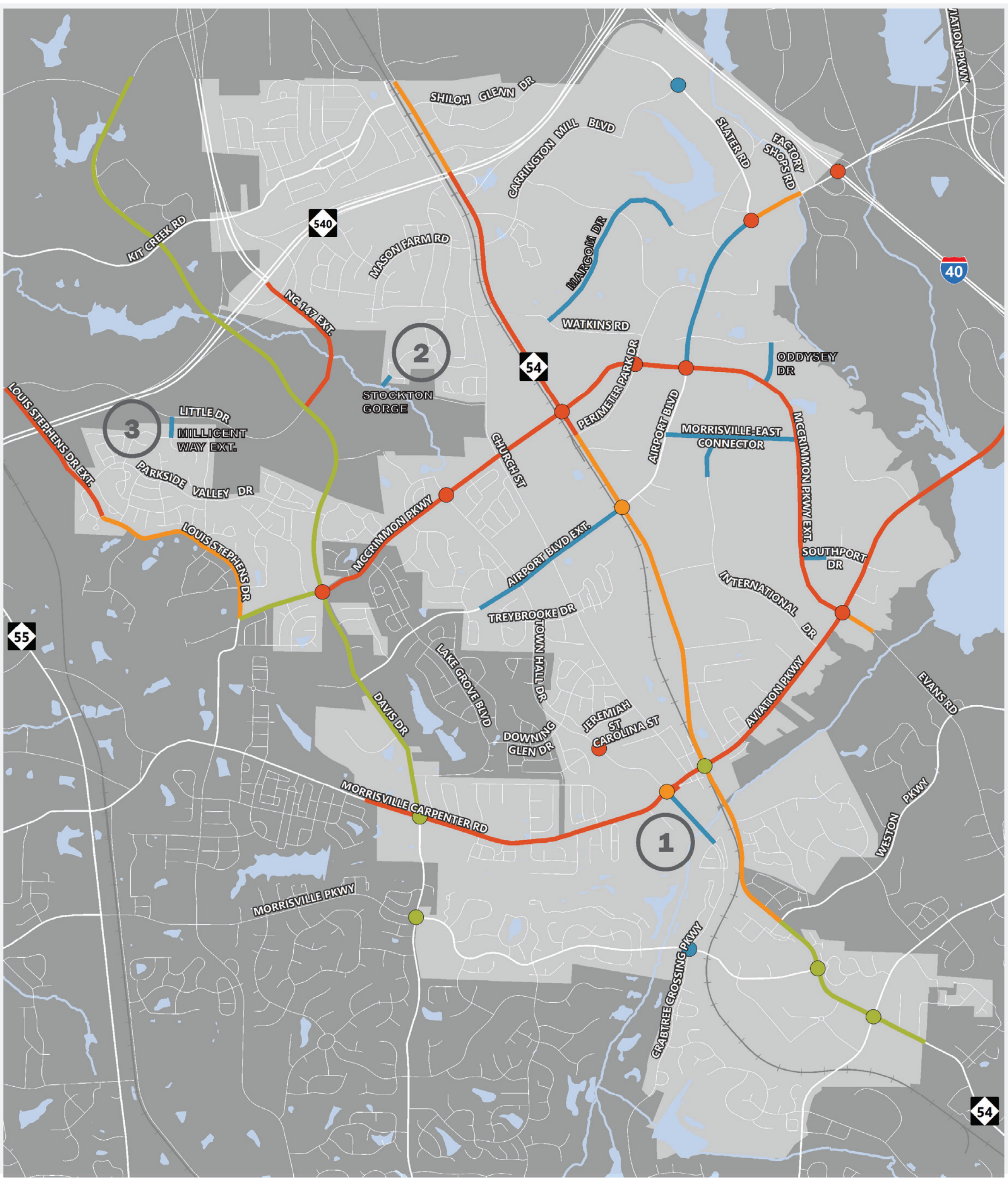
General FAQ - 04.04.18

Figure D-15: Roadway Recommendations Handout

Draft Comprehensive Transportation Plan Update

ROADWAY RECOMMENDATIONS

Roadway Prioritization



Intersection & Grade Separation Projects

- near-term (<15 years)
- mid-term (15-24 years)
- long-term (>25 years)
- committed project

Roadway Projects

- near-term (<15 years)
- mid-term (15-24 years)
- long-term (>25 years)
- committed project

1. Crabtree Crossing Parkway – (1) Crabtree Crossing Parkway will not be extended until the NCDOT project to extend NC 147 is completed. Upon completion of NC 147, further study will need to occur before action is taken by Town Council to consider the project as part of the CIP. | (2) Crabtree Crossing Parkway Extension is a lower-priority project than the widening of NC 54 in Town. | (3) Prior to construction of this extension, the Town will review potential ways to legally limit cut-through traffic (on the section Crabtree Crossing Parkway south of Morrisville Parkway) and messaging on traffic congestion navigation mobile applications, such as Waze.
2. Stockton Gorge Road – If NC 147 Extension does not happen or if it is determined during the design of NC 147 Extension that a connection cannot be made, the Plan must be amended to remove the connection.
3. Millicent Way Extension -- Needs further study before action to determine if a road, greenway, or no connection is warranted.

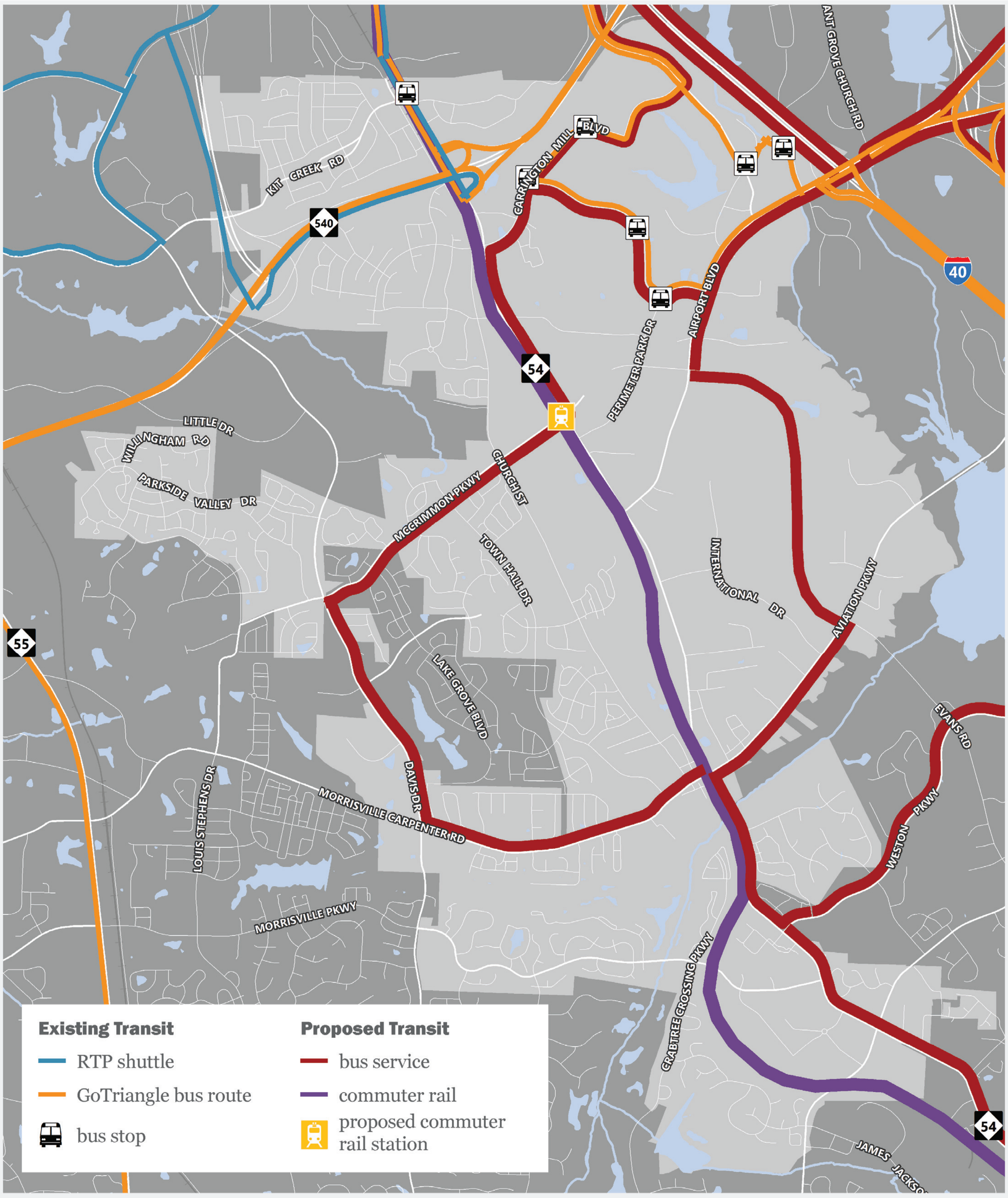
Roadway Recommendations - 04.10.18

Figure D-16: Public Transit Handout

Draft Comprehensive Transportation Plan Update

PUBLIC TRANSIT

Existing & Proposed Public Transit Network



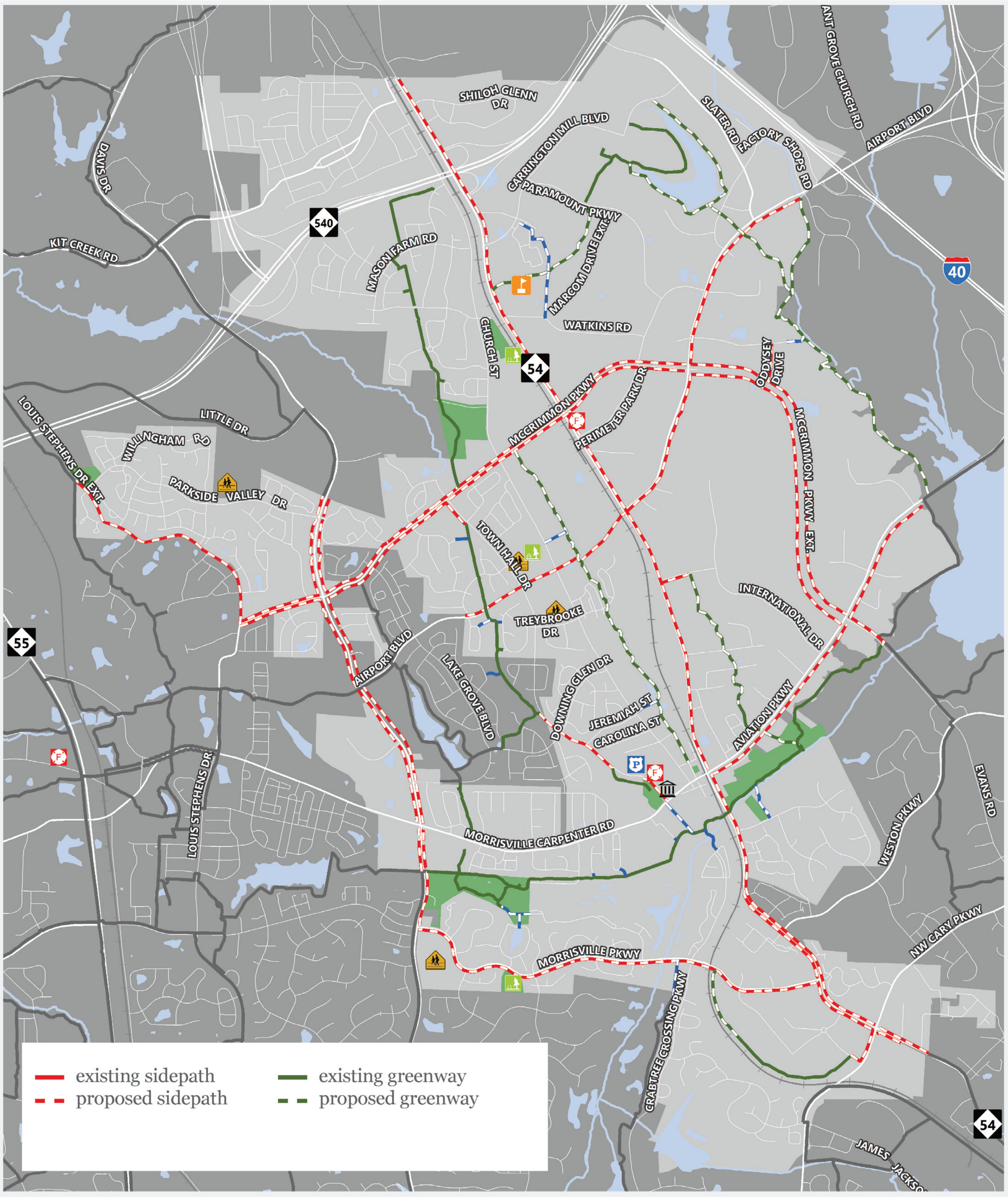
Public Transit - 04.10.18

Figure D-17: Greenways & Sidepaths Handout

Draft Comprehensive Transportation Plan Update

GREENWAYS & SIDEPATHS

Existing & Proposed Multi-Use Path Facilities



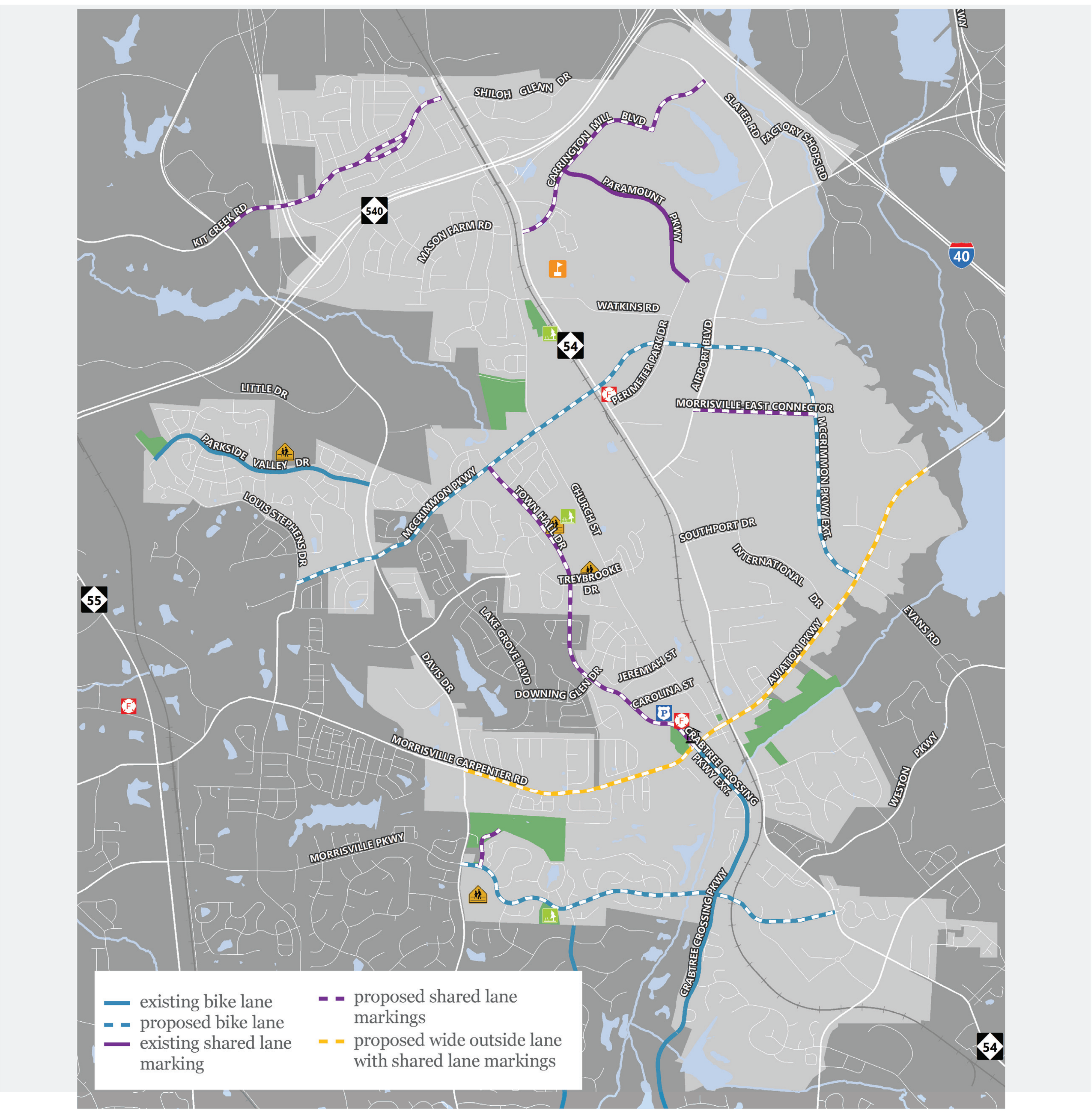
Greenways & Sidepaths - 04.10.18

Figure D-18: On-Street Bicycle Network Handout

Draft Comprehensive Transportation Plan Update

ON-STREET BICYCLE NETWORK

Existing & Proposed On-Street Bicycle Network



On-Street Bike Network - 04.10.18

Figure D-19: Crabtree Crossing Parkway Extension Handout Front

Draft Comprehensive Transportation Plan Update

Crabtree Crossing Parkway Extension

Where is the proposed Crabtree Crossing Parkway extension located?

The proposed road is located between Morrisville-Carpenter Road and the dead-end of the existing section of Crabtree Crossing Parkway north of Morrisville Parkway. (See the orange dashed line)

What is the history of the Crabtree Crossing Parkway Extension?

The Crabtree Crossing Parkway Extension was originally included in the 2002-2025 Morrisville Transportation Plan, prepared to provide policy direction on Transportation, as the Town Hall Drive Extension. This Plan identified the roadway as a three-lane cross-section between Morrisville Parkway and Morrisville-Carpenter Road.

In 2004, the Town held a Street Improvements Bond referendum that was approved by 87.7% of voters. Following the approval of the 2004 Street Improvement Bond, the Town bid a street improvement project that consisted of four projects:

- Widening Morrisville-Carpenter Road between the Savannah neighborhood and NC 54
- Improving the railroad crossing on Morrisville-Carpenter Road at NC 54
- Extending Carolina Street to Town Hall Drive
- Constructing Crabtree Crossing Parkway Extension

Due to the cost of the four projects, only Jeremiah Street and the railroad crossing improvements were constructed using the 2004 Street Improvement Bond.

During the development of the 2009-2035 Transportation Plan, the Crabtree Crossing Parkway Extension was discussed. Town Council ultimately removed the roadway from the Plan prior to adoption and designated the connection as a greenway connector. More detail on the 2009 Transportation Plan and the Crabtree Crossing Parkway Extension is available in **Appendix G** of the 2009 Plan.

How was the Crabtree Crossing Parkway Extension reintroduced into the Draft Comprehensive Transportation Plan Update?

During development of the Comprehensive Transportation Plan Update, the Town sought to take a complete look at the transportation network in Town, including potential road connections. Guiding principles were then developed based on public, Planning and Zoning Board, and Town Council input.

In addition, the Town held several public engagement events to gather input. Members of the public emphasized the importance of street connectivity, and a connection in this area was introduced on the thought wall, a static map, and in the online survey. Based on this input and the emphasis on connectivity as a congestion mitigation option, the Crabtree Crossing Parkway Extension was included on the initial draft **Roadway Recommendation Map (dated September 8, 2017)**, which was presented to the public during the second Open House in June 2017 and to the Planning and Zoning Board and Town Council in July and August 2017, respectively. Detailed

Crabtree Crossing Parkway Extension - 04.04.18

Figure D-20: Crabtree Crossing Parkway Extension Handout Back

Draft Comprehensive Transportation Plan Update

Crabtree Crossing Parkway Extension

information on the public engagement activities is located in **Appendix D** of the Draft Comprehensive Transportation Plan Update.

Why is connectivity an important concern?
The purpose of connectivity is to ensure that all parts of the Town are served by a coordinated, multi-modal transportation system that permits the safe and efficient movement of motor vehicles, emergency vehicles, transit, bicyclists, and pedestrians. Connectivity has been shown to:

- Increase the effectiveness of local service delivery
- Reduce emergency response times
- Promote healthy walking and bicycling
- Reduce vehicle miles of travel and travel times
- Improve air quality and reduce greenhouse gas emissions
- Minimize congestion and traffic conflicts
- Preserve the capacity of community transportation systems

The Crabtree Crossing Extension greenway recommended in the 2009 Transportation Plan is now proposed as a recommendation for a roadway in the current update. How and why did this happen?
The Town did not start the update process with a preset list of roadways and greenways to add, keep, or remove from the adopted 2009 Transportation Plan. The road extension was added as a result of information gathered from public input and based on guiding principles established for the project. The Draft Comprehensive Transportation Plan Update proposes a **greenway** as well as a **two-lane road with sidewalks and bike lanes**.

What are the potential benefits to Morrisville citizens and business owners if the proposed Crabtree Crossing Parkway Extension is constructed?

- A second means of emergency access to 436 residential units (or 900+ residents) located on Crabtree Crossing Parkway north of Morrisville Parkway
- Better connectivity to public facilities such as Morrisville Community Park, Morrisville Elementary, Morrisville Aquatics and Fitness Center, and regional shopping, such as Park West Village, without using Davis Drive or NC 54 for neighborhoods along Morrisville-Carpenter Road, Town Hall Drive, and Church Street
- Better connectivity to future Town Center and Wake County Public Library without using Davis Drive or NC 45 for neighborhoods along Morrisville Parkway
- Improved emergency response time for some neighborhoods along Morrisville Parkway

What are the potential negative impacts to Morrisville citizens and business owners if the proposed Crabtree Crossing Parkway Extension is constructed?

- An increase in the number of vehicles on Crabtree Crossing Parkway
- Commuters using Crabtree Crossing Parkway instead of NC 54 or Davis Drive
- Potential relocation and/or reconstruction of a portion of the Crabtree-Hatcher Creek Greenway
- Higher that average construction costs for a two-lane road with sidewalks and bike lanes due to Crabtree Creek

Does the NC 147 Extension connect directly to Crabtree Crossing Parkway?
The Draft Comprehensive Transportation Plan Update recommends extending NC 147 to Davis Drive, not McCrimmon Parkway, to minimize impacts to Crabtree Crossing Parkway. The Draft Comprehensive Transportation Plan Update also recommends that the Crabtree Crossing Parkway Extension should not be funded until after NC 147 is constructed. This timing is purposeful since impacts to Crabtree Crossing Parkway will be best-understood using actual vehicle trip data, which will not be available until the NC 147 project is complete.

When does the Draft Comprehensive Transportation Plan Update anticipate future construction of the Crabtree Crossing Parkway Extension?
The Draft Comprehensive Transportation Plan Update lists the project as long-term, which is defined as 25 or more years.

Crabtree Crossing Parkway Extension - 04.04.18

Figure D-21: Millicent Way Extension Handout

Draft Comprehensive Transportation Plan Update

Millicent Way Extension

Where is the proposed Millicent Way extension located in the Draft Comprehensive Transportation Plan Update?

The proposed extension (see the dashed orange line) would extend Millicent Way north to Little Drive.

If constructed as a roadway, Millicent Way would be classified as a two-lane, local road with curb and gutter and sidewalk on both sides of the street.

Why is this proposed road extension included in the Draft Comprehensive Transportation Plan Update?

The right-of-way for the road extension was dedicated (given to the Town) during the approval of the Breckenridge neighborhood, but the road was never constructed.

Is a roadway or greenway proposed in the Draft Comprehensive Transportation Plan?

The Planning and Zoning Board recommended keeping the road connection in the Draft Comprehensive Transportation Plan on the condition the Town prepares a detailed study to evaluate if a road, greenway, or no connection is most appropriate at this location.

Millicent Way Extension - 04.04.18

Figure D-22: Chapter 1 Summary Poster

Draft Comprehensive Transportation Plan Update

INTRODUCTION

01

2009 Transportation Plan Progress Report

Completed transportation related action items
create UDO, update TIA language, create McCrimmon Transit Small Area Plan, identify funding sources for bike and pedestrian projects

$260 million
programmed sidewalk and road improvements

52%
of recommended roadway improvements are completed, partially complete, or funded for completion

> 10 miles
of new bike lanes, sidewalks, greenways, and multi-use paths constructed

Guiding Principles for the Plan

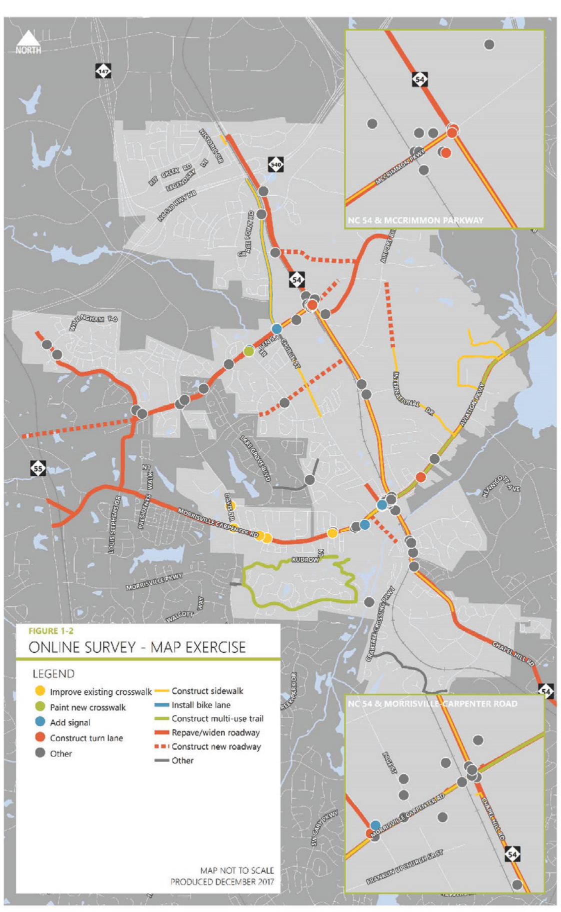
- Culture and the Environment
- Mobility and Accessibility
- Economic Vitality
- Safety and Security
- Growth and Development
- System Preservation and Efficiency

Public Engagement

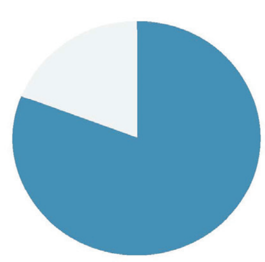
August 2016 - October 2017
16 engagement events

- **2** community outreach events
- **2** public workshops
- **2** public open houses
- **3** plan update presentations
- **6** work sessions

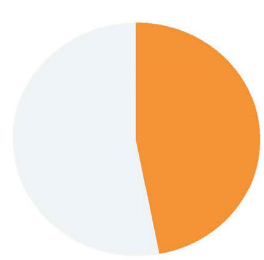
1 online survey (Oct. '16 to Dec. '16)



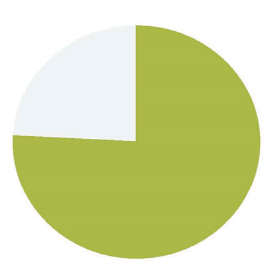
Survey Findings



Over the last five years, transportation in Morrisville has . . .
significantly worsened or slightly worsened. (81% of respondents)



When planning transportation improvements, we should focus on . . .
design streets based on land use and urban design features of the surrounding area (47% of respondents)



The biggest transportation need in Morrisville is . . .
roadways (76% of respondents)

Figure D-23: Chapter 2 Summary Poster

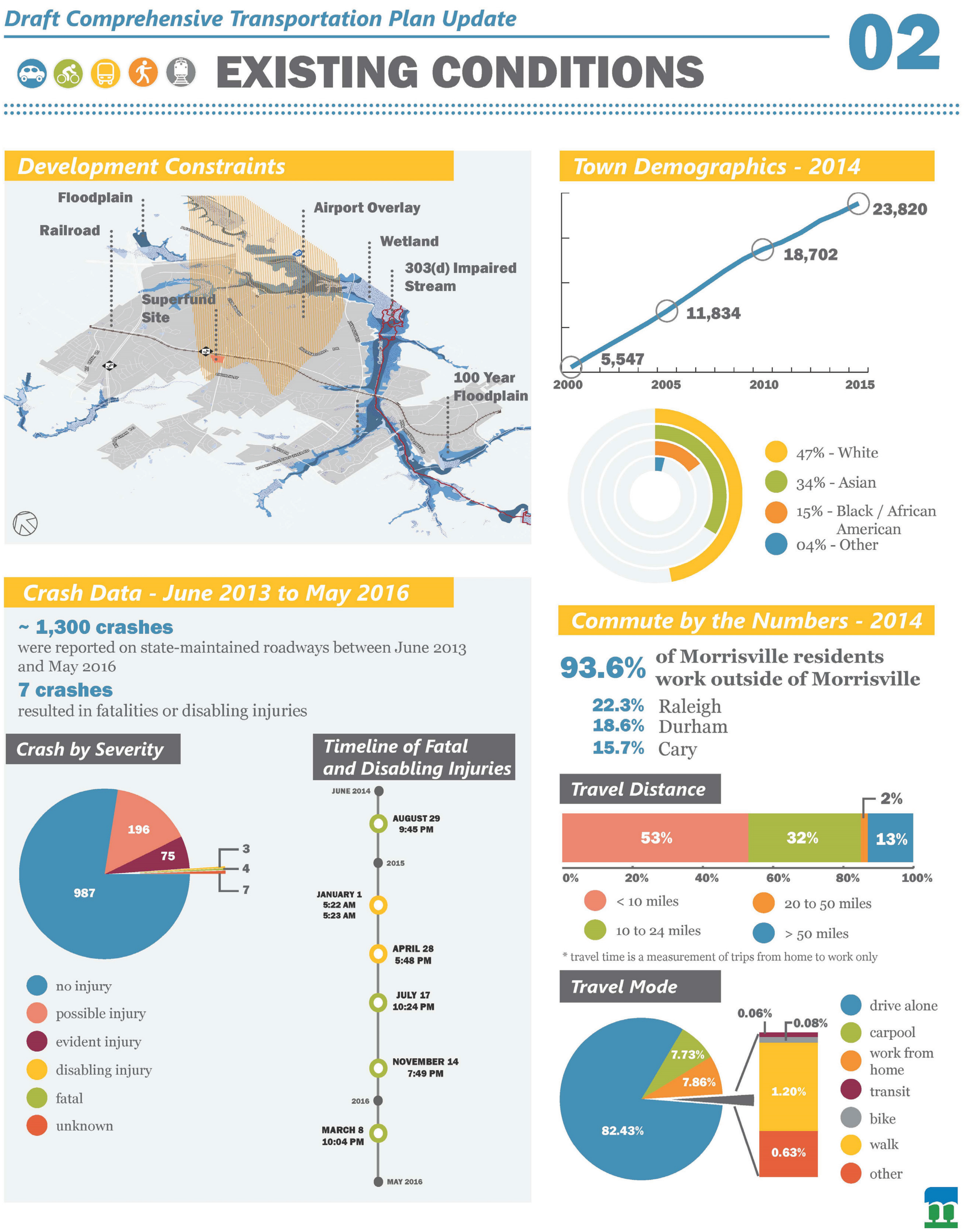


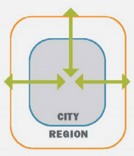
Figure D-24: Chapter 3 Summary Poster

Draft Comprehensive Transportation Plan Update

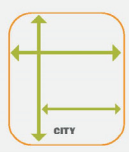
ROADWAYS 03

Street Hierarchy

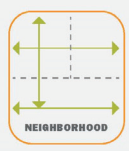
Freeway
- Controlled access
- Serve highest speed and distance trips



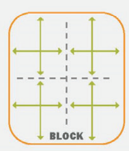
Major Thoroughfare
- Controlled access
- Multi-lane roads with higher speeds



Minor Thoroughfare
- Provide local access and moving goods and people

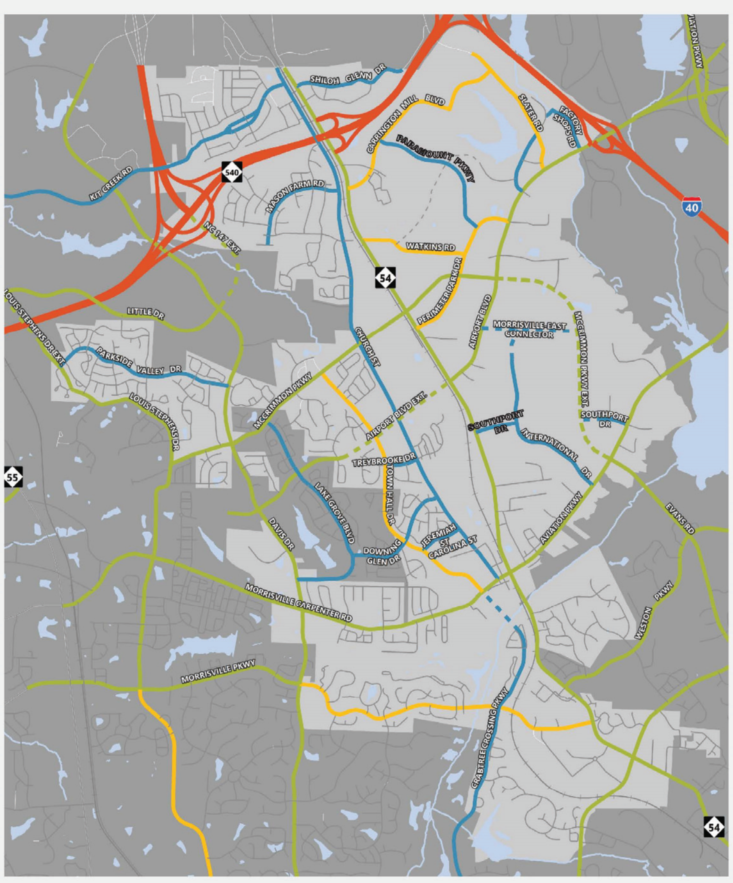


Collector Street
- Connect neighbor-hoods to thorough-fares
- Slower travel speed



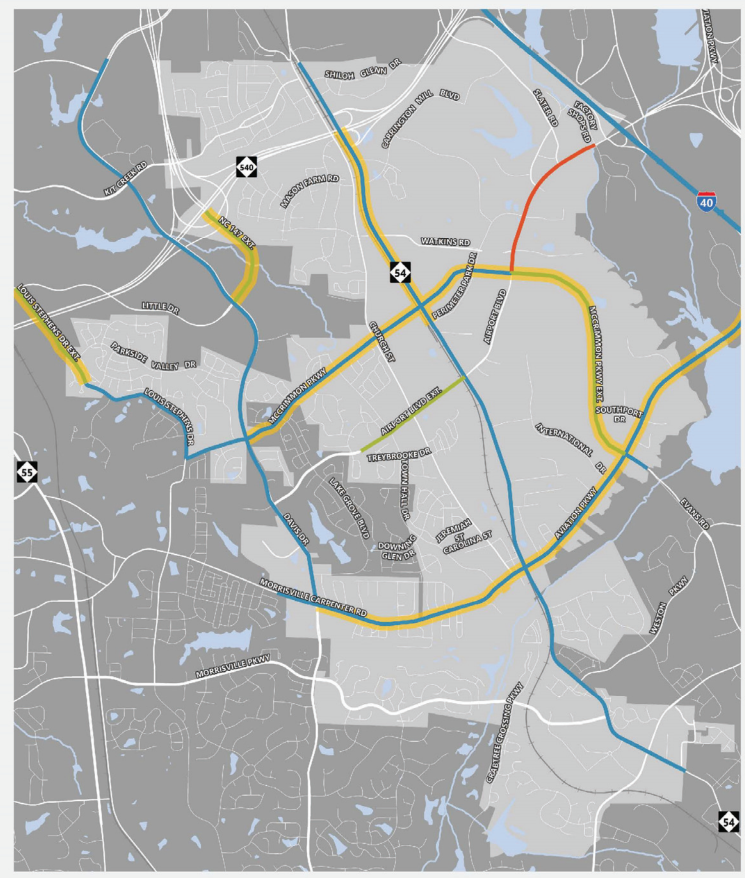
Local Street
- Slowest speeds
- Exclusive purpose is to provide block level, local trips

Morrisville Street Hierarchy



- freeway
- major thoroughfare
- new major thoroughfare
- minor thoroughfare
- new minor thoroughfare
- collector street
- new collector street
- local street
- new local street

Recommended Thoroughfare Improvements



- access management
- new alignment
- widening
- committed project

Intersection-Level Improvements

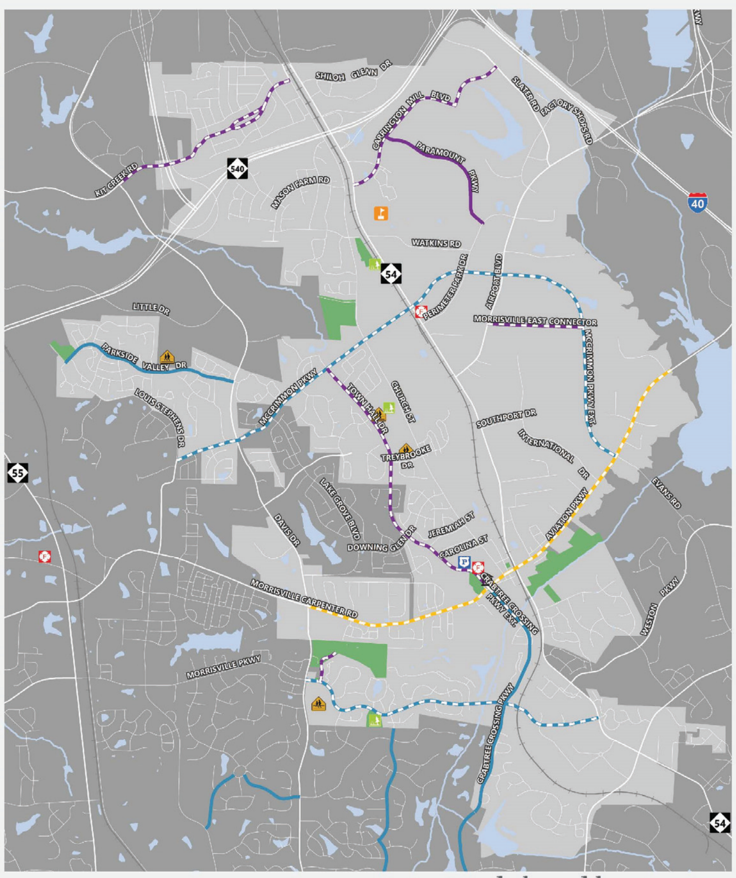
CORRIDOR	IMPROVEMENT
Davis Drive & Morrisville-Carpenter	Intersection Improvements
Davis Drive & Morrisville Parkway	Intersection Improvements
NC 54 & Morrisville Parkway	Intersection Improvements
NC 54 & NW Cary Parkway	Intersection Improvements
Morrisville-Carpenter Road Grade Separation	Grade Separation
Morrisville-Carpenter Road & NC 54	At Grade Improvements
Davis Drive & McCrimmon Pkwy	Intersection Improvements
Airport Boulevard & NC 54	Grade Separation
Crabtree Crossing Parkway & Morrisville Parkway	Intersection Improvements
Slater Road & Carrington Mill Boulevard	Intersection Improvements

Figure D-25: Chapter 4 Summary Poster

Draft Comprehensive Transportation Plan Update

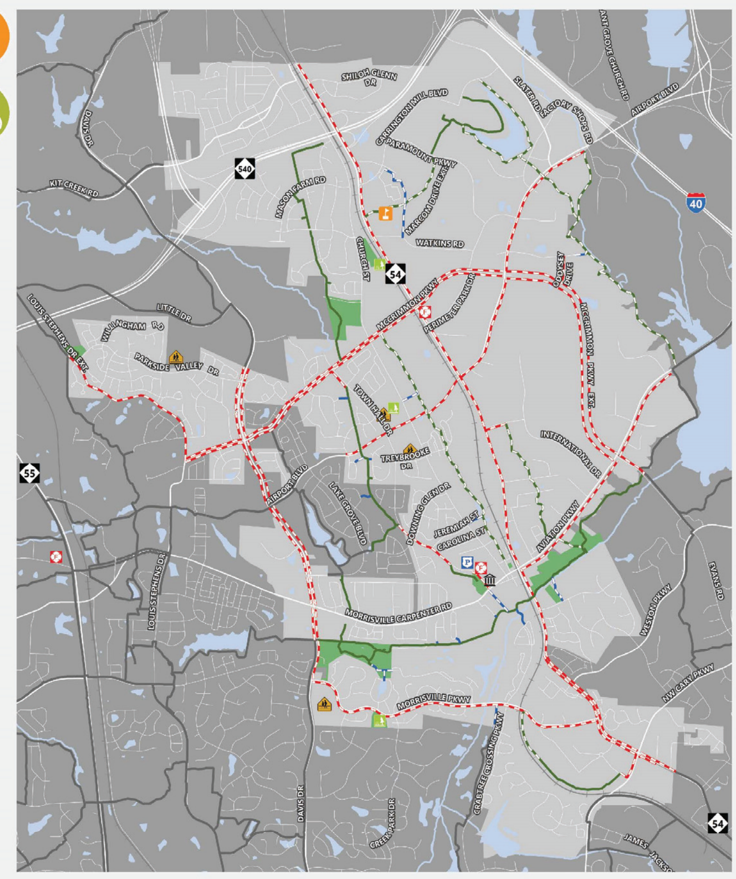
04 ALTERNATIVE TRAVEL MODES

On-Street Bicycle Network



- existing bike lane
- proposed bike lane
- existing shared lane marking
- proposed shared lane markings
- proposed wide outside lane with shared lane markings

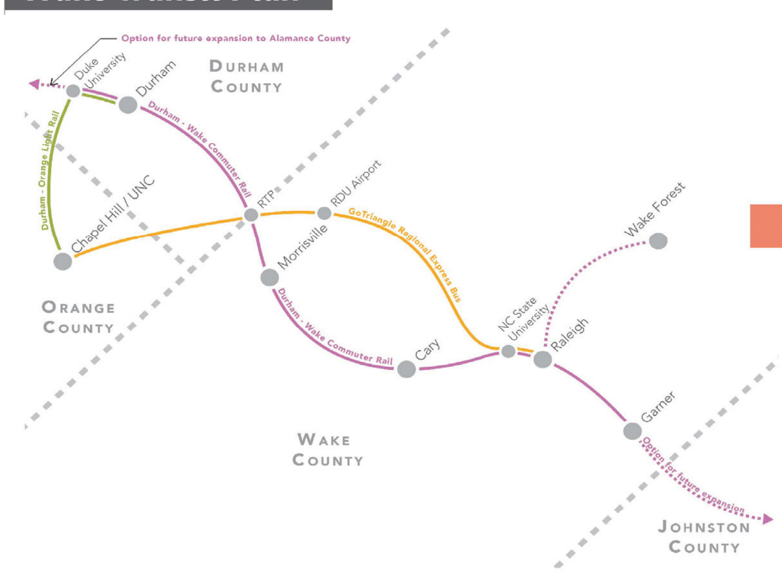
Multi-Use Path Facilities



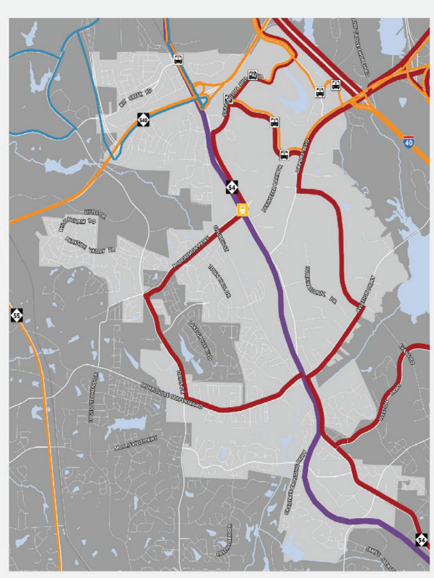
- existing sidepath
- proposed sidepath
- existing greenway
- proposed greenway

Transit

Wake Transit Plan



Existing & Proposed Transit



Existing Transit
- RTP shuttle
- GoTriangle bus route
- bus stop

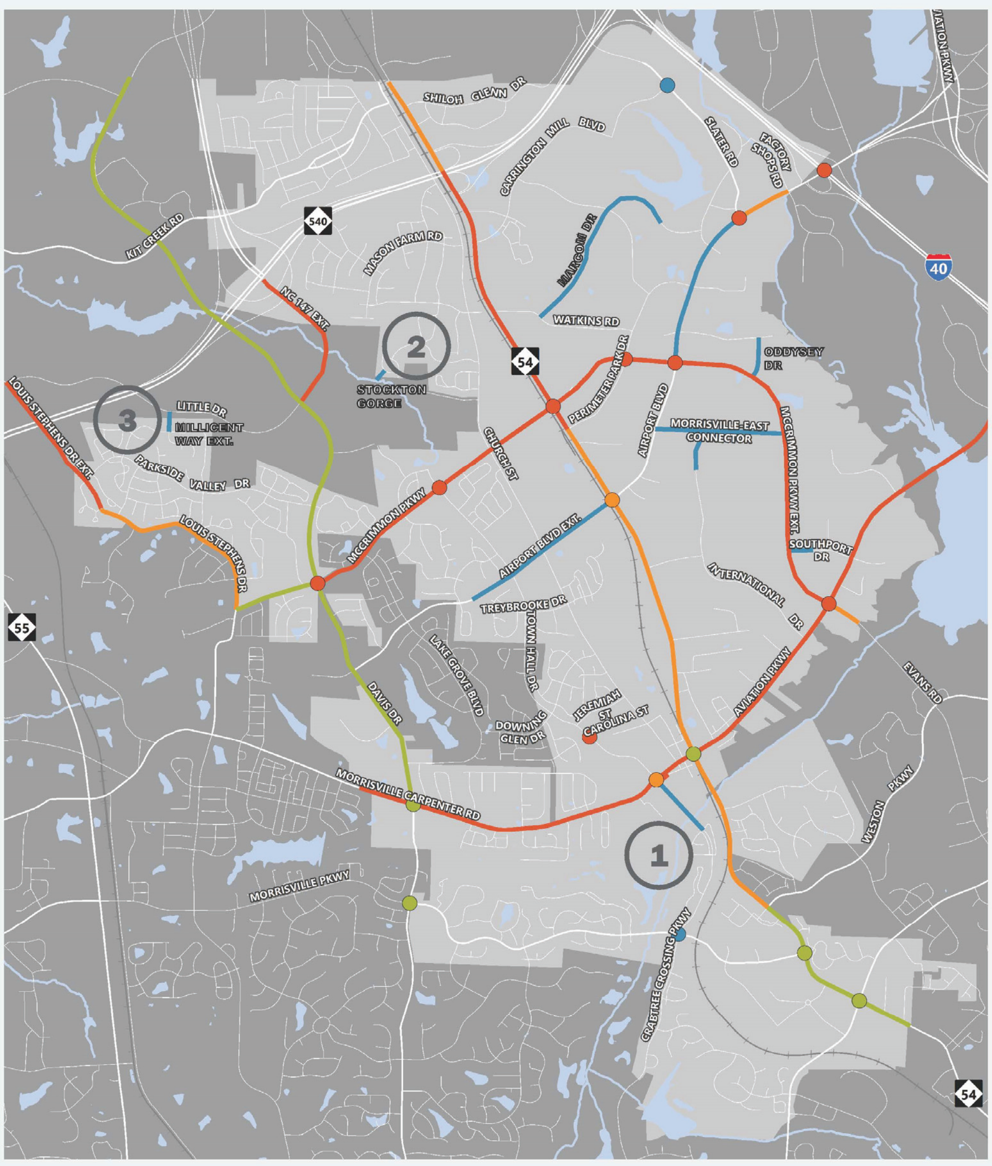
Proposed Transit
- bus service
- commuter rail
- proposed commuter rail station

Figure D-26: Chapter 5 Summary Poster

Draft Comprehensive Transportation Plan Update

05 ACTION PLAN

Roadway Improvement Prioritization



Intersection & Grade Separation Projects

- near-term (<15 years)
- mid-term (15-24 years)
- long-term (>25 years)
- committed project

Roadway Projects

- near-term (<15 years)
- mid-term (15-24 years)
- long-term (>25 years)
- committed project

1 Crabtree Crossing Parkway -- (1) Crabtree Crossing Parkway will not be extended until the NCDOT project to extend NC 147 is completed. Upon completion of NC 147, further study will need to occur before action is taken by Town Council to consider the project as part of the CIP. | (2) Crabtree Crossing Parkway Extension is a lower-priority project than the widening of NC 54 in Town. | (3) Prior to construction of this extension, the Town will review potential ways to legally limit cut-through traffic (on the section Crabtree Crossing Parkway south of Morrisville Parkway) and messaging on traffic congestion navigation mobile applications, such as Waze.

2 Stockton Gorge Road – If NC 147 Extension does not happen or if it is determined during the design of NC 147 Extension that a connection cannot be made, the Plan must be amended to remove the connection.

3 Millicent Way Extension – Needs further study before action to determine if a road, greenway, or no connection is warranted.

Funding Sources

- Property Tax
- Motor Vehicle License Fee
- Powell Bill
- Development Requirements
- NCDOT STIP
- CAMPO / Federal Funding
- CDBG Infrastructure Grants
- Local Sales Tax
- Special Assessment - Private Property
- Impact Fees
- State Transportation Grants
- Permits/Fees/Sales/Service

Policy Recommendations Examples

NEAR-TERM

- Conduct an audit of all existing crosswalks for ADA accessibility.
- Prioritize the construction of greenway connections between existing facilities and adjacent neighborhoods.
- Strengthen language in UDO for pedestrian connectivity in new developments.

MID-TERM

- Create wayfinding signage that details the trip length to community destinations by bike or on foot to encourage travelers to step outside their vehicle.
- During road projects, develop a methodology to determine appropriate crossings to enhance with marked crosswalks, pedestrian signal phasing, and ADA-compliant accessibility features.

Figure D-27: Appendix A, B, C, & D Summary Poster

Draft Comprehensive Transportation Plan Update

APPENDIX A, B, C, & D

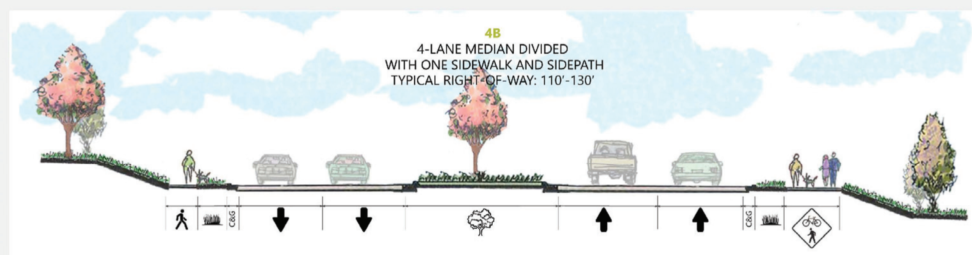
A: Glossary of Terms

Provides a defined list of transportation acronyms and jargon used in the Plan.

Committed Project -- A committed project is defined by the Capital Area Metropolitan Planning Organization as any project within the dedicated funding in the first 5 years of the State Transportation Improvement Program (STIP).
Cross-section -- A basic description of a type of roadway. Includes attributes such as the number of lanes, bicycle and pedestrian accommodations, and median type.

B: Standardized Cross-Sections

Provides a list of cross-sections for roadway design.

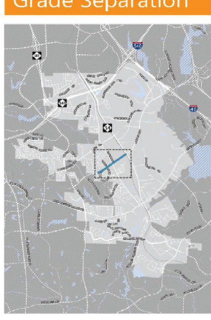


C: Project Sheets

PROJECT SHEETS C

Airport Boulevard Extension

New Location and Grade Separation



Length
0.77 miles

Traffic Volume (vpd)
2010 – N/A
2040 – 28,971

Congestion (v/c ratio)
2010 – N/A
2040 – 0.63

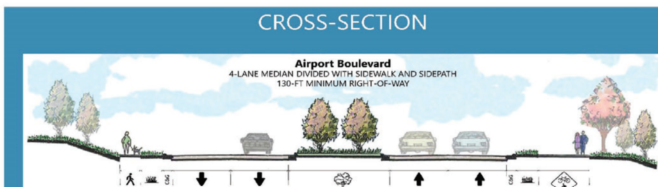
Project Extents
Phase 1: Church Street to Garden Square Lane
Phase 2: NC 54 to Church Street

Street Hierarchy
Major Thoroughfare

Planning Cost Estimate
Phase 1: $5,525,520
Phase 2: $25,383,000

Crash Summary
(June 2013 to May 2016)
N/A

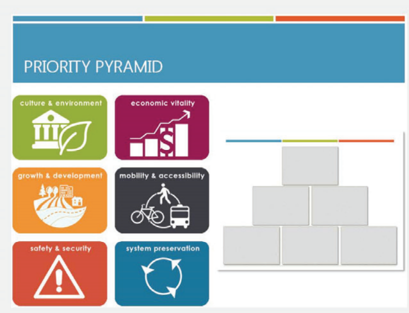
CROSS-SECTION



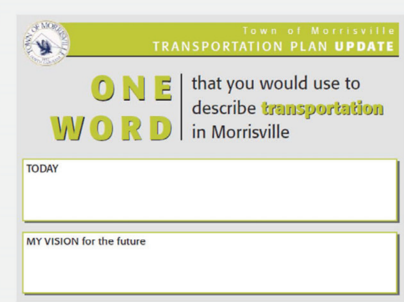
KEY	INTERIM BUILD DIMENSIONS	FULL BUILD-OUT DIMENSIONS	NOTES:
	12-ft inside lane 15-ft wide outside lane	2 11-ft inside lanes 1 12-ft dedicated bus lane	Town staff can consider alternative dimensions and alternative accommodations for bicycles and pedestrians. For speeds below 35 MPH, sharrows shall be provided in the wide outside lanes. The provision of a wide median is intended to reduce future construction costs along corridors that may need widening to 6-lanes to accommodate dedicated bus lanes.
	31.5-ft planted median	17.5-ft planted median	
	5-ft minimum verge	0-ft to 10-ft verge	
	10-ft sidepath south side of roadway	10-ft sidepath	
	5-ft sidewalk	5-ft sidewalk	
BIKE LANE	N/A	N/A	

D: Engagement Summary

Priority Pyramids



One Word Exercises



Key Corridors

Key Corridors

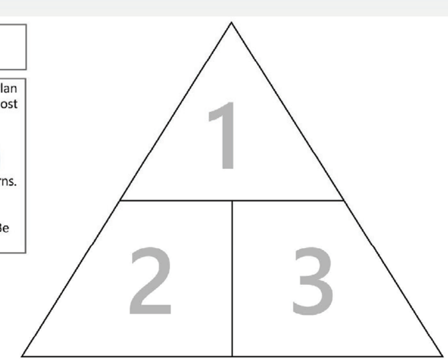
The Town of Morrisville Comprehensive Transportation Plan Update will include details for five of the community's most important corridors. This exercise asks you to identify priorities for each.

1) Check the box beside the corridor.
2) Use three colored dots to prioritize corridor concerns.
3) Post your sheet beside the selected corridor map.

Please complete the pyramid for at least **two** corridors. Be sure to use one sheet per corridor.

- ☐ Town Hall Drive
  Morrisville Carpenter Road to McCrimmon Parkway
- ☐ McCrimmon Parkway
  Davis Drive to Aviation Parkway
- ☐ NC 54
  Weston Parkway to NC 540
- ☐ Aviation Parkway
  NC 54 to Lake Crabtree Park
- ☐ Airport Boulevard
  Interstate 40 to Town Hall Drive

TOWN OF MORRISVILLE
COMPREHENSIVE TRANSPORTATION PLAN UPDATE



PRIORITIES

- Safety
- Walk
- Congestion
- Bike
- Appearance
- Transit

Figure D-28: Appendix E, F, G, H, & I Summary Poster

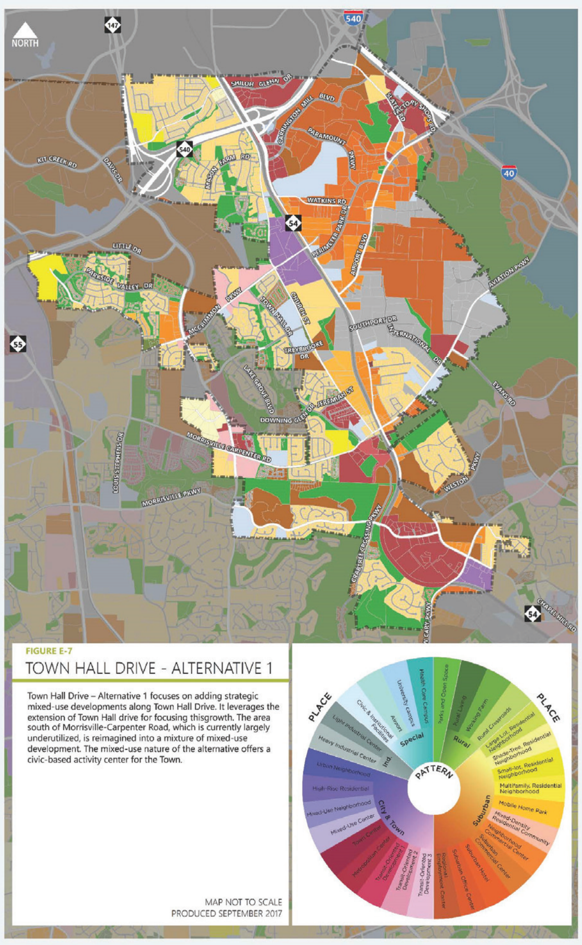
Draft Comprehensive Transportation Plan Update

APPENDIX E, F, G, H, & I

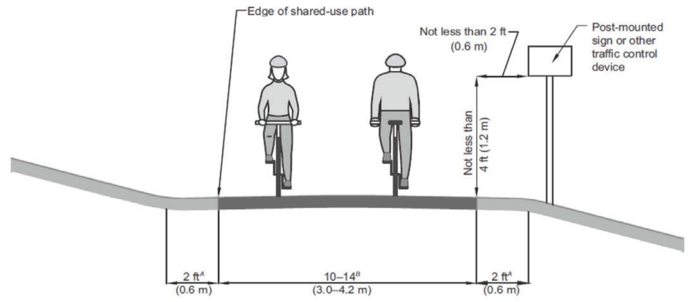
E: Scenario Planning

3 corridors studied
for impacts of different land uses on the transportation network

2 different alternatives
for Town Hall Drive, McCrimmon Parkway, and NC 54

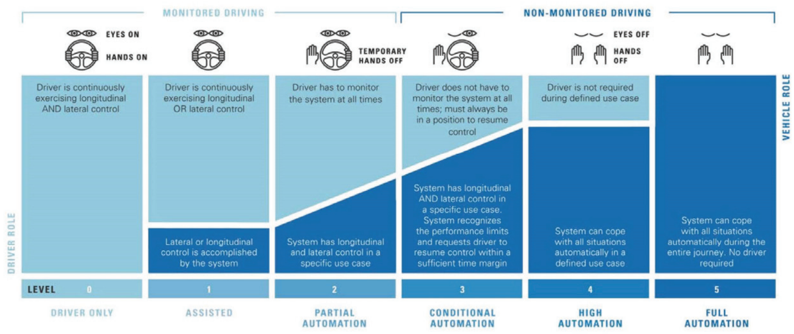


F: Multi-Use Path Design Guidlines

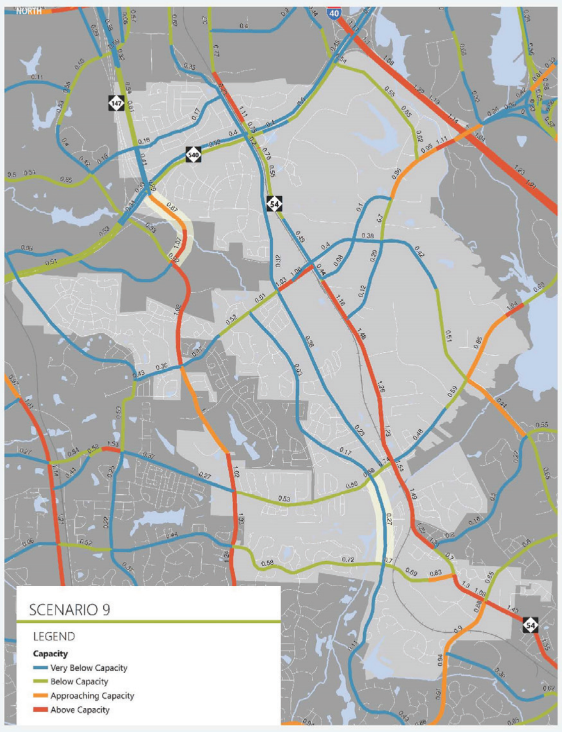


Notes:
A (1V:6H) Maximum slope (typ.)
B More if necessary to meet anticipated volumes and mix of users, per the *Shared Use Path Level of Service Calculator* (9)

G: Transporation Technology



I: Crabtree Crossing Parkway Extension Analsysis



10 scenarios modeled
at the AM and PM peak to determine road segment volumes and road segment v/c ratios.

H: Plan & Policy Review

Number of documents used in the drafting of the plan.

12 LOCAL

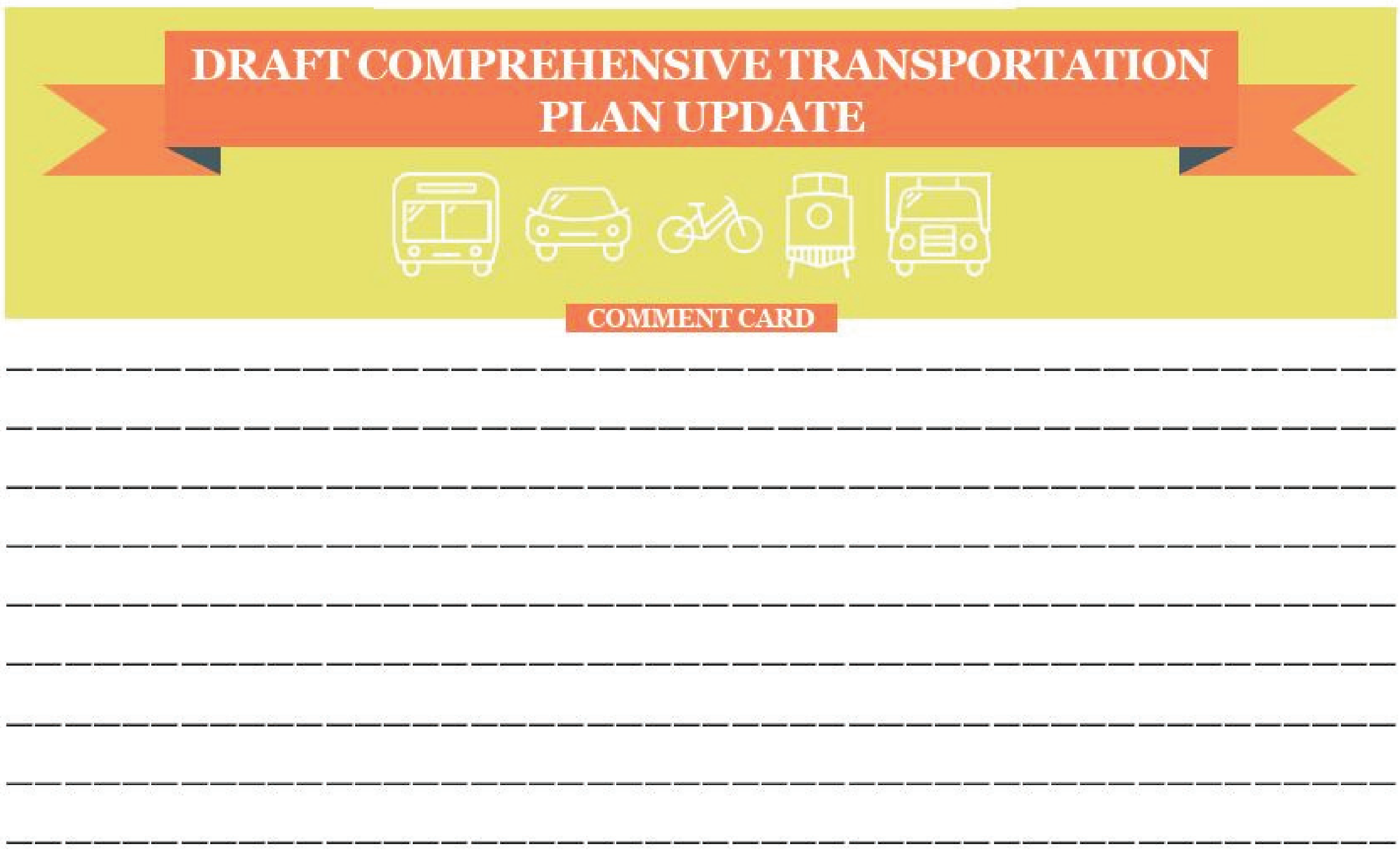
3 REGIONAL

1 STATEWIDE

Table D-15: Spring 2018 Public Comments

COMMENT
Church Street needs to be widened-needs a shoulder. By Providence Place there is a missing piece of the side of the road.
Provided good information thank you. Anything that can expedite McCrimmon Parkway improvement would be appreciated.
Hopson Rd widening needs to be a major priority (from the 54 intersection back). The town should work with Durham to make sure this gets pushed forward ASAP. Sidewalks along Church St should be filled in where there are gaps as a priority over starting sidewalks on the other side of the street.
Please move grade separation to Airport Blvd instead of Aviation Parkway. Grade Separation @ Aviation would significantly impact Cotten Place property values. We also would not like to see NC-54 move east closer to Cotten Place. These houses are less than 2 years old and this was unknown to all homeowners. Cotten Place HOA will start forming a petition from all homeowners to suggest finding other alternatives that do not affect Cotton Place homes.
Consider adding road sensors that are triggered by bike to cause traffic signal to change.
No Millicent Way Extension. To much trafic
Intersection of McCrimmon and Davis, the stoplight does not let a line of cars proceed if someone ahead is just a bit slow at starting up. Please forward to Cary. Also Louis Stephens between McCrimmon & M. Carpenter needs paving and upgrade work – increased traffic on it. Like the idea of connecting NW park to RTP walkways. Very much want the Airport Blvd. extension. Please do soon. Concerned about Millicent extension. Would prefer not to have it. Too many ingresses and egresses to our neighborhood. Breckenridge.
Speed bumps on Willingham. It is a highway! Not acceptable
Would like more details about when and how the greenway / road decisions will be made, and what will factor into the decision. (Millicent Drive)
We want to bring up our concern regarding the traffic in general. With the extension of Louis Stephens Rd, there is going to be increased traffic into the Breckenridge subdivision. What is the plan to reduce traffic into subdivision? Also concerned about the proposed entrance from Millicent, which can again increase traffic into. We would prefer a greenway to school.
My concern about Louis Stephen extension and Millicent Drive. I understand traffic needs improvement, but not I am against when the road has to go through a neighborhood especially when kids will be playing in neighborhood. No to Millicent Road way extension.
Not in favor of the Millicent Road Connector. Highly opposed to a roadway there. It will not alleviate neighborhood traffic, only increase it. There are too many children living in that area for this to be a viable option. Blind turns & a hilly terrain on Willingham make this increasingly dangerous for non-residents cutting through the neighborhood. It also creates another exit point out of the neighborhood for possible crime. I am in favor of a greenway only at this point.
Millicent Way should not be taken off the table. Opening up Millicent is not a good idea. It attracts way too much traffic through a residential area. There are a lot of kids living along that road. We prefer a greenway and not a road.
The proposed extension from Millicent Way to Little Drive will cause more traffic and congestion to the already crowded Willingham Rd. Lots of kids and parents use Willingham everyday and this proposed new extension will be very "dangerous" especially to the kids. Also majority of the drivers going thru this next extension will only care about reaching their destination faster and won't care about the neighbors. So I "strongly" oppose his new extension to Little Drive from Millicent Way.
To whom it may concern: Millicent way Extension, is the worst possible thing to happen to his development. Why, simple. Blink corners, children playing, and unlite road cutthrough. So open the door to crime easy I easy out. Property value going down. Were is the safety for my home, family, friends. How many people now will cut in, not go to davis make a right, to Parkside, and use a controlled entrance. And fic – B.S. you can go through Parkside School, you can use Louis Stephens. I wonder how many accidents, personal & vehicale are now open to happing. Do not approve! Stop it or we vote you out! God bless
Concerned Int. of Louis Stephens & McCrimmons traffic with cars, big trucks, and bicycles. A very dangerous, not stopping at stop signs.
Protesting the connection of Little Drive to Breckenridge because of safety concern related to children, traffic and reduced security. Request widening of Highway 54 all the way from Hwy 540 exit till where Cary city limit starts.
I am very against connecting Millicent Way to Little Dr. The increase in traffic what would result from that would incredibaly dangerous for all the children that will be walking through that area to go the new school. There is a curve on Willingham that is a blind curve and people that live in the neighborhood know to go slow to avoid hitting children crossing the street, but people from outside of the neighborhood using the road to cut through the neighborhood would not be award of that. It would create a huge threat to everyone in that area of the neighborhood. The option of a greenway instead would be great and I think very well received in the neighborhood.
No on Millicent. Yes Greenway. Me + my kids safety.
I am very against a connection between Millicent Rd and Little Dr. It would create a very dangerous situation with all of the neighborhood kids. It is (Willingham/Millicent) already a dangerous road for kids but with all the extra traffic cutting through it will certainly take a very bad and bad accident. Also cars can just use Louis Stephens Rd to go through. Please put a greenway instead of a connection. The greenway would be great but a road connection dangerous and scary.
Millicent Way should not be oppened for road adding traffic that will affect the safety of children. Instead it should be converted into a greenway to walk to the new public school. Please keep "Parkside Valley School" traditional as originally planned because that will help address the community necesitties.
Opposed to Milicent Extension due to safety concerns for pedestrian students reaching Parkside Elementary & congestion at the trail head leading to the school along Willingham. Louis Stephens speed limit should be kept low at intersection w/ Parkside Valley due to Breckenridge kids cross from Walnut to reach the community pool & tennis courts.
Regarding Millicent to Little Connection Also there has been a vehicle flip over without the connection. Imagine if the volume of cars increased because of the connection. Also this will be dangerous for school kids. Another point is that crime may go up esp. with the connection. Already cars get broken into at night every 3 months or so. About 50% of cars in this area of neighborhood. Thank you for considering. I'm against the Millicent to Little connector but love a greenway there.

Figure D-29: Public Comment Card



ADDITIONAL PUBLIC COMMENTS

Between August 17, 2017 and June 21, 2018, the public was able to submit written comments for the Comprehensive Transportation Plan either through the online portal located on the Town's website or to Town staff directly via email. During this period, staff received and recorded 609 comments. The feedback received touched on a number of topics. However, four topics – Millicent Way Extension, Crabtree Crossing Parkway Extension, Green Drive and Clements Drive, and Morrisville-Carpenter Road Widening/Kudrow Lane – emerged as the most discussed themes. The sections below outline the impact of the written comments in the decision-making process.

Millicent Road Extension

The ***Town of Morrisville Comprehensive Transportation Plan*** does not include the extension of Millicent Road between Willingham Road and Little Drive. In place of the road extension, the ***Morrisville Comprehensive Transportation Plan*** includes a recommendation for construction of greenway intended to serve as an emergency accessway to Willingham Road from Little Drive.

Green Drive and Clements Drive

The ***Town of Morrisville Comprehensive Transportation Plan*** does not include the connection between Green Drive and Clements Drive.

Crabtree Crossing Parkway Extension

The ***Town of Morrisville Comprehensive Transportation Plan*** does not include a recommendation for the Crabtree Crossing Parkway Extension

Morrisville-Carpenter Road/Kudrow Lane

The ***Town of Morrisville Comprehensive Transportation Plan*** made no changes relative to comments received about Morrisville-Carpenter Road/Kudrow Lane. The comments made were all in reference to the Morrisville-Carpenter Road widening project, which is currently underway, and were forwarded to the Project Manager for that project.

INTRODUCTION

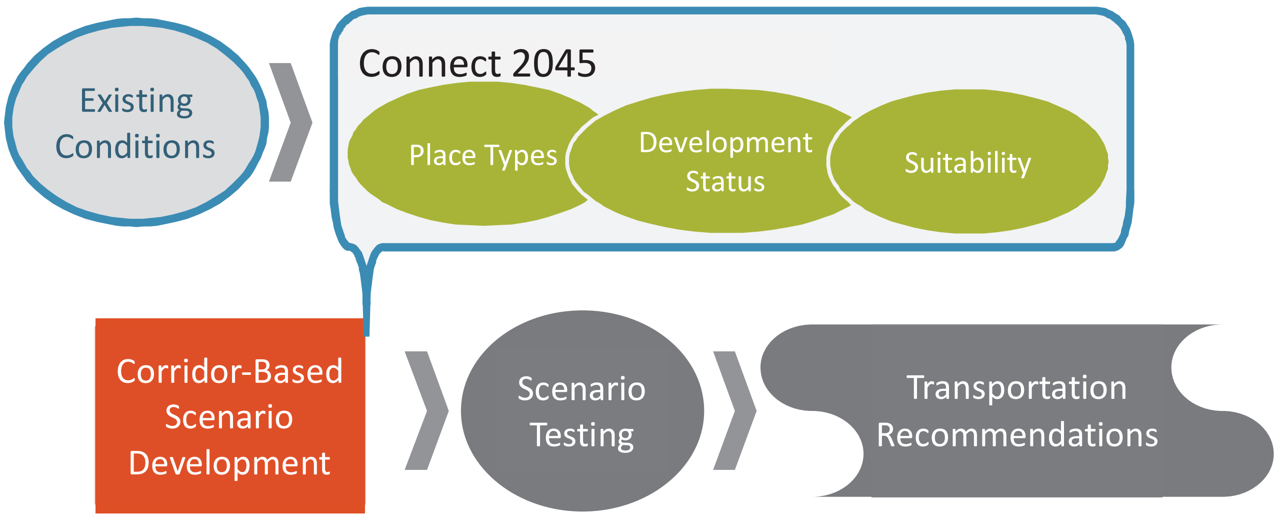
Places that can demonstrate the ability to deal with competing interests in ways that allow them to make informed, strategic choices can prepare themselves for success. These choices typically occur through an analytical process that is balanced with vision and creativity. The ***Town of Morrisville Comprehensive Transportation Plan*** included ways to:

- Identify what the community values,
- Create and test alternative approaches to accommodating growth, and
- Select—and modify—the alternative that is best aligned with community values.

Scenario Planning Process

The scenario planning process included the use of a digital growth model designed to test the performance of different corridor-based growth patterns. The purpose of this test was to generate information to help to explore how different growth patterns would affect the transportation network. The Morrisville scenario planning process (**Figure E-1**) included an investigation into three scenarios: NC 54; McCrimmon Parkway (including future extension); and Town Hall Drive. Two alternatives for each scenario were compared to a baseline scenario that represented the continuation of Figure 5.1, Future Land Use, in the *2009 Land Use Plan*. The performance of each corridor scenario was tested against a series of performance indicators that represent the values that the Morrisville community identified as priorities.

Figure E-1: Scenario Planning Process



Connect 2045

Connect 2045 is an update to the Imagine 2040 Scenario Planning process. The scenario planning process represents a partnership between the Capital Area Metropolitan Planning Organization (CAMPO) and the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO) to promote a coordinated decision-making process for a more sustainable transportation system. Connect 2045 uses CommunityViz software to measure and evaluate the impacts of growth patterns and major investments in the regional transportation system. The Triangle CommunityViz2 model was created in efforts to develop the growth forecast for the *2045 Metropolitan Transportation Plan*. This model was used to test each individual corridor scenario for the ***Town of Morrisville Comprehensive Transportation Plan***.

Testing Scenarios

PLACE TYPES AND COMMUNITY TYPES

The corridor-based alternative scenarios were developed by assigning place types throughout the study area to simulate future development patterns. These place types are a direct input of the Triangle CommunityViz2 Model and include 30 different options. These place types also fall into larger categories, called community types, which represent a simplified communication tool to better understand a scenario's general development pattern. The larger categories include: Rural; Suburban; City and Town; Industrial; and Special.

ALTERNATIVES

Three scenarios were tested for each corridor (McCrimmon Parkway, NC 54, and Town Hall Drive) with two alternatives compared against a scenario reflecting Figure 5.1, Future Land Use, in the *2009 Land Use Plan*.

- **Figure E-2**: Baseline Scenario
- **Figure E-3**: McCrimmon Parkway – Alternative 1
- **Figure E-4**: McCrimmon Parkway – Alternative 2
- **Figure E-5**: NC 54 – Alternative 1
- **Figure E-6**: NC 54 – Alternative 2
- **Figure E-7**: Town Hall Drive – Alternative 1
- **Figure E-8**: Town Hall Drive – Alternative 2

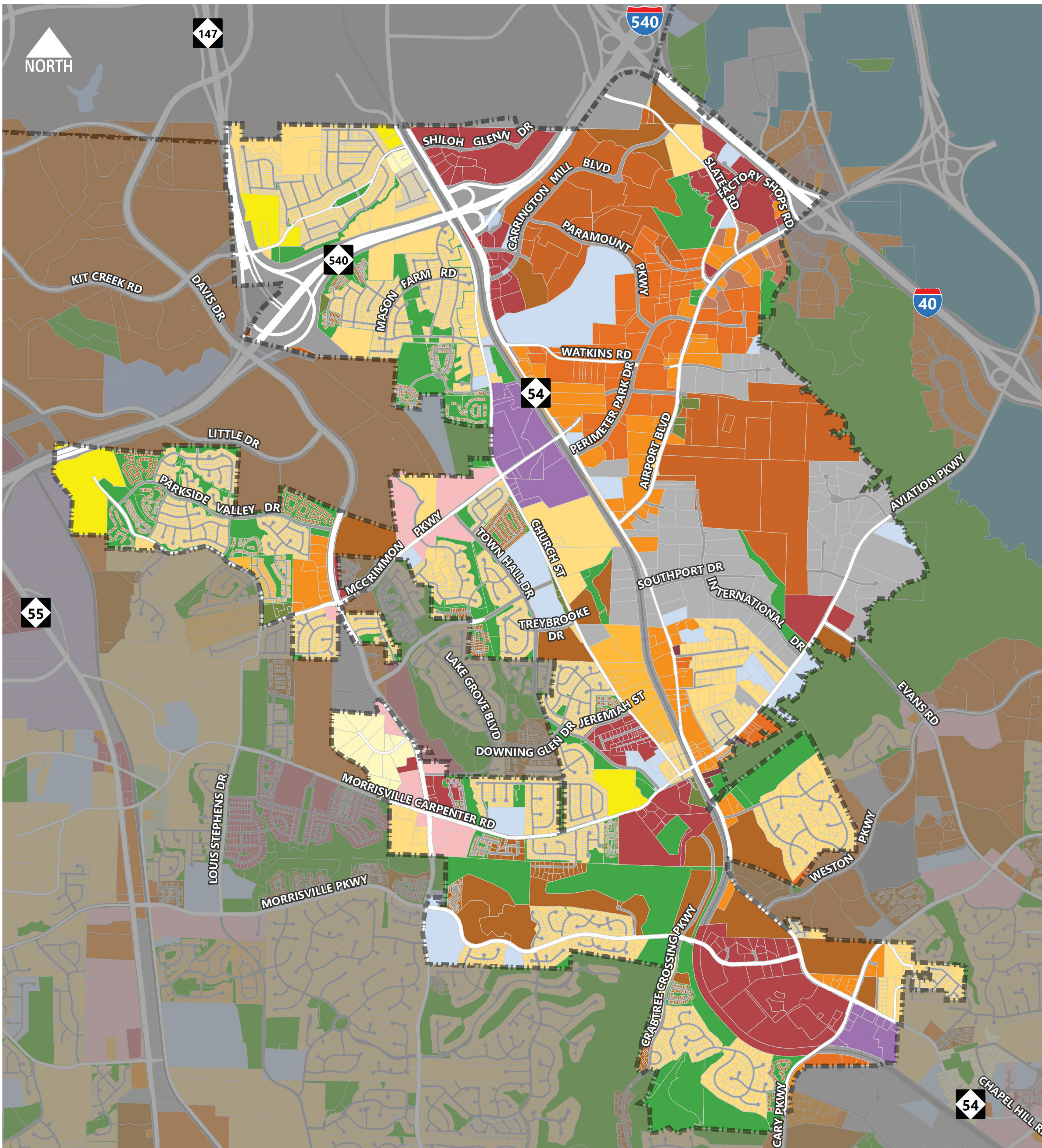
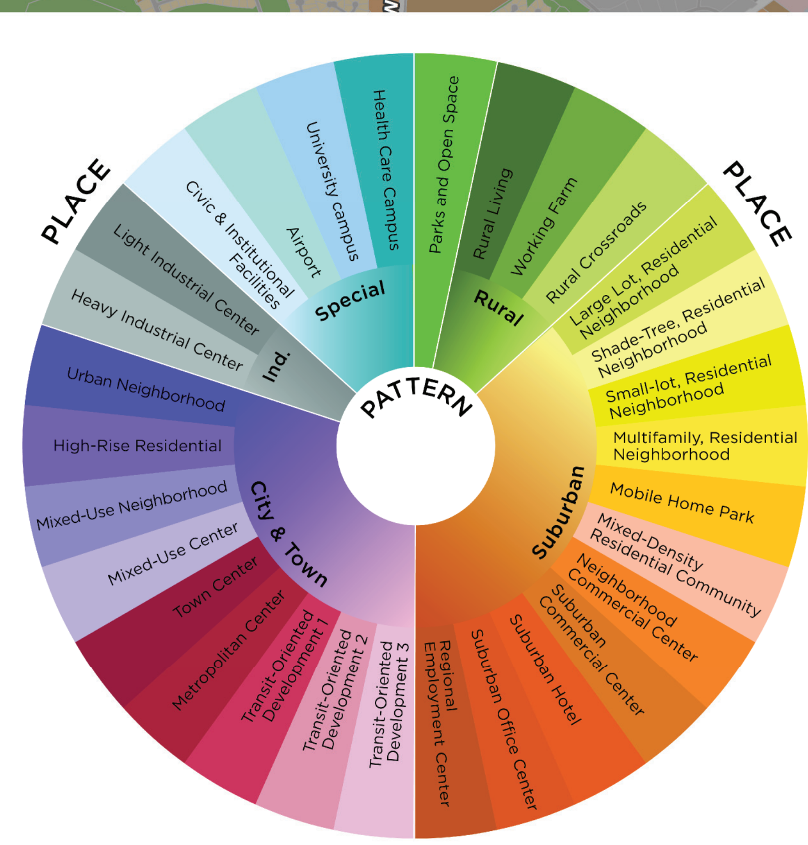


FIGURE E-2

BASELINE SCENARIO

The baseline scenario for all three corridors is based on the existing land use plan for the Town of Morrisville. The scenario serves as a test for baseline metrics as a comparison for the alternatives. Current plans for Town Hall Drive include transit-oriented development between Town Hall Drive and NC 54 straddling McCrimmon Parkway. Town Hall Drive remains residential-focused with highlights of Town Center-level mixed use development south of Morrisville-Carpenter Road.
For McCrimmon Parkway, existing plans show Neighborhood-to-Suburban Commercial center activity, concentrated east of NC 54. NC 54's proximity to the aforementioned corridors shows the same development patterns, with a heavier influence in residential development north of McCrimmon Parkway.

MAP NOT TO SCALE
PRODUCED SEPTEMBER 2017



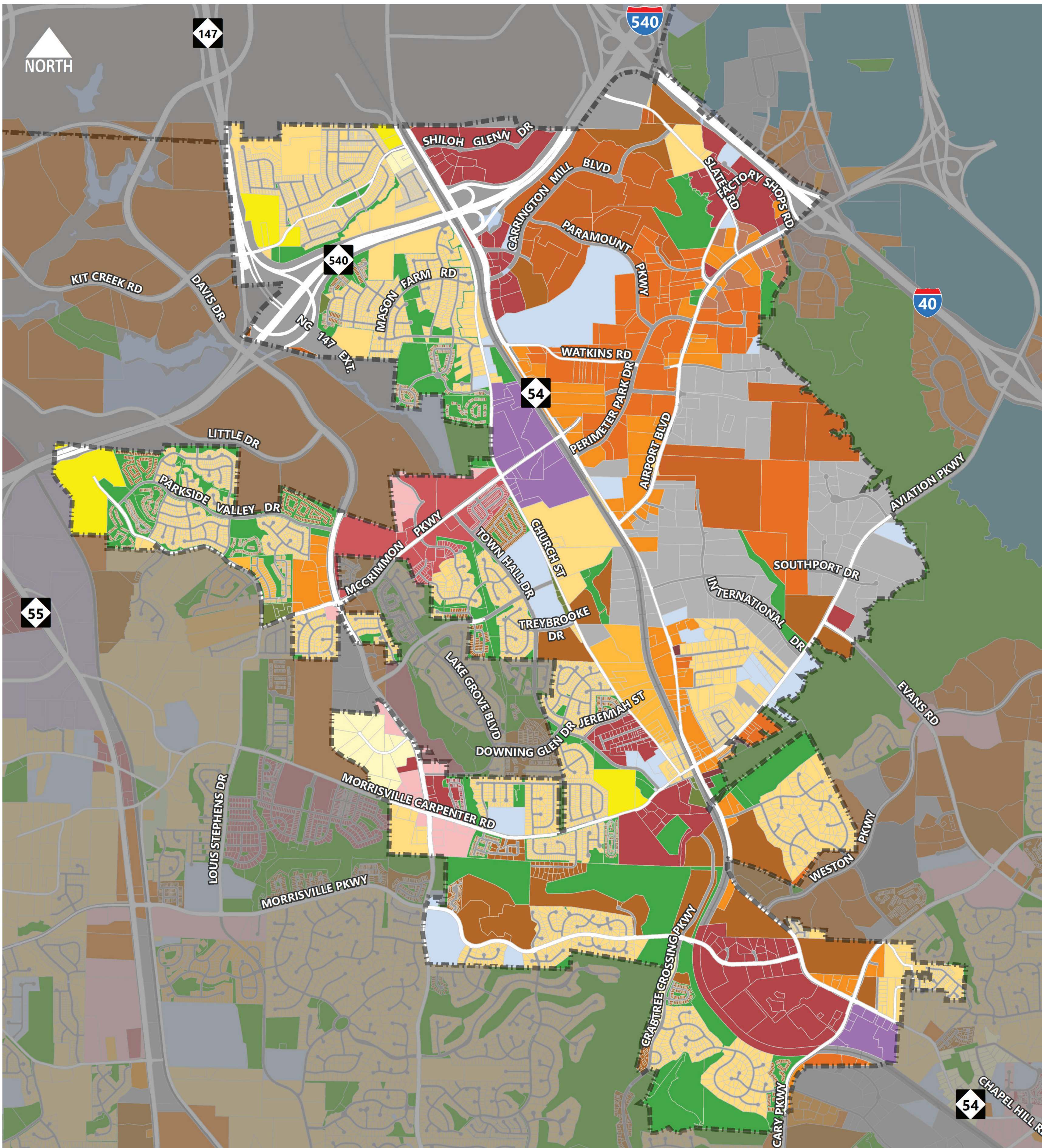
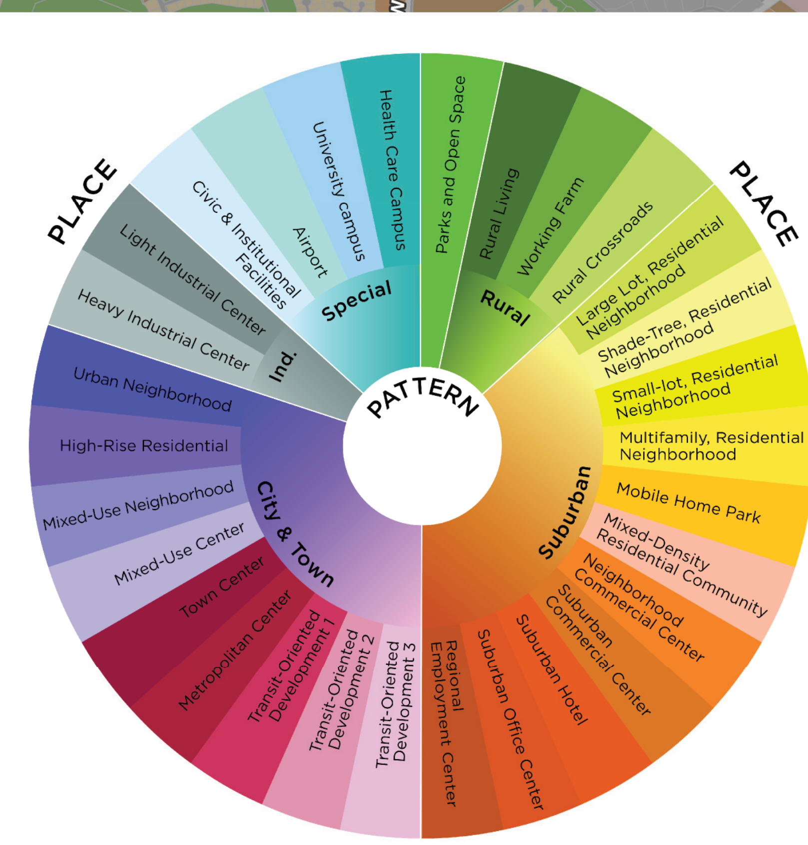


FIGURE E-3

MCCRIMMON PKWY - ALTERNATIVE 1

McCrimmon Parkway – Alternative 1 leverages the future McCrimmon Parkway extension as a strategic method for growth. Compared to the baseline scenario, this alternative leverages mixed-use neighborhood-level development west of Town Hall Drive and strategically places suburban-type uses as buffers to existing neighborhoods. South of Airport Boulevard, this scenario tests a larger industrial foothold than the baseline.

MAP NOT TO SCALE
PRODUCED SEPTEMBER 2017



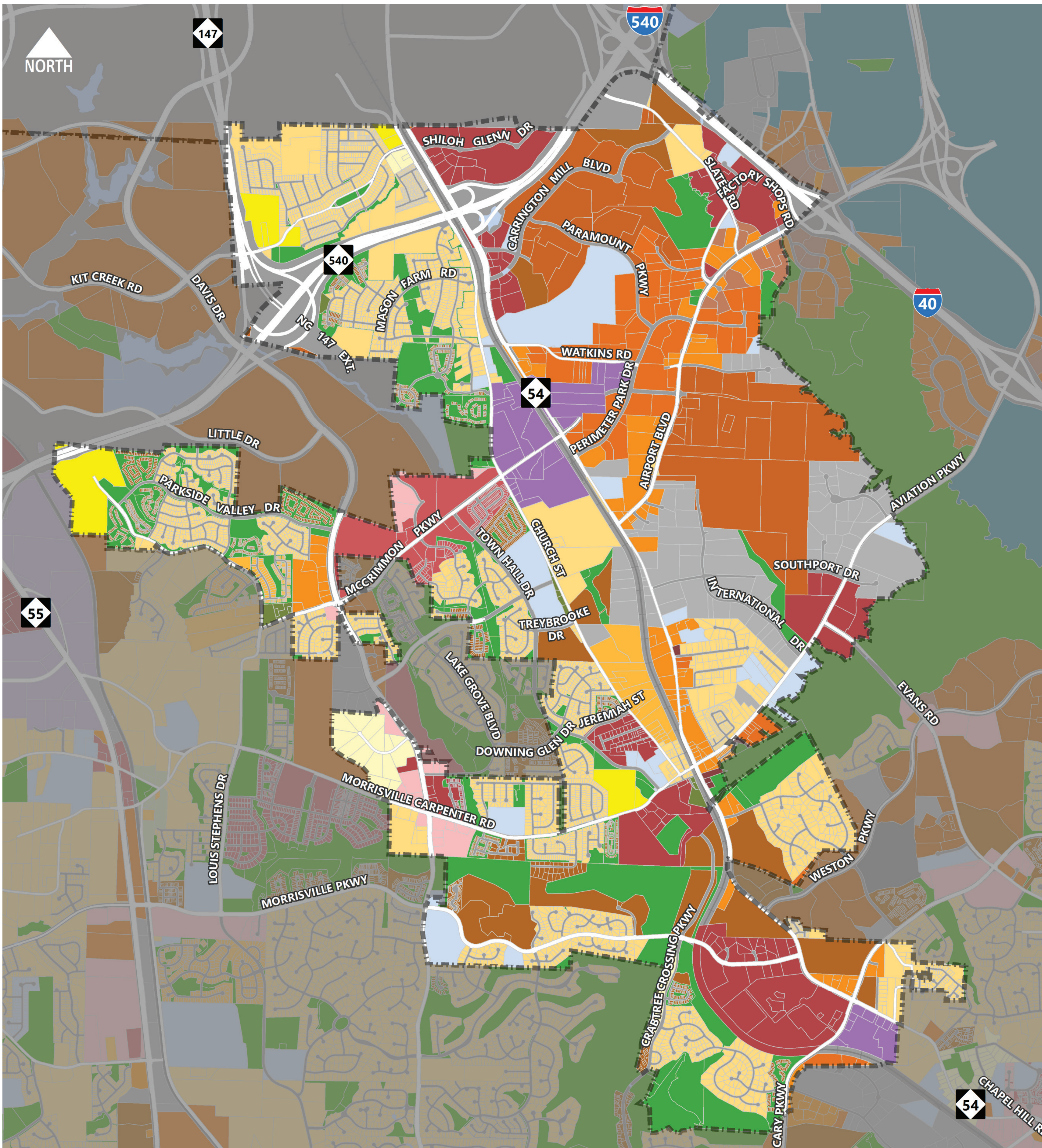
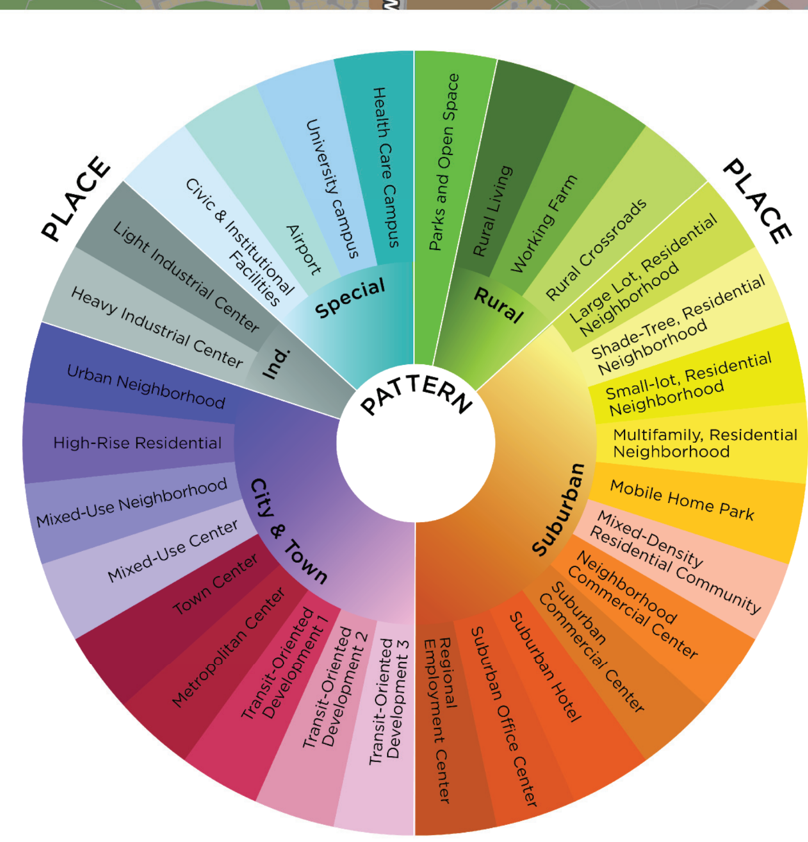


FIGURE E-4

MCCRIMMON PKWY - ALTERNATIVE 2

McCrimmon Parkway – Alternative 2 uses the same McCrimmon Parkway extension to place strategic growth opportunities along the corridor. This scenario, rather than just testing mixed-use developments like the first alternative, focuses on regional employment opportunities mixed with mixed-use developments. A significant difference in this scenario is the eastward expansion of transit-oriented development that is currently slated in the baseline for the area between Town Hall Drive and NC 54 straddled by McCrimmon Parkway (existing).

MAP NOT TO SCALE
PRODUCED SEPTEMBER 2017



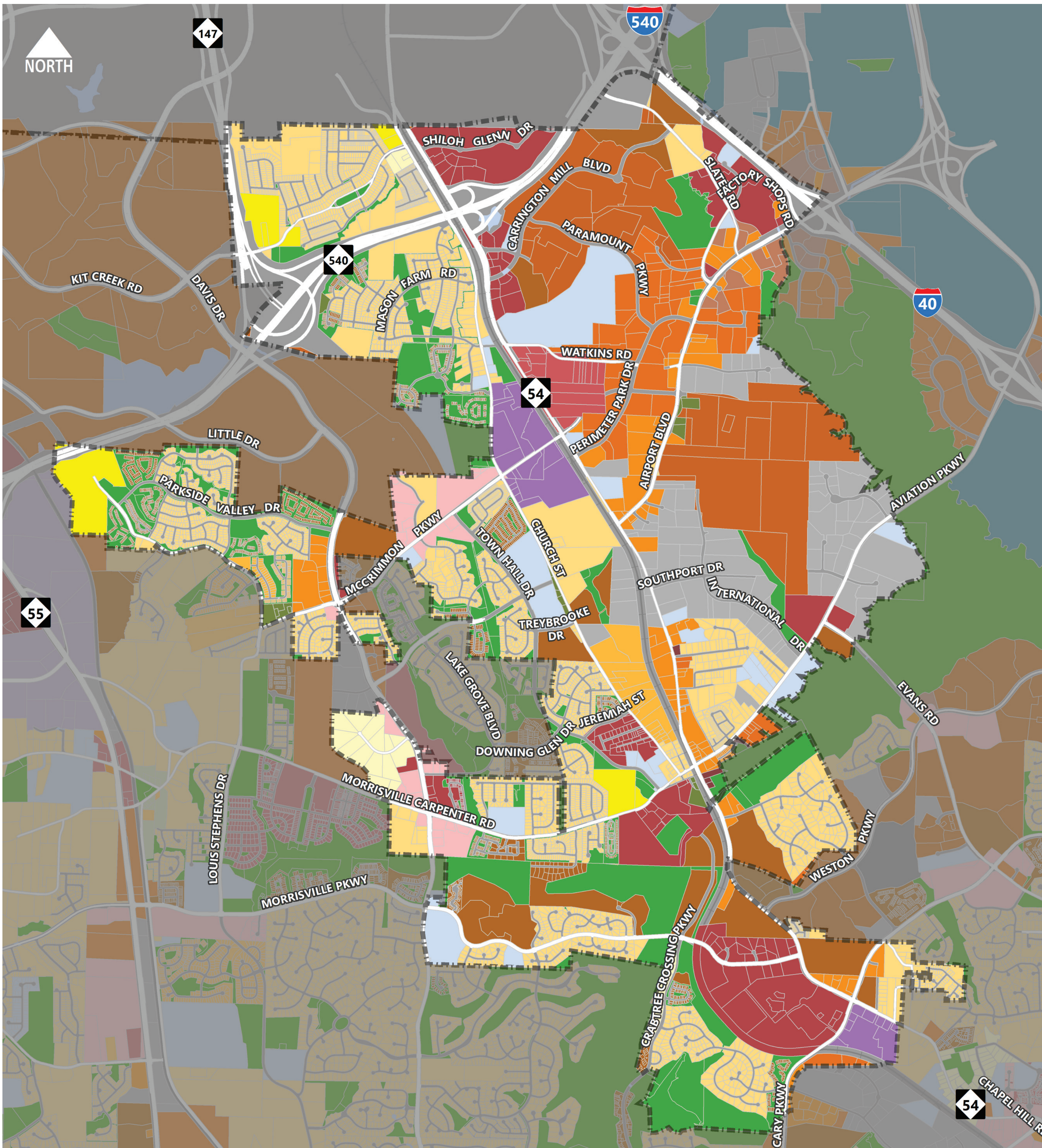


FIGURE E-5

NC 54 - ALTERNATIVE 1

NC 54 – Alternative 1 looks at potential growth opportunities using existing higher education developments as an anchor for mixed-use potential. Mixed-use and mixed-use supportive uses are placed south of Watkins Road near NC 54 and extends towards McCrimmon Parkway. This scenario leverages transit-oriented development uses that lie just west of NC 54.

MAP NOT TO SCALE
PRODUCED SEPTEMBER 2017

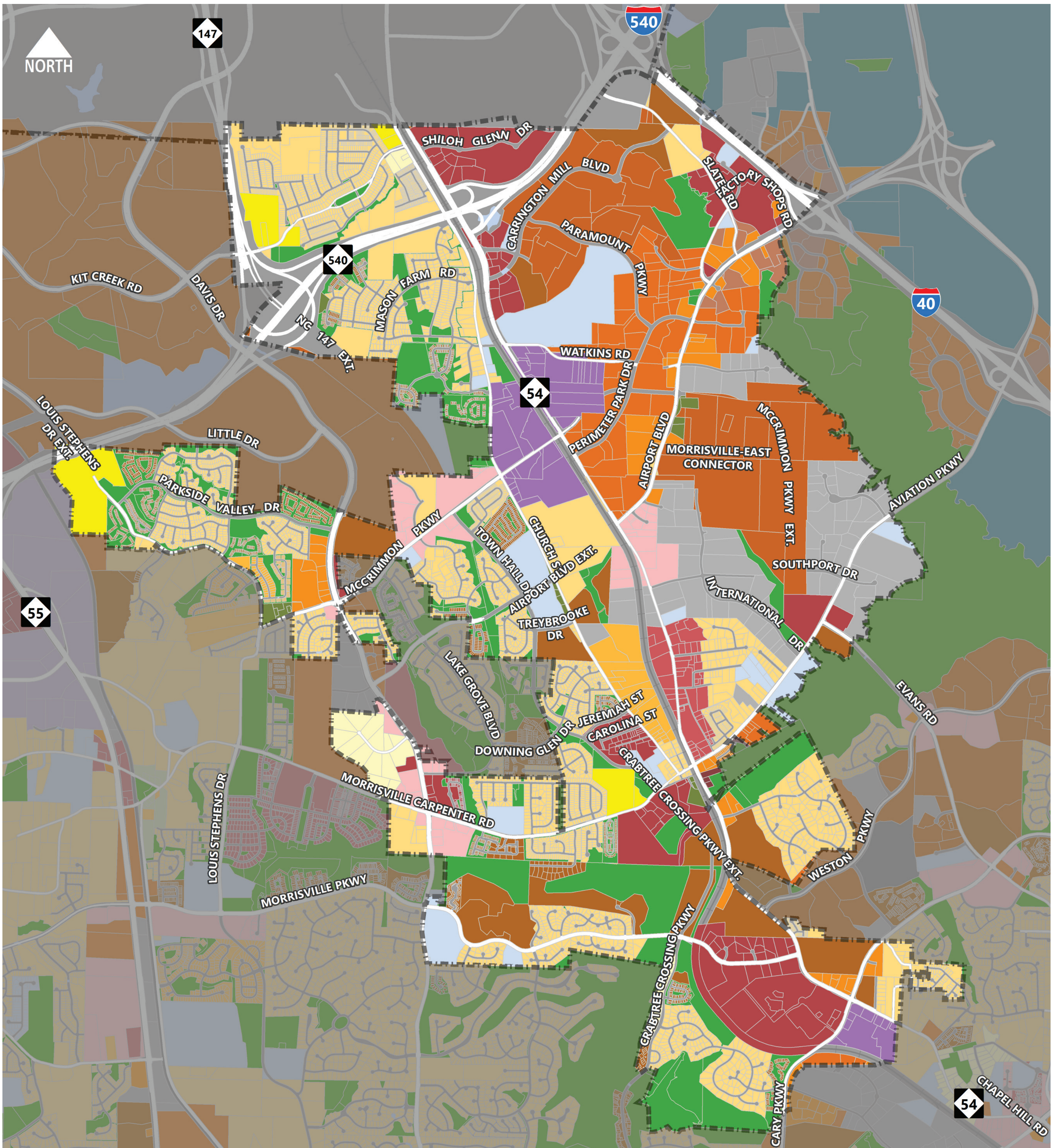


FIGURE E-6

NC 54 - ALTERNATIVE 2

NC 54 – Alternative 2 reimagines the baseline scenario's transit-oriented uses by expanding its reach to across NC 54 south of Watkins Road. This alternative looks at pairing transit-oriented developments with neighborhood-level commercial uses and more suburban-development use types. This scenario leverages educational uses just north of Watkins Road as a dominant demand driver for transit-oriented developments.

MAP NOT TO SCALE
PRODUCED SEPTEMBER 2017

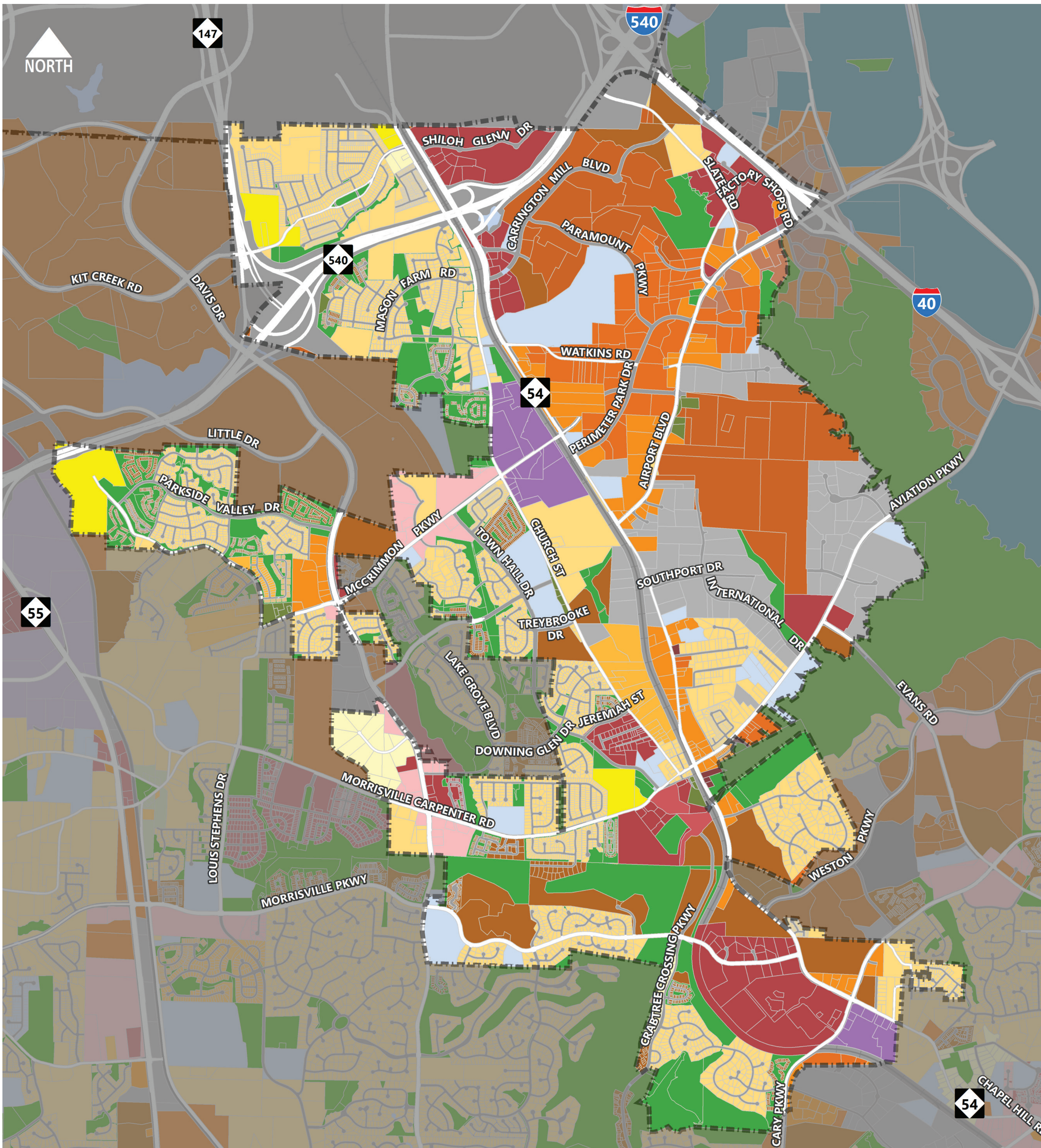


FIGURE E-7

TOWN HALL DRIVE - ALTERNATIVE 1

Town Hall Drive – Alternative 1 focuses on adding strategic mixed-use developments along Town Hall Drive. It leverages the extension of Town Hall drive for focusing thisgrowth. The area south of Morrisville-Carpenter Road, which is currently largely underutilized, is reimagined into a mixture of mixed-use development. The mixed-use nature of the alternative offers a civic-based activity center for the Town.

MAP NOT TO SCALE
PRODUCED SEPTEMBER 2017

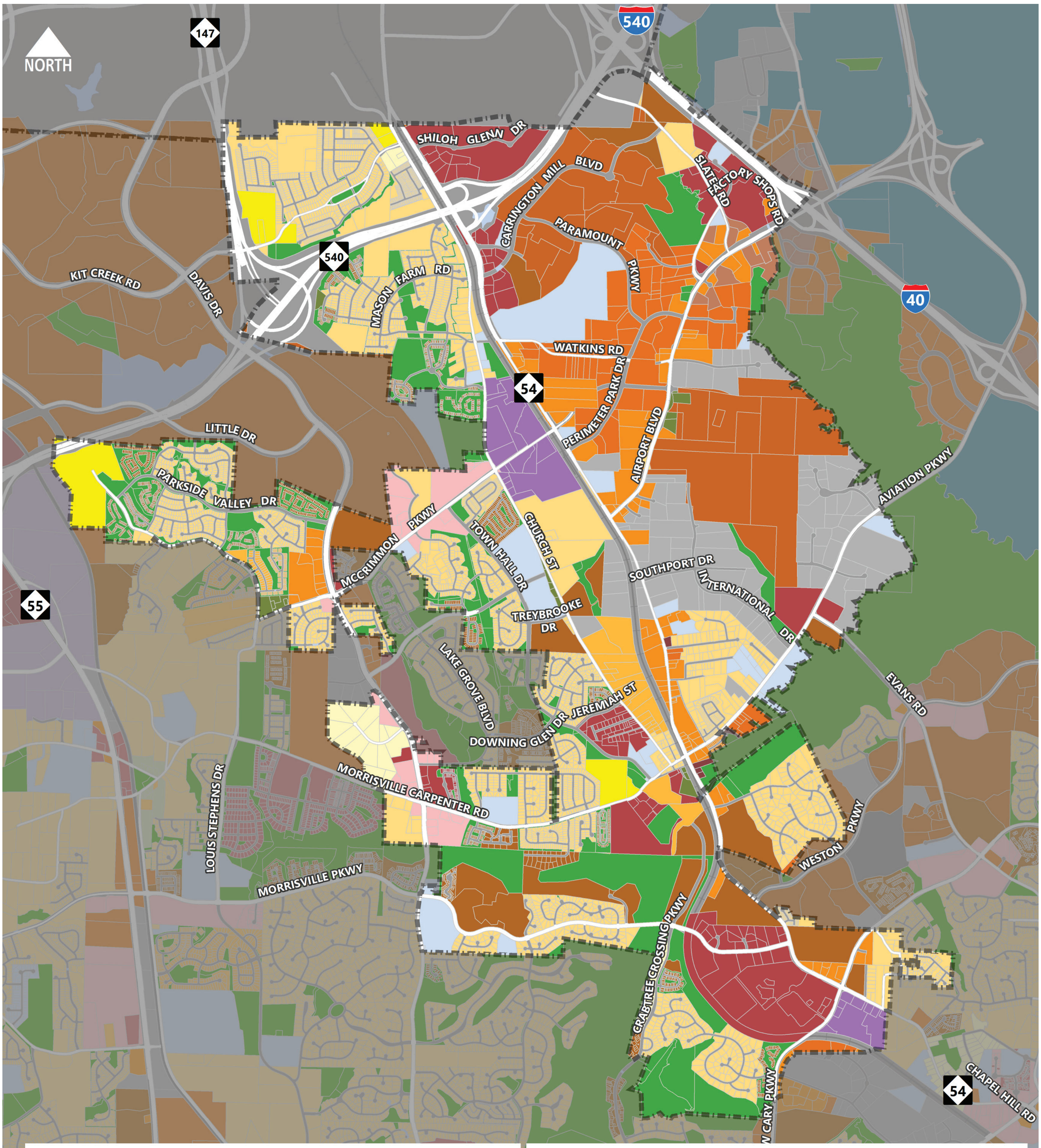
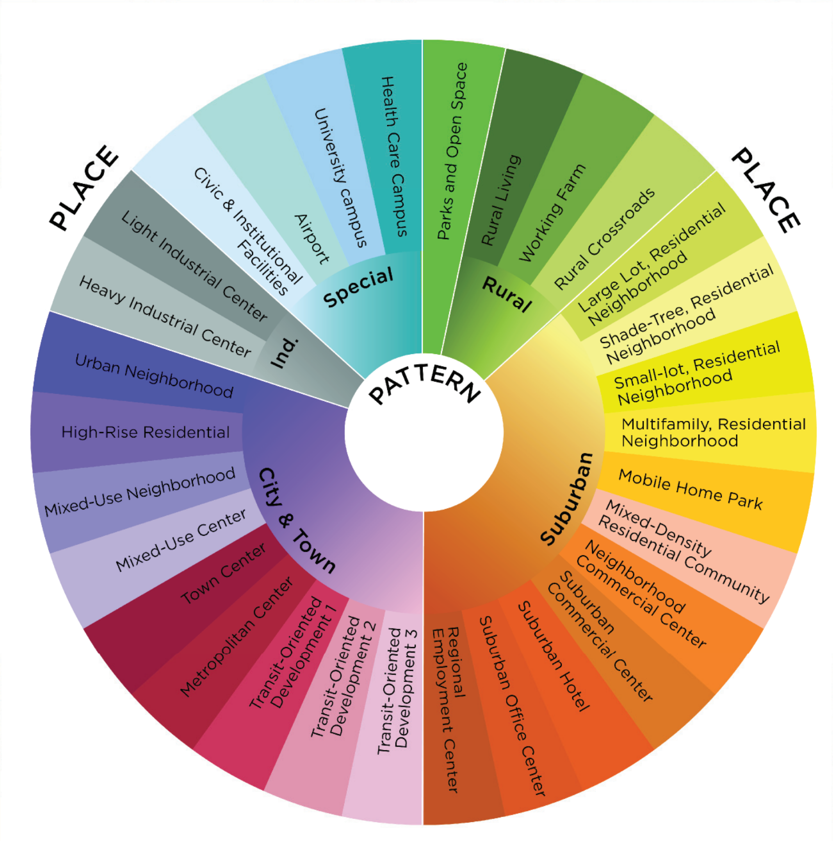


FIGURE E-8

TOWN HALL DRIVE - ALTERNATIVE 2

Town Hall Drive – Alternative 2 offers a higher intensity vision of Town Hall Drive – Alternative 2. Growth is centered similarly to Alternative 1, where the extension of Town Hall Drive is leveraged for focusing future growth. This alternative also reimagines the area south of Morrisville-Carpenter Road as a civic-based gathering center based around Morrisville Town Hall.

MAP NOT TO SCALE
PRODUCED SEPTEMBER 2017



RESULTS

Two options for each corridor were evaluated using a set of performance metrics (or indicators). These indicators offer various ways to evaluate the relative performance of the scenarios and are based on the Guiding Principles created to help shape the direction and outcomes of the ***Town of Morrisville Comprehensive Transportation Plan*** (**Figure E-9**). Input from town staff and a review of available data and potential model outputs were used to ensure the performance metrics were customized to the unique circumstances of the ***Town of Morrisville Comprehensive Transportation Plan*** process. The report card (**Figure E-10**) includes 10 indicators organized into four groups:

Figure E-9: Performance Metrics for Scenarios

Mobility & Accessibility

Trip Intensity
Total growth within the corridor

Transit Readiness
Growth near future transit stops

Employment Walkability
Jobs in walkable place types

Residential Walkability
Households in walkable place types

Culture & Environment

Household Access to Community Resources
Households near cultural and recreational resources

Job Access to Community Resources
Jobs near cultural and recreational resources

Growth & Development

Context Distribution
Percent of land area by community type

Economic Vitality

Overall Jobs-to-Housing Balance
Ratio of jobs to households for entire corridor

Urban Jobs-to-Housing Balance
Ratio of jobs to households within walkable place types

Urban Investment
Density of walkable place types

Figure E-10: Scenario Report Card

Report Card

Performs ***WORSE*** *than* ***Baseline*** ← → *Performs* ***BETTER*** *than* ***Baseline***

MCCRIMMON PARKWAY

MOBILITY & ACCESSIBILITY

Trip Intensity
Total growth within the corridor
Scenario 1 → | Scenario 2 →

Transit Readiness
Growth near future transit stops
Scenario 1 → | Scenario 2 →

Employment Walkability
Jobs in walkable place types
Scenario 1 → | Scenario 2 →

Residential Walkability
Households in walkable place types
Scenario 1 → | Scenario 2 →

CULTURE & ENVIRONMENT

Household Access to Community Resources
Households near cultural and recreational resources
Scenario 1 → | Scenario 2 ←

Job Access to Community Resources
Jobs near cultural and recreational resources
Scenario 1 → | Scenario 2 →

GROWTH & DEVELOPMENT

Context Distribution
Percent of land area by community type

	Baseline	Scenario 1	Scenario 2
City & Town	10.9%	17.3%	22.2%
Suburban	68.3%	82.7%	68.7%
Rural	0.4%	0.4%	0.0%
Protected Green Space	0.0%	0.0%	0.0%
Other	20.5%	0.0%	9.1%

ECONOMIC VITALITY

Overall Jobs-to-Housing Balance
Ratio of jobs to households for entire corridor
Scenario 1 → | Scenario 2 →

Urban Jobs-to-Housing Balance
Ratio of jobs to households within walkable place types
Scenario 1 → | Scenario 2 →

Urban Investment
Density within urban place types (City & Town)
Scenario 1 → | Scenario 2 →

NC 54

MOBILITY & ACCESSIBILITY

Trip Intensity
Total growth within the corridor
Scenario 1 → | Scenario 2 →

Transit Readiness
Growth near future transit stops
Scenario 1 ← | Scenario 2 →

Employment Walkability
Jobs in walkable place types
Scenario 1 ← | Scenario 2 ←

Residential Walkability
Households in walkable place types
Scenario 1 → | Scenario 2 →

CULTURE & ENVIRONMENT

Household Access to Community Resources
Households near cultural and recreational resources
Scenario 1 → | Scenario 2 →

Job Access to Community Resources
Jobs near cultural and recreational resources
Scenario 1 ← | Scenario 2 ←

GROWTH & DEVELOPMENT

Context Distribution
Percent of land area by community type

	Baseline	Scenario 1	Scenario 2
City & Town	18.0%	21.8%	24.3%
Suburban	50.0%	49.2%	50.1%
Rural	0.6%	0.6%	0.6%
Protected Green Space	19.5%	17.2%	17.2%
Other	11.7%	11.0%	7.6%

ECONOMIC VITALITY

Overall Jobs-to-Housing Balance
Ratio of jobs to households for entire corridor
Scenario 1 → | Scenario 2 →

Urban Jobs-to-Housing Balance
Ratio of jobs to households within walkable place types
Scenario 1 → | Scenario 2 →

Urban Investment
Density within urban place types (City & Town)
Scenario 1 → | Scenario 2 →

TOWN HALL DRIVE

MOBILITY & ACCESSIBILITY

Trip Intensity
Total growth within the corridor
Scenario 1 → | Scenario 2 →

Transit Readiness
Growth near future transit stops
Scenario 1 → | Scenario 2 →

Employment Walkability
Jobs in walkable place types
Scenario 1 ← | Scenario 2 ←

Residential Walkability
Households in walkable place types
Scenario 1 → | Scenario 2 →

CULTURE & ENVIRONMENT

Household Access to Community Resources
Households near cultural and recreational resources
Scenario 1 → | Scenario 2 →

Job Access to Community Resources
Jobs near cultural and recreational resources
Scenario 1 → | Scenario 2 →

GROWTH & DEVELOPMENT

Context Distribution
Percent of land area by community type

	Baseline	Scenario 1	Scenario 2
City & Town	20.5%	20.7%	20.8%
Suburban	45.5%	45.5%	45.4%
Rural	0.7%	0.8%	0.8%
Protected Green Space	23.7%	23.7%	23.8%
Other	9.5%	9.4%	9.4%

ECONOMIC VITALITY

Overall Jobs-to-Housing Balance
Ratio of jobs to households for entire corridor
Scenario 1 → | Scenario 2 →

Urban Jobs-to-Housing Balance
Ratio of jobs to households within walkable place types
Scenario 1 → | Scenario 2 →

Urban Investment
Density within urban place types (City & Town)
Scenario 1 → | Scenario 2 →

MULTI-USE PATH DESIGN GUIDELINES

A multi-use path (MUP) is designed for both transportation and recreational purposes. Within the Town of Morrisville, two types of multi-use paths exist. Side paths are multi-use paths that fall within a roadway right-of-way, while greenways are multi-use paths with an independent right-of-way. Unless specified for a particular area, multi-use paths within the Town are assumed to accommodate pedestrians, bicyclists, and other non-motorized users. Multi-use paths provide connectivity between neighborhoods, schools, parks, civic uses, and commercial areas and are considered part of a transportation system for commuters and for recreation.

Town of Morrisville Comprehensive Transportation Plan outlines a series of recommendations for the Town's multimodal transportation facilities, including multi-use paths. These recommendations seek to provide enhanced multimodal accommodations to the diverse neighborhoods within the Town while providing alternative means for residents to access jobs, schools, and retail centers. The Multi-Use Path Design Guidelines will serve as a tool to help the Town provide consistent and appropriate multi-use pathways. The various design recommendations and guidelines within this document adhere to federal and state design standards and are defined by:

- *Guide to the Development of Bicycle Facilities, 4th Edition*. American Association of State Highway Transportation Officials (AASHTO), 2012 (amended February 2017)
- *Manual on Uniform Traffic Control Devices (MUTCD).* U. S. Department of Transportation, Washington, DC, 2004
- National Association of City Transportation Officials (NACTO)
- *Proposed Public Rights-of-Way Accessibility Guidelines (PROWAG).* U.S. Access Board
- *North Carolina Bicycle Facilities Planning and Design Guidelines*. NCDOT Office of Bicycle and Pedestrian Transportation, Raleigh, NC, 1999

The Multi-Use Path Design Guidelines are organized into the following subsections:

- **Multi-Use Path Design Elements** – This subsection provides guidance on the design characteristics of multi-use paths. Design features such as path width, surface material, and ADA compliance are discussed, along with horizontal and vertical curvature information. This information is helpful when considering the design characteristics of the main line of a multi-use path.
- **Intersections** – This subsection contains information about how to address the needs of multi-use paths when they intersect another multi-use path or a roadway. Design characteristics of signalized intersections, unsignalized intersections, and mid-block crossings are addressed.
- **Multi-Use Path Structures and Easements** – This subsection provides additional details associate with special circumstances that may be relevant for certain multi-use path segments. An examination of the design features for multi-use path boardwalks, bridges, underpasses, and retaining walls is included, along with information on temporary and permanent easements and the provisions of trailheads.
- **Multi-Use Path Enhancements** – This subsection includes information about supporting amenities for multi-use paths such as safety railings, signage, pavement markings, and lighting.
- **Landscaping & Amenities** – This subsection contains guidance on how to provide landscaping and ancillary amenities along a multi-use path.

Multi-Use Path Design Elements

MULTI-USE PATH WIDTH

Multi-use paths are intended to accommodate multiple modes of bidirectional non-motorized travel. To do this, multi-use paths must be designed with sufficient width.

Guidelines

- AASHTO's minimum paved width is 10 feet. This is the Town's preferred width.
- Depending on volume and type of non-motorized use, width may vary from 8'-15' or greater,
- An 8-foot path width is generally not recommended and must be used only for physical or environmental constraints or with other extenuating circumstances.
- Paved multi-use paths need to be designed to withstand loading requirements, and emergency vehicles
- Centerline stripes need to be considered and are useful along curving sections

Table F-1 provides information on multi-use path widths.

Table F-1. Multi-Use Path Width Considerations

8-FOOT PATH	10-FOOT PATH
• Limited application • Bicycle traffic is expected to be low • Pedestrian use is only occasional • A physical constraint, such as an environmental feature, bridge abutment, utility structure, etc., requires narrowed path for a short distance • May be used in a sidepath situation where on-street striped bicycle lanes are also present • Short spur connecting to main path	• Town standard situation • Path to residential, business parks, recreation facilities, or retail centers • Long spur or spur connection for high level of access
11-TO 14-FOOT PATH	**15-FOOT PATH OR GREATER**
• Large pedestrian use (anticipate more than 30% pedestrians) • High user volume (anticipate more than 300 users per hour) • Significant use by skaters • Access for larger maintenance vehicles • On steep grades or curves to allow additional passing area	• Heavy pathway volumes which dictate the need to separate wheeled users from pedestrians. A minimum 5-foot width for pedestrians and 10-foot width for wheeled users must be provided.

SHOULDER WIDTH

Shoulders provide more space for incorporating furnishings and signage, give users an area to stop alongside the path, and can even serve as a separate jogging path. **Figure F-1** provides the AASHTO guideline for a typical shoulder width design. Paved shoulders are required for use within the Town of Morrisville.

Guidelines

- AASHTO graded shoulder with a cross slope must be provided, along with a 3-to 5-foot shoulder with a maximum cross-slope of 1V:6H on both sides.
- At a minimum, a 2-foot shoulder needs to be provided to meet horizontal clearance requirements.

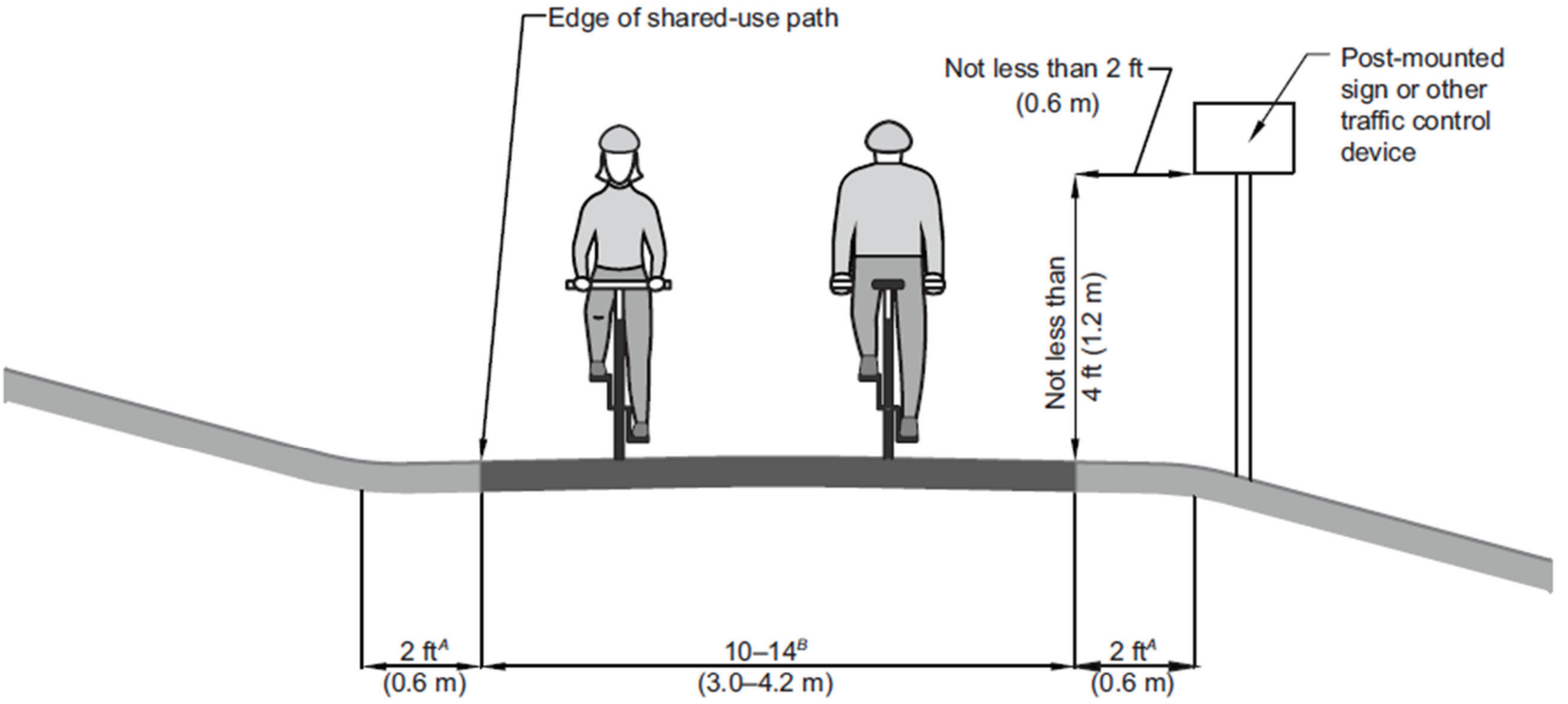
HORIZONTAL & VERTICAL CLEARANCE

Adequate horizontal and vertical clearance reduces the possibility of interfering or colliding into obstructions within a multi-use path right-of-way. These obstructions may include: signage, buses, large rocks, utilities, bridge piers, and poles. Refer to **Figure F-1** for a typical AASHTO cross-section of a typical horizontal and vertical clearance along with complete dimensions of a basic multi-use path.

Guidelines

- A minimum 2-foot horizontal clearance from the edge of the path needs to be provided to allow clearance from lateral obstructions such as bushes, signage, large rocks, above-ground utilities, bridge piers, abutments, and poles.
- Desirable vertical clearance is 10 feet.
- A minimum vertical clearance of 8 feet can be used in constrained areas but must be clearly marked to be visible at night and warn of low clearance.
- Vertical clearance greater than 10 feet will be needed for the passage of maintenance of emergency vehicles.

Figure F-1: AASHTO Guide to Bicycle Facilities Typical Cross Section of Two-Way, Shared Use Path on Independent Right-of-Way



Notes:
A (1V:6H) Maximum slope (typ.)
B More if necessary to meet anticipated volumes and mix of users, per the *Shared Use Path Level of Service Calculator*

HORIZONTAL OFFSETS

Horizontal offsets need to be used in locations where the multi-use path is adjacent to parallel bodies of water (outside of the floodplain) or on a downward slope. **Table F-2** presents the projected slopes to provide horizontal offset ratios from the bottom of a designated bank. Refer to the Drainage and Erosion Section of the AASHTO guide for additional horizontal offset for paths within a floodplain.

Guidelines

- When the projected slope is 1V:3H or steeper, the multi-use path must have a reasonable offset from the top of the bank or hinge point.
- The edge of the shoulder must be 5 feet from the top of the bank/hinge point or the projected slope (**Table F-2**), whichever is greater.
- Depending on the bank height and conditions at the bottom of the bank, a physical barrier, such as a fence, railing, or dense shrubbery, may be necessary.
- If a minimum 5-foot recoverable area (i.e., the distance between the edge of the path and the hinge point) cannot be achieved, a physical barrier or rails are recommended.

Table F-2. Projected Slopes to Provide Horizontal Offset

CONDITION	PROJECTED SLOPE FROM BOTTOM OF BANK[1]
Bank in residual soils	1.5:1
Bank in fills soils	2:0:1
Bank in coastal plain soils	2:5:1
Bank in alluvial soils[2]	3:0:1

[1] Only valid if bank height is 15 feet or less. Anything greater than 15 feet need to be assessed individually.

[2] Assume this condition if no other information is available.

HORIZONTAL CURVES

The horizontal curve radius must be based on the chosen design speed, typically assumed for multi-use paths to be between the 18-and 30-mph case. The multi-use path alignment must follow the contours of the land closely and, to the extent possible, preserve the natural terrain and vegetation. Meanders can be evaluated to provide potential tree preservation.

Guidelines

- Installation of signage warning of sharp turns needs to be implemented if sharper radii are used.
- Meanders in the path must be limited and appear to have a purpose.
- The NCDOT desired minimum horizontal curve is 60 feet, (18 mph design speed) but when ample room exists curves greater than 60-foot radii need to be implemented.

DESIGN SPEED

The design speed determines the geometric features of a new or existing multi-use path in the design process. The design speed can fluctuate depending on the context of the path, the user types expected, the path terrain, and other path characteristics. **Table F-3** shows the horizontal curves recommended for use at various design speeds. Engineering judgement needs to be applied on a case-by-case basis to determine the most appropriate design speed. In addition, other factors including stopping distance will need to be considered. The following examples from AASHTO help to illustrate these factors:

Guidelines

- According to AASHTO, the typical riding speed varies from 8-to 15-mph for cyclists.
- Multi-use paths anticipated to accommodate a variety of user types or frequent conflicts and constraints must be designed for lower design speeds than multi-use paths with few conflicts.
- Allow for an 18-mph design speed for relatively flat areas, except on inclines where high speeds can occur.
- Design speed within a maximum downhill terrain condition (6 percent or greater) is 30-mph
- Horizontal curvature in path design can reduce speed

Table F-3. Minimum Radii for Horizontal Curves

DESIGN SPEED (MPH)	MINIMUM RADIUS (FT.)
12	27
14	36
16	47
18	60
20	74
25	115
30	166

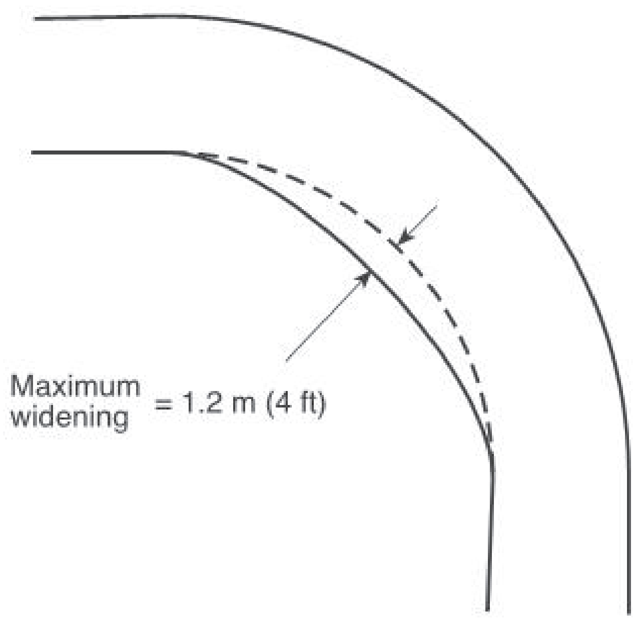
CURVE WIDENING

In some circumstances when environmental or physical constraints limit the geometrics, slower design speeds (12 to 16 mph) may be appropriate and sharper horizontal curves may be used. **Figure F-2** (taken from the *North Carolina Bicycle Facilities Planning and Design Guidelines*) provide an example of the maximum widening of 4 feet to a path. The suggested minimum curve widening within the Town is 2 feet.

Guidelines

- Wider paths (12 feet or greater) or curve widenings are recommended to let users navigate the effects of substandard curves.
- Curve widening of 2 to 4 feet must be implemented.

Figure F-2: North Carolina Bicycle Facilities Planning and Design Guidelines Curve Widening Example



STOPPING SIGHT DISTANCE AND MINIMUM VERTICAL CURVE

Providing multi-use path users with opportunities to visually see unexpected conditions can be achieved through designing appropriate stopping sight distances. The *AASHTO Guide for the Development of Bicycle and Pedestrian Facilities* has been referenced to present stopping sight distance (SSD) in the figures below. **Figure F-3** presents the minimum (SSD) controlled by the ascending grade. **Figure F-4** shows the determined stopping sight distance vs. the grade in a descending path. **Figure F-5** then shows the minimum SSD that can be used to determine the minimum crest vertical curve length.

Guideline

- Minimum length of a vertical curve is 3 feet

Figure F-3: AASHTO Guide for the Development of Bicycle Facilities Minimum Stopping Sight Distance vs Grades – Ascending

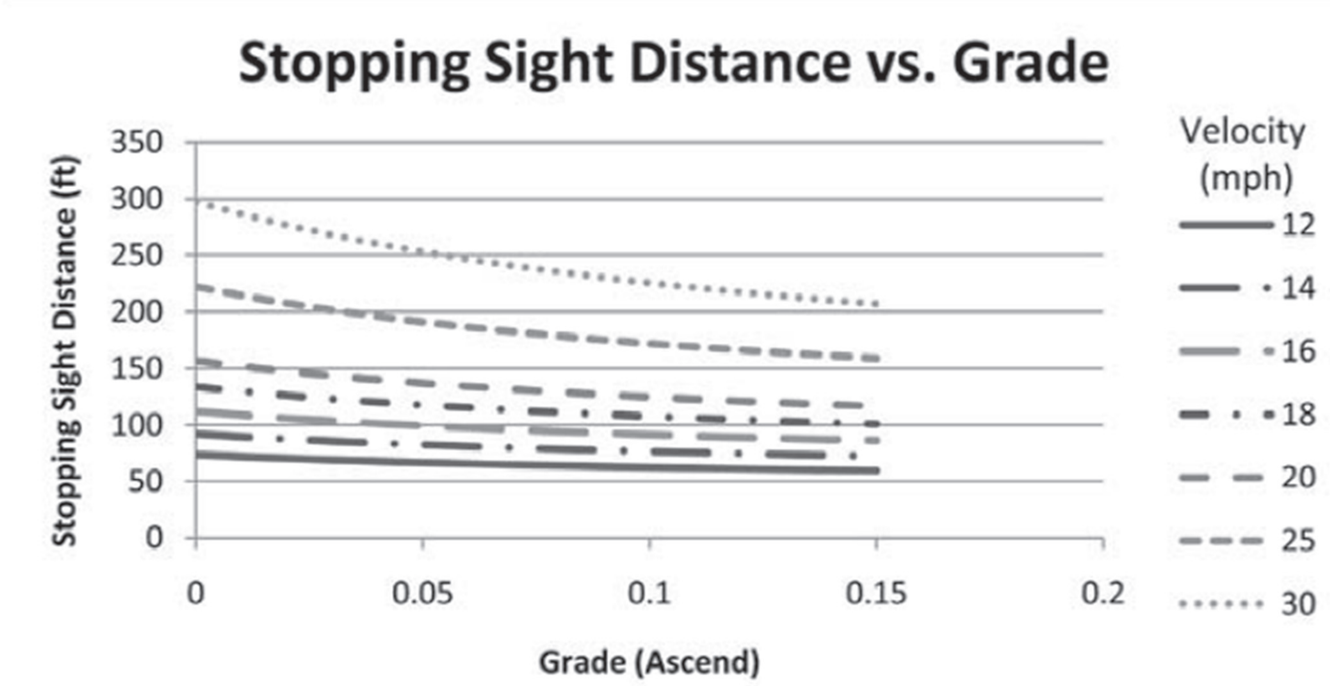


Figure F-4: AASHTO Guide for the Development of Bicycle Facilities Minimum Stopping Sight Distance vs Grades – Descending

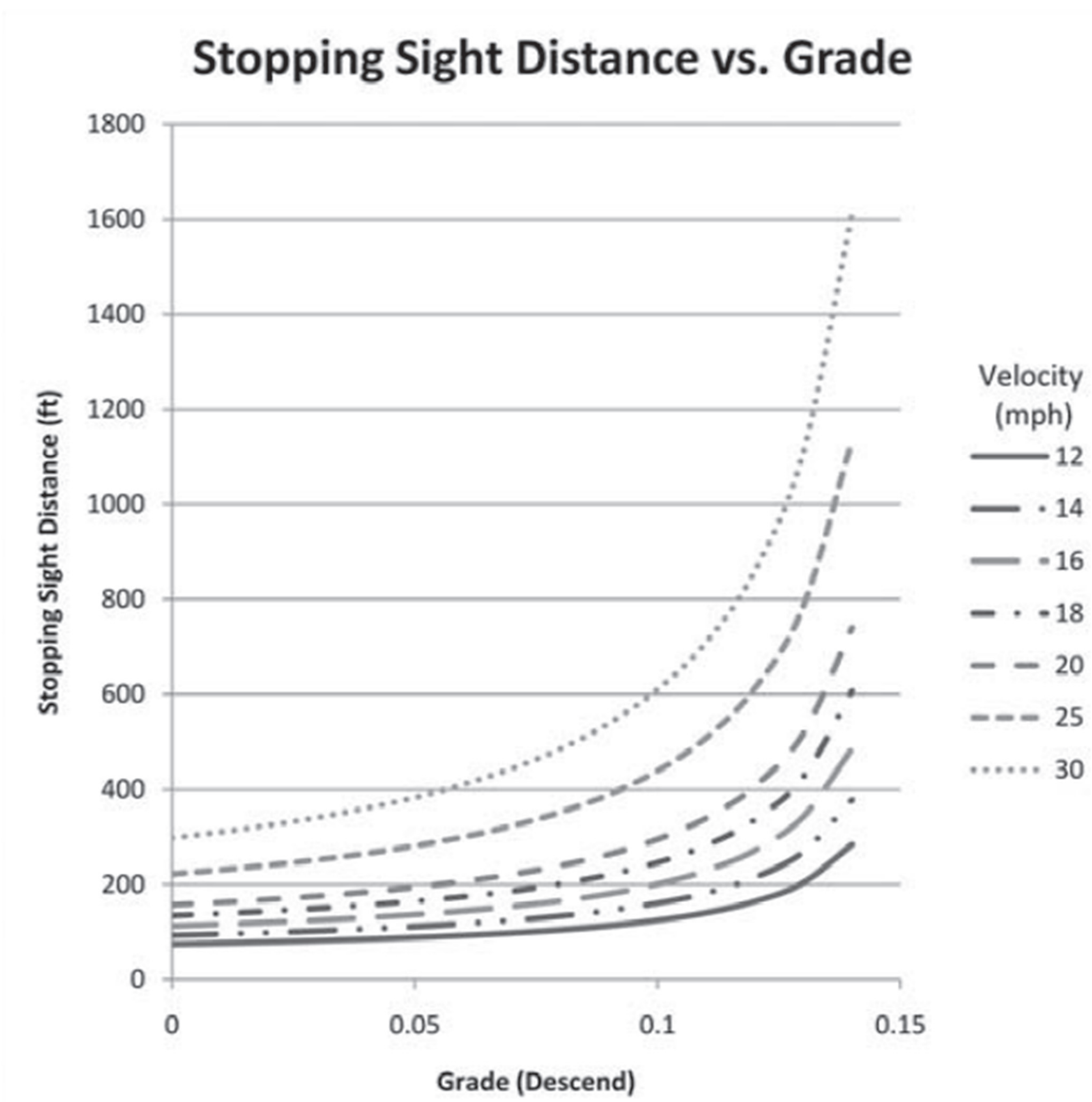


Figure F-5: AASHTO Guide for the Development of Bicycle Facilities Minimum Length of Crest Vertical Curve

U.S. Customary

A	S = Stopping Sight Distance (ft)														
(%)	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300
2												30	70	110	150
3								20	60	100	140	180	220	260	300
4						15	55	95	135	175	215	256	300	348	400
5					20	60	100	140	180	222	269	320	376	436	500
6				10	50	90	130	170	210	267	323	384	451	523	600
7				31	71	111	151	191	231	311	376	448	526	610	700
8			8	48	88	128	168	208	248	356	430	512	601	697	800
9			20	60	100	140	180	220	260	400	484	576	676	784	900
10			30	70	110	150	190	230	270	444	538	640	751	871	1000
11			38	78	118	158	198	238	278	489	592	704	826	958	1100
12		5	45	85	125	165	205	245	285	533	645	768	901	1045	1200
13		11	51	91	131	171	211	251	291	578	699	832	976	1132	1300
14		16	56	96	136	176	216	256	296	622	753	896	1052	1220	1400
15		20	60	100	140	180	220	260	300	667	807	960	1127	1307	1500
16		24	64	104	144	184	224	264	304	711	860	1024	1202	1394	1600
17		27	67	107	147	187	227	267	307	756	914	1088	1277	1481	1700
18		30	70	110	150	190	230	270	310	800	968	1152	1352	1568	1800
19		33	73	113	153	193	233	273	313	844	1022	1216	1427	1655	1900
20		35	75	115	155	195	235	275	315	889	1076	1280	1502	1742	2000
21		37	77	117	157	197	237	277	317	933	1129	1344	1577	1829	2100
22		39	79	119	159	199	239	279	319	978	1183	1408	1652	1916	2200
23		41	81	121	161	201	241	281	321	1022	1237	1472	1728	2004	2300
24	3	43	83	123	163	203	243	283	323	1067	1291	1536	1803	2091	2400
25	4	44	84	124	164	204	244	284	324	1111	1344	1600	1878	2178	2500

Shaded area represents S < L
Minimum length of vertical curve = 3 ft

ADA COMPLIANCE

ADA accessibility guidelines must reflect the Proposed Public Rights-of-Way Accessibility Guidelines (PROWAG) which is developed by the U.S. Access Board. The PROWAG provides draft accessibility guidelines for the design, construction, and alteration of pedestrian facilities in the public right-of-way. The guidelines ensure that sidewalks, pedestrian street crossings, pedestrian signals, and other facilities for pedestrian circulation and use constructed or altered in the public right-of-way by state and local governments are readily accessible to and usable by pedestrians with disabilities. Compliance with the accessibility guidelines will be mandatory when they are finalized and adopted. Notable ADA compliant public right-of-way must focus on cross-slope and superelevation, longitudinal grades, ramps and landings, and surface material design.

Cross-Slope and Superelevation

Cross-slope is provided as an important safety feature for users but is also calculated for appropriating drainage of water off the surface to a drainage system such as a street gutter or ditch. PROWAG states that individuals with disabilities, such as wheeled mobility devices, generally need less steep slopes to conserve energy and to better maintain control of the wheeled mobility device. NCDOT guidelines recommends that grades greater than 5% are undesirable. In addition, steep grades affect the safety of all users, particularly where multiple types of users are on the path at the same time.

Guidelines

- Maximum cross slope for the trail is 2%. The preference is to have the trail sloped in one direction. If a center crowned typical section is needed, the maximum cross slope is 1%.
- AASHTO maximum allowance cross slope for shoulders is 6H:1V.
- Superelevation is not required since it is accounted for with the horizontal curvature. If cross slope does need to transition, the transition length must be a minimum of 5 feet per one percent of change.

Longitudinal Grades

Longitudinal grade is also referred to as running grade. In 2011, the United States Access Board (USAB) issued the *Advance Notice of Proposed Rulemaking (ANPRM) on Accessibility Guidelines for Shared Use Paths* and, in 2013, a supplemental notice of rulemaking (SNPRM) to provide clarification on the longitudinal grade requirements. **Table F-4** provides regulatory constraints that would include federal, state, or local laws with the purpose of preserving threatened or endangered species; the environment; or archaeological, cultural, historical, or significant natural features that would be adversely affected by the additional gradient. However, USAB acknowledged that there will be circumstances in which full compliance with the grade requirements may not be practical due to physical or regulatory constraints. Physical constraints would include existing terrain or infrastructure, right-of-way availability, notable natural features, or any similar existing physical constraint. The suggested minimum longitudinal grade is 0.5 percent. The information below provides more clarity about special cases for implementation.

Guidelines

- Multi-use paths will not exceed the general grade established for the adjacent street or highway, within a highway or street right-of-way.
- Maximum 5% grade within a highway or street right-of-way.

Table F-4. Maximum Running Slope and Segment Length when Physical or Regulatory Constraints Exist

RUNNING SLOPE OF TRAIL SEGMENT		MAXIMUM LENGTH OF SEGMENT
Steeper Than	*But Not Steeper Than*	
1:20 (5%)	1:12 (8.33%)	200 feet
1:12 (8.33%)	1:10 (10%)	30 feet
1:10 (10%)	1:8 (12%)	10 feet

If the terrain requires steep runs longer than the allowable distance, resting intervals need to be provided at the top and bottom of each segment. A resting interval is also required any time the running slope exceeds 1:20 (five percent). Resting intervals may be provided within or adjacent to the path tread. When the resting area is within the path tread, it must be 60 inches long and at least as wide as the path. When the resting area is adjacent to the path, it must be 60 inches long and 36 inches wide and provide a minimum 4-foot by 4-foot turning space. The surface of the resting area cannot exceed 1:48 (two percent) in any direction.

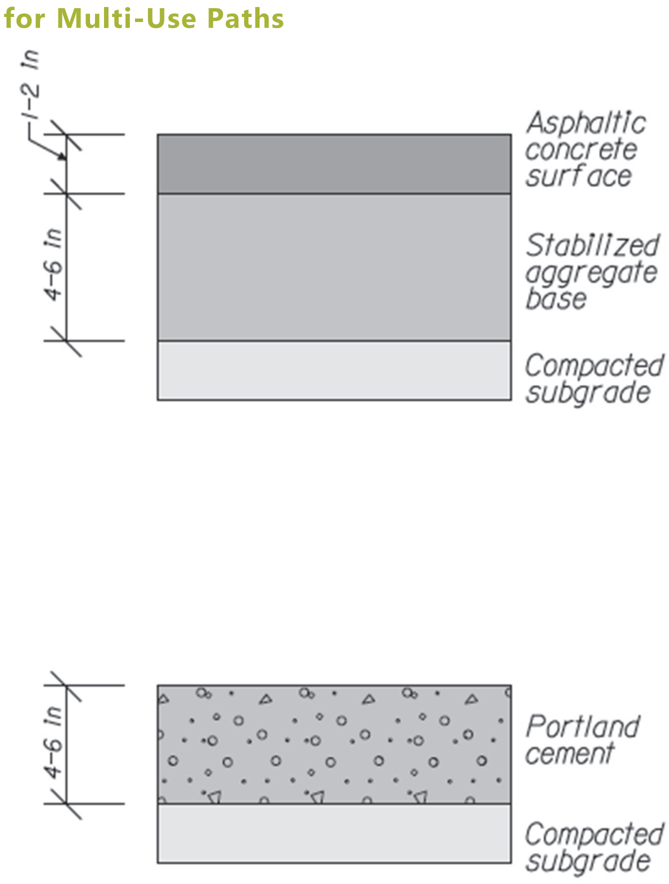
Ramps and Landings

Curb ramps provide access between the multi-use path and roadway for people using wheelchairs, strollers, walkers, crutches, handcarts, bicycles, and for pedestrians with mobility impairments who have trouble stepping up and down high curbs. Curb ramps must be installed at all intersections and midblock locations where pedestrian crossings exist, as mandated by federal legislation (1973 Rehabilitation Act and 1990 Americans with Disabilities Act). The running slope of a curb ramp must not exceed 1:12 (8.33%).

Guidelines

- Detectable warnings need to be placed across the path width, adjacent to the roadway.
- *Proposed Rights of Way Accessibility Guidelines (PROWAG)* states handrails are required on ramp runs with a rise greater than 6 inches, but are not required for pedestrian circulation paths.
- Any side flares associated with the ramp must be outside the path width.

Figure F-6. Typical Pavement Structural Sections for Multi-Use Paths



Surface Material

The specific pavement section for multi-use paths is dependent on the site-specific soils, loads, and construction practices. According to AASHTO, cement concrete typically has a longer service life, reduced susceptibility to cracking and deformation from roots and weeds, and a more consistent riding surface after years of use and exposure to natural elements. A drawback of cement concrete pavements is that pavement markings (such as centerlines) can have a lower contrast against the concrete surface. Asphalt includes a smooth surface, but is less durable with a typical life expectancy of 15-20 years. Unpaved surfaces are typically only appropriate on rural paths, where the intended use of the path is primarily recreational, or as a temporary measure to open a path before funding is available for paving. Within the Town of Morrisville asphalt should be used for paths outside of roadway rights-of-way, and concrete should be used for paths within roadway rights-of-way. **Figure F-6** on this page shows a range of materials that may be used for multi-use paths.

Intersections

MULTI-USE PATH INTERSECTION

When two paths intersect, the users need to be alerted before approaching a crossing multi-use path with appropriate signage. Advanced warning signs shown in **Figure F-7**, from the *MUTCD* Intersection Warning Sign template (W2-1,2,3,4,5) must be placed near the multi-use path intersection. Advanced warning signs need to be placed a minimum of 50 feet from the crossing and directional signs needs to be placed on the corners. The crossing paths must try to be aligned at a 90-degree angle when possible. The line of sight as the two paths converge must be kept clear of obstructions.

Figure F-7. Warning Signs and Plaques for Multi-Use Path Intersections

MID-BLOCK CROSSINGS

Mid-block crosswalks facilitate crossings in non-intersection places within the middle of corridor or street networks and where heavy pedestrian crossings occur. Because of their location away from an intersection, mid-block crossings can experience challenges with visibility and driver recognition. As a result, mid-block crossings are only intended to be used in limited and unique circumstances. The mid-block crosswalk is recommended to be a high-visibility crosswalk to help alert motorists of the crossing. Warning signs shown in **Figure F-8**, such as the Combination Bike Pedestrian Crossing (W11-15) and any associated plaque (W11-15P, W16-7P, or W16-9P), Turning Vehicles Yield to Peds (R10-15), Yield/Stop Here for Pedestrians (R1-5a, R1-5b, R1-5c), Yield (R1-2), and Stop (R1-1) must be considered along the roadway. Refer to *MUTCD* Table for sign dimensions and 2C-4, "Guidelines for Advanced Placement of Warning Signs" for specific sight condition requirements. Depending on the crossing pavement markings, yield bars, stop bars, or crossing bicycle symbols could also be installed. Illustrations from *AASHTO Guide to the Development of Bicycle Facilities* depicting examples of mid-block path-roadway intersections are shown in **Figures F-9 – F-13**.

Guidelines

- 10' wide crosswalk, high-visibility with ladder bar pattern, across the road with curb ramps at each end.
- Raised crossings increase visibility, yielding behavior, and create a safer pedestrian crossing environment.
- Medians or safety islands create a 2-stage crossing for pedestrians, which creates an easier and safer crossing.
- Pedestrian Hybrid Beacon: Installed at mid-block crosswalks, the Pedestrian Hybrid Beacons (PHB), formerly known as the HAWK, remains dark until a pedestrian presses a pushbutton to activate the system.
- PHB systems include count-down pedestrian signal heads that indicate to pedestrians when they can cross.
- Mid-block crossings are not recommended on roadways with posted speeds ≥ 40 MPH unless a signal is installed.

Figure F-8. Regulatory Signs and Plaques for Multi-Use Crossings

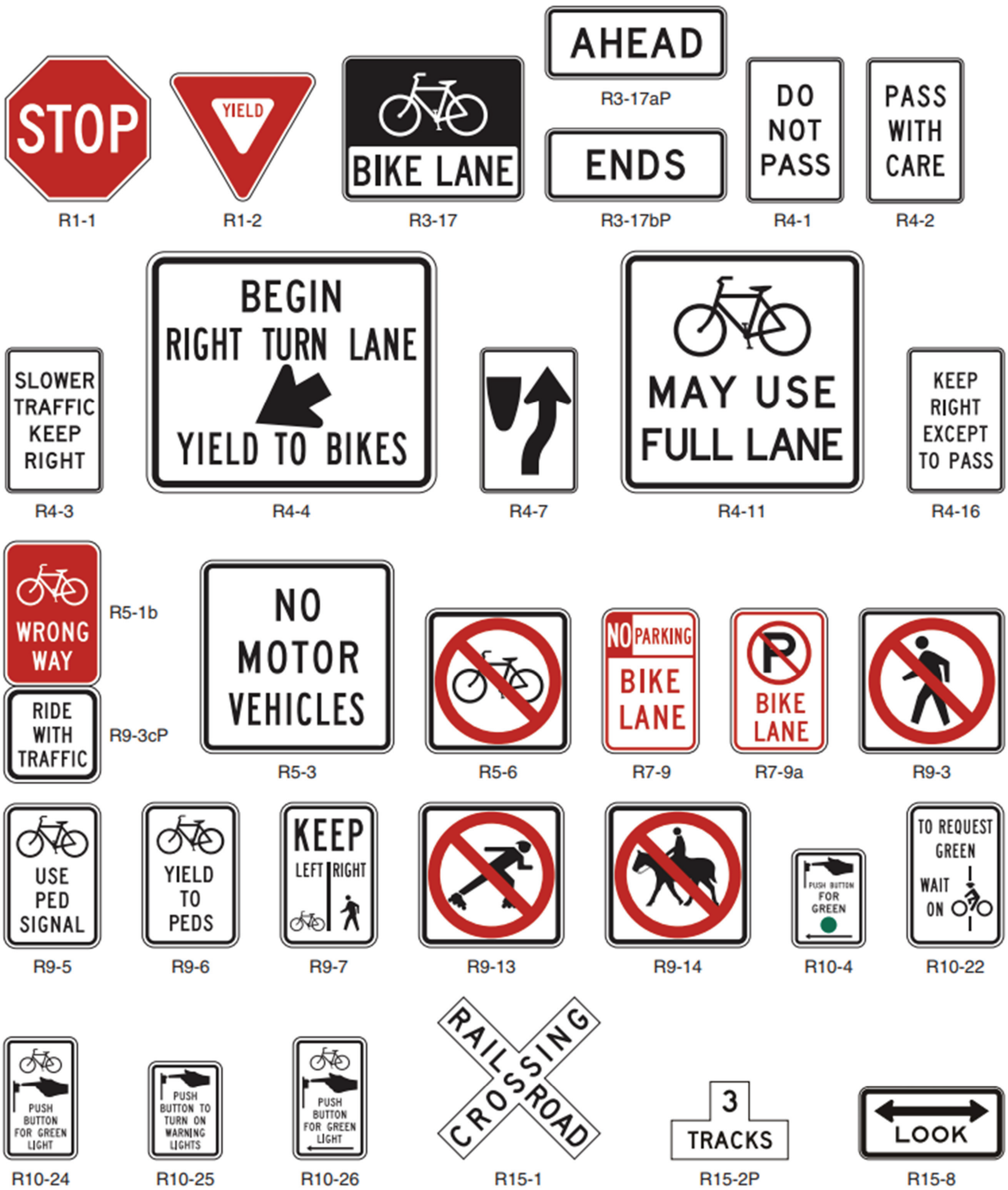


Figure F-9: Mid-Block Crossing - Roadway Yield Controlled

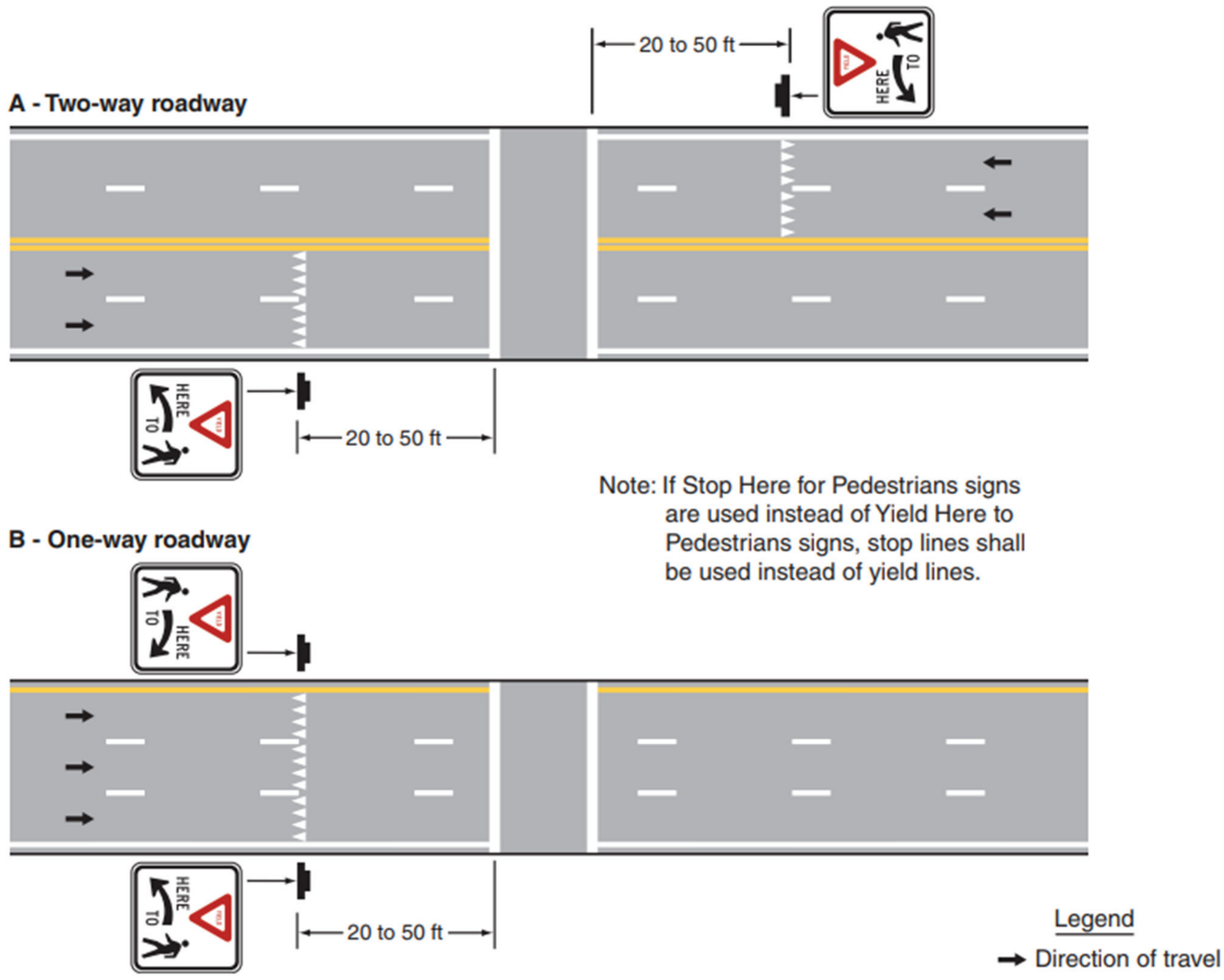
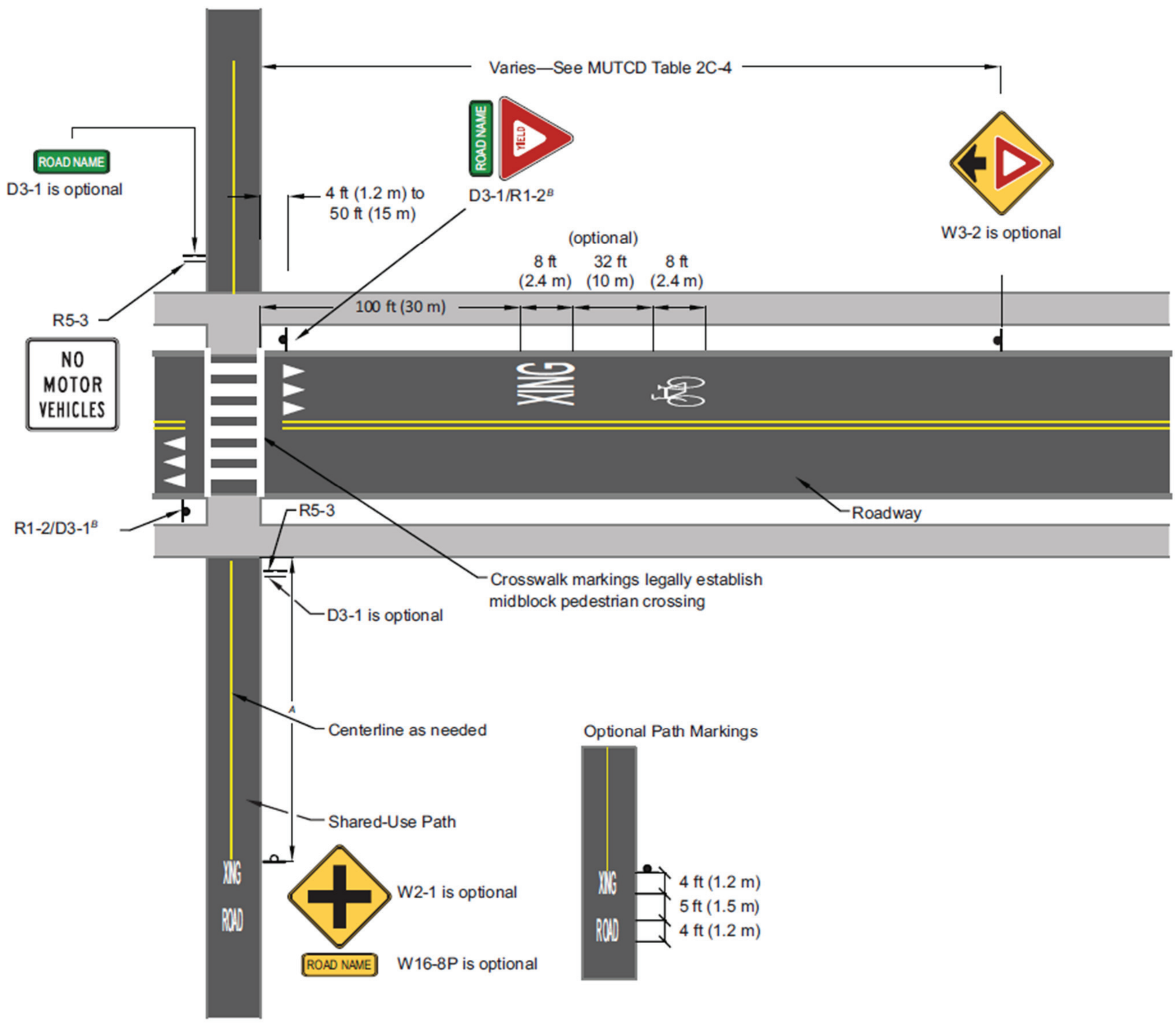


Figure F-10: Mid-Block Crossing - Roadway is Yield Controlled

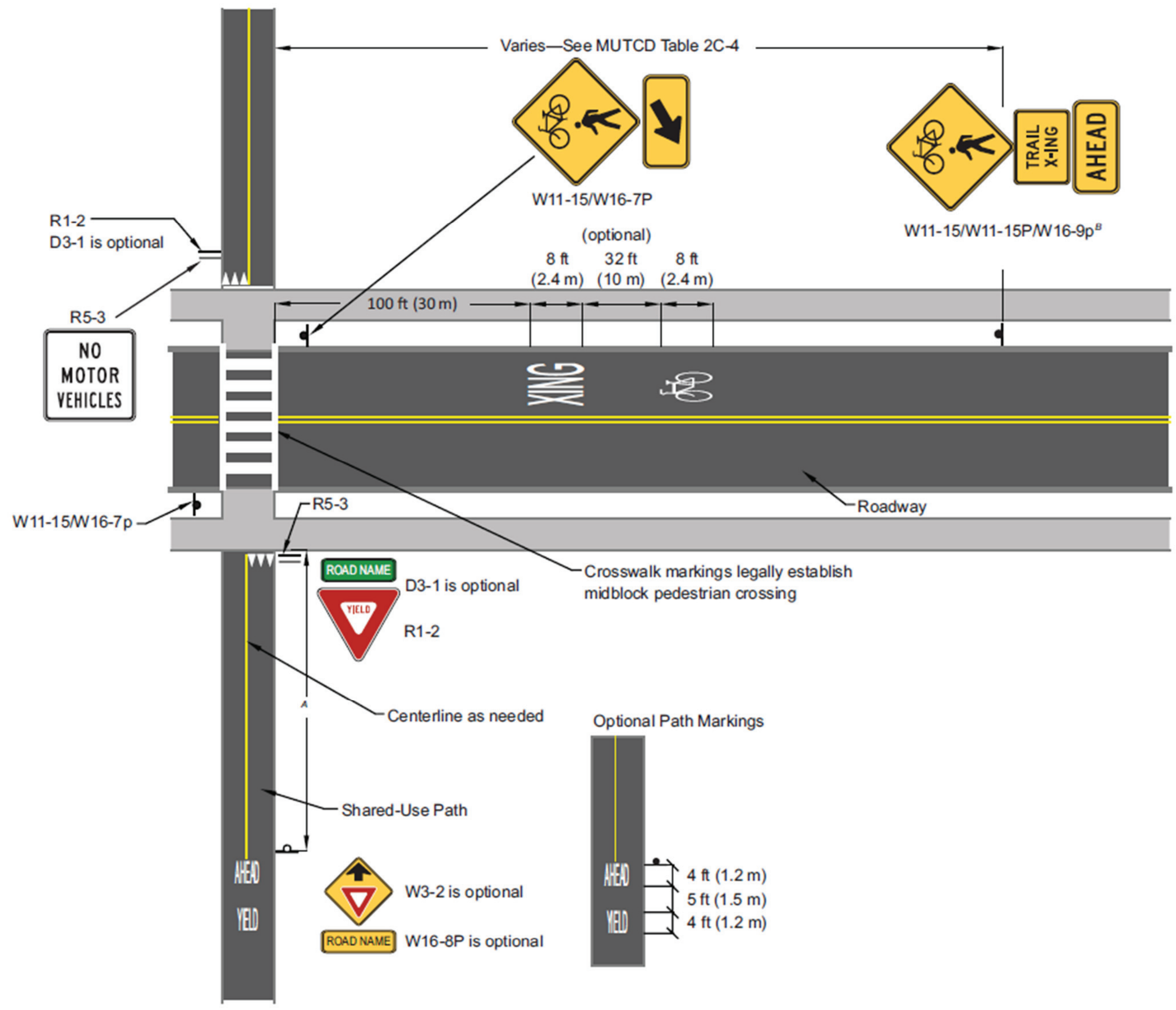


Notes:

A Advance warning signs and solid centerline striping should be placed at the required stopping sight distance from the roadway edge, but not less than 50 ft (15 m).

B D3-1 sign is optional, R1-2 sign is required. At multilane road crossings, the R1-5 series (Yield Here To/Stop Here for Pedestrians signs and markings, placed in advance of the crosswalk to reduce muliple-threat crashes) may be a more appropriate solution.

Figure F-11: Mid-Block Crossing - Path Yield Controlled

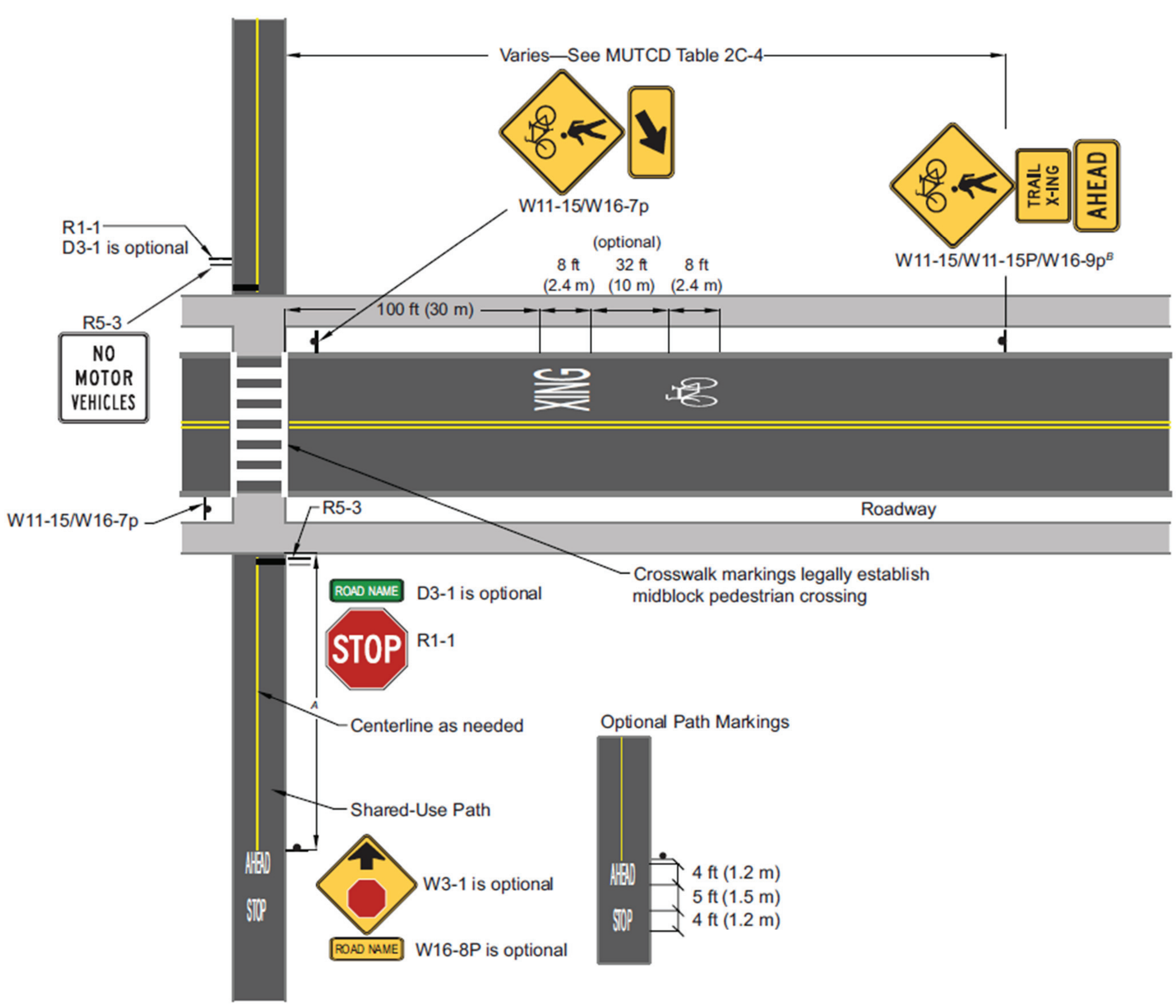


Notes:

A Advance warning signs and solid centerline striping should be placed at the required stopping sight distance from the roadway edge, but not less than 50 ft (15 m).

B W11 series sign is required, supplemental plaques are optional.

Figure F-12: Mid-Block Crossing - Path is Stop Controlled

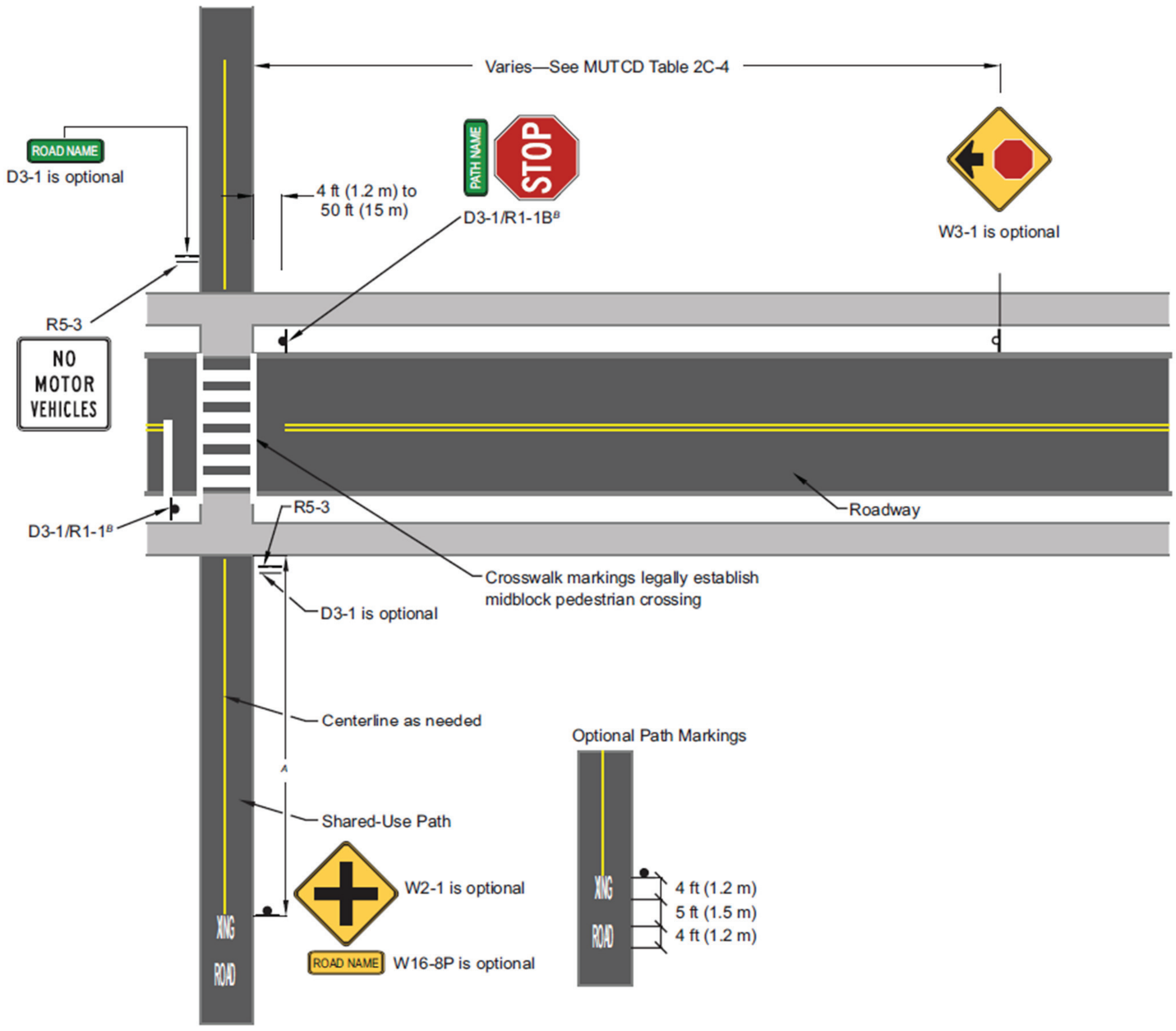


Notes:

A Advance warning signs and solid centerline striping should be placed at the required stopping sight distance from the roadway edge, but not less than 50 ft (15 m).

B W11 series sign is required, supplemental plaques are optional.

Figure F-13: Mid-Block Crossing - Roadway is Stop Controlled



Notes:

[A] Advance warning signs and solid centerline striping should be placed at the required stopping sight distance from the roadway edge, but not less than 50 ft (15 m).

[B] D3-1 sign is optional, R1-2 sign is required. At multilane road crossings, the R1-5 series (Yield Here To/Stop Here for Pedestrians signs and markings, placed in advance of the crosswalk to reduce muliple-threat crashes) may be a more appropriate solution.

To further enhance the visibility and safety of mid-block crossings, raised pedestrian refuge islands and Pedestrian Hybrid Beacons (PHB) need to be evaluated. Higher speed and volume roadways or multi-roadway lane crossings (i.e., greater than 35 mph and greater than three lanes of traffic) pose a greater need to install the refuge island or provide a PHB.

The refuge island must be a minimum of 6 feet wide, extend at least 6 feet in each direction prior to the crossing, provide a 10-foot opening, and have proper taper for roadway users. The island width must be maximized to the widest available width to help provide additional protection to path users. It is preferred that the walkway through the island be an at-grade passage rather than ramps and landings. Engineering judgement needs to be applied when determining if a PHB beacon is warranted. Refer to Chapter 4 of the *MUTCD* for guidance on when a PHB is appropriate.

SIGNALIZED CROSSINGS

Signalized crossings provide the most controlled crossing for both non-motorized and motorized users. The crossing needs to be highly visible with controlled signage, according to the *MUTCD* pedestrian signal indications must be used at traffic signals wherever warranted.

Guidelines

- 10' wide crosswalk, high visibility with ladder bar pattern, across the road with curb ramps at each end.
- If a signalized crossing is within 400 feet of the path crossing, it is recommended to try and route the users to the signalized crossing.
- The crossing can be actuated or included in the standard signal timing.
- If several signals are timed together, it is recommended to include the crossing in the timing as to not interfere with the motorized traffic patterns.

Multi-Use Path Structures and Easements

STRUCTURES

Boardwalk

Boardwalks provide an opportunity to construct a path in a sensitive natural or inundated area while limiting the potential environmental impacts. They are typically used to cross wetlands or small creeks. Boardwalks are usually constructed of timber, concrete, or recycled plastic decking. Span lengths can vary but typically, the longest boardwalk span is 20 feet. If a longer span is needed, a pedestrian bridge maybe more applicable. The maximum boardwalk span will vary some depending on the material used. AASHTO prefers a boardwalk to be wide enough to provide a 2-foot clearance on both sides of the pathway, but under constrained conditions, may allow the boardwalk clearance width to taper to the path width. The boardwalk minimum width needs to be the same as the width of the multi-use path.

Railing

A 6-inch curb rail is recommended on boardwalks elevated less than 30 inches. Any boardwalk elevated 30 inches or greater will require a minimum of a 42-inch railing; however, a 48-inch minimum is preferred to prevent bicyclists from falling over the railing during a crash. However, NCDOT requires a height of 54 inches. In accordance with AASHTO requirements, openings between horizontal and vertical members on a railing needs to be small enough that a 6-inch sphere cannot pass through them in the lower 27 inches and an 8-inch sphere cannot pass through the portion 27 inches or higher. PROWAG also requires that a 4-inch sphere not pass under the lowest horizontal member. When a railing is provided, continuous handrails on both sides of the boardwalk must be provided. Handrails must be provided with a minimum 1.5-inch knuckle space between the railing and the vertical and horizontal members, fencing, or other portions of the rail assembly. The rails must be located 36 inches above the deck surface. The handrail will also serve as a rubrail to protect handlebars from being caught in the vertical members.

Structural Design

At a minimum, boardwalks must be structurally designed to support five tons of capacity (H5 loading) and signed as “No Motor Vehicles” (R5-3). Coordination with the Town is needed prior to design to ensure additional loading requirements will not be necessary. Boardwalk footings need to include uplift as well as loading considerations for flood events. Each project will be unique and member sizing and post footing design will need to be completed by a structural engineer. If a boardwalk is being used to span a creek, engineering judgement needs to be applied to the offset of the endbent from the top of bank. Some creeks tend to migrate over time and this movement of the top of bank must be factored into the location of the endbent. The endbent need to generally be offset 10 to 20 feet from the top of bank.

The boardwalk vertical elevation need to be designed to provide a minimum of 6 inches of clearance below the bottom of the cap (or bottom of the stringer if spread footing) and the existing ground to allow debris to pass under the boardwalk. If the boardwalk is within a floodplain, it is preferred to set the boardwalk grade high enough to keep the bottom stringer out of the 100-year flood elevation. If the boardwalk crosses a small creek, an engineer needs to hydraulically evaluate what elevation the boardwalk needs to be set as to not restrict flow. When a boardwalk is proposed in a wetland or over a blue line stream, local, state, and federal permits will be required. Coordination will be needed with the Town and relevant review agencies to receive the latest guidance on what elevation to set the boardwalk to avoid permanent impacts to wetlands.

Bridges and Underpasses

Bridges or underpasses can be used when grade separation is needed to cross a wider stream, roadway, or railroad. The type and size of the bridge can vary depending on the multi-use path and specific site requirements. If the grade separation is for crossing a roadway or railroad, a bridge or underpass may be used. The adjacent topography typically guides which option is more practical but bridges are typically preferred because they provide less security and drainage challenges. The preferred option must be discussed with the Town prior to completing design. AASHTO prefers a bridge be wide enough to provide 2 feet of clearance on both sides of the pathway but, under constrained conditions, may allow the bridge clearance width to taper to the path width. The minimum bridge width must equal the designated path width.

Railing

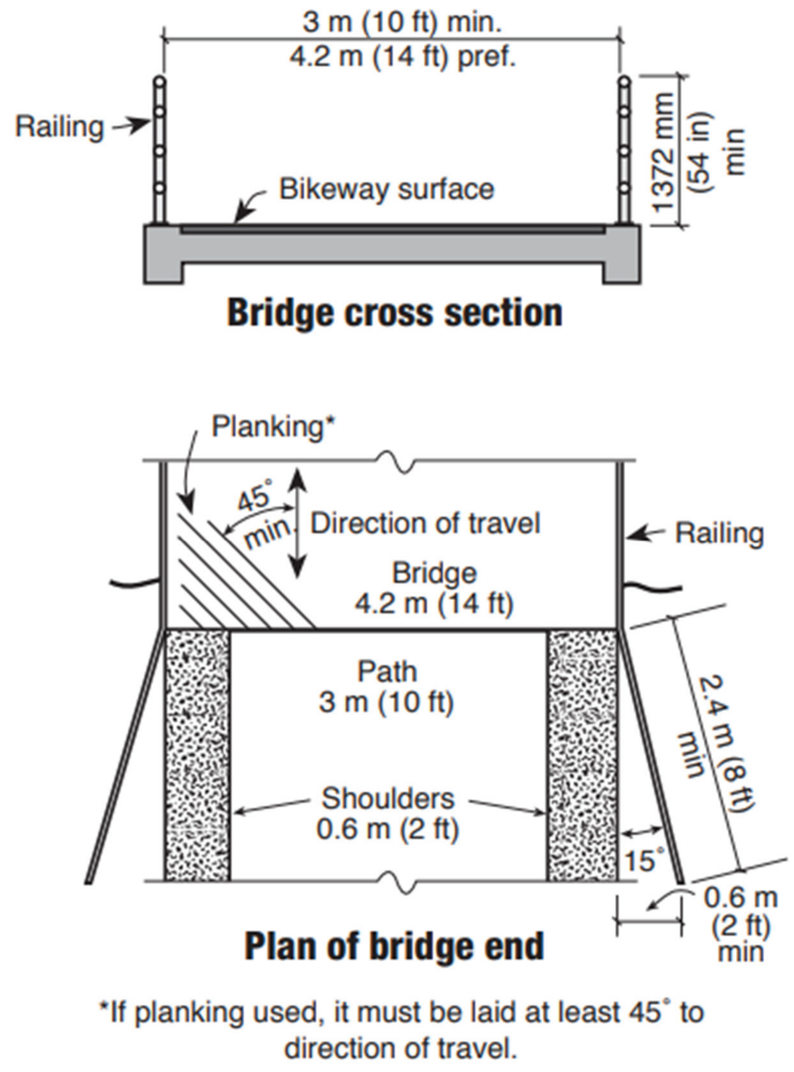
NCDOT Bicycle Facilities Planning and Guidelines recommends a minimum 54-inch vertical hand railing to prevent bicyclists from falling over the railing during a crash. In accordance with AASHTO requirements, openings between horizontal and vertical members on railing must be small enough that a 6-inch sphere cannot pass through them in the lower 27 inches and an 8-inch sphere cannot pass through the portion 27 inches or higher. PROWAG also requires that a 4-inch sphere not pass under the lowest horizontal member. The bridge must be provided with continuous handrails on both sides of the bridge. Handrails must be provided with a minimum 1.5-inch knuckle space between the railing and the truss verticals and diagonals, fencing, or other portions of the rail assembly. The rails must be located 36 inches above the deck surface. The handrail will also serve as a rub rail to protect handlebars from being caught in the vertical members.

Structural Design

If authorized vehicular traffic is anticipated on the bridge, the bridge must be designed to support a minimum of 10 tons of capacity (H-10). If all vehicular traffic will be restricted and the bridge is 6 to 10 feet wide, the bridge needs to be designed to support a minimum of five tons of capacity (H-5) with signs added noting the restriction. Coordination with the Town will be needed prior to design to ensure additional loading requirements will not be necessary. Bridge decks with widths over 10 feet must be designed for H-10 loading.

When crossing streams, the bridge needs to be aligned to cross perpendicular to and at the narrowest section of the stream channel to minimize impacts. The bridge span and height of the bridge cords will be controlled by the floodway and impacts to the base flood elevation of streams. The bridge length must be designed to provide the endbent 10 to 20-feet offset from the top of bank. Scour documentation will be required to justify the endbent locations. Elevations need to be, at a minimum, high enough to pass the 25-year storm and receive necessary FEMA approvals. When feasible, the 100-year storm event elevations must also be accommodated. A 15-foot approach slab with flared safety rail must be on both sides of the bridge. All abutment and foundation design must be completed and sealed by a professional structural engineer. All pedestrian bridges will require local building, storm water, land disturbance, and floodplain development permits as well as FEMA approval. **Figure F-14** shows bridge widths and clearances.

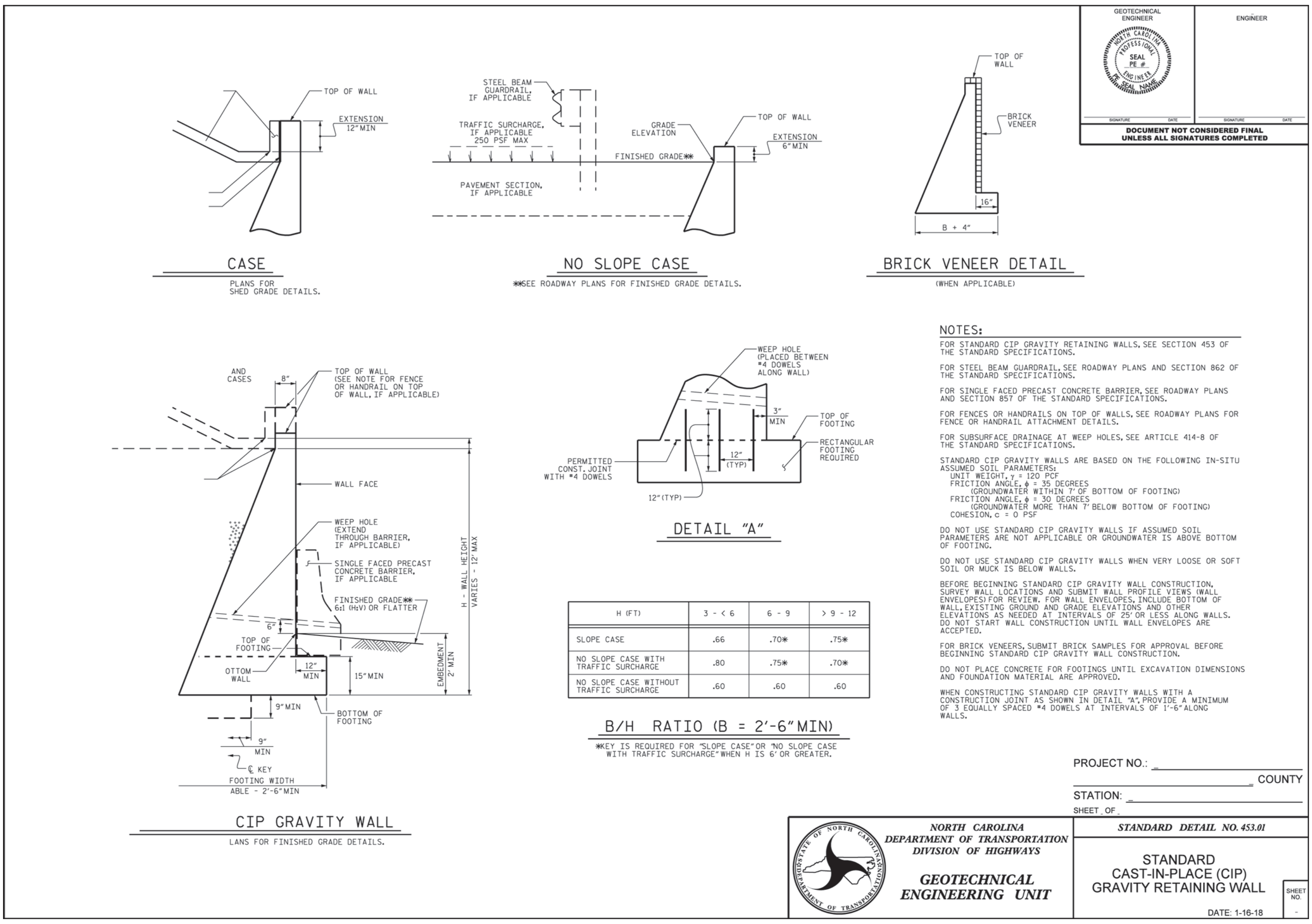
Figure F-14. Bridge Widths and Clearances



Retaining Walls

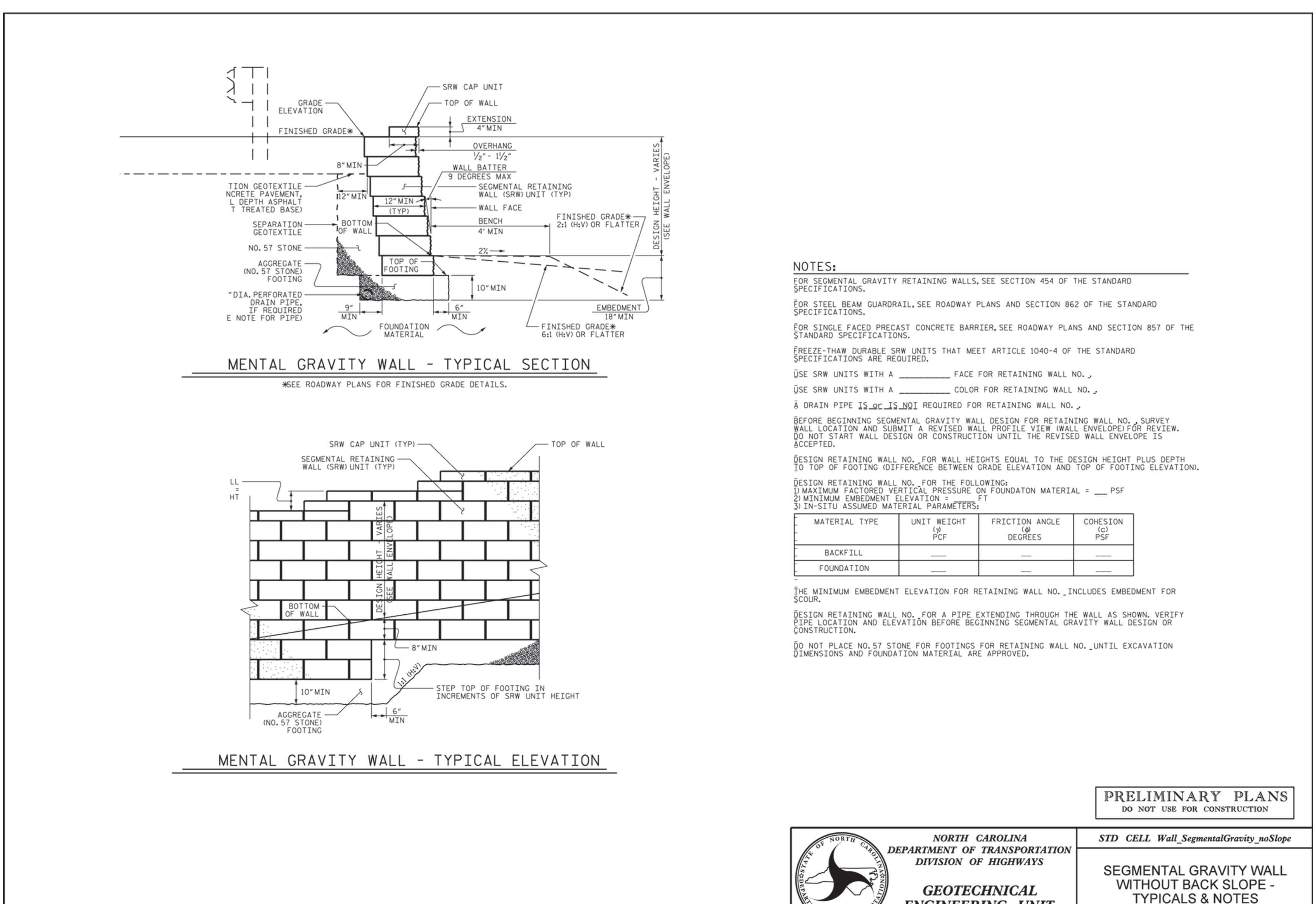
Retaining walls need be designed in accordance with NCDOT retaining wall standards. Engineering judgement needs to be used when determining the site-specific wall type but options include mechanically stabilized earth (MSE) walls, concrete block walls, and soldier pile walls. See NCDOT wall type details in **Figure F-15** and **Figure F-16.** The full size NCDOT Standard Drawing plan sheets can be found on the Connect NCDOT website. Where appropriate, an anti-graffiti application needs be applied to retaining walls. Safety rails are required when a wall greater than 30 inches in height is proposed. Upon approval by the Town, the safety fence maybe eliminated if the edge of path is offset greater than 5 feet or the existing condition above the wall does not warrant the safety rail.

Figure F-15: Standard Cast-In-Place (CIP) Gravity Retaining Wall



H (FT)	3 - < 6	6 - 9	> 9 - 12
SLOPE CASE	.66	.70*	.75*
NO SLOPE CASE WITH TRAFFIC SURCHARGE	.80	.75*	.70*
NO SLOPE CASE WITHOUT TRAFFIC SURCHARGE	.60	.60	.60

Figure F-16. Standard Segmental Gravity Retaining Wall



MATERIAL TYPE	UNIT WEIGHT (γ) PCF	FRICTION ANGLE (ϕ) DEGREES	COHESION (c) PSF
BACKFILL	___	__	___
FOUNDATION	___	__	___

EASEMENTS

Temporary Construction Easement

The area provided for a Temporary Construction Easement (TCE) needs to be sufficient for the contractor to construct the path but not so extensive as to unnecessarily impact trees and the surrounding natural area. Generally, providing a temporary construction easement limit that is offset 5 feet from the construction limits is adequate. This allows the contractor 3 feet from the construction limit to work and 2 feet behind the silt fence to maintain it.

Permanent Easement

A permanent easement provides permanent public access to a path outside of public right-of-way. A Permanent Easement (PE) gives the path owner permission to maintain the path and gives the path user permission to access it.

- The suggested minimum PE width is 20 feet (10 feet centered about the path). Additional width may be acquired in an unconstrained corridor and will provide flexibility during construction.

Future Easements

A future easement, consisting of a permanent public access easement that is being dedicated for a future path, must be 30 to 50 feet wide.

- If the PE will be a shared use easement with utilities such as sanitary sewer, water, gas, or power, the PE needs to be established to provide a minimum clearance of 20 feet from the outside edge of the utilities (pipe, manhole, etc.).
- Additionally, the PE must not be within the floodplain without prior approval from the Town. Refer to the Drainage and Erosion Control section for additional clarification on easements within floodplains in 5-28 of the *MUTCD*.

TRAIL ACCESS

Trailheads

Trailheads provide an opportunity for a transition between motorized and nonmotorized transportation and recreational systems. Trailheads can also provide a location for many amenities, including automobile and bicycle parking, restrooms, drinking fountains, picnic areas, trash and recycling receptacles, dog waste stations, bicycle repair stations, and path wayfinding signs. An easy way to provide access to a path is to use existing public facilities such as schools, libraries, Town Hall, and parks.

There is no set standard for the frequency of trailheads. The best way to determine where and how often to install a trailhead is to conduct user counts, vehicle counts, and surveys across the existing multi-use path system. Not all trailheads need to be the same size. There can be major and minor trailheads. A major trailhead would provide parking for 10-40 vehicles, while a smaller trailhead would provide parking for 10 vehicles or less. Both are required by the Town of Morrisville to be paved and to be ADA compliant.

Guidelines

- Emergency and maintenance vehicles access and turnaround areas must be provided.
- At least one ADA accessible parking space per every 25 spaces is needed.
- Bike racks (approved by the Town) need to be provided, with one bike space for every one parking space, and no less than five bike spaces at any trailhead.
- Wayfinding signage needs to be provided that directs multi-use path users to the path.
- An accessible pathway must be provided from parking and other accessible elements to the multi-use path.
- Lighting must be provided at the parking lot and trail intersection. Refer to the Lighting section for additional requirements.
- Benches and other amenities need to be provided to users/visitors.

Multi-Use Path Enhancements

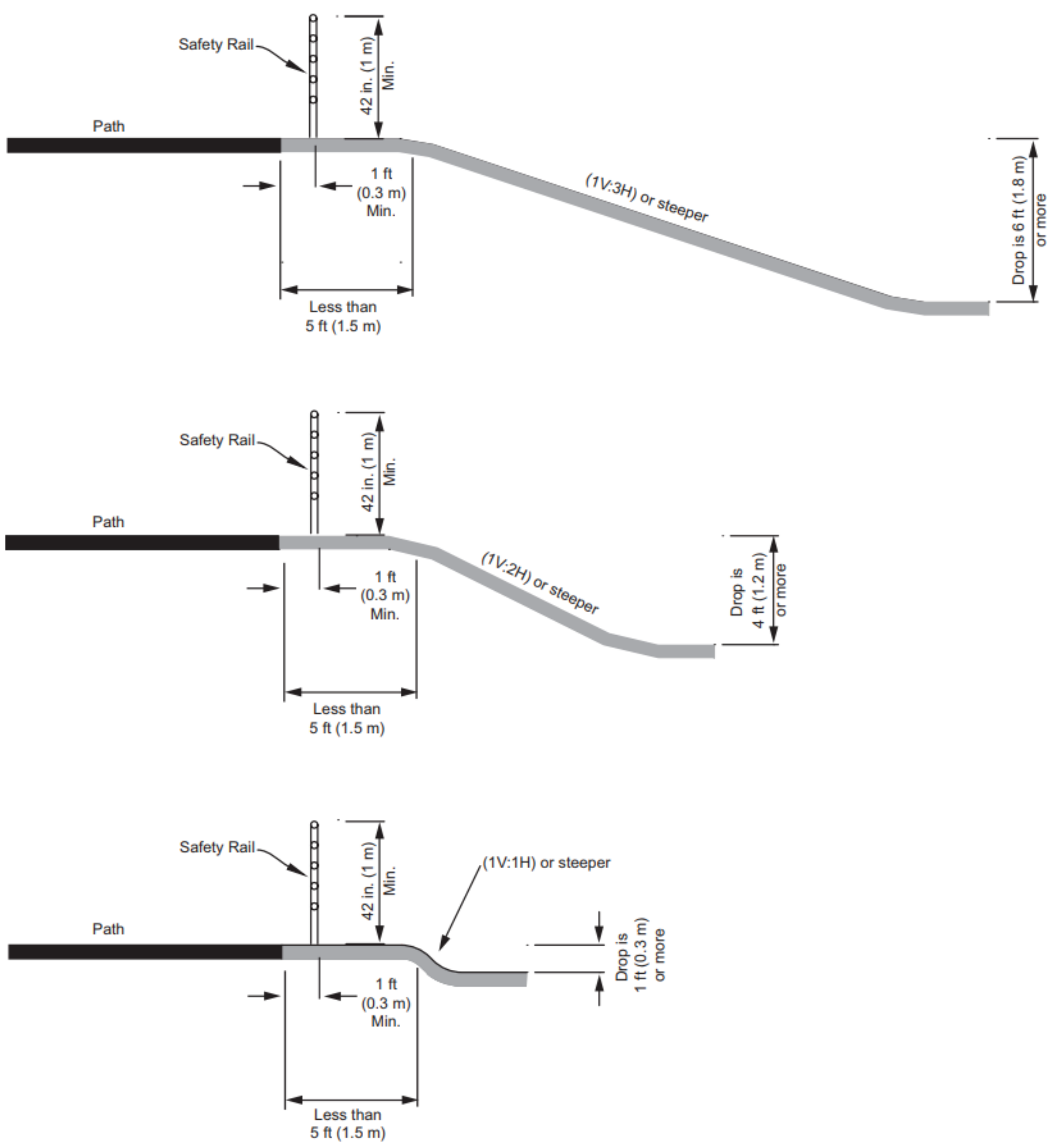
SAFETY RAILING AND FENCES

A safety rail needs to be a minimum height of 42 inches and is required for the slope conditions list below. AASHTO provides dimensions below for railing, fences and slope conditions and are illustrated in **Figure F-17**.

- Slopes 1V:3H or steeper, adjacent to a parallel body of water or another substantial obstacle
- Slopes 1V:3H or steeper, with a drop of 6 feet or greater
- Slopes 1V:2H or steeper, with a drop of 4 feet or greater
- Slopes 1V:1H or steeper, with a drop of 1 foot or greater

The safety railing must begin prior to and extend beyond the area of need and be at least 1 foot offset from the path edge. The beginning and end of the safety rail needs to be outside the 2-foot clear area or be marked with an object marker. The safety rail can also be flared out at the beginning and end to provide clearance from an abrupt object. Suggested railing offset is 2 feet from the edge of path.

Figure F-17: AASHTO examples of when safety fence is required.



If a safety railing is being used to provide protection from slopes or to discourage path users from venturing off the path corridor, the railing can have relatively large openings. A standard design includes two to four horizontal elements with vertical elements spaced fairly far apart. If a safety railing is required for a high vertical drop or body of water, a 48-inch railing height or the requirements of a bridge railing may be necessary. Engineering judgement must be used to determine what the specific situation requires. Refer to the Bridge section for additional railing requirements.

If a safety railing is not warranted, but a barrier is desired there are options to consider for fence types. There are opaque options such as tall (6-foot or greater) wooden fence or chain link fence with a screen. More transparent options could include shorter wooden or chain link fence (4-foot tall), metal pipe handrail, or placement of multiple bollards. The benefit of a continuous fence line is it directs multi-use path users to stay on the designated path. The opaque fence options would physically restrict users from veering off the path and provide more privacy to the private property owner. The more transparent fence options would discourage trail users from leaving the path, but would not fully restrict this movement.

Bollards

In certain situations, bollards may be required to restrict unauthorized use of multi-use paths by motor vehicles. If bollards are used, the associated "No Motor Vehicles" signage (*MUTCD* R5-3) must also be installed to enforce the rule. Bollards restricting vehicles must meet the following guidelines.

Guidelines

- Bollards must be a minimum height of 30 inches and minimum diameter of 4 inches.
- Bollards must be retroreflective on both sides or marked with an appropriate object maker.
- Bollards must be set back from the roadway edge a minimum of 5 feet. The setback will be site specific and need to be approved by the Town.
- If more than one bollard is used, an odd number of bollards must be used and spaced 6 feet apart.
- Bollards must not restrict non-motorized users or users with disabilities.
- Bollards must have a striping envelope around the bollard to help guide users around the vertical object.
- Bollards must be lockable or removable to allow entrance by authorized vehicles. If hardware is installed in the ground to allow the bollard to be removed, it must be flush with the surface to avoid creating an additional obstacle.

Rigid bollards are only recommended after other methods such as signage, landscaping, flexible bollards, targeted surveillance, and curb cut design have been considered, since bollards do create a vertical obstacle in the middle of the path.

SIGNAGE

Signage indicates and alerts various path conditions for users such as steep grades, hazardous trail conditions, narrow bikeways, and sharp turns. **Figure F-18** shows standard regulatory signage, which in all cases must be retroreflective. Refer to Table 9B-1 in the *MUTCD* document for allowable path signage dimensions and signage, other guidelines are found below

Guidelines

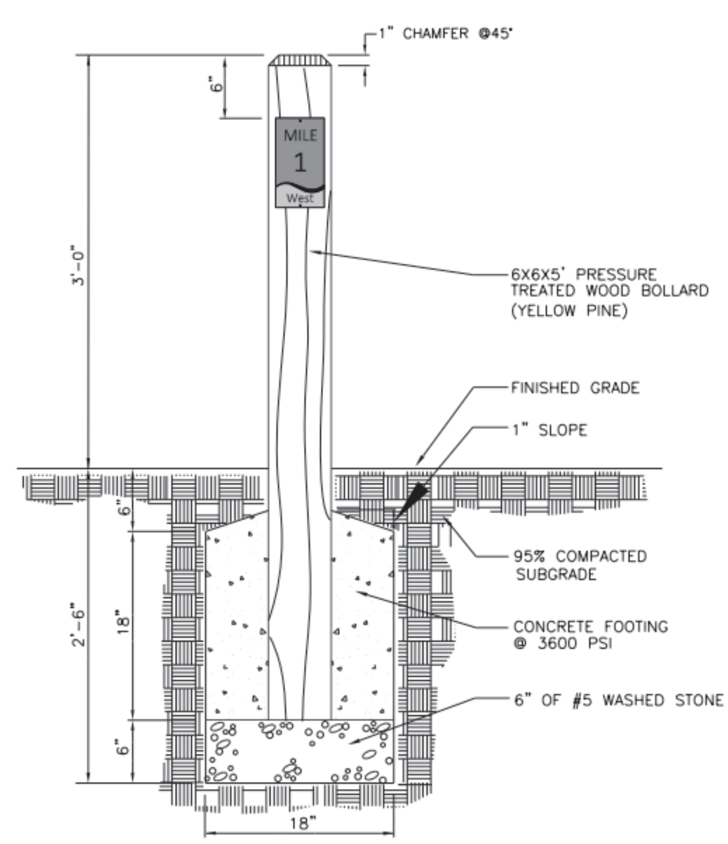
- These signs must be placed at least 50 feet in advance of the change or hazard. Some examples of common path signs are listed below.
- If a path crosses a roadway, regulatory signage will need to be added to the roadway to alert motorists of the crossing. Refer to the Intersection section for recommended roadway signage.

Figure F-18. Common Regulatory Signs to Use on a Multi-Use Path

Wayfinding Signage

A wayfinding signage system is a unified approach to providing path users with different information. Wayfinding signs can indicate direction of travel, location of a destination, and/or location of access points.

Figure F-19: Example Mile Marker Post



One sign type to include in the wayfinding sign system is a mile marker post. These signs would be disbursed along the path in ¼-, ½-, or 1-mile increments. These posts provide users with an understanding of their location along a path. In case of an emergency, a path user can provide emergency personnel with the closest mile marker, which can help improve response time. At a minimum, a mile marker post needs to include the path mile but could also include the path name and distance to the nearest trailhead. A mile marker needs to be at least 36 inches tall and typically is made of wood, recycled plastic, or stone. **Figure F-19** illustrates an example of a marker.

Directional signs can be provided at locations where paths intersect or routes change direction. The directional sign will provide the user with the direction of his/her destination. Typically, the mileage to the destination will be included and these signs can vary in shape. They can be mounted to a post, fixed to the ground, or elevated on a post.

Another helpful sign is a path entrance sign. As its name indicates, these signs are placed at the entrance to a path. They provide information to users entering and leaving the path. The multi-use path system, path name, entity maintaining the path, path rules, and any other necessary safety information must be listed. Sometimes, the sign will include a map of the trail. These signs can vary in size depending on how much information is displayed. They can be elevated, fixed to the ground, or mounted to a post. Typically, major trailheads will have a larger sign. Minor trailheads or locations where the path crosses a road will have smaller signs.

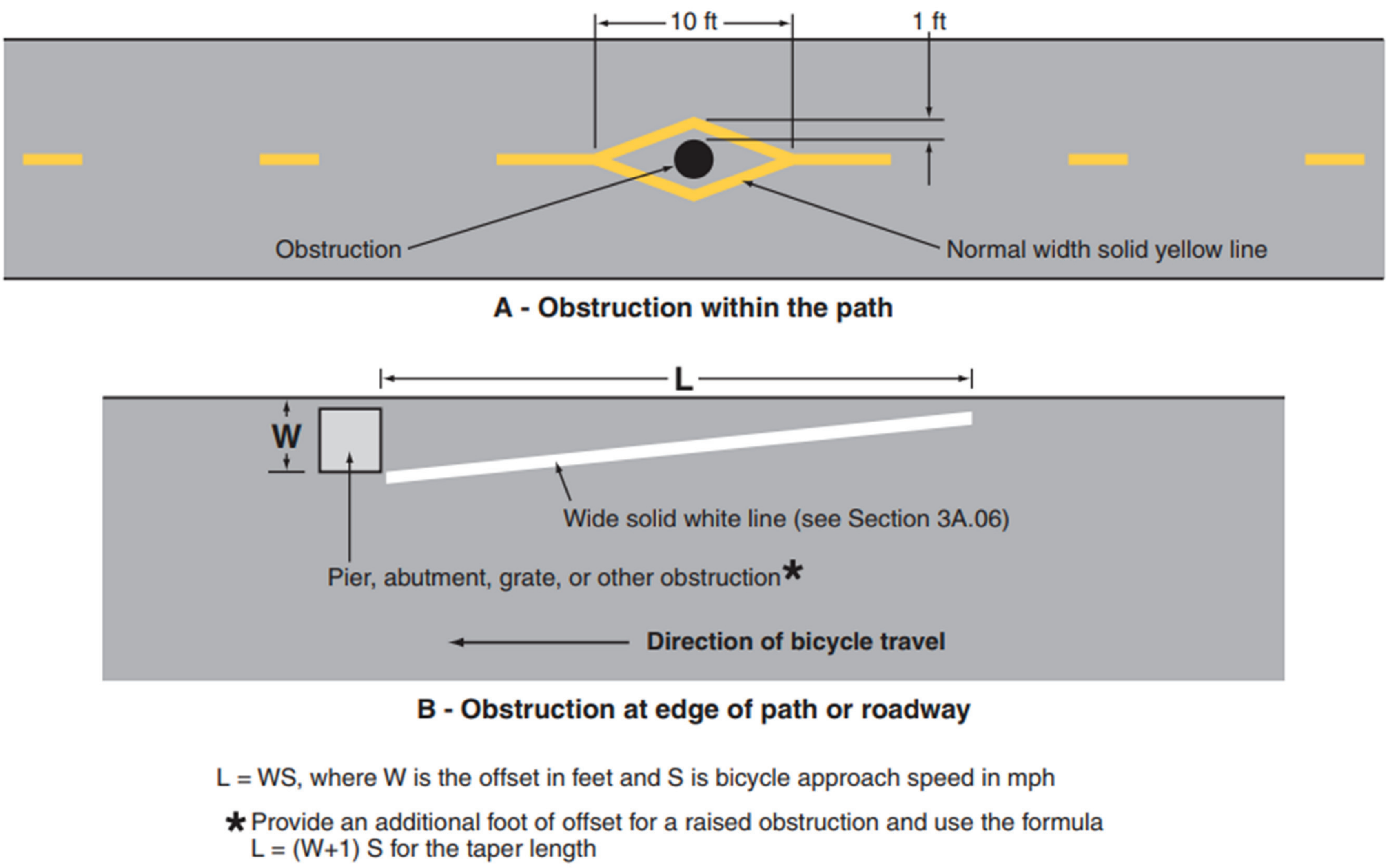
PAVEMENT MARKINGS

Pavement markings help enforce signage and may separate travel directions or uses, markings need to be retroreflective and strategically placed. Do not place pavement markings at critical stopping or turning points as they can become slick to bicyclists when wet. If a bollard is installed within the path, a yellow diamond must be installed around the bollard. Refer to **Figure F-20** for pavement markings associated with a bollard as shown in *MUTCD*.

Guidelines

- A centerline is not required but must be considered when the path is heavily travelled and the two-way traffic pattern needs to be clearly marked.
- As in roadway rules, a solid line must be used when passing is prohibited and a dashed line when passing is permitted.
- The centerline must be a 4-inch yellow line. Dashed lines would be 3-foot segment with 9-foot gap.
- A 4-inch line must be used to warn of an obstruction in the path.
- A stop bar must be must at intersecting roads or paths.

Figure F-20: Pavement Markings associated with obstructions



LIGHTING

Lighting can improve visibility and enhance safety. Lighting options need to be evaluated on a case-by-case basis, but regardless of whether a path will be used at night, it is recommended that lighting be provided at path-roadway intersections and at major trailheads. Providing lighting at intersections will improve sight distance and help alert motorized vehicles of pedestrians. Providing light at trailheads would help deter vandalism.

The following are some conditions/locations that must be considered during the evaluation:

- The path is intended to be used after dark
- The path is in an urban area and a convenient connection to transit stops, schools, universities, shopping, or employment areas
- The path is under vehicular bridges, underpasses, tunnels, and multi-use path bridges
- Path locations with limited visibility
- Path intersections
- Major trail entrances

Guidelines

- The illumination must be adequate to identify a face up to 20 yards away.
- Full cut-off fixtures must be used to reduce light pollution and comply with the International Dark Sky regulation.
- Electrical components need to abide by Article 862 of the National Electrical Code (NFC) in flood prone areas.
- Average horizontal illumination levels must be between 0.5- to 2-foot candles.
- Metal halide lamps must be used.

Different pedestrian light types to consider are pedestrian height posts (15-foot poles) and pedestrian bollards. The pedestrian posts will provide more adequate light than a bollard light but bollard light can provide a more pleasing aesthetic. Due to using full cut-off fixtures, several bollards would need to be used to provide the equivalent light level of one light post and would have to be very close to the path to adequately illuminate it. Another element of lighting is the power source. Pedestrian lights can be solar powered or hard wired. Solar power could be preferable when utility collection is difficult or when alternative energy sources are desired. The amount of tree canopy does need to be factored into the effectiveness of solar power.

Landscaping & Amenities

LANDSCAPING

Landscaping can enhance the experience on a multi-use path. It can provide shade, shelter, and serve as a natural privacy screen. When possible, the path needs to be designed and constructed to protect, preserve, and maintain the existing native vegetation.

Guidelines

- If the native vegetation is impacted or was sparse, trees and shrubs can be planted in logical places along the path. The only vegetation along the shoulder must be grass. All trees and shrubs must be planted 5 feet offset from outside edge of the path shoulder.
- Native species will be more tolerant and require less maintenance. The topography and existing soils will affect the type of plants chosen.
- It is recommended that shrubs adjacent to the path be a maximum of 24 inches in height as to not obstruct the line of sight.
- Canopy trees need to be trimmed to provide a minimum of 8 feet of vertical clearance and be placed as to not obstruct path lighting if installed.

AMENITIES

As noted in the Trailhead section, the following amenities must be considered throughout the path and are recommendations:

- Trash Cans
  - Trash cans must be placed at each trailhead and seating area. One trash can must be placed per every two picnic tables and one per two benches.
  - Trash cans must be a minimum of 3 feet from the path edge and be secured to a 12- by 24-inch concrete pad.
  - Trash cans need to be accessible by all users and maintenance personnel.
  - Trash cans could provide combo trash/recycling containers.
- Benches
  - Benches need to be a minimum of 3 feet from the path edge and secured to a minimum 10- by 6-foot concrete pad.
  - Benches need to be placed at trailheads and along the multi-use path where appropriate. If benches are placed along the path, ½- to 1-mile spacing is recommended.
  - Benches must be placed at interesting views, close to interpretive elements, or in areas with shade or sheltered from seasonal winds.
- Bicycle Racks
  - Bicycle racks must be placed at trailheads, restrooms, points of interest, and rest areas.
  - Racks must be shaped to allow users to lock the frame to one or both wheels with a U-lock.
  - The nearest post of the rack must be a minimum of 4 feet from the path edge.
  - Adjacent racks need to be a minimum of 3 feet apart.
  - The rack must be secured to a concrete or asphalt pad.
- Water Fountains
  - Water fountains need to be located near restrooms, trailheads, larger rest areas, and other public gathering places along the path. Installation of water fountains will be dependent on available utility connections.
  - Water fountains must be a minimum of 5 feet from the path edge and installed on a concrete pad.
  - Water foundations must be accessible by all path users and be ADA compliant.
- Bicycle Repair Stations
  - Bicycle repair stations are recommended in areas with high activity as they tend to be a target for theft and vandalism.
  - Bicycle repair stations need to be offset a minimum of 5 feet from the path edge and on a concrete or asphalt pad.
  - A structural engineer must design the concrete pad.

TRANSPORTATION TECHNOLOGY

With its location near the Research Triangle Park and many of the Triangle's most significant travelways, the Town of Morrisville is in a unique position to be proactive when planning for and incorporating transportation technology. This section details current applications of transportation technology within the Town, as well as considerations for the incorporation of emerging transportation technology.

Current Efforts

The Town of Morrisville has numerous signalized intersections, which depending on their location are maintained either by the Town of Cary or by NCDOT. Funding has been awarded to the Town of Morrisville to develop a Townwide coordinated signal system. A coordinated signal system will allow for communication between the various signalized intersections within the Town. Signals along a corridor can be timed to maximize green time for drivers, and signal timing can be adjusted dynamically to adjust to crashes, congestion, or other changing conditions. The Town will be working closely with CAMPO as this coordinated signal system is developed by NCDOT. During this process, the Town should consider how best to manage the coordinated signal system upon its completion, potentially partnering with the Town of Cary.

Residents and employees within the Town of Morrisville also can take advantage of transportation demand management programs that are active throughout the region. Strategies such as carpooling, vanpooling, flexible work hours, or telecommuting reduce the amount of single occupant vehicles on the road and help reduce congestion. The Town should continue to seek out opportunities to educate its citizens about the availability of these programs.

Electric vehicles are already a part of the landscape within the Town of Morrisville. As this portion of the vehicle fleet continues to grow, communities will need to be intentional about providing charging stations at public facilities and with private development. The Town's Unified Development Ordinance includes some considerations for the location and quantity of these charging stations. Moving forward, the Town should continue to explore adding detail to these considerations, including guidance on when private developers or the Town are responsible for installation.

Emerging Technology

While the impacts of some technological developments are limited to their field, there are others—like the printing press, the telephone, and the computer—that have the capacity to introduce a much more significant impact and transform the lifestyle of a generation. The introduction and advancements of connected and automated vehicles (CAV) is one such development. Connected vehicles are defined as vehicles equipped with technology for communication with other vehicles and roadside infrastructure. Autonomous vehicles are defined as vehicles that can perform driving functions without a driver at any time.

As CAV advancements expand daily and are introduced into existing transportation systems, it becomes more challenging for agencies to prepare and plan for these advancements. CAV will introduce changes in the way states and local agencies implement transportation projects and future developments. **Figure G-1** captures a sampling of the opportunities and impacts that many agencies have recently identified with respect to CAV.

Figure G-1: Opportunities and Impacts of CAV Technologies

What are Connected and Automated Vehicles?

TERMINOLOGY

The following list provides some of the acronyms and abbreviations currently used within CAV discussions.

- CV – Connected Vehicles
- AV – Automated Vehicles
- V2V – Vehicle-to-Vehicle
- V2I – Vehicle-to-Infrastructure
- V2X – Vehicle-to-Anything
- CAV – Connected and Automated Vehicles
- TNC – Transportation Network Companies (e.g. Uber, Lyft)

Connected Vehicles (CV) are vehicles equipped with technology that allows the vehicle to communicate with road infrastructure to share real-time transportation information between systems. Three communication technologies exist: vehicle-to-vehicle (V2V) communications, vehicle-to-infrastructure (V2I) communications, and vehicle-to-anything (V2X) communications.

Examples of CV technology and applications include:
- Safety: red-light running, rail-passing timing, emergency braking, blind spot warning,
- Mobility: traffic light status, transit priority, incidental alerts, and
- Environment: eco-driving, freight routing, transit.

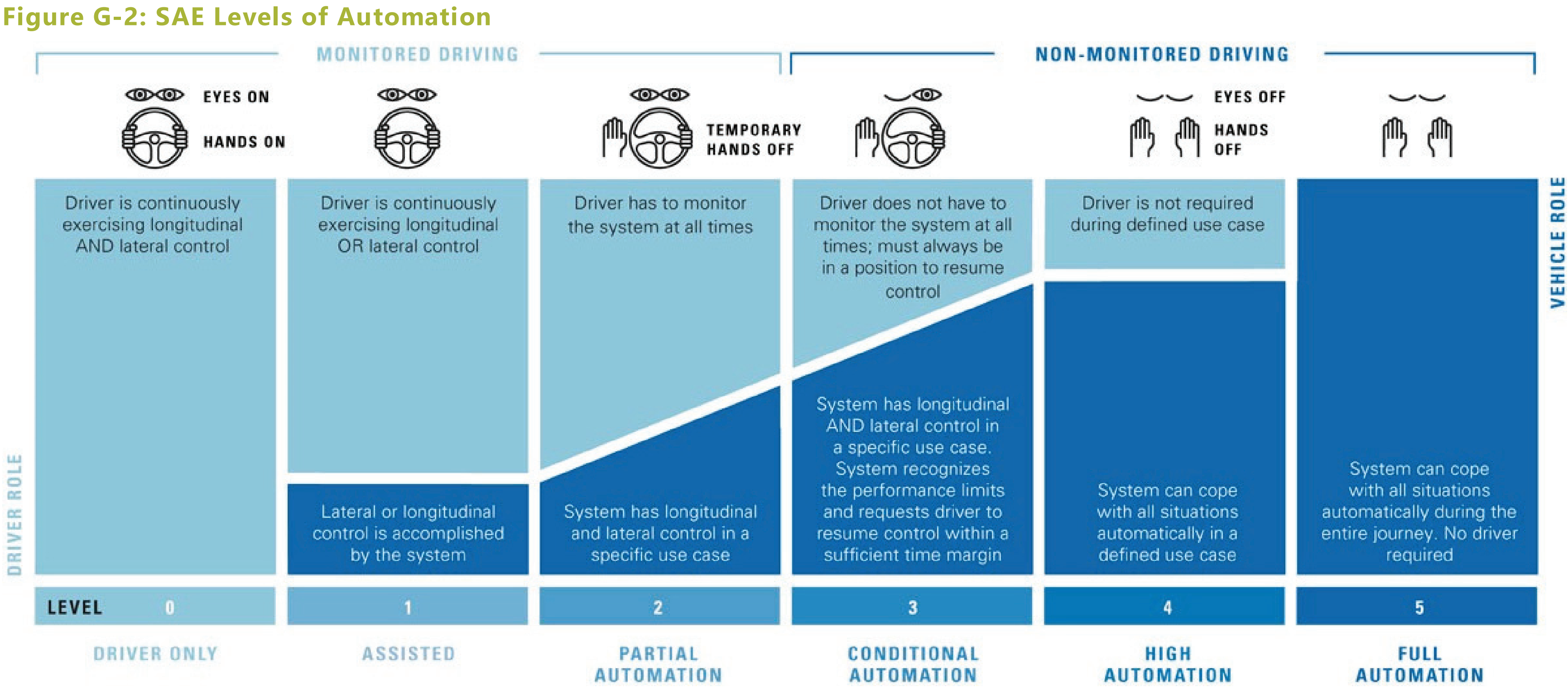
Automated Vehicles (AV) perform a driving function, with or without a human actively monitoring the driving environment and is further defined by an associated level of autonomy. The "SAE (Society of Automotive Engineers) International Levels of Automation" provide a taxonomy of six levels of vehicle automation—this spans from self-driving to full car system control. These various levels shown in **Figure G-2** divide the vehicle's automation level based on the establishment of "who does what, when."
Source: http://www.sae.org/misc/pdfs/automated_driving.pdf

Examples of AV technology and applications include:
- Europe's CityMobil2 Public Transport
- Google Driverless car
- Ollie, 3-D printed, self-driving minibus (2016)
- Heathrow Ultra Personal Rapid Transit

LEVELS OF AUTOMATION

SAE levels depict and categorize the level of human interaction and the attentiveness when monitoring the driving environment. At the lowest level of autonomy, Level 0, the human driver continuously controls everything throughout the driving experience. Level 1 represents an automated system on the vehicle that can sometimes assist the human driver conduct some parts of the driving task. The Level 2 automated system on the vehicle may conduct some parts of the driving while the human driver continues to monitor the driving environment. In these levels of automation, the human driver is required to be fully engaged and monitor the driving environment. Level 3 functions at a conditional automation level where the system conducts some parts of the driving task and monitors the driving environment; however, the human driver must be ready to take back control upon request from the automated system. Level 4 operates at a high level of automation—the system can subsist with all situations automatically but only in certain environments, such as between two interchanges on the freeway. Finally, Level 5 automation can perform all driving tasks, under all conditions that a human driver could perform. In these higher levels of automation, the system monitors the environment.

Figure G-2: SAE Levels of Automation



What role does Morrisville play?

With the development and introduction of CAV technologies, the infrastructure, investments, and planning to support CAV's increasing presence will need to be thoroughly strategized for the future. Within each travel mode, there are potential strategies and challenges that can be considered now to help facilitate the eventual incorporation of CAV technologies. In many instances, these planning issues will need to be assessed at a regional level to make their implementation feasible. The Town of Morrisville can serve as an advocate to encourage the consideration of these issues. Some examples of this are shown in **Table G-1**. Future updates to the Comprehensive Transportation Plan should continue to update both the current state and future outlook for CAV and other emerging transportation technologies.

Table G-1: Near-Term Planning Issues for Connected and Autonomous Vehicles (CAV)

TRAVEL MODE	NEAR-TERM PLANNING STRATEGIES
General	Consider the future impacts of autonomous vehicles on land development and zoning bylaws.
Roadway	Consider design requirements to enhance detection equipment and controller equipment to collect and broadcast speed and safety information.
Roadway	Consider how to begin accommodating autonomous vehicles within a mixed vehicle fleet.
Roadway	Assess the safety and mobility impacts of providing two-way left turn lanes in a CAV setting.
Parking	Consider the implications of converting on-street parking into pick up and drop off lanes.
Bicycle & Pedestrian	Consider impacts of greenway crossings at surface streets in a CAV setting.
Bicycle & Pedestrian	Consider the design impacts to bike lanes as autonomous vehicles are introduced into the fleet.
Bicycle & Pedestrian	Explore additional education and outreach programs designed for both bicyclists and motorists.
Transit	Consider future impacts of potential design requirements to accommodate autonomous transit vehicles.
Transit	Consider dynamic routing and agility in transit stops in response to real-time ridership needs.

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PLAN AND POLICY REVIEW

Over the last two decades, the Town of Morrisville has a developed a range of plans and regulations to guide the Town in crafting action steps and policy recommendations, shown in **Table H-1**. During the preparation of the ***Town of Morrisville Comprehensive Transportation Plan***, the adopted plans and regulations were used to understand how those policies have shaped transportation decisions in a host of ways, from land use to development guidelines and standards.

Many of the plans and ordinances outlined below can be accessed via the Town's website by clicking here.

Table H-1: Plans and Regulations Adopted by Morrisville

DOCUMENT	DATE	DESCRIPTION	KEY FINDINGS
LOCAL			
Town of Morrisville Code of Ordinances	October 1993	Document that provides ordinance code for the Town of Morrisville	Chapter 46 of the document refers to the Morrisville Unified Development Ordinance document. Article V of Section 58 details the methods of transportation that can be allowed for use on Town sidewalks and greenways.
Morrisville Town Center Plan	2007	The Plan describes creating a vision for a vibrant downtown center at Morrisville's historic crossroads.	Chapter 2 highlights the planning process and concept design, which outlines several changes/additions for the transportation system. Such as: better pedestrian access, physical road constraints, greenway linkages, and transportation improvement investments.
Morrisville Transportation Plan	March 2009	Written concurrently with the 2009 Land Use Plan, the document outlines the future of Morrisville transportation at that time, looking at 2035 as a horizon year.	Chapter 4 of the plan outlines policy direction for that time. Section 4.2 contains a list of policies meant to address: growth and development patterns, character and quality of development, transportation and land use integration, and community facilities and services via recommended transportation policies.
Morrisville Land Use Plan	March 2009	Written concurrently with the 2009 Transportation Plan, the document outlines future land use strategies and policies for Morrisville, with a horizon year of 2035.	Chapter 4 of the plan outlines the recommended land use policies, many of which have implications for the transportation system. Section 4.2 specifically lists these policies out. In addition, Chapter 5 goes into depth about future land use principles and form which also have implications on the transportation system.
McCrimmon Extension Guide Report	December 2012	The report provides guidance on land use and development for the extension of McCrimmon Parkway in Eastern Morrisville. This guidance was used to help prepare Morrisville's Unified Development Ordinance (UDO).	Pages 6-8 of the report list guidance for various land uses and development options, many of which have relationships with key transportation issues.
Morrisville Telecommunication Facilities Master Plan	July 2013	The Plan is provided to balance the goals of providing good cellular service while minimizing the impacts that telecommunication facilities have on the community.	Page 6 of the report references goals from the 2009 Land Use and Transportation Plans for Morrisville.
Morrisville Unified Development Ordinance	December 2013	Originally adopted in December 2013, and amended several times since, the purpose of the Ordinance is to "guide and manage the development of Morrisville in a way that takes into account present and future needs and resources that protect the health, safety, prosperity, and general welfare of the Town's citizens and landowners." The Ordinance is also intended to implement the goals, objectives, and policies of all adopted plans guiding the Town's growth and development.	5.2.2 outlines design and development standards for Transit-Oriented Development Districts. 5.3.1 outlines development standards for city blocks and subsequent street patterns. Section D specifically details block lengths/widths. 5.7 provides details on perimeter and streetyard buffers, which has implications for street networks and design. 5.8 provides stipulations for access and circulation in order to "ensure that development is served by a coordinated, multimodal transportation system that permits the safe and efficient movement of motor vehicles, emergency vehicles, transit, bicyclists, and pedestrians." 5.8.1 lists the main objectives for the section. 5.10 details parking and loading requirements for various types of development.

DOCUMENT	DATE	DESCRIPTION	KEY FINDINGS
McCrimmon Transit Small Area Plan	June 2014	Written in response to long-term plans for regional investments in expanded bus service and rail transit service, the Plan looks to create a TOD around the intersection of McCrimmon Parkway and NC 54.	The "Traffic and Transportation" section of Chapter 3 outlines the relevant implications and goals for the transportation system regarding the future development in the area. The sections feature analysis of intersection and road segments in the area, and seeks to forecast change based on future development. In addition, Chapter 4 outlines TOD Policy Goals and Objectives. Goal #2: Expand Transportation Choices, is most relevant to the Morrisville CTP.
Morrisville Engineering, Design, and Construction Manual	July 2014	The EDCM helps design professionals and developers comply with the UDO and other federal, state, and local laws and regulations.	Section 6: Access and Circulation details several important transportation design standards. These include a wide variety of street, intersection, and bike/pedestrian accessibility.
Active Kids Strategic Plan	April 2017	The Active Kids Strategic Plan adopted in April 2017 identifies action steps to realize a more active community for the youth in Morrisville.	Section 5 identifies several action steps for implementation including involvement with Safe Routes to Schools and continual support and funding of active transportation infrastructure.
Secondary and Cumulative Impacts Master Management Plan	September 2017	This document outlines the direct, indirect (or secondary), and cumulative impacts to natural, cultural, and historical resources.	Chapter 2 references the 2009 Morrisville Transportation Plan and its identification of areas in need of additional infrastructure. The section goes on to analyze these future infrastructure improvements will affect and be affected by hydrology resources.
Morrisville Parks and Recreation Plan	April 2018	The Parks and Recreation Master Plan provides decisions makers with a framework for prioritizing park and recreation investments. Additionally, the plan sets forth goals and Level of Service (LOS) standards to help the Town measure progress.	The plan shares that a robust greenway trail system was one of the most important recreational facilities desired by households in Town. The plan also reports that Morrisville is currently at 0.33 miles of trail per 1,000 residents with an anticipated 6.94 additional miles needed to reach the recommended 0.45 miles of trail per 1,000 residents.
REGIONAL			
Wake County Hazard Mitigation Plan	2008	Prepared by Wake County to focus on natural disaster mitigation strategies and proactive methods for preparing for them.	Chapter 2 of the plan, Mitigation Action Plan, focuses on the types of threats the County might face and the consequences of those threats. Many of these have implications with the transportation system such as closed roads or altered routes from flooding, storms, ice, wildfires, etc. Section B of the chapter lists goals and objectives that included some transportation strategies that will help to mitigate the effects of natural hazards.
CAMPO 2040 Metropolitan Transportation Plan	2013	Prepared by the Capital Area Metropolitan Planning Organization, of which Morrisville is a part of, the document lists future highway, bus transit, light rail, bicycle, pedestrian, and other transportation projects to be implemented throughout the region through the horizon year 2040.	Chapter 4 of the plan outlines the visions and goals for the regions as seen by CAMPO. Chapter 4.2 lists these goals and objectives; 9 total goals, each with specific objectives. The section also lists notable performance targets for mobility issues. and compares them with 2040 forecasts.
Wake County Greenway Plan	January 2017	Map of current and future greenway facilities in Wake County	The map shows a variety of in development, existing, and future greenways in Morrisville. Some of which are a part of the regional system of greenways.
STATEWIDE			
NCDOT 2040 Statewide Transportation Plan	August 2012	This document, prepared by the state DOT, is meant to look at the future of the statewide transportation network, with 2040 as a horizon year.	Chapter 2 of the plan lists NCDOT's mission, goals, and guiding principles. The summary table at the end of Chapter 6 is also relevant, listing proposed policies, processes, and programs.

CRABTREE CROSSING PARKWAY EXTENSION ANALYSIS

The Crabtree Crossing Parkway Extension was a proposed street connection from Morrisville-Carpenter Road at Town Hall Drive to Stardale Road and was evaluated per the request of the Planning and Zoning Board and is no longer a recommendation in the ***Town of Morrisville Comprehensive Transportation Plan***. The proposed street is a two-lane collector street with a speed limit of 25 miles per hour, including striped bicycle lanes and sidewalks. In addition to the proposed street extension, there are two greenway connections to the Crabtree-Hatcher Creek Greenway. One connection is proposed from Morrisville-Carpenter Road, and a second connection from Crabtree Crossing Parkway is funded and under construction.

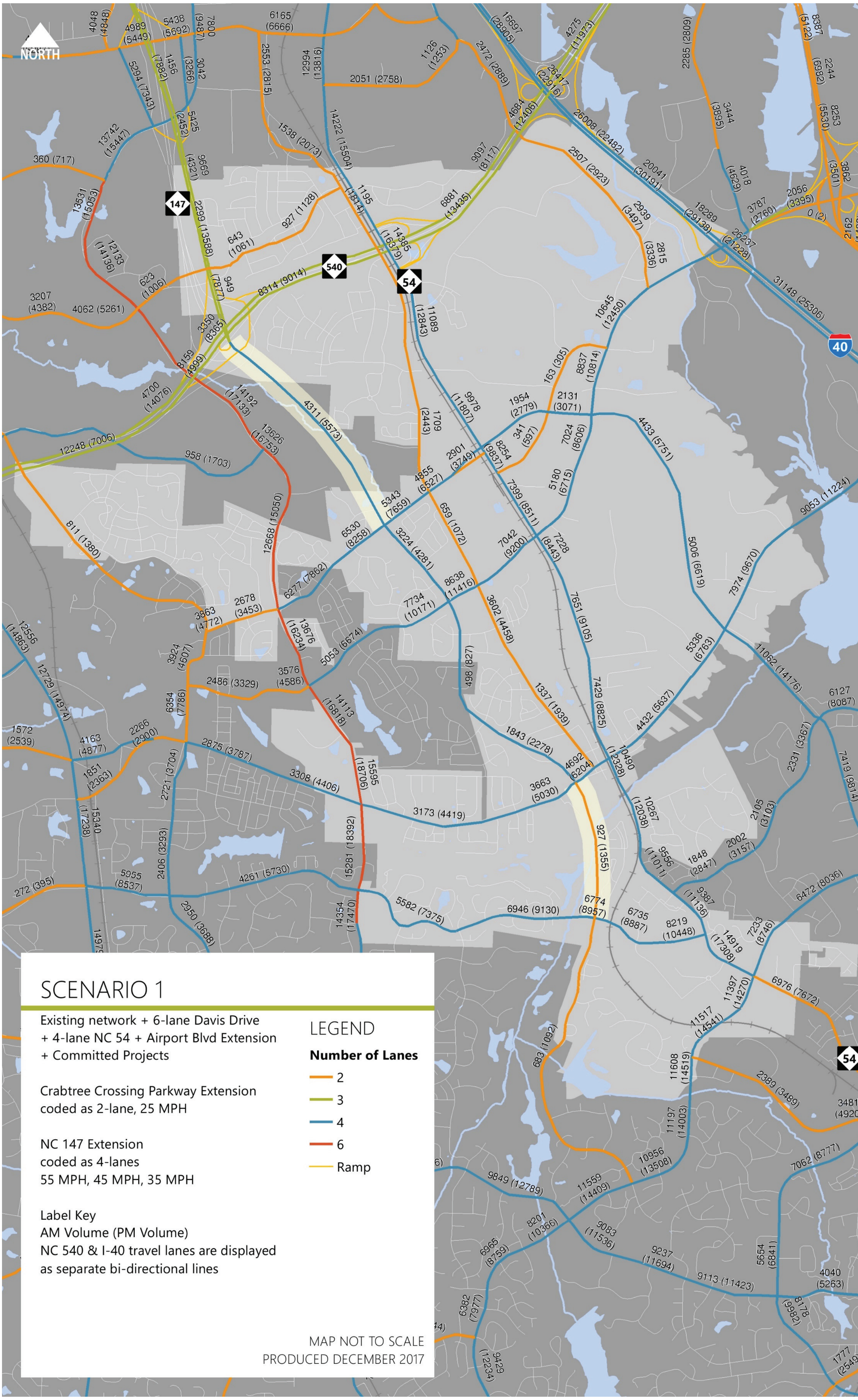
During the development of the ***Town of Morrisville Comprehensive Transportation Plan***, the Planning and Zoning Board requested Town staff to coordinate with the consultant to identify a series of scenarios to test the effects of the Crabtree Crossing Parkway Extension on the roadway network. Appendix I documents the definition, methodology, and results from each scenario. Information gathered from this analysis was used by the Planning and Zoning Board to development Plan recommendations.

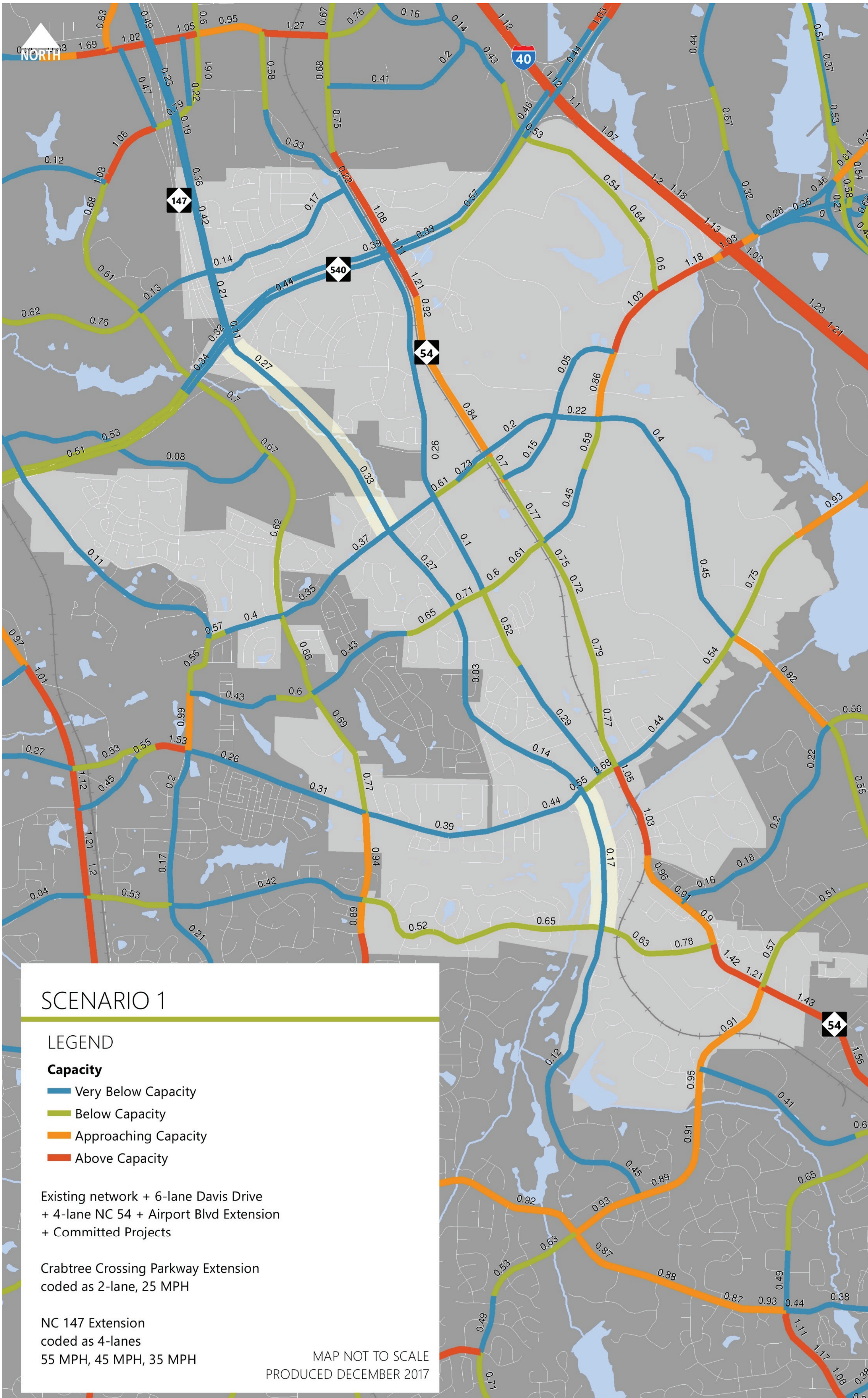
SCENARIO DEFINITIONS

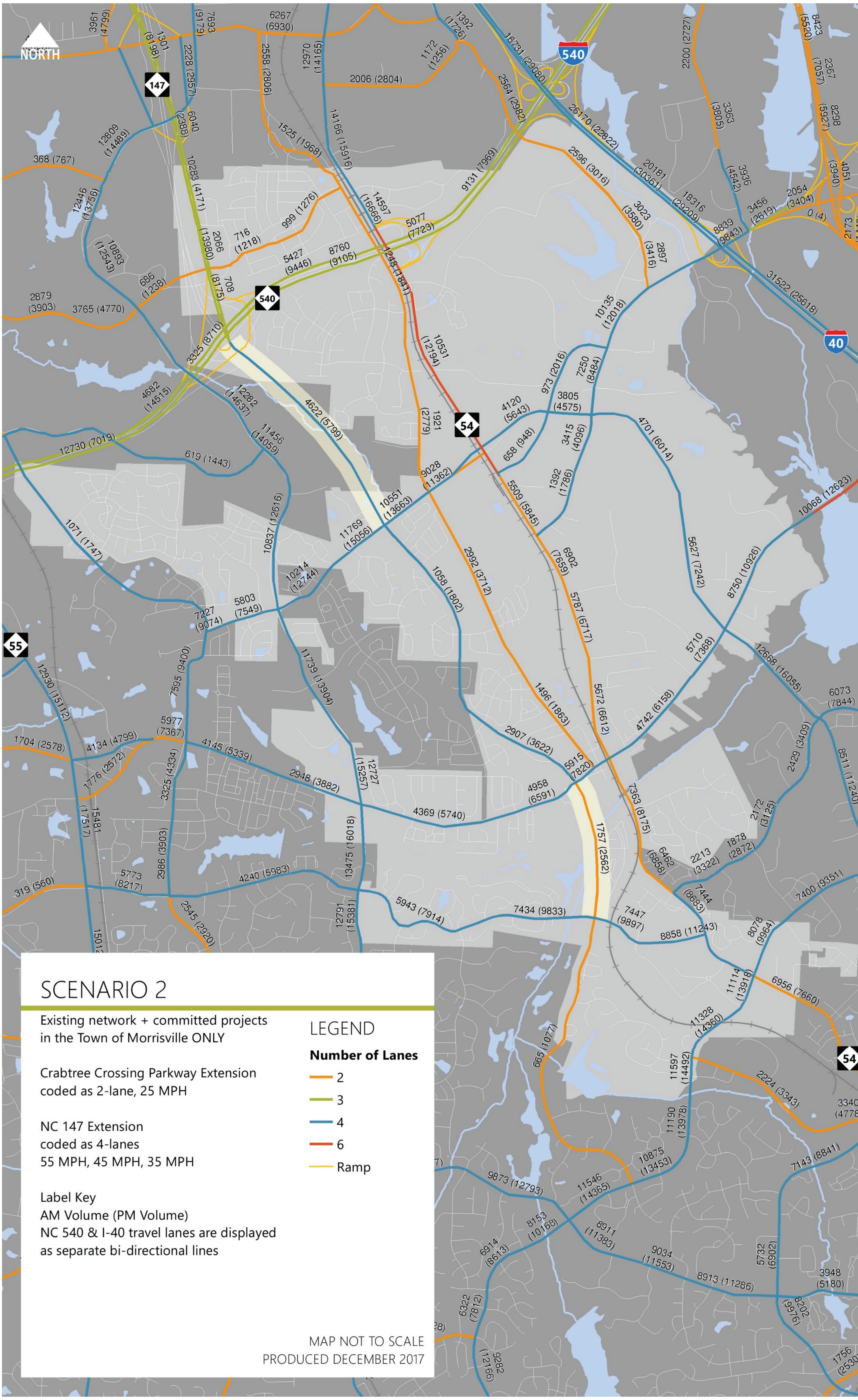
The Crabtree Crossing Parkway Extension analysis consisted of a series of ten scenarios (model scenarios) using the currently approved version of the Triangle Regional Travel Demand Model (version 5). All of the model scenarios were performed for AM peak (6AM – 10AM) and PM peak (3PM – 7PM) periods, using the population and employment growth projections for 2040. For each scenario, the roadway network and attributes within the travel demand model were revised to reflect the definitions provided below, and are illustrated in two ways: road segment volumes and road segment v/c ratios.

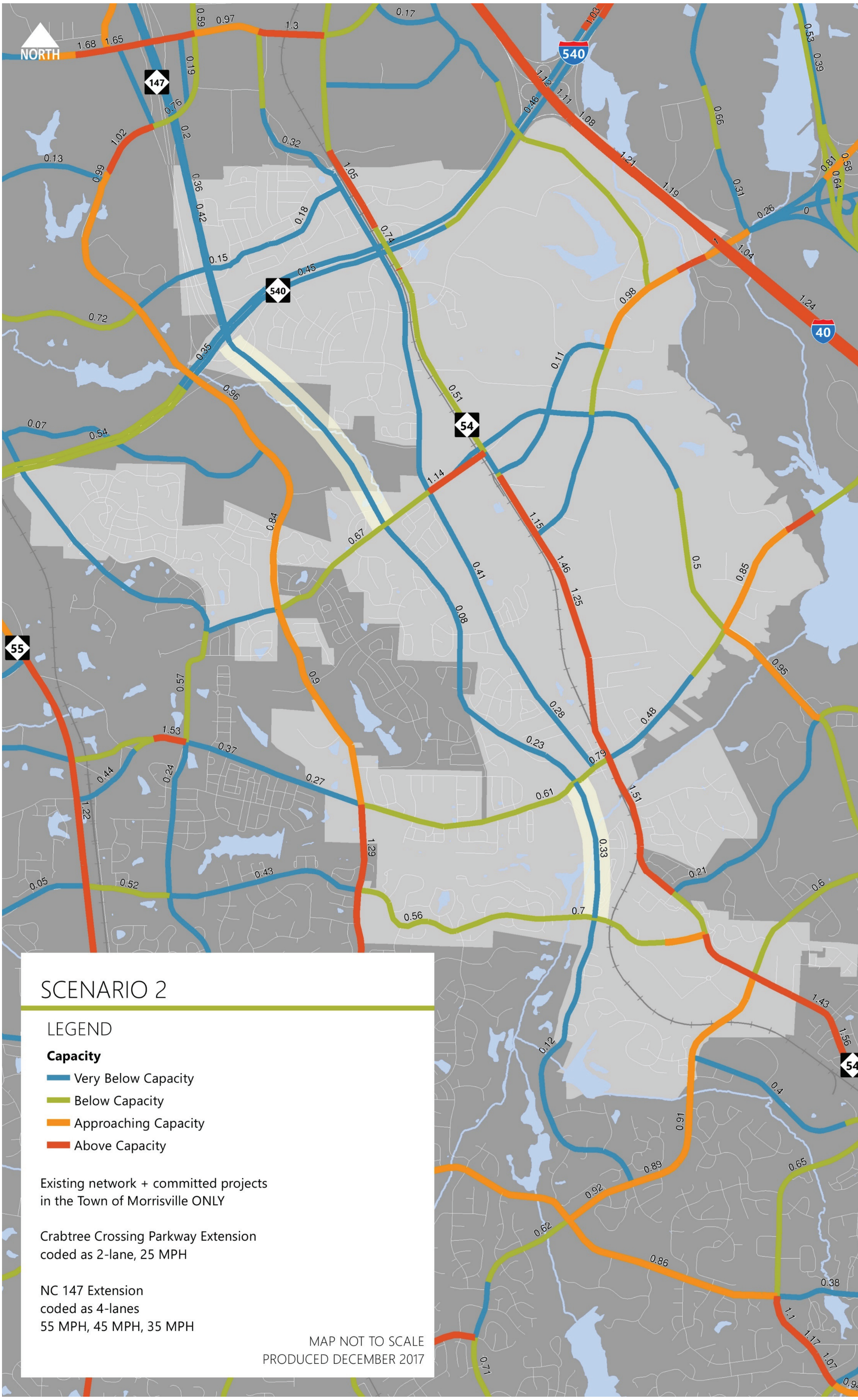
The ten model scenarios contain the following attributes:

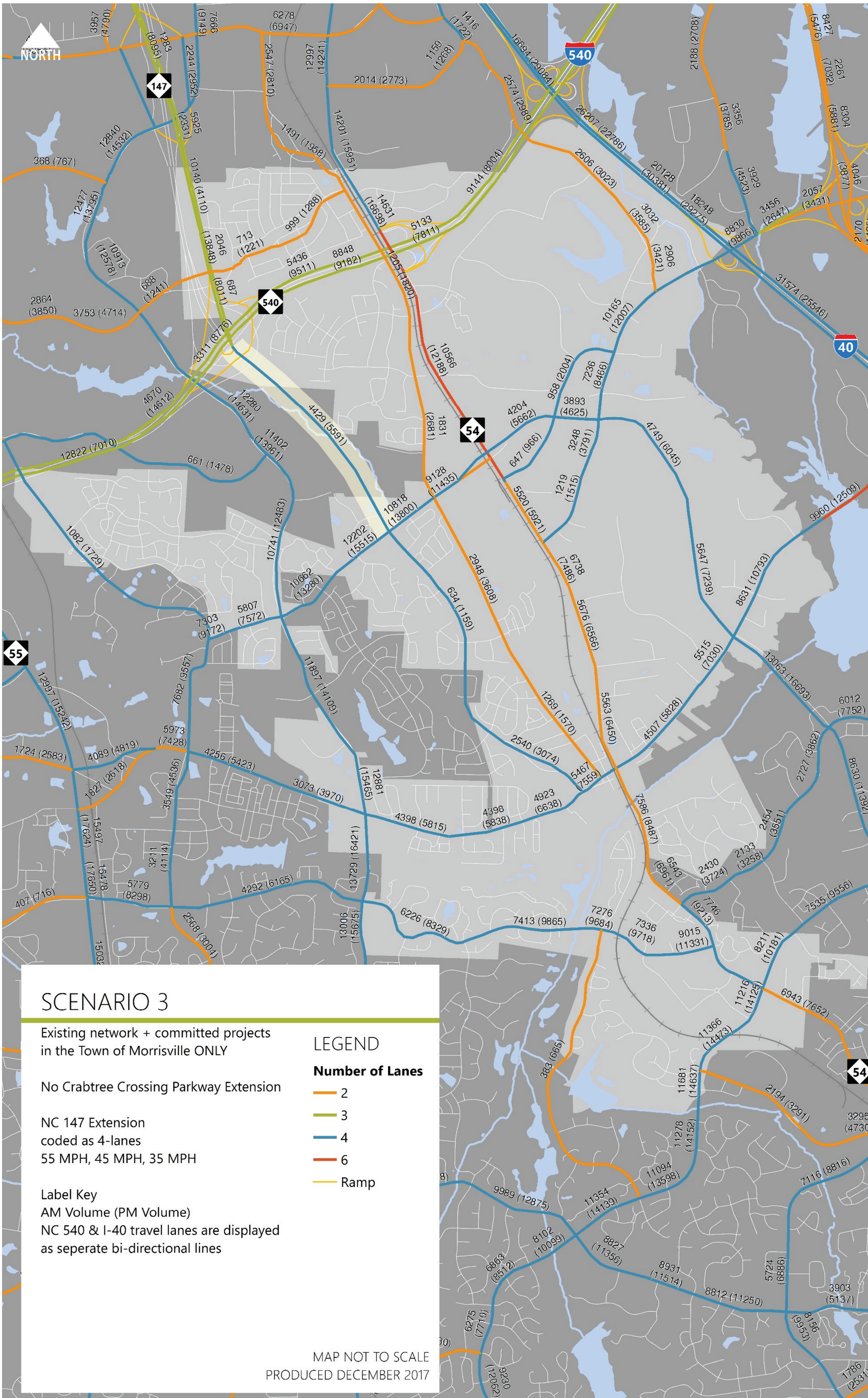
- Scenario 1 consists of a model scenario showing committed Morrisville projects, Davis Drive widening, NC 54 widening, Airport Boulevard Extension, NC 147 extension, using an alignment that connects directly into McCrimmon Parkway at Town Hall Drive, and Crabtree Crossing Parkway Extension.
- Scenario 2 reflects existing and committed projects within the Town of Morrisville, and existing facilities only for surrounding areas. This scenario includes the completion of the NC 147 extension, using an alignment that connects directly into McCrimmon Parkway at Town Hall Drive, and Crabtree Crossing Parkway Extension.
- Scenario 3 reflects existing and committed projects within the Town of Morrisville, and existing facilities only for surrounding areas. This scenario includes the completion of the NC 147 extension, using an alignment that connects directly into McCrimmon Parkway at Town Hall Drive.
- Scenario 4 reflects existing and committed projects within the Town of Morrisville, and existing facilities only for surrounding areas. This scenario includes Crabtree Crossing Parkway Extension, but does not include the completion of the NC 147 extension.
- Scenario 5 reflects existing and committed projects within the Town of Morrisville, and existing facilities only for surrounding areas. This scenario does not include the completion of the NC 147 extension or Crabtree Crossing Parkway Extension.
- Scenario 6 reflects existing and committed projects within the Town of Morrisville, and existing facilities only for surrounding areas. This scenario includes a realigned NC 147 extension that connects in with Little Drive and a new local road extending from McCrimmon Parkway at Town Hall Drive to the NC 147 extension. Scenario 6 has been conducted with the Crabtree Crossing Parkway Extension complete.
- Scenario 7 reflects existing and committed projects within the Town of Morrisville, and existing facilities only for surrounding areas. This scenario includes a realigned NC 147 extension that connects in with Little Drive and a new local road extending from McCrimmon Parkway at Town Hall Drive to the NC 147 extension. Scenario 7 has been conducted without the Crabtree Crossing Parkway Extension.
- Scenario 8 consists of a model showing committed Morrisville projects, plus Davis Drive widening, NC 54 widening, Airport Boulevard Extension, and the NC 147 extension, using an alignment that connects directly into McCrimmon Parkway at Town Hall Drive. This scenario does not include the completion of Crabtree Crossing Parkway Extension.
- Scenario 9 reflects existing and committed projects within the Town of Morrisville, and existing facilities only for surrounding areas. This scenario includes a realigned NC 147 extension that connects in with Little Drive at Davis Drive. This scenario does not include a new local road connection from Town Hall Drive and McCrimmon Parkway ("Town Hall Drive Ext.") to the NC 147 extension. This scenario includes Crabtree Creek Parkway Extension.
- Scenario 10 reflects existing and committed projects within the Town of Morrisville, and existing facilities only for surrounding areas. This scenario includes a realigned NC 147 extension that connects in with Little Drive at Davis Drive. This scenario does not include the Crabtree Crossing Parkway Extension or a new local road connection extending from McCrimmon Parkway at Town Hall Drive to the NC 147 extension.

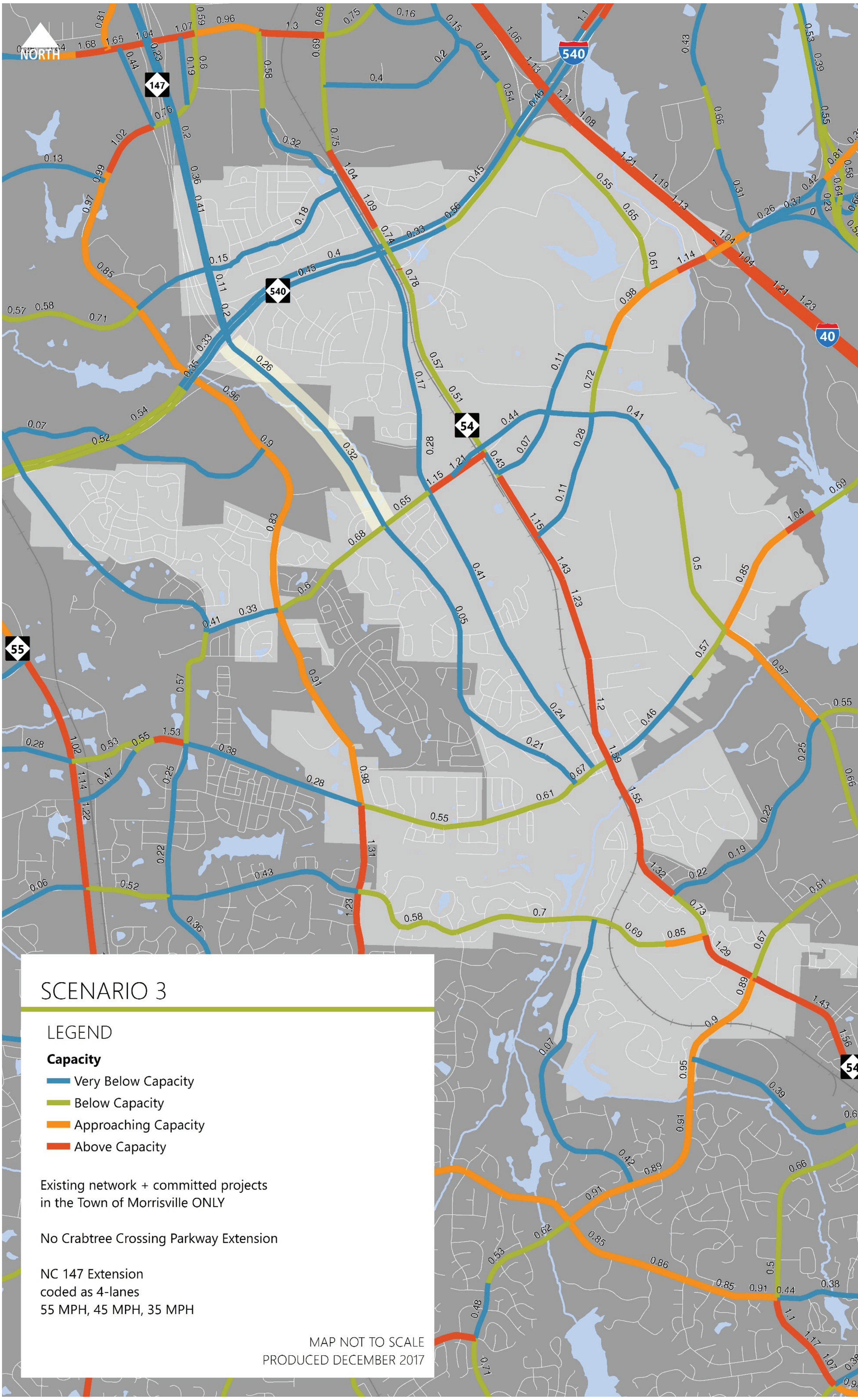

NORTH
SCENARIO 1
Existing network + 6-lane Davis Drive + 4-lane NC 54 + Airport Blvd Extension + Committed Projects
Crabtree Crossing Parkway Extension coded as 2-lane, 25 MPH
NC 147 Extension coded as 4-lanes 55 MPH, 45 MPH, 35 MPH
Label Key
AM Volume (PM Volume)
NC 540 & I-40 travel lanes are displayed as separate bi-directional lines
LEGEND
Number of Lanes
2
3
4
6
Ramp
MAP NOT TO SCALE
PRODUCED DECEMBER 2017

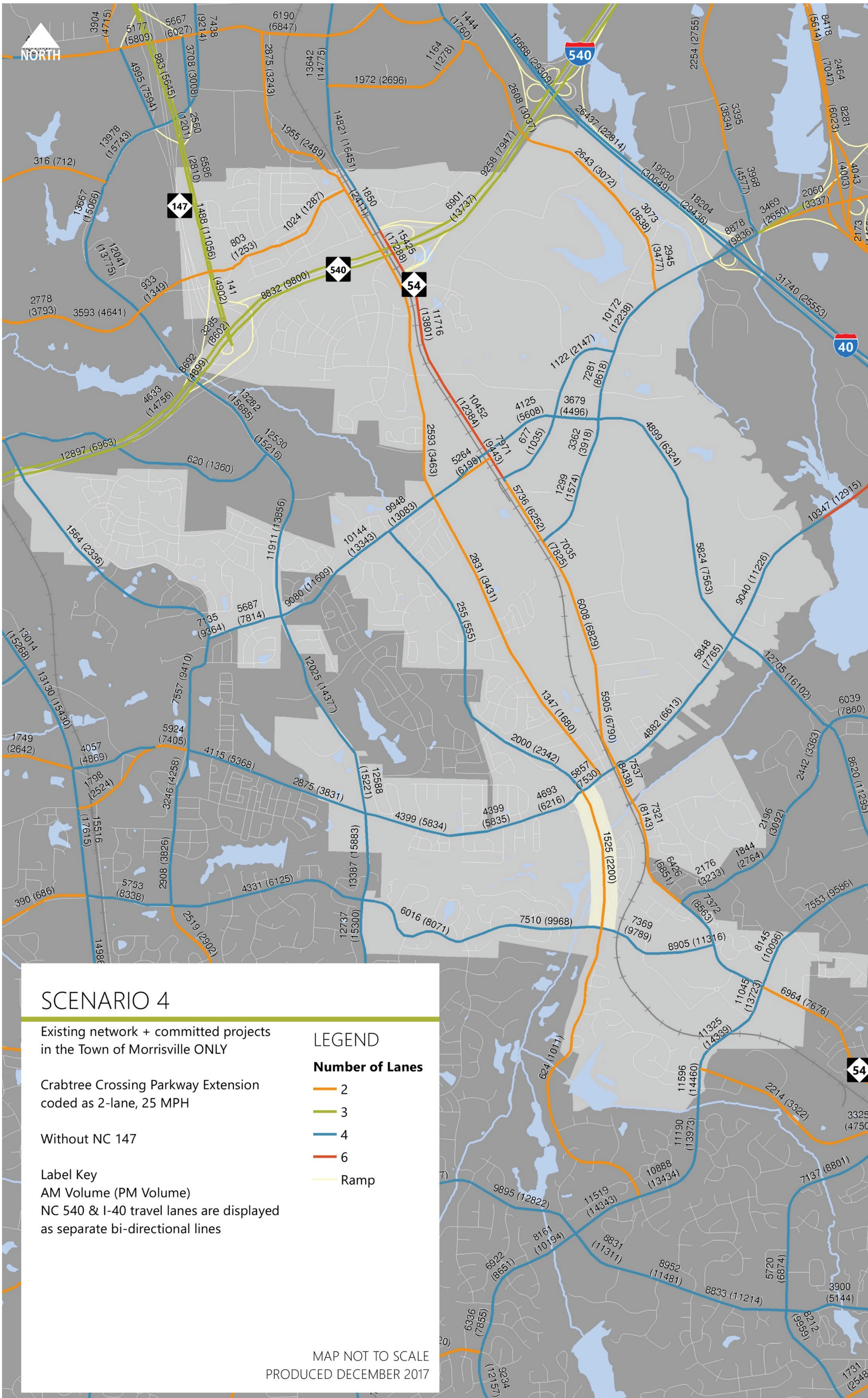

NORTH
147
540
40
54
SCENARIO 1
LEGEND
Capacity
Very Below Capacity
Below Capacity
Approaching Capacity
Above Capacity
Existing network + 6-lane Davis Drive
+ 4-lane NC 54 + Airport Blvd Extension
+ Committed Projects
Crabtree Crossing Parkway Extension
coded as 2-lane, 25 MPH
NC 147 Extension
coded as 4-lanes
55 MPH, 45 MPH, 35 MPH
MAP NOT TO SCALE
PRODUCED DECEMBER 2017

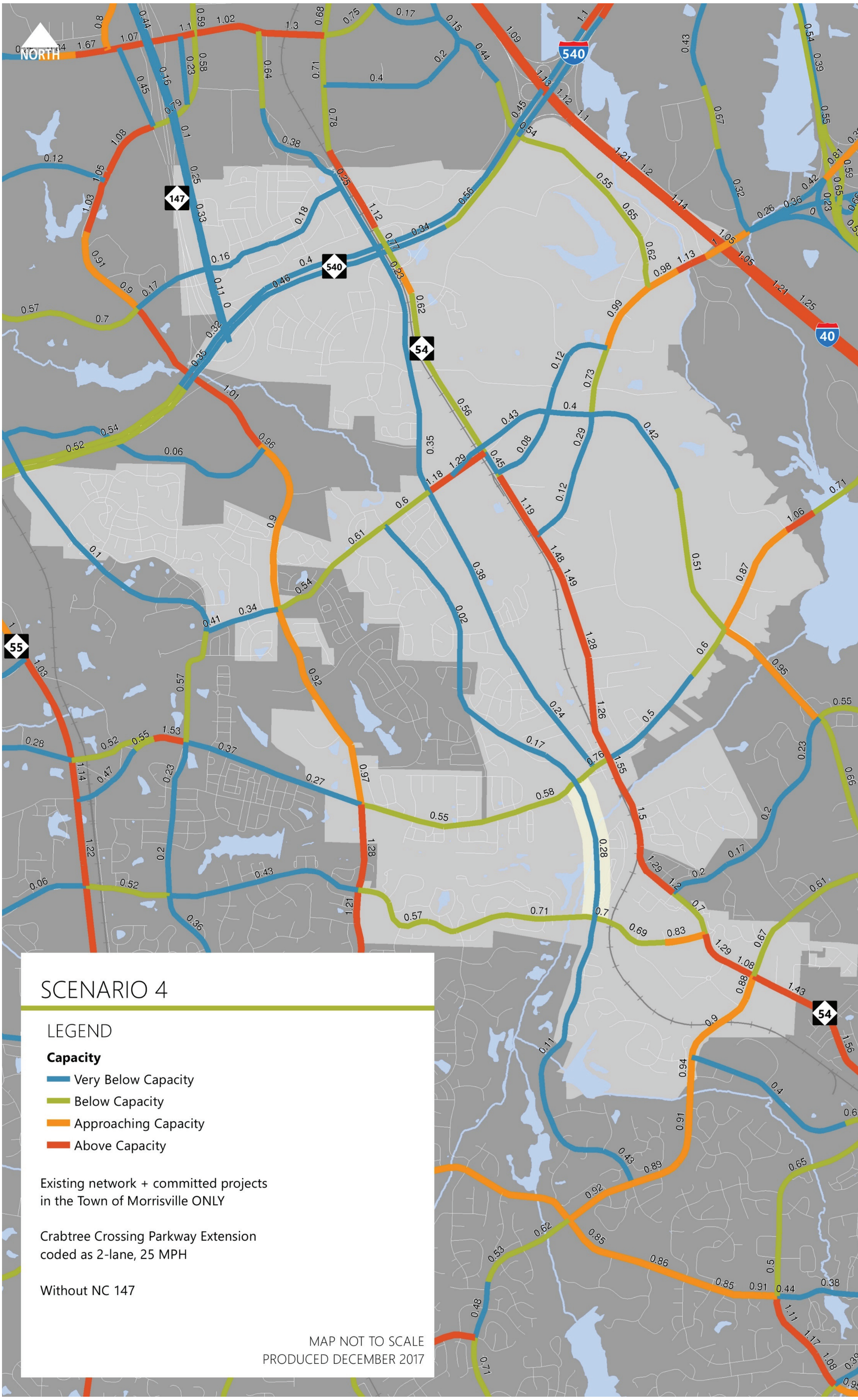

NORTH
147
540
40
54
55
SCENARIO 2
Existing network + committed projects in the Town of Morrisville ONLY
Crabtree Crossing Parkway Extension coded as 2-lane, 25 MPH
NC 147 Extension coded as 4-lanes 55 MPH, 45 MPH, 35 MPH
Label Key
AM Volume (PM Volume)
NC 540 & I-40 travel lanes are displayed as separate bi-directional lines
LEGEND
Number of Lanes
2
3
4
6
Ramp
MAP NOT TO SCALE
PRODUCED DECEMBER 2017

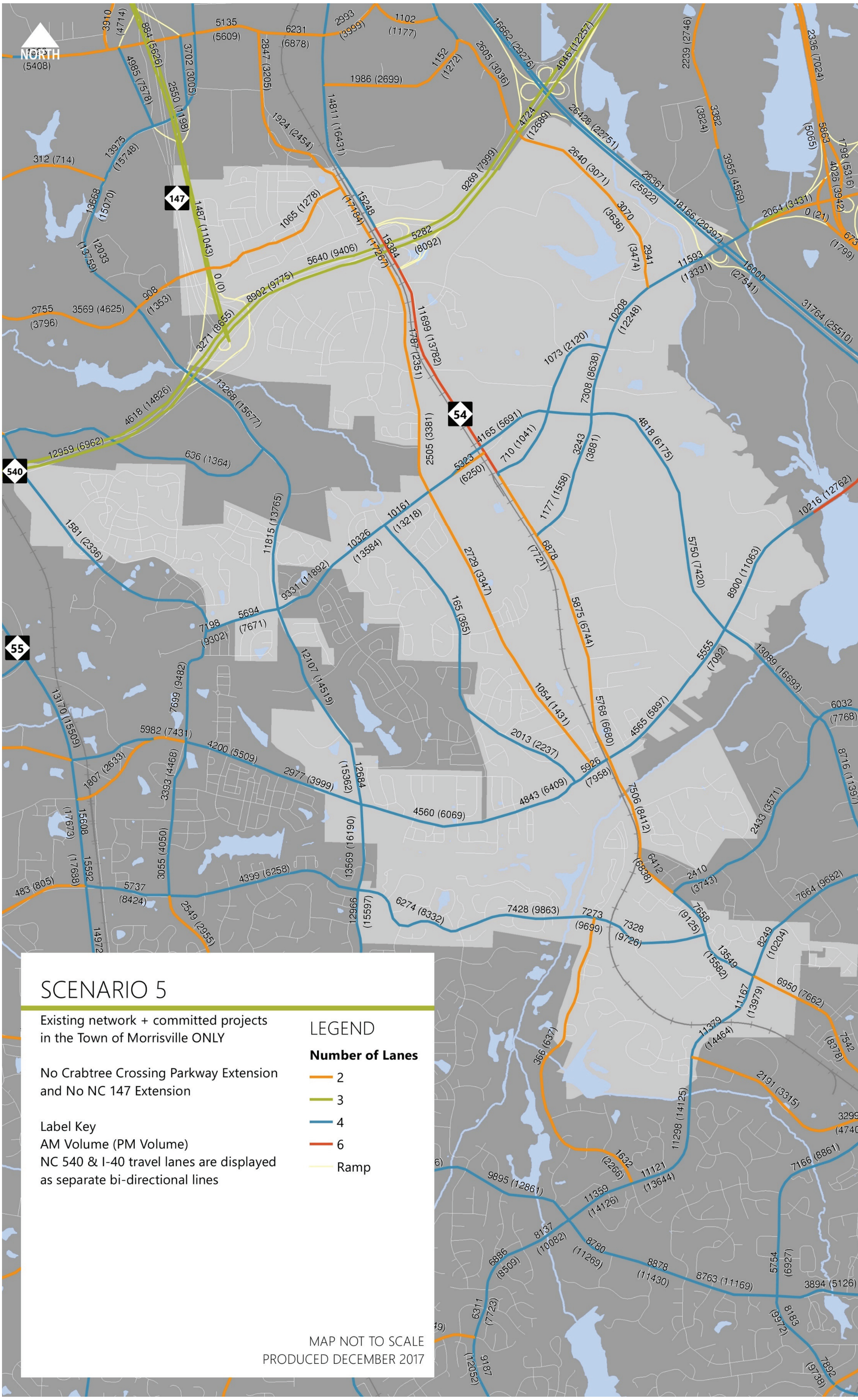

NORTH
SCENARIO 2
LEGEND
Capacity
Very Below Capacity
Below Capacity
Approaching Capacity
Above Capacity
Existing network + committed projects in the Town of Morrisville ONLY
Crabtree Crossing Parkway Extension coded as 2-lane, 25 MPH
NC 147 Extension coded as 4-lanes 55 MPH, 45 MPH, 35 MPH
MAP NOT TO SCALE
PRODUCED DECEMBER 2017

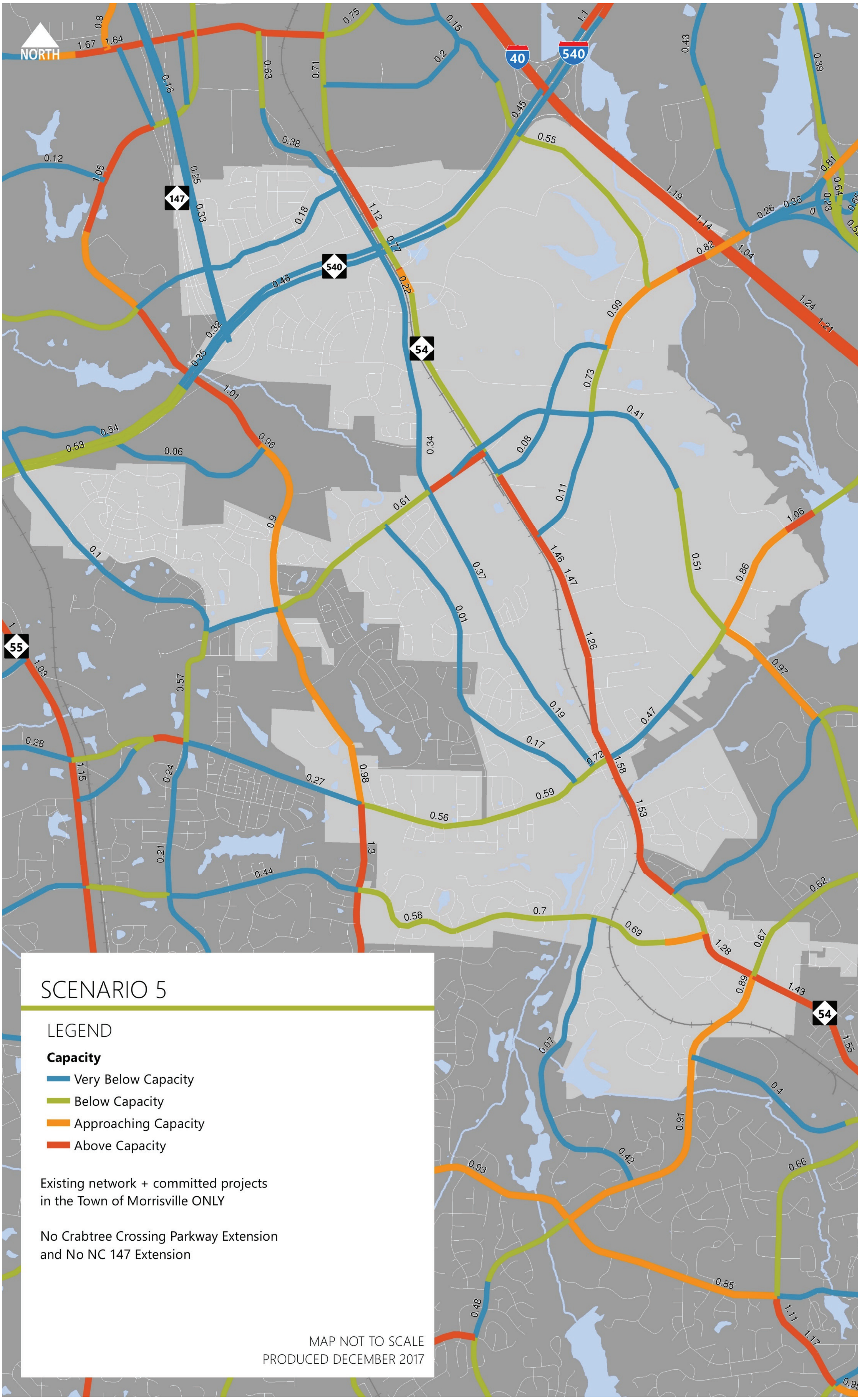

NORTH
SCENARIO 3
Existing network + committed projects in the Town of Morrisville ONLY
No Crabtree Crossing Parkway Extension
NC 147 Extension coded as 4-lanes 55 MPH, 45 MPH, 35 MPH
Label Key
AM Volume (PM Volume)
NC 540 & I-40 travel lanes are displayed as seperate bi-directional lines
LEGEND
Number of Lanes
2
3
4
6
Ramp
MAP NOT TO SCALE
PRODUCED DECEMBER 2017

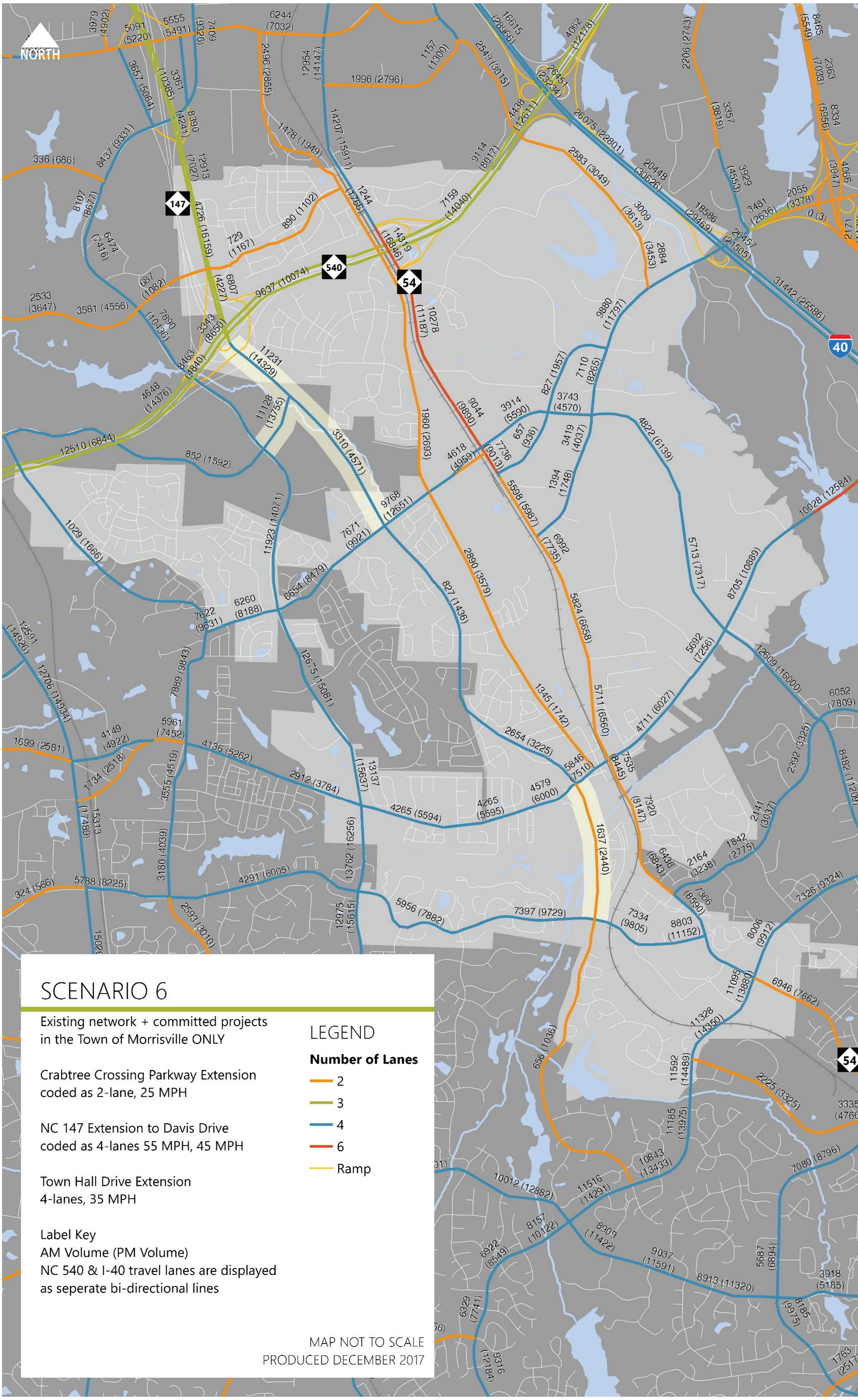

NORTH
147
540
54
55
40
SCENARIO 3
LEGEND
Capacity
Very Below Capacity
Below Capacity
Approaching Capacity
Above Capacity
Existing network + committed projects
in the Town of Morrisville ONLY
No Crabtree Crossing Parkway Extension
NC 147 Extension
coded as 4-lanes
55 MPH, 45 MPH, 35 MPH
MAP NOT TO SCALE
PRODUCED DECEMBER 2017

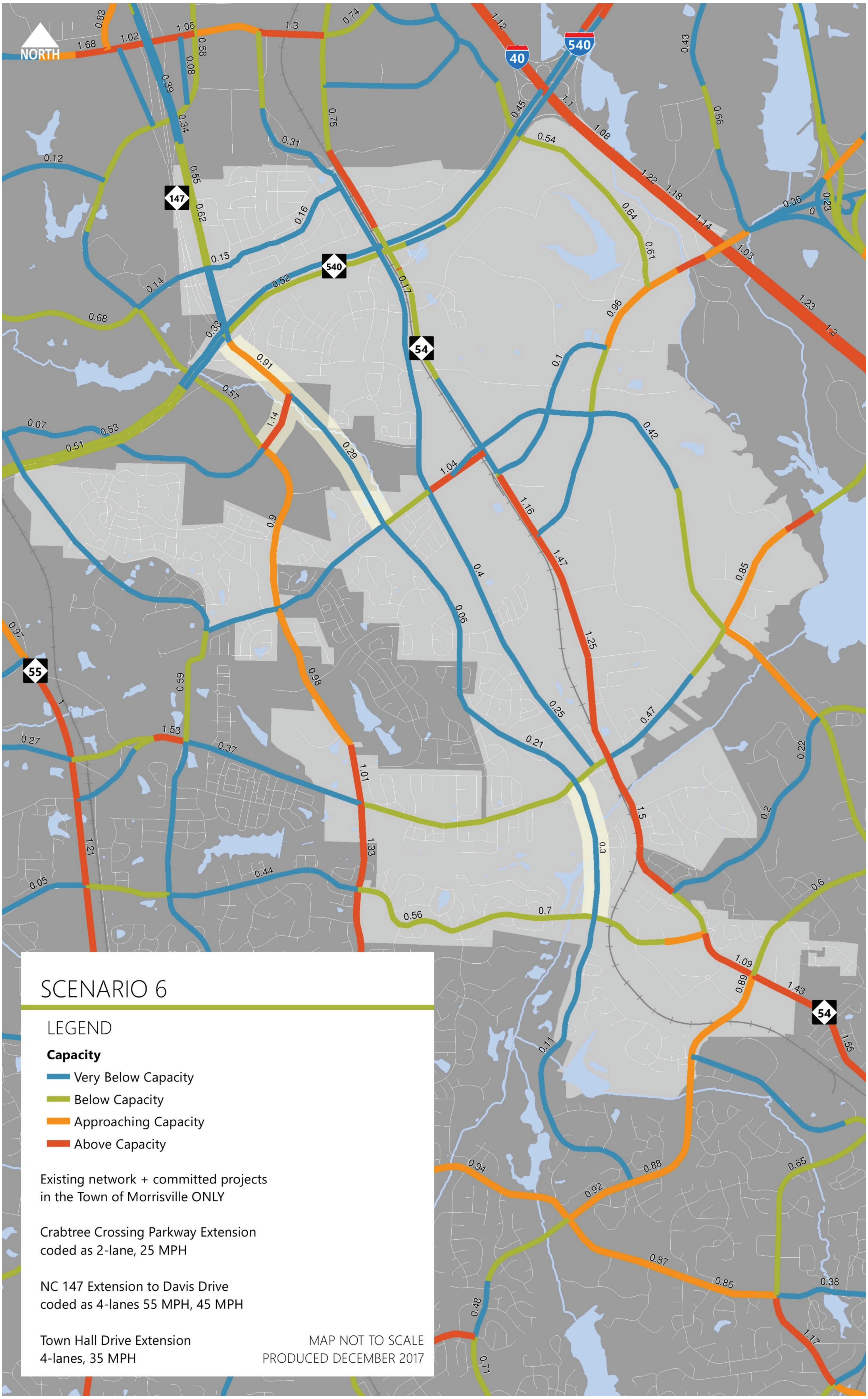

NORTH
540
40
147
54
SCENARIO 4
Existing network + committed projects in the Town of Morrisville ONLY
Crabtree Crossing Parkway Extension coded as 2-lane, 25 MPH
Without NC 147
Label Key
AM Volume (PM Volume)
NC 540 & I-40 travel lanes are displayed as separate bi-directional lines
LEGEND
Number of Lanes
2
3
4
6
Ramp
MAP NOT TO SCALE
PRODUCED DECEMBER 2017

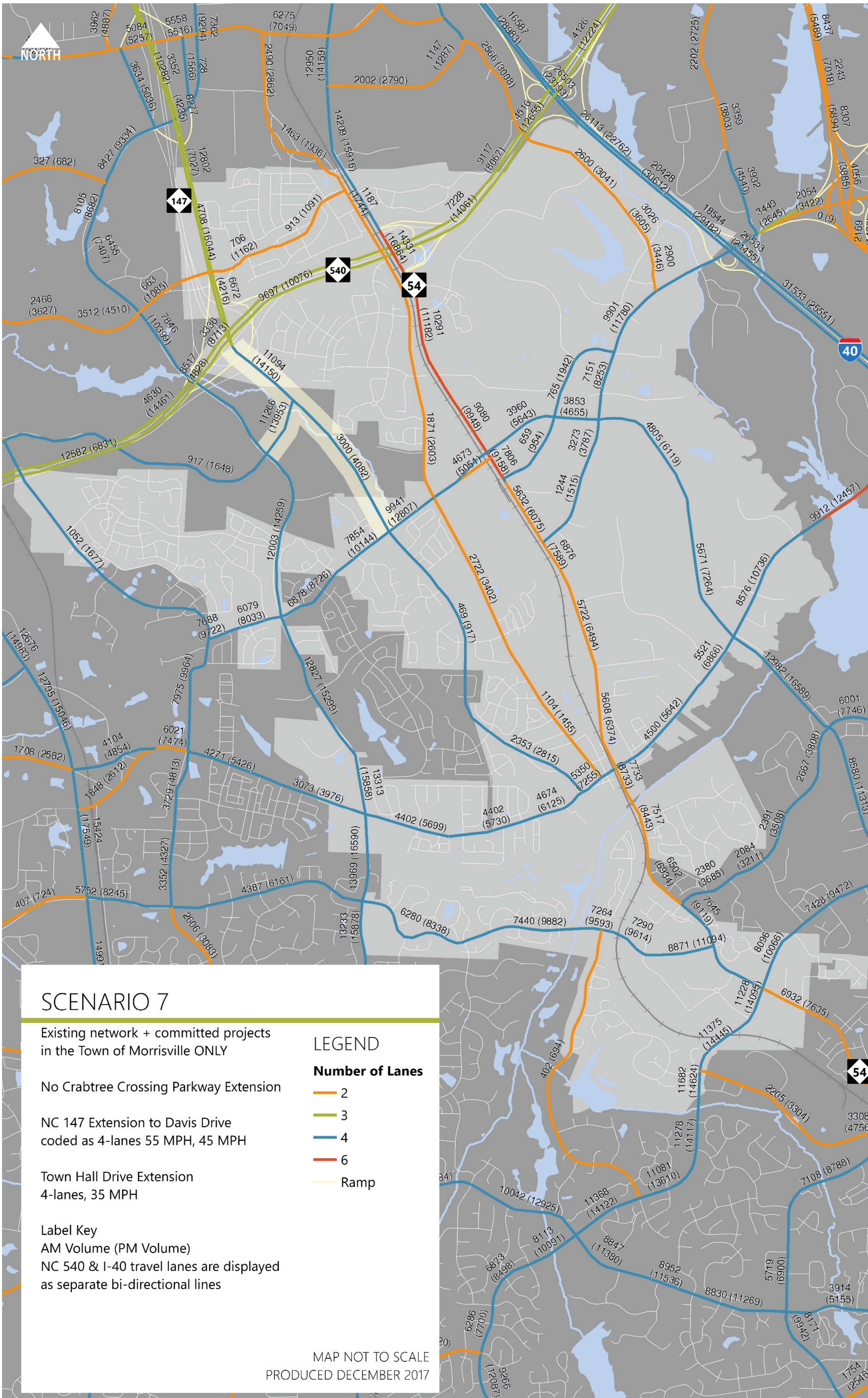

NORTH
SCENARIO 4
LEGEND
Capacity
Very Below Capacity
Below Capacity
Approaching Capacity
Above Capacity
Existing network + committed projects
in the Town of Morrisville ONLY
Crabtree Crossing Parkway Extension
coded as 2-lane, 25 MPH
Without NC 147
MAP NOT TO SCALE
PRODUCED DECEMBER 2017
540
147
540
54
55
40
54

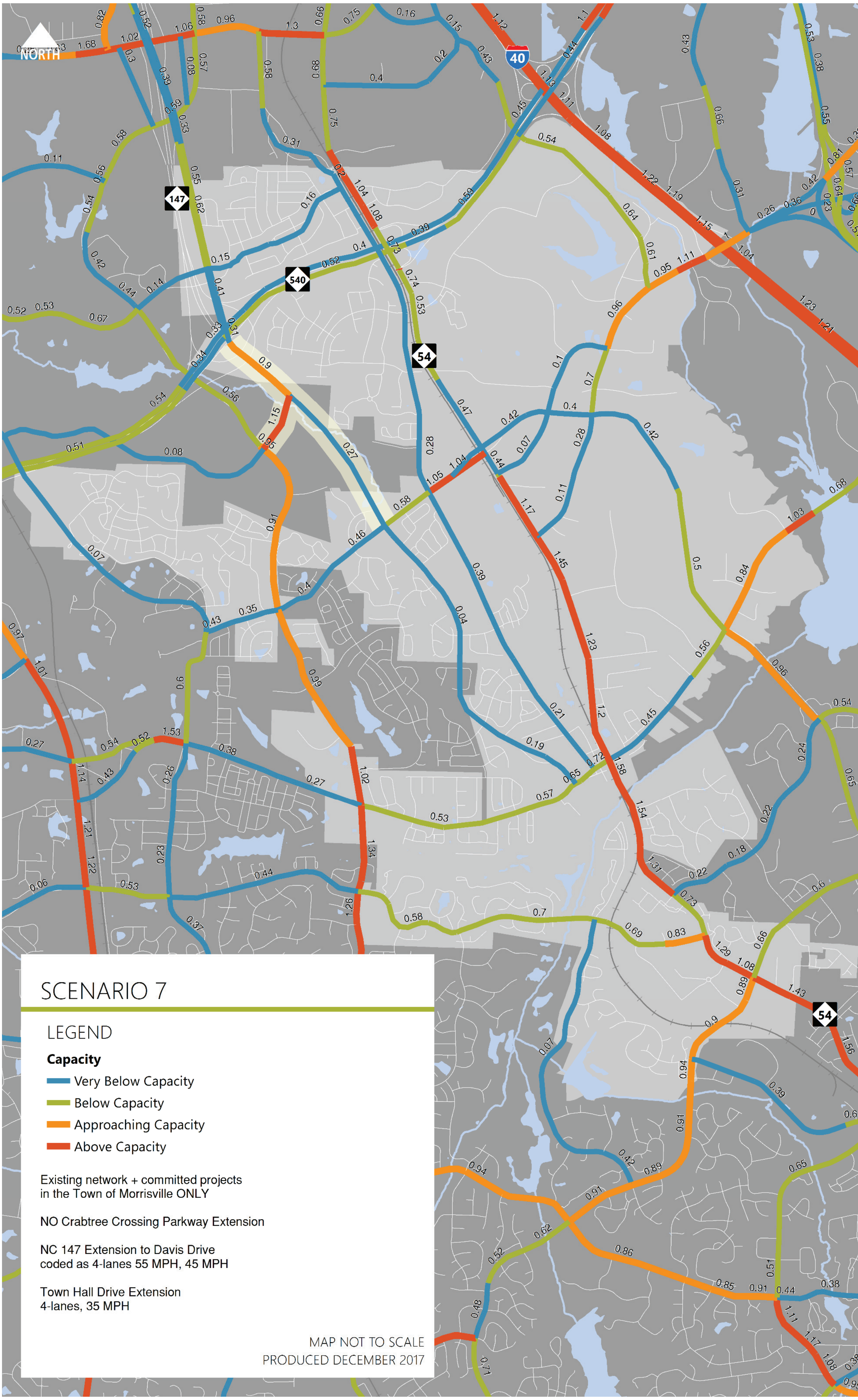

NORTH
SCENARIO 5
Existing network + committed projects in the Town of Morrisville ONLY
No Crabtree Crossing Parkway Extension and No NC 147 Extension
Label Key
AM Volume (PM Volume)
NC 540 & I-40 travel lanes are displayed as separate bi-directional lines
LEGEND
Number of Lanes
2
3
4
6
Ramp
MAP NOT TO SCALE
PRODUCED DECEMBER 2017
147
540
54
55

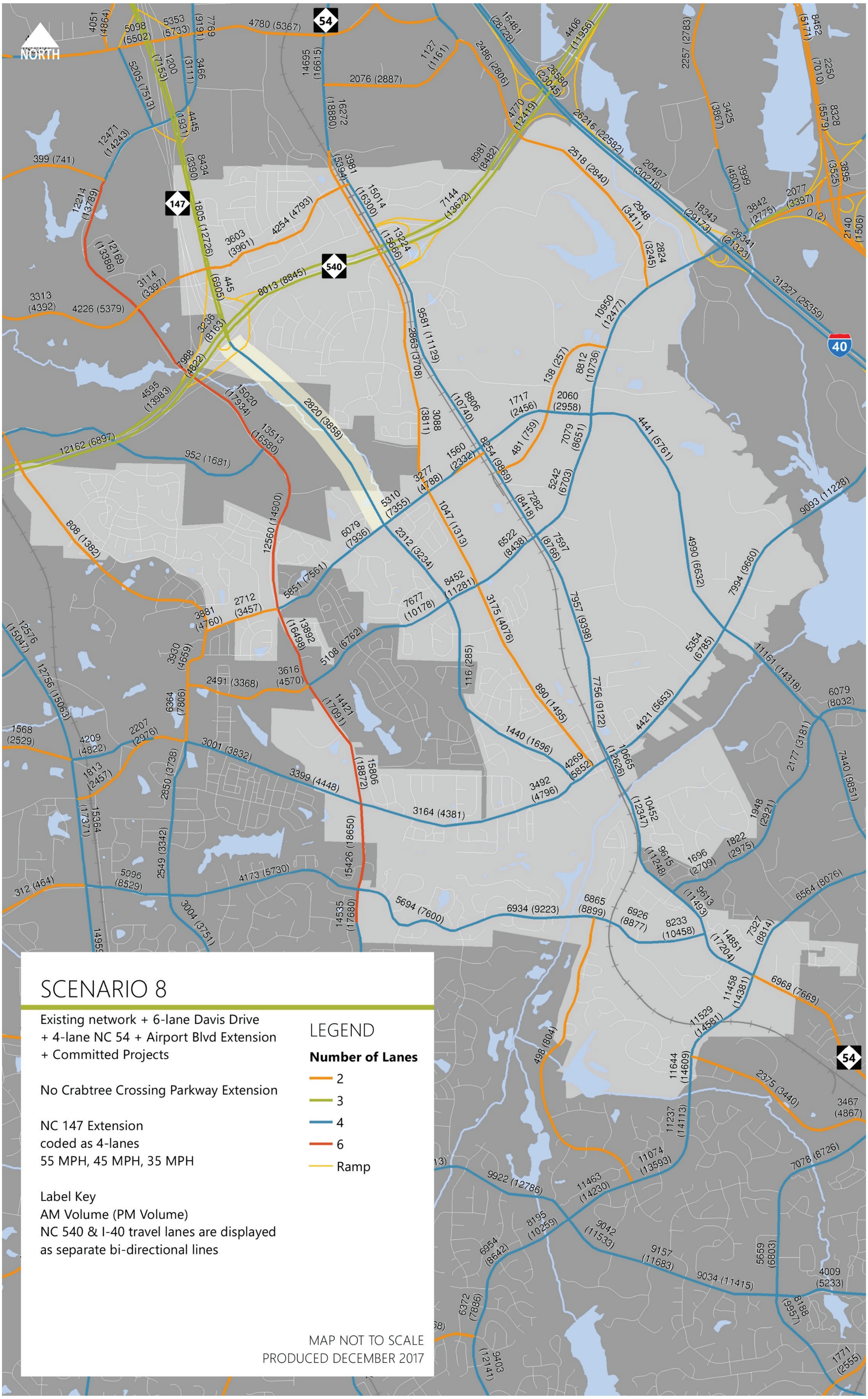

NORTH
40
540
147
54
55
SCENARIO 5
LEGEND
Capacity
Very Below Capacity
Below Capacity
Approaching Capacity
Above Capacity
Existing network + committed projects
in the Town of Morrisville ONLY
No Crabtree Crossing Parkway Extension
and No NC 147 Extension
MAP NOT TO SCALE
PRODUCED DECEMBER 2017

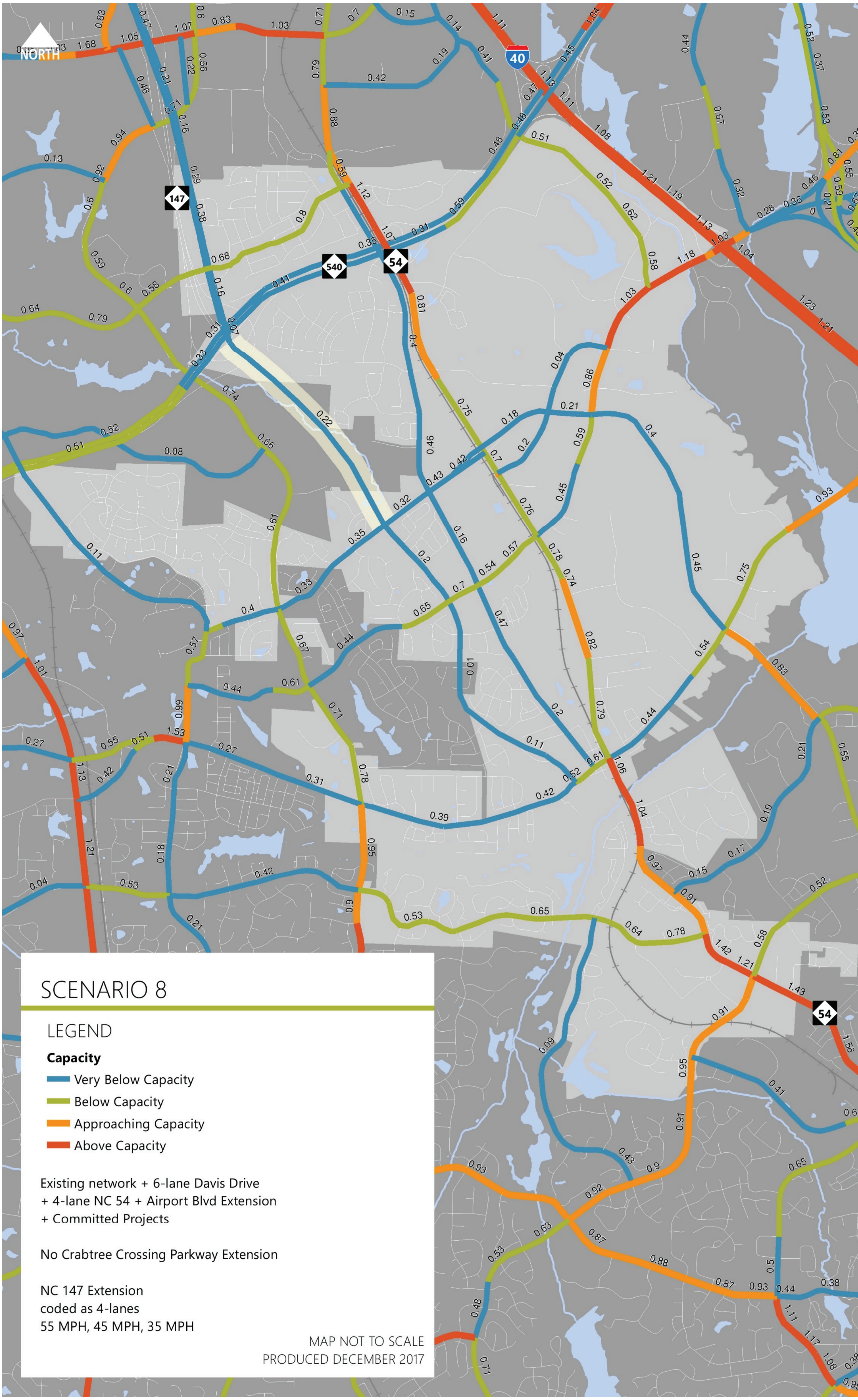

NORTH
147
540
54
40
SCENARIO 6
Existing network + committed projects in the Town of Morrisville ONLY
Crabtree Crossing Parkway Extension coded as 2-lane, 25 MPH
NC 147 Extension to Davis Drive coded as 4-lanes 55 MPH, 45 MPH
Town Hall Drive Extension 4-lanes, 35 MPH
Label Key
AM Volume (PM Volume)
NC 540 & I-40 travel lanes are displayed as seperate bi-directional lines
LEGEND
Number of Lanes
2
3
4
6
Ramp
MAP NOT TO SCALE
PRODUCED DECEMBER 2017

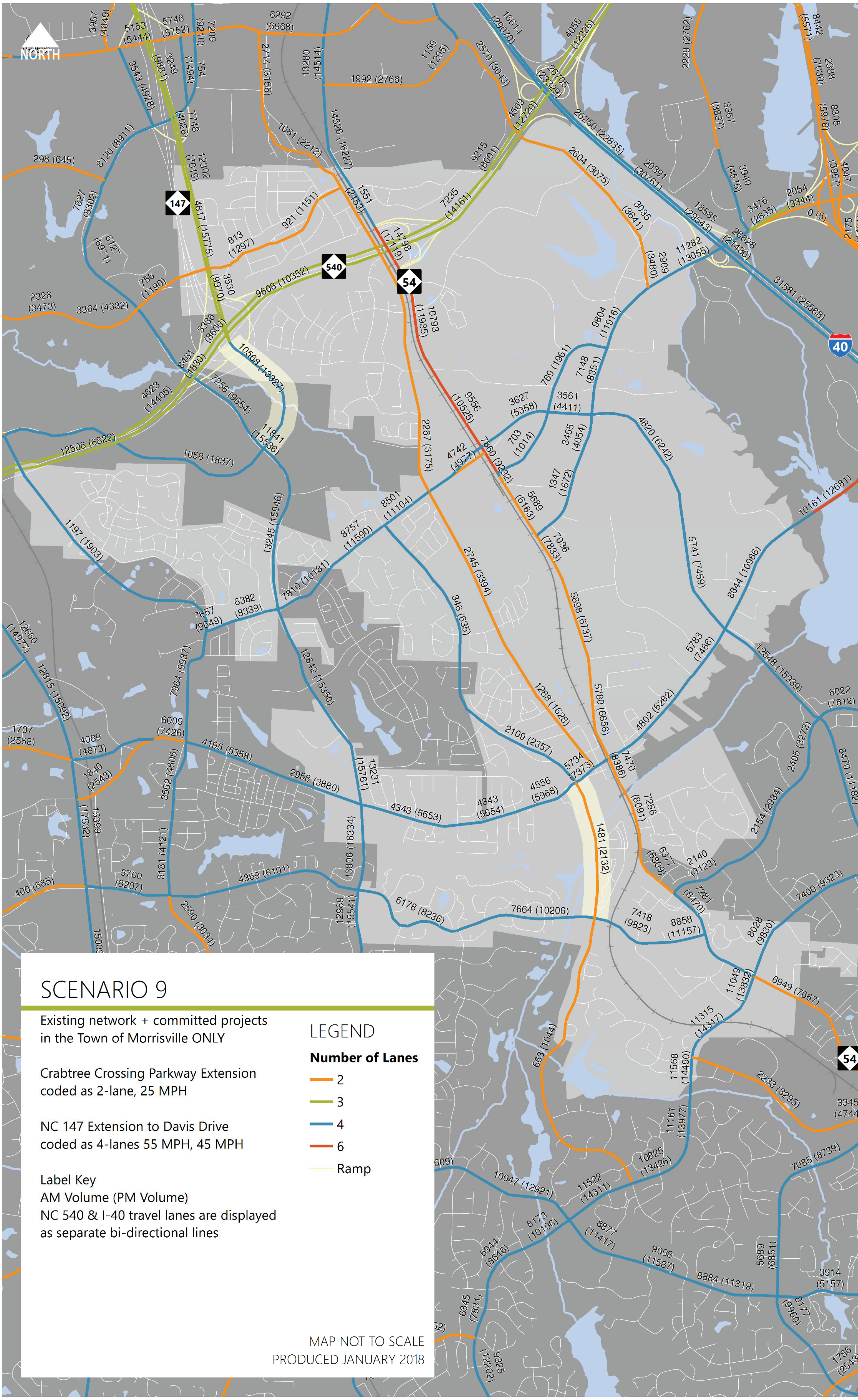

NORTH
40
540
147
540
54
55
54
SCENARIO 6
LEGEND
Capacity
Very Below Capacity
Below Capacity
Approaching Capacity
Above Capacity
Existing network + committed projects in the Town of Morrisville ONLY
Crabtree Crossing Parkway Extension coded as 2-lane, 25 MPH
NC 147 Extension to Davis Drive coded as 4-lanes 55 MPH, 45 MPH
Town Hall Drive Extension 4-lanes, 35 MPH
MAP NOT TO SCALE
PRODUCED DECEMBER 2017

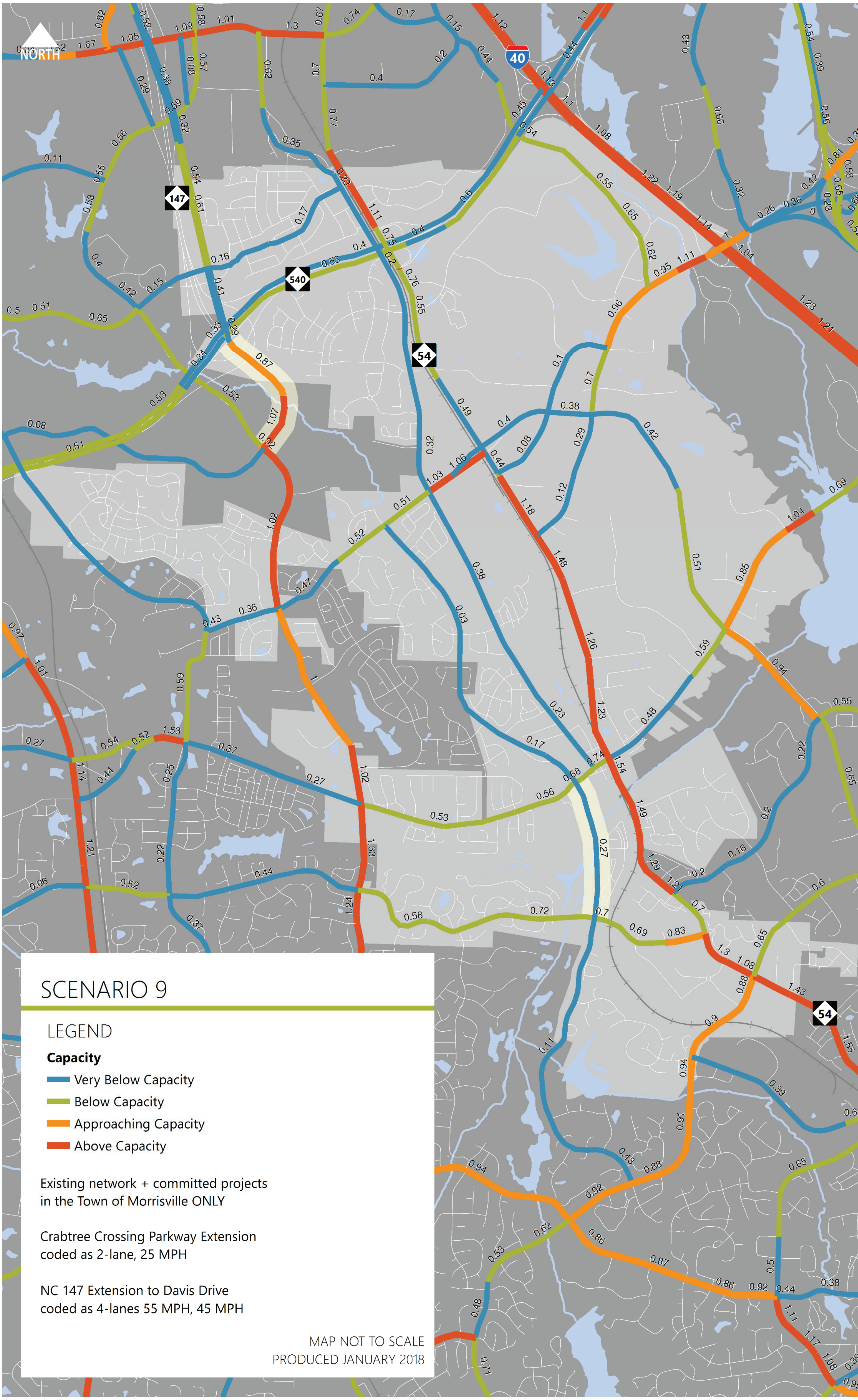

NORTH
SCENARIO 7
Existing network + committed projects in the Town of Morrisville ONLY
No Crabtree Crossing Parkway Extension
NC 147 Extension to Davis Drive coded as 4-lanes 55 MPH, 45 MPH
Town Hall Drive Extension 4-lanes, 35 MPH
Label Key
AM Volume (PM Volume)
NC 540 & I-40 travel lanes are displayed as separate bi-directional lines
LEGEND
Number of Lanes
2
3
4
6
Ramp
MAP NOT TO SCALE
PRODUCED DECEMBER 2017

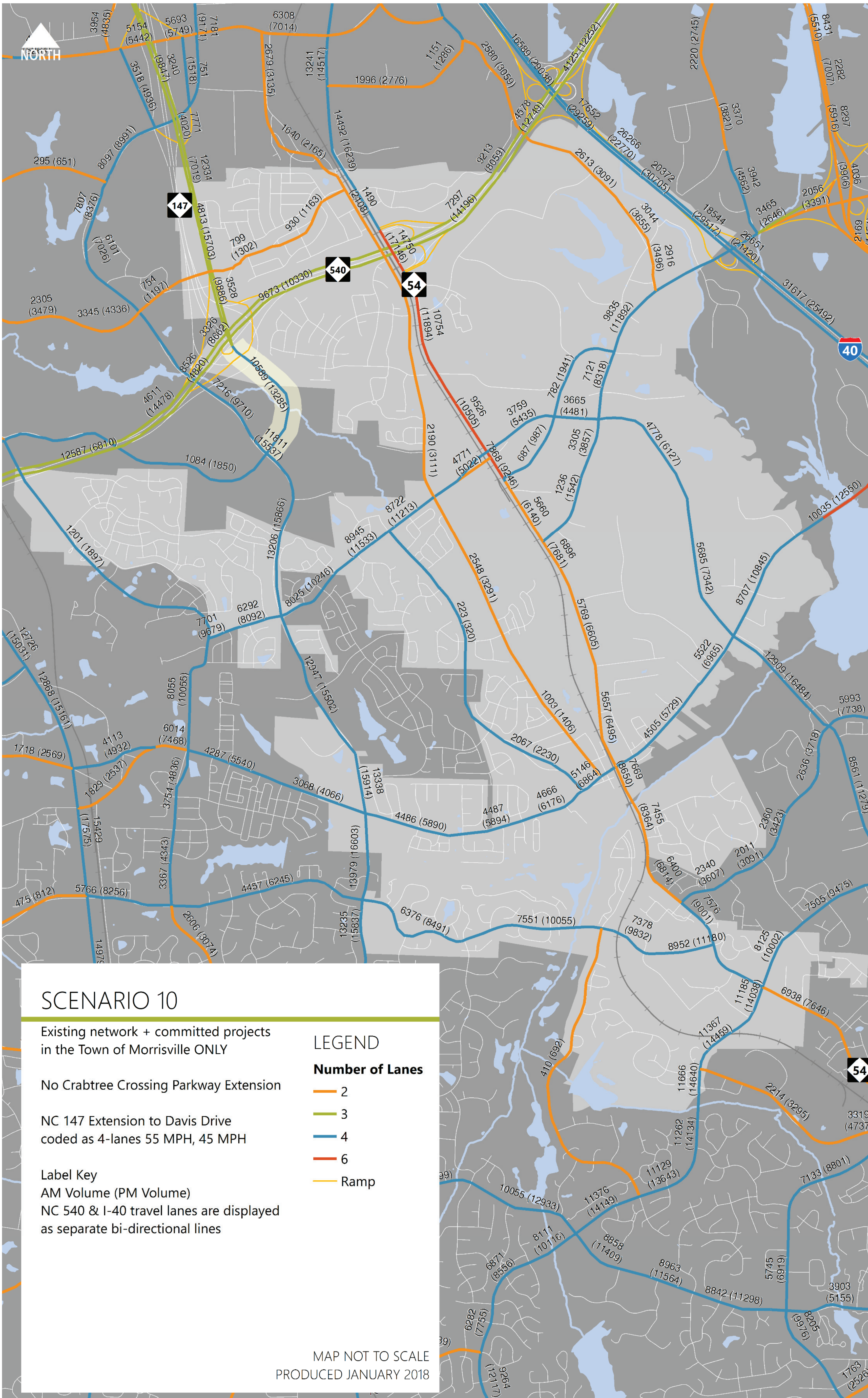

NORTH
147
540
54
40
SCENARIO 7
LEGEND
Capacity
Very Below Capacity
Below Capacity
Approaching Capacity
Above Capacity
Existing network + committed projects in the Town of Morrisville ONLY
NO Crabtree Crossing Parkway Extension
NC 147 Extension to Davis Drive coded as 4-lanes 55 MPH, 45 MPH
Town Hall Drive Extension 4-lanes, 35 MPH
MAP NOT TO SCALE
PRODUCED DECEMBER 2017

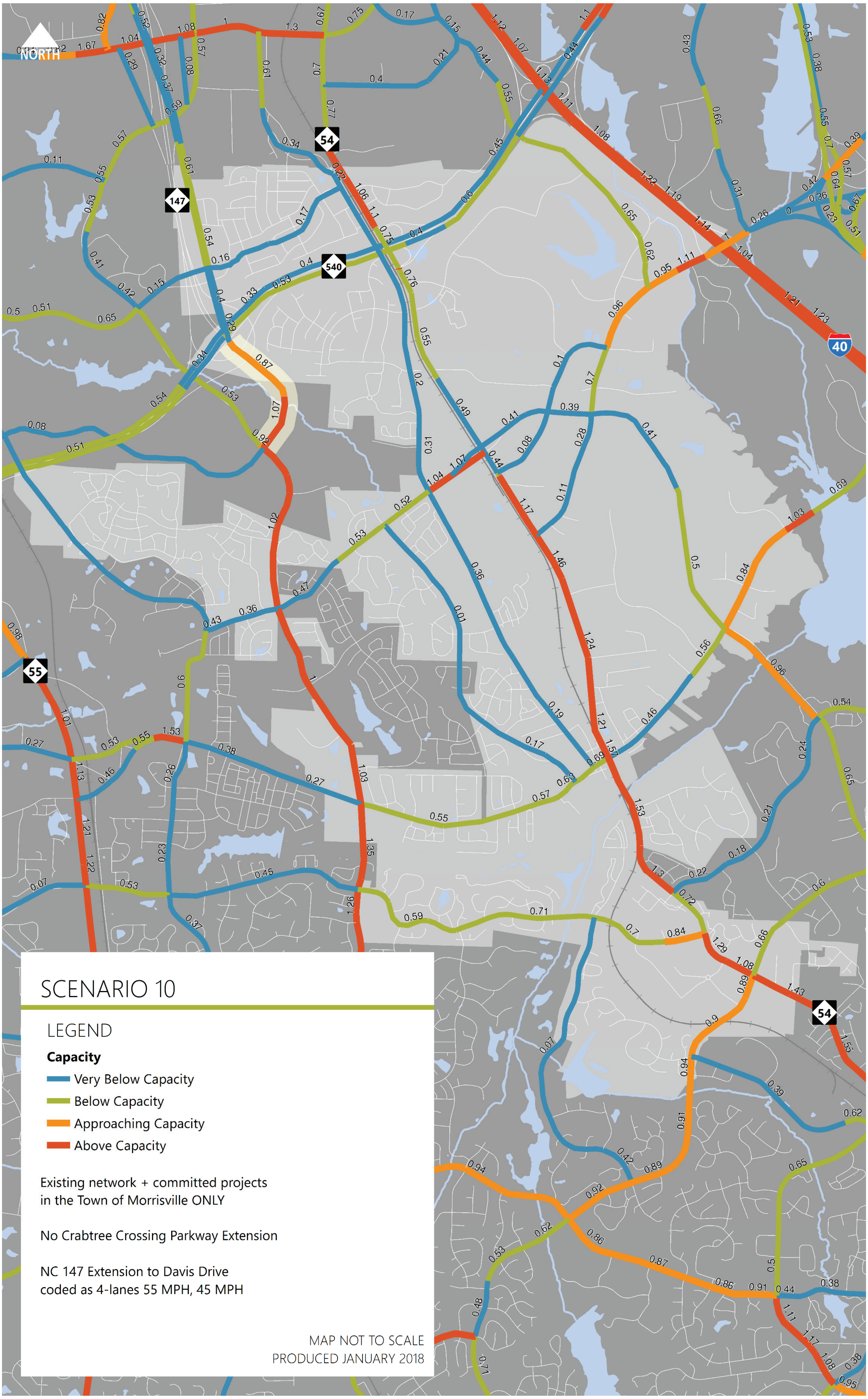

NORTH
SCENARIO 8
Existing network + 6-lane Davis Drive
+ 4-lane NC 54 + Airport Blvd Extension
+ Committed Projects
No Crabtree Crossing Parkway Extension
NC 147 Extension
coded as 4-lanes
55 MPH, 45 MPH, 35 MPH
Label Key
AM Volume (PM Volume)
NC 540 & I-40 travel lanes are displayed
as separate bi-directional lines
LEGEND
Number of Lanes
2
3
4
6
Ramp
MAP NOT TO SCALE
PRODUCED DECEMBER 2017


NORTH
147
540
54
40
SCENARIO 8
LEGEND
Capacity
Very Below Capacity
Below Capacity
Approaching Capacity
Above Capacity
Existing network + 6-lane Davis Drive
+ 4-lane NC 54 + Airport Blvd Extension
+ Committed Projects
No Crabtree Crossing Parkway Extension
NC 147 Extension
coded as 4-lanes
55 MPH, 45 MPH, 35 MPH
MAP NOT TO SCALE
PRODUCED DECEMBER 2017


NORTH
SCENARIO 9
Existing network + committed projects in the Town of Morrisville ONLY
Crabtree Crossing Parkway Extension coded as 2-lane, 25 MPH
NC 147 Extension to Davis Drive coded as 4-lanes 55 MPH, 45 MPH
Label Key
AM Volume (PM Volume)
NC 540 & I-40 travel lanes are displayed as separate bi-directional lines
LEGEND
Number of Lanes
2
3
4
6
Ramp
MAP NOT TO SCALE
PRODUCED JANUARY 2018


NORTH
147
540
54
40
SCENARIO 9
LEGEND
Capacity
Very Below Capacity
Below Capacity
Approaching Capacity
Above Capacity
Existing network + committed projects
in the Town of Morrisville ONLY
Crabtree Crossing Parkway Extension
coded as 2-lane, 25 MPH
NC 147 Extension to Davis Drive
coded as 4-lanes 55 MPH, 45 MPH
MAP NOT TO SCALE
PRODUCED JANUARY 2018


NORTH
147
540
54
40
SCENARIO 10
Existing network + committed projects in the Town of Morrisville ONLY
No Crabtree Crossing Parkway Extension
NC 147 Extension to Davis Drive coded as 4-lanes 55 MPH, 45 MPH
Label Key
AM Volume (PM Volume)
NC 540 & I-40 travel lanes are displayed as separate bi-directional lines
LEGEND
Number of Lanes
2
3
4
6
Ramp
MAP NOT TO SCALE
PRODUCED JANUARY 2018


NORTH
SCENARIO 10
LEGEND
Capacity
Very Below Capacity
Below Capacity
Approaching Capacity
Above Capacity
Existing network + committed projects
in the Town of Morrisville ONLY
No Crabtree Crossing Parkway Extension
NC 147 Extension to Davis Drive
coded as 4-lanes 55 MPH, 45 MPH
MAP NOT TO SCALE
PRODUCED JANUARY 2018

PREPARED FOR:

Morrisville

PREPARED BY:

Kimley»Horn