PREPARED BY ALTA PLANNING + DESIGN | ADOPTED 2017 | UPDATED 2019

PREPARED FOR THE GREENVILLE URBAN AREA METROPOLITAN PLANNING ORGANIZATION, INCLUDING GREENVILLE, WINTERVILLE, AYDEN, SIMPSON, AND PARTS OF PITT COUNTY

alta
PLANNING + DESIGN

ACKNOWLEDGMENTS

Thank you to the 1,000+ local residents, business owners, community leaders, students, and government staff that participated in the development of this plan through meetings, events, comment forms, and plan review. Special thanks to those who participated as project steering committee members, listed below.

PROJECT STEERING COMMITTEE

» *David Boyd, Mayor of the Village of Simpson*
» *Will Broughton, Friends of Greenville Greenways*
» *Jeff Cabaniss, NCDOT Division 2*
» *Dede Carney, Keep Greenville Beautiful*
» *Chad Carwein, East Carolina University Sustainability Program*
» *Tim Corley, Pitt County Engineering*
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» *Chris Padgett, Greenville Utilities Commission*
» *Tony Parker, Greenville Organization of Runners*
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Prepared for the Greenville Urban Area Metropolitan Planning Organization, Including Greenville, Winterville, Ayden, Simpson, and parts of Pitt County

Project Website: www.WalkBikeGreenvilleNC.com

CONTENTS

INTENDED AUDIENCES

The intended audience for this document includes residents, elected officials, government planners, developers, and all people interested in active transportation, recreation, health, wellness, environmental stewardship, economic development, tourism, and overall quality of life in the Greater Greenville Area.

ADDITIONAL INFORMATION

Please contact the Greenville Urban Area Metropolitan Planning Organization for additional information on this plan and planning process: 200 West Fifth Street, Greenville, NC 27834
www.greenvillenc.gov/government/public-works
252.329.CITY (2489)

Executive Summary

"Connectivity is a very important issue. People have to be able to get where they want to go and that involves connecting neighborhoods with shopping, restaurants and schools in a safe and convenient way. This can involve some of the existing roadways but not in their current state. If you make the routes to these desired locations reasonable to navigate by foot or bike people will use them."

- Public Comment, 2016

Executive Summary

The Greater Greenville Area is working together to create better walking and bicycling connections in our communities. In 2016, the City of Greenville and the Greenville Urban Area Metropolitan Planning Organization (MPO) began updating their 2011 Bicycle and Pedestrian Master Plan. The purpose of this update is to renew plan priorities, tools and programs for improving the bicycle and pedestrian environments in the Greenville urban area, which includes the City of Greenville, Town of Ayden, Town of Winterville, Village of Simpson, and portions of Pitt County. Another major update to the plan is the additional focus on shared use trails, or "greenways". This updated plan for bicycle, pedestrian, and greenway infrastructure, programs, and policies is now known as the MPO's "Active Transportation Plan". The vision statement for this Plan (below) captures its main purpose and intent:

Plan Goals

- *Enhance Connectivity*
- *Create a Positive Economic Impact*
- *Protect the Environment*
- *Promote Equity*
- *Enhance Health*
- *Increase Safety*
- *Increase Livability*

Vision Statement

"The Greater Greenville Area will offer residents and visitors many options for walking and bicycling, through well-designed and beautifully maintained greenway trails, and through walkable, bicycle-friendly streets. People of all ages, abilities, and incomes will be able to safely and conveniently get to where they want to go."

– Vision Statement from the Active Transportation Plan Steering Committee

Planning Process

The development of this Plan was open and participatory, with area residents providing input through public events, workshops, committee meetings, public comment forms, and an online input map This Plan features:

- A thorough analysis of current conditions and public feedback regarding walking, bicycling, and trails in the MPO
- A comprehensive recommended bicycle, pedestrian, and greenway network
- A strategic list of recommended top priority projects
- Recommended strategies for bicycle, pedestrian and trail policy, programs, design, and implementation.

Analysis & Public Input

Key Types of Meetings & Public Input (pages 22-31)

30+	Project Steering Committee Members
5	Steering Committee Meetings
200+	Comments through the Online Input Map
5	Input Stations Set Up Throughout MPO
3	Outreach Sessions at Local Events
4	Draft and Final Plan Presentations
1,000+	Public Comment Forms
3,000+	Average Monthly Visitors to the Project Website

1,008 Total number of survey respondents

With roughly proportional responses from Greenville, Winterville, Ayden, Simpson, and Pitt County

See Appendix A for full summary of comment form results.

About **75%** of survey respondents

Say it is VERY important to improve walking, bicycling and greenway trail conditions in their community.

92 Crashes in Greenville Involving a Bicyclist or Pedestrian In 2016 ALONE

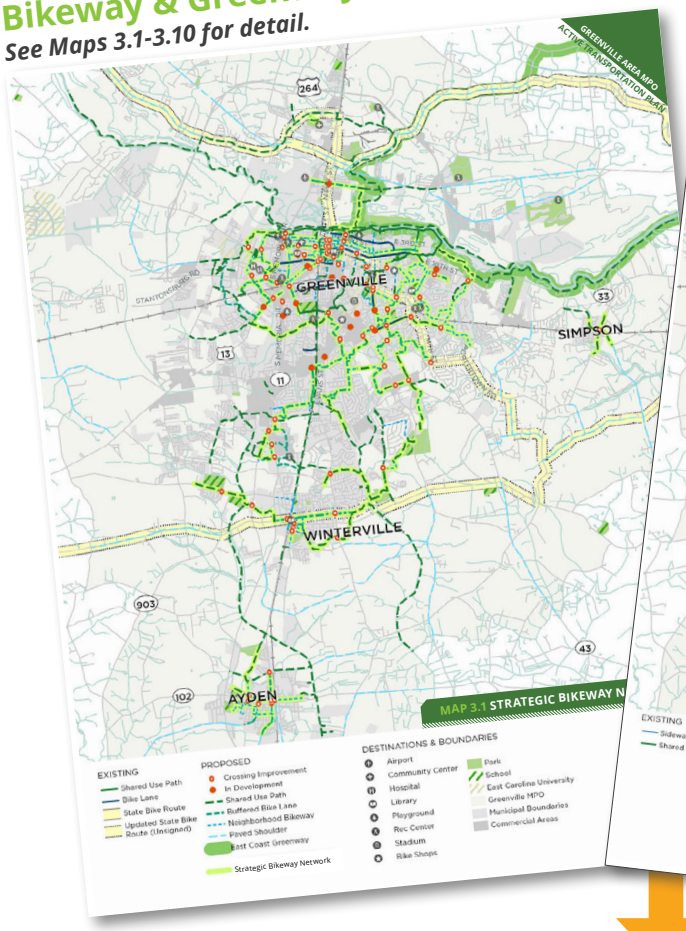
Of the 92 people involved in crashes, 5 people were killed and 37 people were disabled.

See Chapter 2 for more on this topic and other aspects of existing conditions.

Recommendations

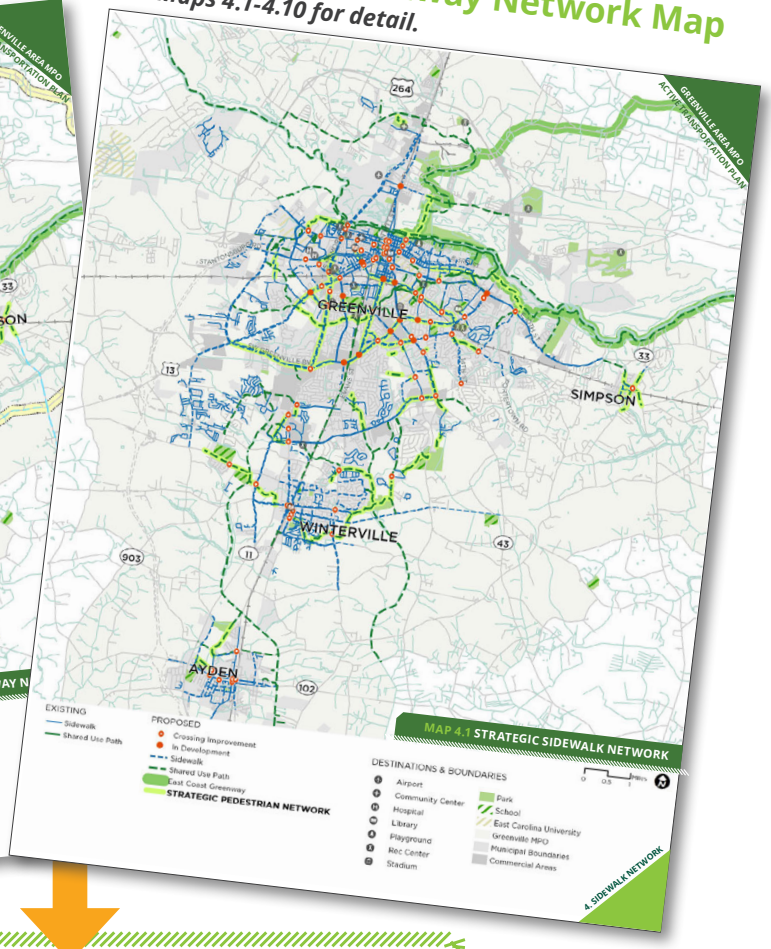
Bikeway & Greenway Network Map

See Maps 3.1-3.10 for detail.



Sidewalk & Greenway Network Map

See Maps 4.1-4.10 for detail.



28 **Priority Project Cutsheets**

Featuring individual project maps, cost estimates, and other details.

Chapter 5

The priority projects have the greatest impact in terms of safety and connectivity. Examples include greenways, sidewalks, bicycle lanes, bicycle shared-lane markings, side paths, and similar facilities. These projects have the potential to spur momentum for longer-term projects.

39 **Implementation Action Steps**

Along with detailed recommendations for policies, programs, design, and implementation.

Chapter 6 & 7

Successful implementation will require a consistent, coordinated effort by local leaders, MPO transportation planners, municipal planners and engineers, multiple NCDOT agencies, private partners, stakeholders, and advocates in the region. The plan's facility design guidelines provide a go-to resource for statewide and national best practices. A combination of federal, state, local and private/non-profit funding sources are recommended to get these projects from planning and design stages to implementation.

1 Introduction

"Greenville is a beautiful city and would have so much more to offer if only it could be seen and traveled safely on foot and by bicycle."

- Public Comment, 2016

Purpose

The Greater Greenville Area is working together to create better walking and bicycling connections in our communities.

Background

The Greater Greenville Area is working together to create better walking and bicycling connections in our communities. In 2016, the City of Greenville and the Greenville Urban Area Metropolitan Planning Organization (MPO) began updating their 2011 Bicycle and Pedestrian Master Plan. The purpose of this update is to renew plan priorities, tools and programs for improving the bicycle and pedestrian environments in the Greenville urban area, which includes the City of Greenville, Town of Ayden, Town of Winterville, Village of Simpson, and portions of Pitt County. Another major update to the plan is the additional focus on shared use trails, or "greenways". This updated plan for bicycle, pedestrian, and greenway infrastructure, programs, and policies is now known as the MPO's "Active Transportation Plan". The vision statement for this Plan (right) captures its main purpose and intent:

VISION STATEMENT

"The Greater Greenville Area will offer residents and visitors many options for walking and bicycling, through well-designed and beautifully maintained greenway trails, and through walkable, bicycle-friendly streets. People of all ages, abilities, and incomes will be able to safely and conveniently get to where they want to go."

– Vision Statement from the Active Transportation Plan Steering Committee

Goals

The goals outlined below build upon the vision statement and key themes from local plans and Federal guidelines. For example, they align with key components of Greenville's Community Plan, Horizons 2026, including: "Building Great Places", "Enhancing Mobility", "Creating Complete Neighborhoods", "Fostering a Resilient City", and "Growing a Healthy City." They also tie directly to the Federal Highway Administration's (FHWA) *Guidebook for Developing Pedestrian and Bicycle Performance Measures.* Finally, the main themes within these goals also provide structure to many sections of this Plan's analysis and recommendations.

Enhance Connectivity

Create more trails and walkable, bicycle-friendly streets that allow people of all ages and abilities to safely and conveniently get where they want to go.

Create a Positive Economic Impact

Recognize the economic benefits of walkable, bicycle-friendly communities, and capitalize on trail-based tourism.

Protect the Environment

Increase air quality by replacing a percentage of automobile trips with walking and bicycling trips; Protect waterways, wildlife habitat, and natural areas along greenways.

Promote Equity

People who do not own cars should still be able to go places safely and conveniently; Ensure that walking and bicycling infrastructure is provided in places with lower car ownership rates.

Enhance Health

Improve access to outdoor recreation and active transportation for health and wellness.

Increase Safety

Address the safety of the transportation system for all users; Achieve a transportation system that has zero bicycle or pedestrian fatalities or serious injuries.

Increase Livability

Transportation systems have a direct impact on overall quality of life; Provide active transportation choices within the transportation system that support healthy, safe, and walkable/ bikeable neighborhoods, whether rural, urban, or suburban.

Planning Process

The development of this Plan was open and participatory, with area residents providing input through public events, workshops, committee meetings, public comment forms, and an online input map. The overall process and timeline is summarized in the list below:

Summer 2016: Begin analyzing existing conditions and initiate committee meetings and public outreach;

Fall 2016: Continue public outreach, review conditions in the field, and begin development of the draft plan;

Winter 2016/2017: Complete draft plan and collect draft plan feedback from stakeholders and the public;

Spring 2017: Revise draft plan, produce final plan, and present to elected officials for plan adoption

Summer 2017: Begin Implementation

This Plan features:

- A thorough analysis of current conditions and public feedback regarding walking, bicycling, and trails in the MPO
- A comprehensive recommended bicycle, pedestrian, and greenway network
- A strategic list of recommended top priority projects
- Recommended strategies for bicycle, pedestrian and trail policy, programs, design, and implementation.

STEERING COMMITTEE & STAKEHOLDERS

The Steering Committee is made up of representatives from the following agencies and organizations, among others (such as local faith organizations and minority businesses):

- *Greenville Urban Area MPO*
- *City of Greenville*
- *Town of Ayden*
- *Town of Winterville*
- *Village of Simpson*
- *Pitt County*
- *Pitt County Development Commission*
- *North Carolina Department of Transportation*
- *Greenville Bicycle and Pedestrian Commission*
- *Greenville Neighborhood Advisory Board*
- *Greenville Environmental Advisory Commission*
- *Greenville Utilities Commission*
- *Friends of Greenville Greenways (FROGGS)*
- *East Carolina University*
- *Pitt Community College*
- *Uptown Greenville*
- *Eastern Carolina Injury Prevention Program*
- *Vidant Health*
- *Safe Kids Pitt County*
- *Association of Mexicans in NC*
- *Greenville Organization of Runners (GoRun)*
- *Young Professionals of Pitt County*
- *Alta Planning + Design (project consultants)*

The Value of Walkable and Bicycle-Friendly Communities

Increased rates of bicycling and walking will help to improve people's health and fitness, improve livability of our communities, enhance environmental conditions, decrease traffic congestion, and contribute to a greater sense of community.

Scores of studies from the fields of public health, urban planning, urban ecology, real estate, tourism, and transportation have demonstrated the value of supporting bicycling and walking. Communities across the United States and throughout the world are investing in improvements for bicycling, walking, and trails. They do this because of their obligations to promote health, safety and welfare, and also because of the growing awareness of the many benefits outlined in the sections that follow, which mirror the main themes of this plan's goals: *Connectivity, economic impact, environment, equity, health, safety, and livability.*

Connectivity

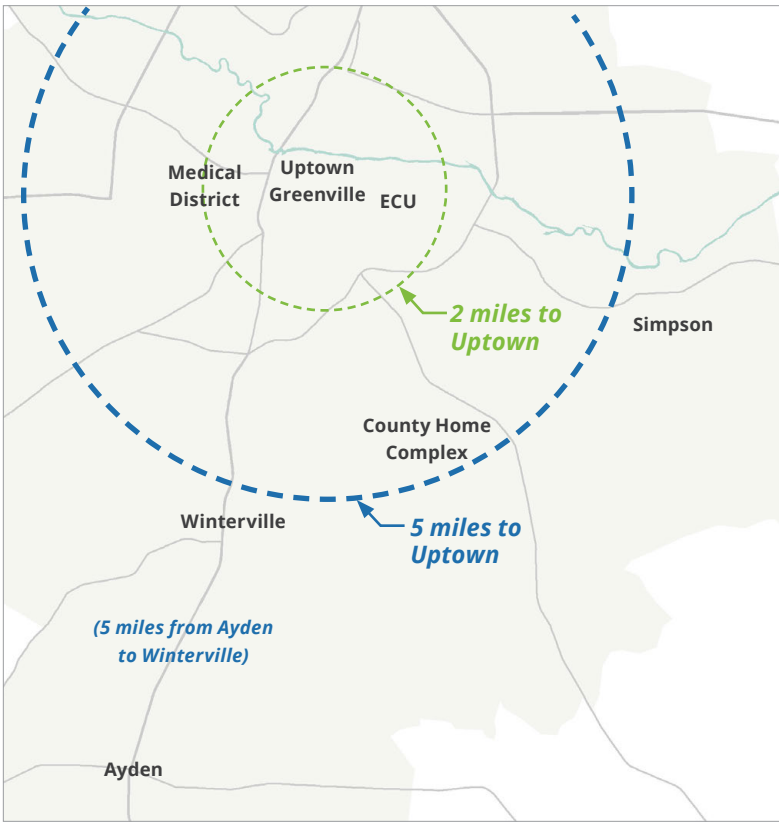
Surveys by the Federal Highway Administration show that Americans are willing to walk as far as two miles to a destination and bicycle as far as five miles.

In the Greenville area, the Medical District and East Carolina University's (ECU) campus core fall within a two-mile radius of Uptown Greenville, meaning some of the area's largest centers of employment, shopping, and culture are within a reasonable walking distance of one another. Similarly, the Town of Winterville, the County Home Complex, and the Village of Simpson are each about five miles from Uptown Greenville, a distance people are willing to bike. The challenge becomes making safe, comfortable, and convenient walking and bicycling connections across these distances, which is a goal of this plan.

In fact, **about 40% of all driving trips made in the U.S. are shorter than two miles, indicating an opportunity to accommodate those trips by providing the right environment for people to make them by foot or by bicycle, rather than in a car.** By doing so, citizens can help alleviate overall congestion since each pedestrian or bicyclist means less cars on the road.

Moreover, many area residents would simply prefer to have more options for getting around. According to the *Horizons 2026* plan, **people in Greenville are seeking a more balanced range of transportation options than they currently use today, with walking being the top choice for how people want to be able to travel.**

Example Trip Distances in the Greenville Area



Travel Preferences in Greenville

Source: Greenville's Horizons 2026 Plan (2016)

*How people in Greenville **travel today**: % of trips by car, walking, biking, or transit.*

*How people in Greenville **want to travel**: % trips by car, walking, biking, or transit*

Economic Impact

The economic benefits of active transportation come in the form of increased property values, tourism, sales, and infrastructure savings.

From a property values standpoint, consider the positive impact of trails and greenways, which are essential components of a complete bicycle and pedestrian network. According to research conducted by Headwaters Economics,

> *"Trails can be associated with higher property value, especially when a trail is designed to provide neighborhood access and maintain residents' privacy. Trails, like good schools or low crime, create an amenity that commands a higher price for nearby homes. Trails are valued by those who live nearby as places to recreate, convenient opportunities for physical activity and improving health, and safe corridors for walking or cycling to work or school."*

There are many examples, both nationally and in North Carolina, that affirm the positive connection between trails, active transportation, and property values. For example, the report *"Walking the Walk"* by CEO's for Cities, which looked at 94,000 real estate transactions in 15 markets, found that in 13 of those markets, higher levels of "walkability"

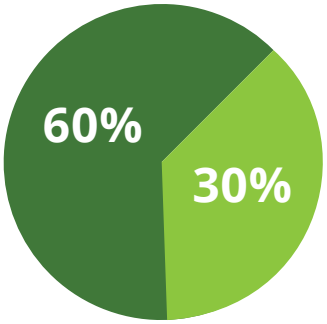
Developers in North Carolina understand the economic value of bicycling and trails.

Example marketing campaign from "Wendell Falls" in Wake County.

See below for more selected national examples of how walking and bicycling trails positively impact property values.

SELECTED RESEARCH HIGHLIGHTS FROM HEADWATERS ECONOMICS

- ***In San Antonio, Texas, neighborhood trails were associated with a two percent house price premium. Trails that were surrounded by greenbelts were associated with a five percent house price premium.[1]***
- ***In southwestern Ohio, the Little Miami Scenic Trail is associated with higher property value in urban, suburban, and rural settings. Up to a mile away from the trail, for every foot closer to the trail, property values increase by about $7. A home a half mile from the trail would sell for approximately nine percent less than a home adjacent to the trail.[2]***
- ***In suburban New Castle County, Delaware, homes within 50 meters of bike paths commanded a four percent price premium.[3]***
- ***In rural Methow Valley, Washington, homes within one-quarter mile of trails benefited from a 10 percent price premium.[4]***
- ***Along a popular trail in Austin, Texas, the price premium ranged from 6 to 20 percent, depending on whether the neighborhood had views of the greenbelt surrounding the trail and whether it had direct neighborhood access to the trail.[5] This price premium translated to roughly $59,000 per year in additional tax revenue or five percent of the annual cost of trail construction and maintenance.[6]***
- ***In Indianapolis, researchers found that a high-profile, destination trail was associated with an 11 percent price premium for homes within a half mile of the trail. Other trails had no price premium.[7]***
- ***In Seattle, Washington[8] and upstate New York[9], adjacent property owners were concerned about trail-related crime before the trail was built. Researchers found no change in crime rate after the trail was built.***



National Neighborhood Preferences

*A majority of Americans prefer a neighborhood with a mix of houses, stores and businesses that are **easy to walk** to over a neighborhood with houses only that requires driving to stores and businesses (National Association of Realtors).*

Neighborhood with mix of houses and stores and other businesses that are easy to walk to.

Neighborhood with houses only and you have to drive to stores and other businesses.

were directly linked to higher home values. From a tourism perspective, consider the economic impact of bicycling on the Outer Banks, NC, where bicycling is estimated to have an annual economic impact of $60 million; 1,407 jobs are supported by the 40,800 visitors for whom bicycling was an important reason for choosing to vacation in the area. The annual return on bicycle facility development in the Outer Banks is approximately nine times higher than the initial investment.[7] Similarly, Damascus, VA, the self-proclaimed 'Friendliest Trail Town', features 34-miles of trail where approximately $2.5 million is spent annually related to recreation visits. Of this amount, non-local visitors spend about $1.2 million directly into the economies of Washington and Grayson counties.[8]

Bicyclists, pedestrians, and trail users can also add real value to local economies. For example, a 2014 study of the American Tobacco Trail Bridge in Durham, NC, found that:

> *"The completion of the bridge linking the Northern and Southern trail segments resulted in an estimated annual impact of 43 jobs, $1.3 million in employee compensation, and $4.9 million in total business gross revenues. As a comparison, the construction of the bridge and connecting trail segments cost approximately $11.2 million" (Bridging the Gap: Economic, Health, and Transportation Impacts from Completing a Critical Link in a 22-Mile Rail Trail).*

Furthermore, many businesses, residents, and visitors consider quality of life factors like walkability and bikability when choosing locations to settle.

According to a survey by the National Association of Realtors (NAR), the demand for the conventional suburban development patterns that predominated in the second half of the 20th century is shifting to more walkable, mixed-use communities—especially among the higher-educated work force that many businesses aim to attract and retain.

The NAR survey also showed that walkability and shorter commutes are key to community preference, indicating that as the demand for automobile-dependent development decreases, communities should be built (and retro-fitted) with walking and bicycling connectivity in mind.

It is also important to consider the relative costs of our transportation infrastructure investments, to put the cost of walking and bicycling projects into perspective. For example, the Greenville Southwest Bypass is projected to cost about $12 million per mile (contracted at $159 million for 12.9 miles). By contrast, one of the largest and most recent greenway examples in North Carolina is the Neuse River Trail, which cost about $1.2 million per mile, and typical sidewalk and bicycle lane projects are even less per mile.

Environment

As demonstrated by the Southern Resource Center of the Federal Highway Administration, **when people get out of their cars and walk or bike, they reduce measurable volumes of pollutants.**9 Other environmental impacts include a reduction in overall neighborhood noise levels and improvements in local water quality as fewer automobile-related discharges wind up in the local rivers, streams, and lakes.

Trails and greenways convey unique environmental benefits, protecting and linking fragmented habitat and providing opportunities for protecting plant and animal species.

Aside from connecting places without the use of air-polluting automobiles, trails and greenways also reduce air pollution by protecting large areas of plants that create oxygen and filter air pollutants such as ozone, sulfur dioxide, carbon monoxide and airborne particles of heavy metal. **Greenways improve water quality** by creating a natural buffer zone that protects streams, rivers and lakes, preventing soil erosion and filtering pollution caused by agricultural and road runoff. Finally, **greenways also prevent losses of life and property from flood damages** by dedicating greenway and trail right-of-way in floodplains, rather than development in floodplains.

Greenways play an important role in the stewardship of our natural resources, particularly our waterways.

Greenville's Tar River Legacy Plan does an excellent job in communicating the value of our local natural resources, and how greenways and trails can play an important role in their protection. The Plan identifies environmentally-responsive, comprehensive strategies to improve Greenville's relationship to its River and other natural areas.

TAR RIVER LEGACY PLAN

Equity

A key component of equity for this plan is providing facilities for all ages, abilities and incomes. For example, children under 16 and seniors with decreasing driving abilities deserve safe ways to access community destinations without depending on an automobile. Similarly, households without access to vehicles are not well-served by auto-oriented transportation solutions and require walking, bicycling, and transit infrastructure.

There are disparate costs and impacts of transportation decisions on populations of different income levels. Walking is virtually free and the cost of operating a bicycle is far less than operating a car. According to the National Household Travel Survey (NHTS), one in 12 U.S. households does not own an automobile and approximately 12 percent of persons 15 or older do not drive.10 **In the Greater Greenville Area, about seven percent of the population does not have access to an automobile.** See Chapter 2 of this plan for more on this topic, including an equity analysis that takes these and other factors into account.

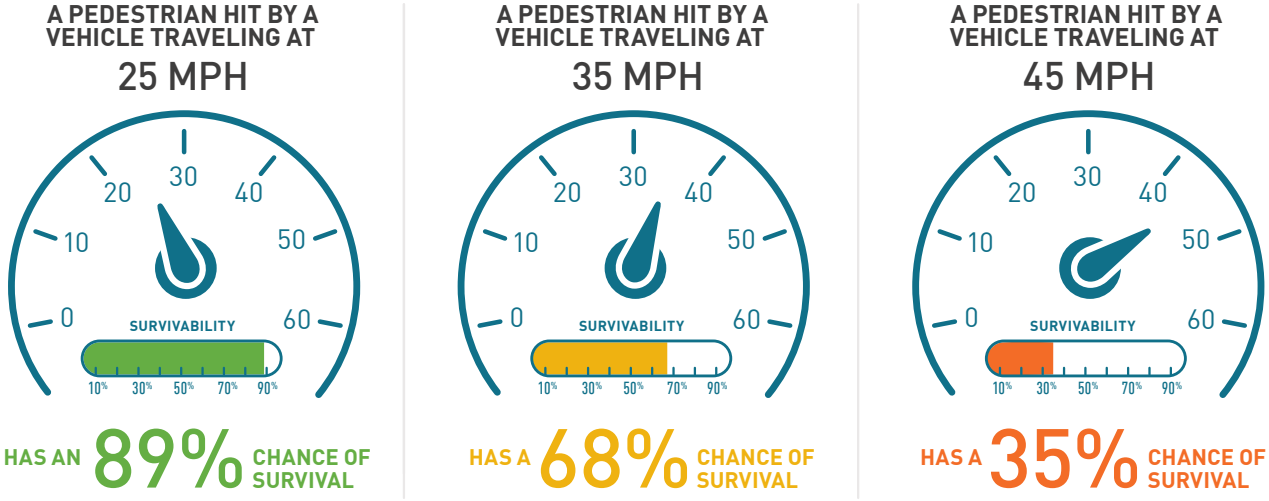
Walking and bicycling infrastructure, such as sidewalks, bike lanes, and trails, play a critical role in connecting people and communities to economic opportunity. This plan can help more people reach opportunity by ensuring that our transportation system provides reliable, safe, and affordable ways to reach jobs, education and other essential services. U.S. DOT's 2016 policy initiative, *Ladders of Opportunity,* notes that:

"The choices we make regarding transportation infrastructure at the Federal, State, and local levels can revitalize communities, create pathways to work, and connect hardworking Americans to a better quality of life."

INTERWOVEN EQUITY ***The concept of "interwoven equity" was set forth for in Horizons 2026: Greenville's Community Plan, which states:***

"Recent decades have shown improvements in economic, health, and quality of life conditions for less privileged people throughout the Southeast. Disparities continue to exist, however, for minorities and children growing up in low income households. The theme of interwoven equity aims to create a city where fairness and equity are provided for in the housing services, health, safety, and livelihood needs of all citizens and groups in Greenville."

Health & Safety



Tefft, B. C. *Impact speed and a pedestrian's risk of severe injury or death*. Accident Analysis & Prevention 50 (2013) 871-878.

A growing number of studies show that the design of our communities—including neighborhoods, towns, transportation systems, parks, trails and other public recreational facilities—affects people's ability to reach the recommended daily 30 minutes of moderately intense physical activity (60 minutes for youth). According to the Centers for Disease Control and Prevention (CDC), "physical inactivity causes numerous physical and mental health problems, is responsible for an estimated 200,000 deaths per year, and contributes to the obesity epidemic." 1

The CDC determined that creating and improving places to be active could result in a 25 percent increase in the number of people who exercise at least three times a week.

This is significant considering that for people who are inactive, even small increases in physical activity can bring measurable health benefits. Establishing a safe and reliable network of sidewalks, bicycle lanes, and safe crossings throughout the Greater Greenville Area will positively impact the health and safety of local residents. The Rails-to-Trails Conservancy puts it simply: **"Individuals must choose to exercise, but communities can make that choice easier."** 3

In 2013, AAA Carolinas counted 4,572 collisions in 2013 in Pitt County, averaging 318 crashes per 100 million vehicle miles traveled. This made Pitt County the most dangerous county in the state for driving for the past six consecutive years. **Many of these crashes also involve bicyclists and pedestrians, who are much more vulnerable to serious injury or death** (See crash analysis in Chapter 2). Measures as simple as reducing the speed limit or adding sidewalk or crosswalks can make streets measurably safer for all users, especially pedestrians (see graphic above).

Livability

Many factors go into determining quality of life for the citizens of a community: the local education system, prevalence of quality employment opportunities, and affordability of housing are all items that are commonly cited. Increasingly though, citizens claim that access to alternative means of transportation and access to quality recreational opportunities such as parks, trails, greenways, and bicycle routes, are important factors for them in determining their overall pleasure within their community.

During the planning process for *Horizons 2026: Greenville's Community Plan*, ***planners asked people, "What Change Would You Most Like to See in Greenville?" The second highest selection was "More transportation options (trails, bike paths, and sidewalks)",*** second only to *"More interesting shopping and entertainment."* The ***Horizons*** plan also states that:

"Greenville is looking to modernize its transportation system to foster the growth of the city's 21st century economy. This helps retain and attract young professionals, and promotes livability for families and elderly individuals."

Communities with such amenities can also attract new businesses, industries, and in turn, new residents. Furthermore, quality of life is positively impacted by bicycling and walking through the increased social connections that take place by residents being active, talking to one another and spending more time outdoors and in their communities.

WHAT DO YOU LIKE MOST ABOUT WALKING AND BICYCLING IN YOUR COMMUNITY? ***Select responses related to the topic of livability from this plan's 2016-2017 public comment form:***

"I enjoy walking in nature and I feel like it's a nice social thing where there are other people on the Greenway."

"Love the exercise and uplifting feeling from being outdoors. Like seeing/greeting others. Like not using gas."

"Nice thing about walking is you don't have to get in, start, drive, stop, park, then walk to where you are going. It is just about as fast to walk as to drive when in university area."

"I enjoy walking for exercise. I currently have a toddler so being able to have sidewalks and safe areas to stroll are very important to me."

"It does not take long to get where I need to go; Greenville is not such a large place. Riding my bicycle feels good and makes me feel healthy. And I like the feeling of connection it gives me to my neighborhood and my city."

"Being able to connect with neighbors."

2 Existing Conditions

"I believe we need more bike lanes, more stop signs, and more sidewalks. It is not safe to walk or ride in a large portion of this city."

- Public Comment, 2016

Overview

This chapter contains a summary of the current conditions for walking and bicycling in the Greater Greenville Area, based on public feedback, Steering Committee input, and planning consultant analysis.

Progress Since the 2011 Plan

The Greenville Urban Area MPO, NCDOT, and other project partners have made progress in several areas of bicycle and pedestrian infrastructure, programming, and policies since the 2011 Plan. Example infrastructure improvements are listed at right, including a range of on-street bicycling improvements, greenway trail constructions, sidewalk additions, and key crossing improvements. Other projects are also underway, such as design of the 10th Street Connector bike lanes, and multiple sidewalk projects in Winterville.

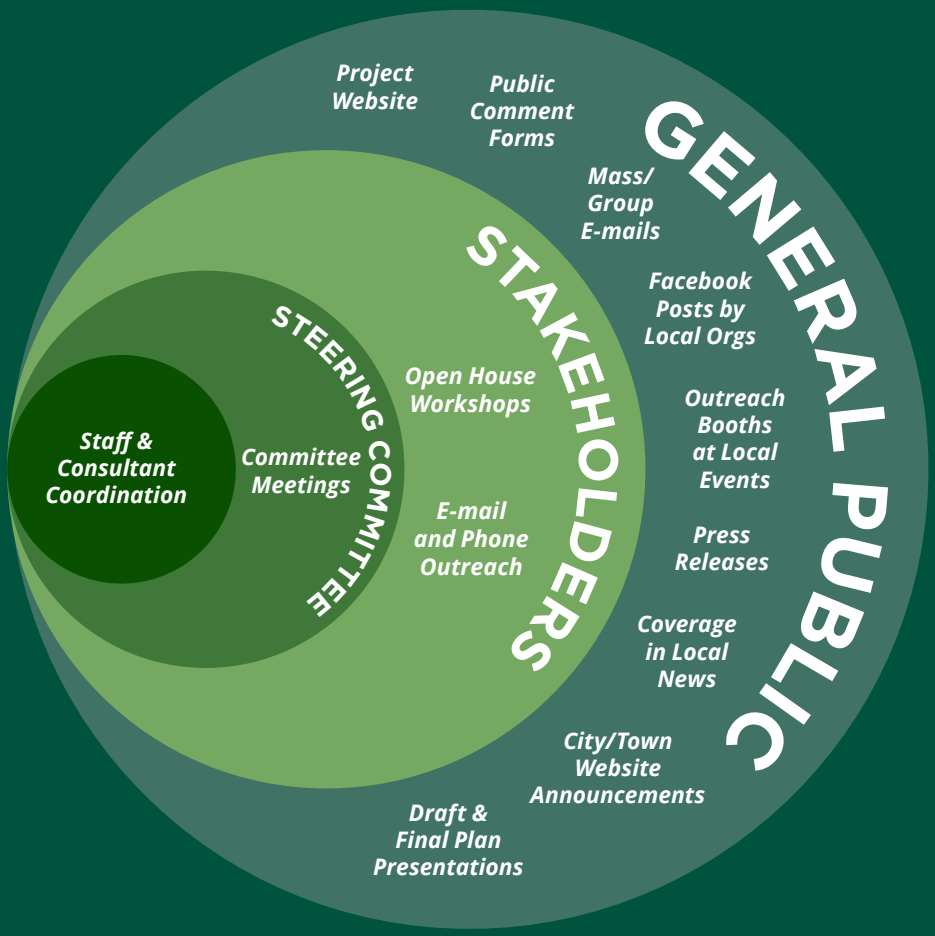
A major policy achievement for the City of Greenville was adoption of the *Horizons 2026 Plan,* which sets the tone for strong support of active transportation, including an entire chapter dedicated to "Enhancing Mobility", which focuses on "offering well-connected, safe, and attractive travel networks for bicyclists, pedestrians, drivers, and users of public transportation."

EXAMPLES OF PROGRESS SINCE THE 2011 PLAN

- ***1st St bike lanes in front of Town Commons***
- ***Elm St bike lanes***
- ***Pitt St shared-lane markings***
- ***Greens Mill Run Greenway***
- ***South Tar River Greenway (underway)***
- ***McDonald St sidewalk in Simpson***
- ***Portions of new sidewalk on Evans St, Charles Blvd, and SW Greenville Blvd***
- ***Mid-block crossing of County Home Rd***
- ***New crosswalks, curb ramps, and sidewalks at multiple priority intersections***
- ***Bike racks on GREAT buses & ECU buses***
- ***ECU Silver-Level Bicycle-Friendly University designation***

Public Process

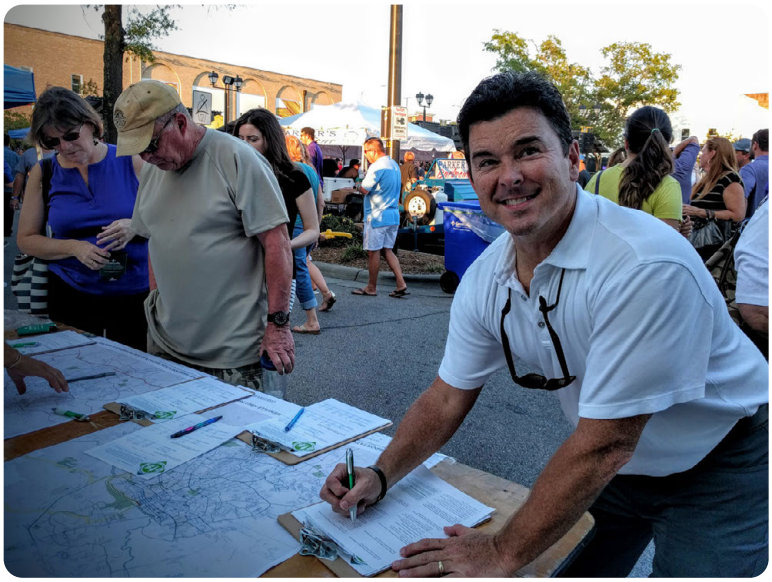
Public input was an overarching component of this plan and was gathered through multiple avenues and outlets. This plan will not only affect those who reside in the Greenville area but also those who work, own businesses, play, and enjoy leisure activities in the area. Feedback from the public guided this plan's recommendations. A full summary of public outreach can be found in Appendix A.



Key Types of Meetings & Public Input:

30+	STEERING COMMITTEE MEMBERS
5	STEERING COMMITTEE MEETINGS
200+	COMMENTS THROUGH THE ONLINE INPUT MAP
5	INPUT STATIONS SET UP THROUGHOUT MPO
3	OUTREACH SESSIONS AT LOCAL EVENTS
4	DRAFT AND FINAL PLAN PRESENTATIONS
1,000+	PUBLIC COMMENT FORMS
3,000+	AVERAGE MONTHLY VISITORS TO THE PROJECT WEBSITE

Public Outreach Events



Images from the public outreach events during the 2016 and 2011 planning processes.

REACHING OUT TO THE PUBLIC

The project team set a goal to reach as many residents as possible and to hear from diverse communities. To do this, the team tabled at public events, provided Spanish-language comment forms, and set up project input displays throughout the study area. In addition, more formal public meetings and stakeholder meetings were advertised for the entire public.

What We Heard

Below are direct quotes from the 2016-17 public comment form.

Our neighborhoods are so isolated from one another by busy roads that most of our citizens would not dare move about from place to place (even for short trips) without getting into a car, which only compounds the problems.

I use to bike everyday in Chapel Hill before moving here a little over a year ago, and have quit due to conditions here in Greenville.

I don't walk because there are not a lot of sidewalks and I don't feel safe walking near traffic. I will only walk or bike on the greenway during the day because it is more safe than anywhere else.

Very few people understand yielding to cross walks, let alone understand giving a cyclist 4 feet of space when passing.

My biggest concern is the cars speeding around and having to walk on the road since there aren't any side walks in my area without driving to a different subdivision.

The Greenway is wonderful, and I'm excited about the expansions happening with it.

I feel very unsafe walking and biking in Greenville. By FAR the least pedestrian / bike friendly place I have ever lived.

I believe we need more bike lanes, more stop signs, and more side-walks. It is not safe to walk or ride in a large portion of this city. Many motorists are inconsiderate, and don't observe common courtesies.

Not safe. Not enough bicycle lanes. I feel like one day I will get hit, but I have no choice but to ride bike or walk to campus where I work.

Greenville is a beautiful city and would have so much more to offer if only it could be seen and traveled safely on foot and by bicycle. Sadly, it is dominated by motor vehicles and is not at all walking and biking friendly.

I personally think it is most important to find a way to link and connect all our neighborhoods in Greenville together by greenways, trails and safe and wide on-street cycling lanes and crosswalks, so that all our citizens could safely travel throughout the city by bike or on foot, and without fear of being run over by motor vehicles.

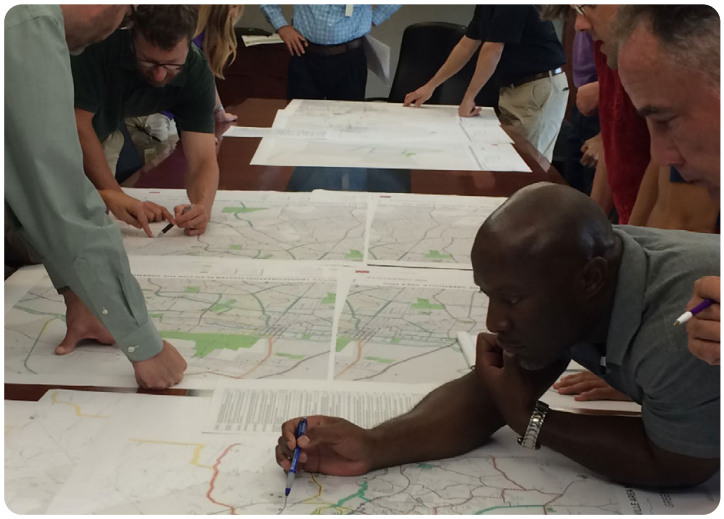
The Greenway area is SUCH a nice addition to our community - it is peaceful and allows both myself and my children a convenient place to get closer to nature - it is a wonderful stress reliever to just walk through that area.

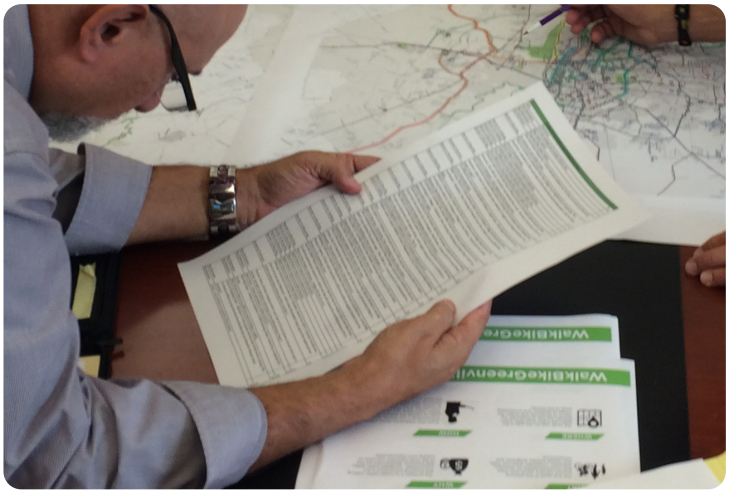
The larger streets are horrible, congested, FAST, and extremely dangerous.

Committee Meetings

COLLABORATING WITH THE STEERING COMMITTEE

The project team sought to collaborate with a variety of stakeholders, agencies, and the community leaders through the project Steering Committee. This plan will only be a success through continued collaboration among stakeholders and local leadership to accomplish the vision of this plan.





Images from the steering committee meetings during the 2016 and 2011 planning processes.

COMMITTEE MEETING #1 | JUNE 2016

At the project Kick-Off Meeting, the committee met to review the planning process, establish the project vision and goals, and to discuss lessons learned since the 2011 plan.

The committee also provided guidance on the public outreach strategy, existing plans to review, and current projects that are underway.

COMMITTEE MEETING #2 | SEPTEMBER 2016

At the second meeting, consultants presented findings from a bicycle and pedestrian crash analysis, a census-based equity analysis, and the review of plans, policies and programs.

The consultant also presented a working draft network of bicycle, pedestrian and greenway facilities, which the committee marked-up by hand on draft maps.

COMMITTEE MEETING #3 | NOVEMBER 2016

At the third meeting, the consultant presented findings from the public input received to-date, and a refined draft network of facilities, including a draft priority network for discussion. The committee marked up the draft maps, and weighed in on a range of potential criteria to be used for prioritization.

COMMITTEE MEETING #4 | FEBRUARY 2017

At the fourth meeting, the committee received a presentation on the full draft plan document, and provided their initial feedback.

The meeting also covered next steps for public outreach, final plan production, and implementation.

COMMITTEE MEETING #5 | SPRING 2017

At the fifth and final committee meeting, the committee reviewed the final plan products, and was asked to officially approve the plan and recommend it for adoption.

Project Website & Public Comment Forms

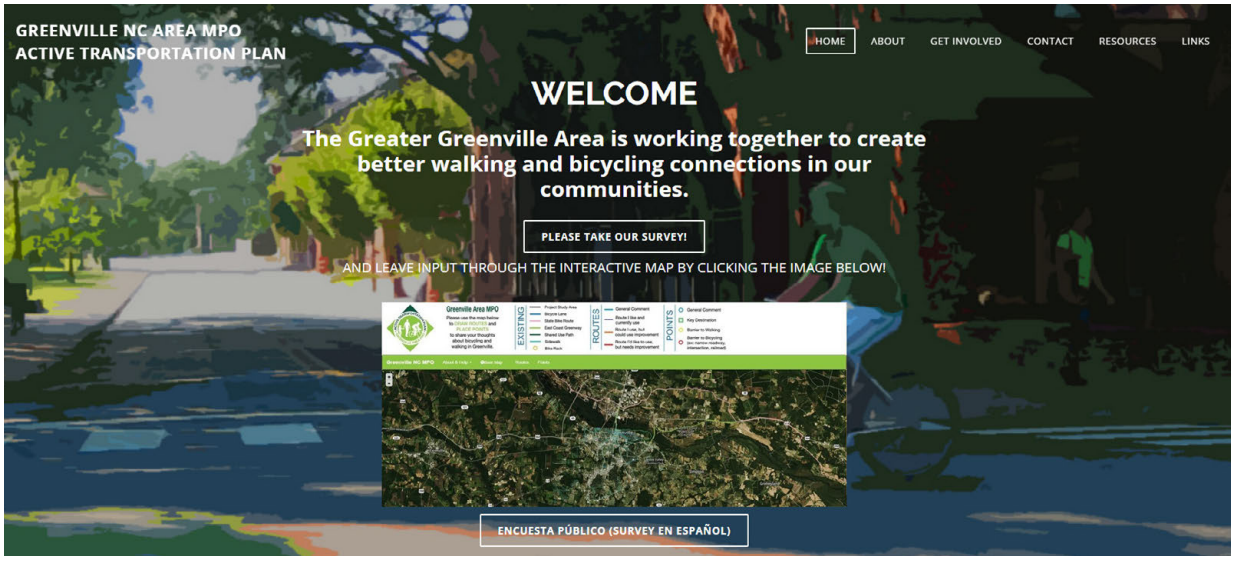
The project website and public comment form were promoted through press releases, social media, links on town and city home-pages, display booths, fliers and thousands of project information cards. As a result, there was an average of more than 3,000 visitors to the project website per month, and a total of more than 1,000 responses to the public comment form.

The public engagement process started in Summer 2016 with the launch of the project's website, **www.walkbikegreenvillenc.com.** This website, which was updated regularly, featured information about the plan, toolkits with outreach materials, meeting updates, and links to tools for the public to provide their thoughts and feedback.

The public comment form was launched in July 2016 shortly after the project kicked off. The focus of the comment form was to gather input about barriers and attitudes towards walking, bicycling, and the use of trails in the Greater Greenville Area.

Thousands of project "business cards" were handed out during the planning process.

They were available at public events and for people to take away from displays throughout the study area during the planning process.



On average, about 3,000 people visited WalkBikeGreenvilleNC.com every month.

Above: A screenshot of the project website home page.

Comment Form Response Highlights

1,008 Total number of survey respondents

With roughly proportional responses from Greenville, Winterville, Ayden, Simpson, and Pitt County

81% Live
in the Greenville Area

68% Work
in the Greenville Area

42% Own
property in the Greenville Area

47% FEEL SAFE USING GREENWAY TRAILS.
14% do not feel safe on trails, and the rest are in between.

45% FEEL SOMEWHAT SAFE WALKING.
24% do feel safe walking, and 31% do not.

55% DON'T FEEL SAFE BICYCLING.
15% do feel safe bicycling, and the rest are in between.

About
75% of survey respondents

say it is VERY important to improve walking, bicycling and greenway trail conditions in their community.

70%

Say we should <u>submit</u> bicycle and pedestrian projects <u>for state funding,</u>

&

that we should <u>leverage our taxes and bonds</u> with outside sources.

See Appendix A for full summary of comment form results.

Online & Community Input Maps

The online public input map received over 200 individual comments about where people walk and bike today, and where they would like to see improvements.

An interactive mapping tool was developed to solicit comments about important destinations, favorite walking and bicycling routes, and needed improvements. The tool was used to gather input without requiring participants to travel to a specific location. The project team also brought large base maps of the county to community events and meetings for participants to draw and add comments that were later added to the online mapping tool.

Both the online tool and the community meeting mapping sessions provided essential public input into the sidewalk and bikeway network development process. The following map highlights the types of input that was received through these mapping exercises.

Map comments at outreach events were transcribed and added to the online input map comments. *Above: A local resident adds his comments to the map at "Freeboot Friday" in Uptown Greenville in Fall 2016.*

SELECTED EXAMPLES OF MAPPING COMMENTS FROM PUBLIC INPUT

These comments (along with nearly 200 others) were tied to specific routes and locations drawn on the input maps:

Example Uptown/ECU/Med Center Comments:

- *"A greenway extension to the new bus depot"*
- *"This is a logical route to the bus station. The bus station would be a good place for Mclean's Bicycles bicycle rental station, which is also next to a bicycle shop. This would also connect the new uptown of breweries and apartments to the Greenway."*
- *"This is the route I use most often from Uptown/ECU to the Hospital / Med School. The median- and curb-cut at 5th St. has improved it significantly, but that's still a little bit weird."*
- *"Alternate route from Uptown to Medical District. Now seriously impeded by 10th St. Connector ramp which has blocked Chestnut between Grande and Columbia.*

Example Greenway Comments:

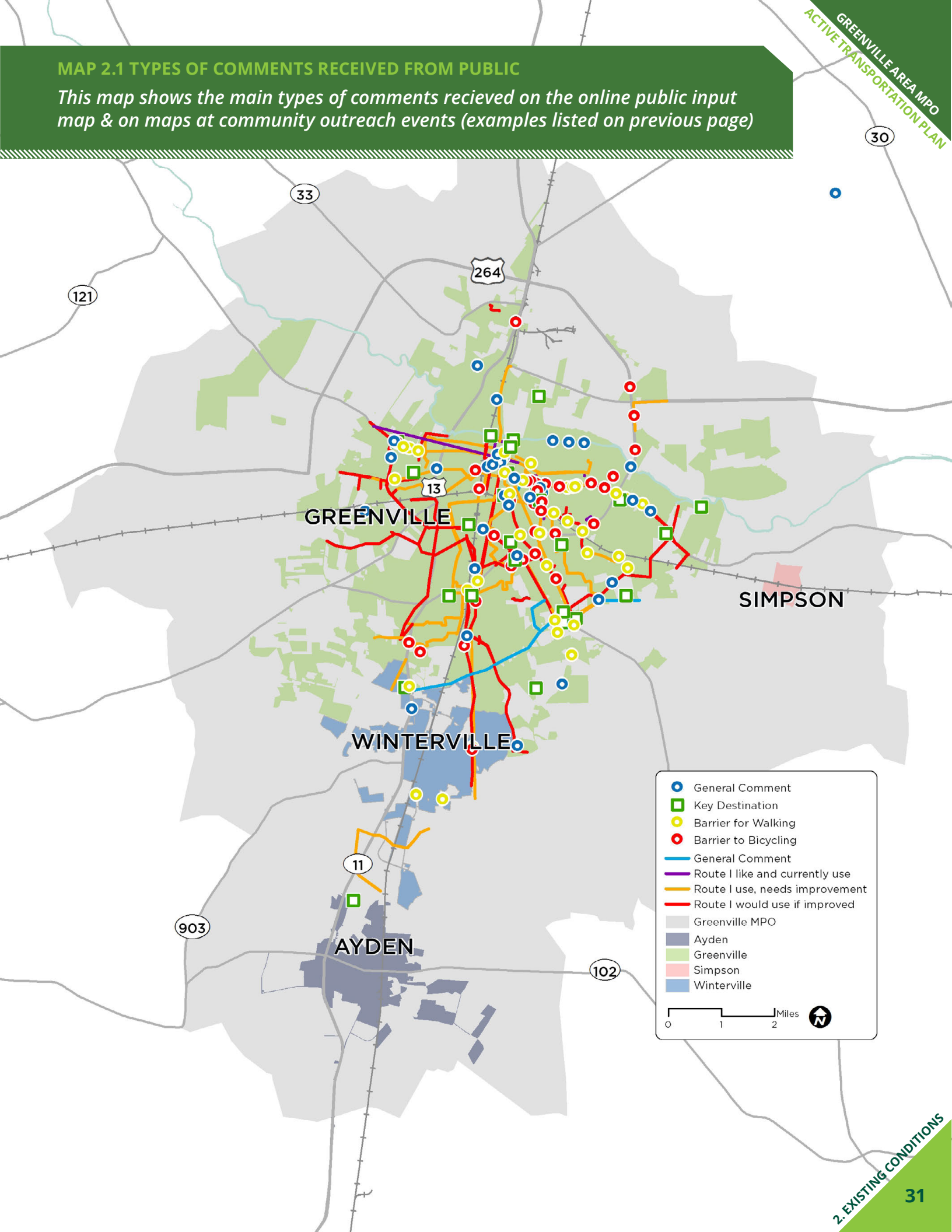
- *"Greenway from Dickinson Av to the river"*
- *"Funding for the final section of South Tar River Greenway Phase III should be a top priority"*
- *"Many students and faculty living in the apartment complexes in this area walk or bike to class/work at the ECU Health Science Campus and must cross this busy intersection each day. A crosswalk would make this intersection much safer and more pedestrian-friendly."*

Example Connectivity Comments:

- *"The BAPC has voted to request that this rather roundabout north-south route, connecting Greenville Blvd/Evans to Uptown via the GMR Greenway Phase II and ECU Campus, be marked with signage once GMR Phase II opens. Variations are possible. Until we get meaningful separated infrastructure on Evans, a north-south signed route is a must."*

MAP 2.1 TYPES OF COMMENTS RECEIVED FROM PUBLIC

This map shows the main types of comments recieved on the online public input map & on maps at community outreach events (examples listed on previous page)



Overarching Themes from Public & Committee Input

These are some the key themes that emerged from the input received, highlighting the main opportunities and constraints for walking, bicycling, and trail development facing the Greater Greenville Area.

SAFETY: As is the case in many U.S. communities, the development patterns of the past half-century in the Greater Greenville Area created a strong network of roadways that are designed to carry high volumes of automobiles. One unintended consequence of this is the way in which these same roadways serve a barriers to walking and bicycling. They not only serve as a barrier to safely traveling by bike or on foot *along* these roadways, but even just *crossing* them safely can be problematic. The names of these higher-volume and higher-speed "barrier roadways" surfaced in the different forms of input received. The corridors most often mentioned include the following (listed alphabetically and mapped on the following page):

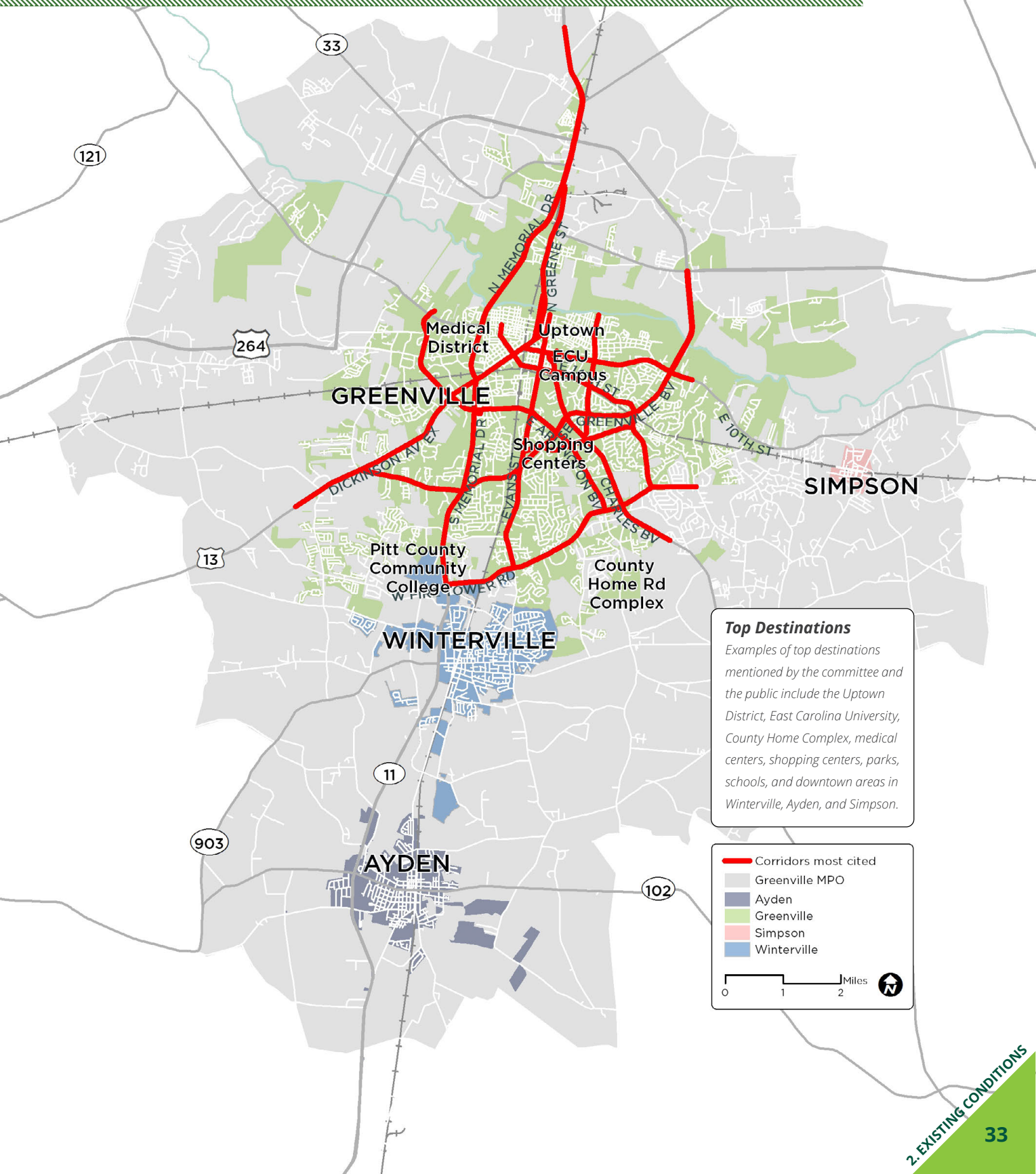
- ***10th Street***
- ***14th Street***
- ***Arlington Boulevard***
- ***Charles Boulevard***
- ***Dickinson Avenue***
- ***Elm Street***
- ***Evans Street***
- ***Greene Street***
- ***Greenville Boulevard***
- ***Fire Tower Road***
- ***Memorial Drive***

Connectivity: Another result of the "barrier roadways" is the space left in-between them. Most of that space is in the form of residential neighborhoods, with streets that are relatively safe for walking and bicycling. Most of the streets in these neighborhoods offer some level of connectivity, so long as one does not have to cross a major roadway. These "islands of connectivity" between the barrier roadways were discussed during committee meetings, and are visible in **Maps 2.7 and 2.9**. Discussion centered around how best to provide connectivity between the residential areas and destinations, and how and where to cross busier roadways.

Quality of Life: The Greater Greenville Area has many traits that are well-suited for a successful active transportation system. Bicycling and walking are potentially more feasible in Greenville than in many parts of the country, with its relatively flat terrain, the absence of harsh winters, and the close proximity of major destinations such as Uptown Greenville, the Medical District, and the ECU Campus. Even destinations in Winterville, Ayden, Simpson, and Pitt County are close enough together to be connected by a regional network of bikeways and greenways. However, in order to capitalize on these traits, the safety issues associated with walking and bicycling for even short trips must be addressed. Many respondents to the comment form expressed that they enjoy being on greenways (even though there are few of them), and that the area has a lot to offer in terms of quality of life. But they also said they wish it were safer and more enjoyable to walk and bike in their community. This sentiment was echoed by the steering committee, many of whom have visited or lived in more bikable and walkable communities in the past, and who can see the potential for increasing quality of life by improving conditions for walking and bicycling.

MAP 2.2 ROADWAYS MOST MENTIONED IN INPUT RECEIVED

As "barrier roadways", these corridors represent some of the region's biggest challenges to connectivity and safety for those going on foot, by bike, and by trail.



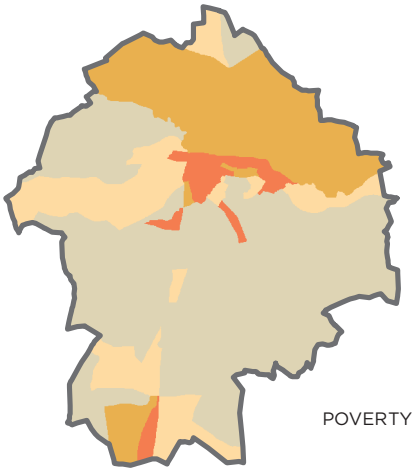
Existing Conditions Analysis

Demographic & Equity Analysis

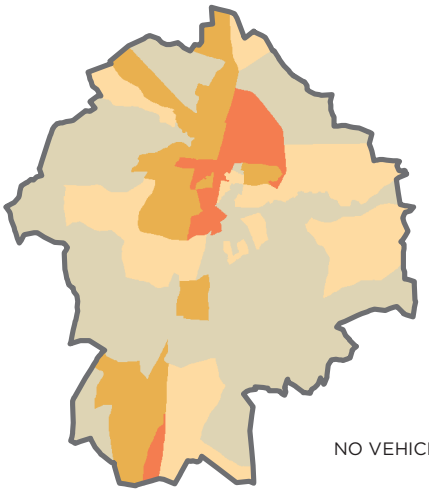
An equity analysis was conducted by mapping data sets from the US Census Bureau. This was done for the Greater Greenville Area, geographically defined for this plan as the study area of the Greenville Urban Area Metropolitan Planning Organization (GUAMPO). The following data sets were mapped as part of this process (shown below):

- Households living below or near the poverty line
- Households with no vehicle available
- Non-white populations
- Populations with limited English proficiency
- Populations with no high school diploma
- Children and senior citizens

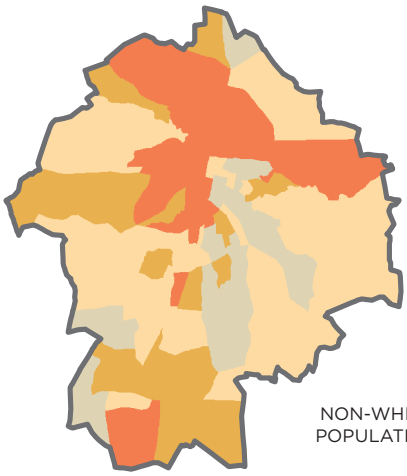
The maps show a range of colors from dark to light, with darker colors representing higher relative concentrations of the households and populations listed in the data sets above. **Map 2.3 Equity Analysis** (opposite page), combines all six of these demographic factors into a single map. This map can be used as one of several analysis tools, to see where there may be a greater need for the allocation of future bicycle and pedestrian facilities and improvements. Other analysis tools and factors include measures of safety, such as examining bicycle and pedestrian crash history, and measures of connectivity, based on roadway corridor conditions and existing facilities.



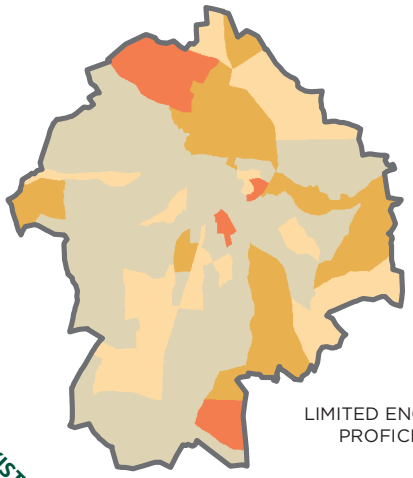
POVERTY STATUS



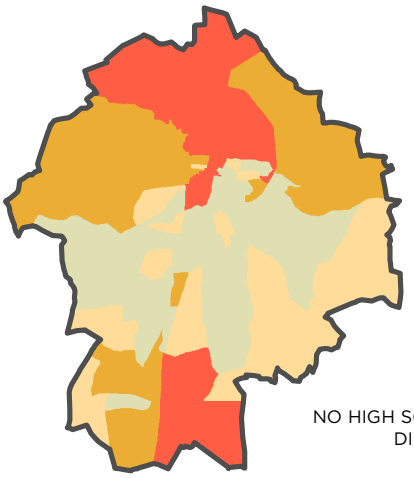
NO VEHICLE ACCESS



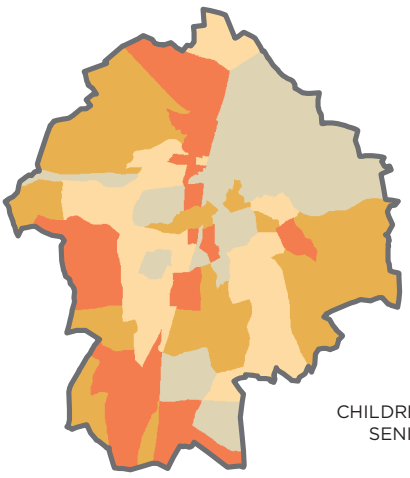
NON-WHITE POPULATION



LIMITED ENGLISH PROFICIENCY



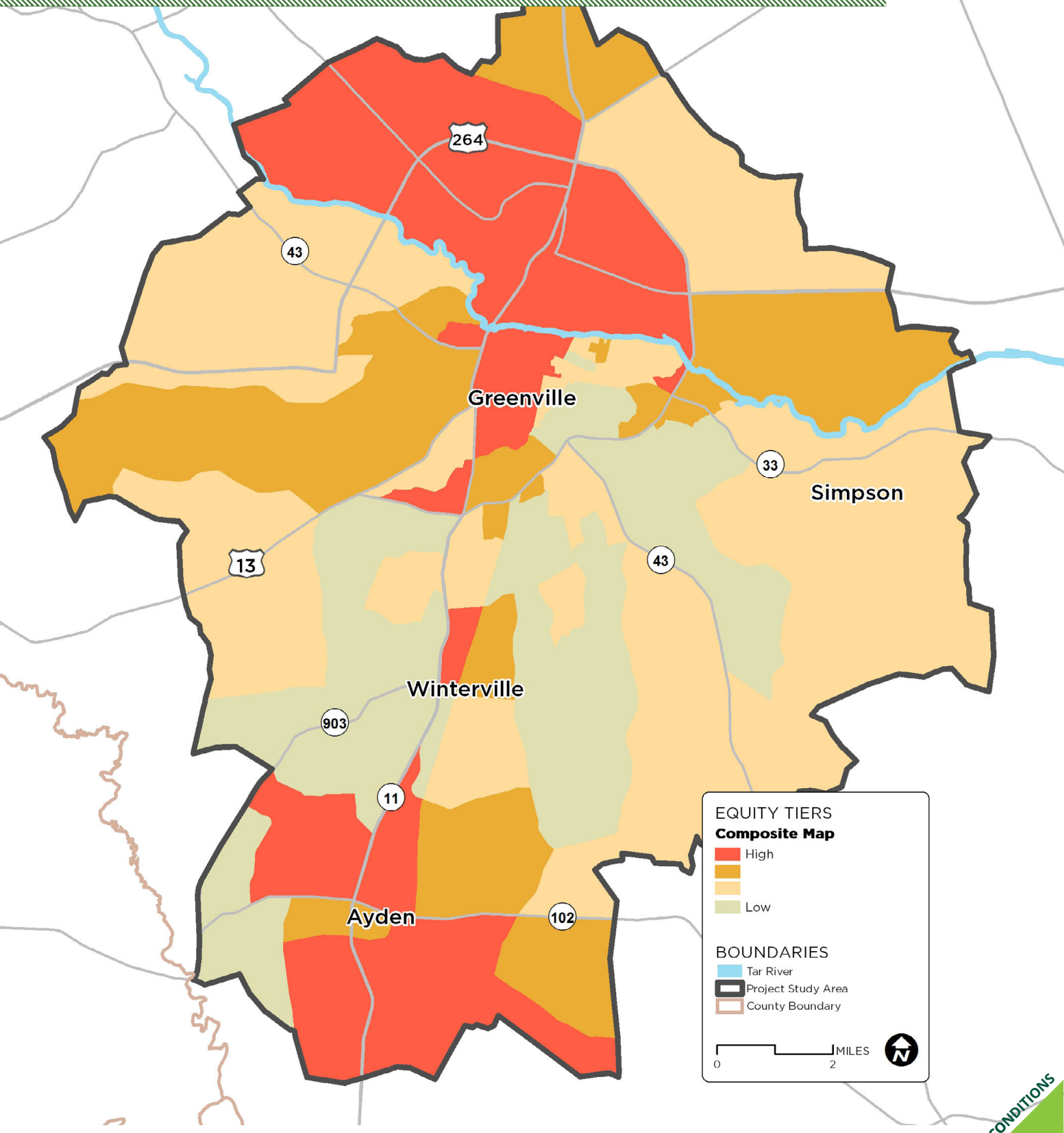
NO HIGH SCHOOL DIPLOMA



CHILDREN & SENIORS

MAP 2.3 EQUITY ANALYSIS

This map combines six demographic factors, showing where there may be a greater need for the allocation of future bicycle and pedestrian facilities and improvements.



Bicycle & Pedestrian Crash Analysis

92 CRASHES IN GREENVILLE INVOLVING A BICYCLIST OR PEDESTRIAN *IN 2016 ALONE*
Of the 92 people involved in crashes, **5 people were killed** *and* **37 people were disabled**.

Image above for illustration only, to humanize the statistics; these are not the actual people involved in the crashes. Source for 2016 crash data: Greenville NC Police Department.

Data Collection: Data for all reported crashes that involved a bicyclist or a pedestrian in the Greenville Urban Area MPO were collected from the North Carolina Department of Transportation (NCDOT). The data covers the most recent 5-year reporting period available, which is 2009 through 2013. Additional reported crashes from the 2014-2016 period were also collected from the City of Greenville Police Department, and are also included in the analysis.

The High Injury Network Map (Map 2.4, opposite page) was created by first mapping the reported bicycle and pedestrian crash locations, and then determining which roadways had the most reported crashes. The map shows roadways with a range of cool to warm colors, with warmer colors indicating higher frequency of reported crashes. The roadways listed at right make up the higher injury roadways within the network.

The High Injury Network & Equity Overlay Map (Map 2.5, page 38) shows how these high injury corridors match up with the levels of need identified in the Equity Analysis. The map reveals that about 50% of the high injury streets fall within areas that also potentially have the highest levels of need (the darker orange/red areas on the map, particularly areas north of the Tar River, and in east central Greenville). This information can be used when evaluating potential project priorities. Ideally, all of these corridors would be improved for bicycle and pedestrian safety. Other options include identifying and improving viable alternative routes to these corridors (including greenway trails and connections along neighborhood streets), especially routes that can serve the same destinations along and between these busier roadway corridors.

HIGH CRASH CORRIDORS (3 TO 6 REPORTED CRASHES)

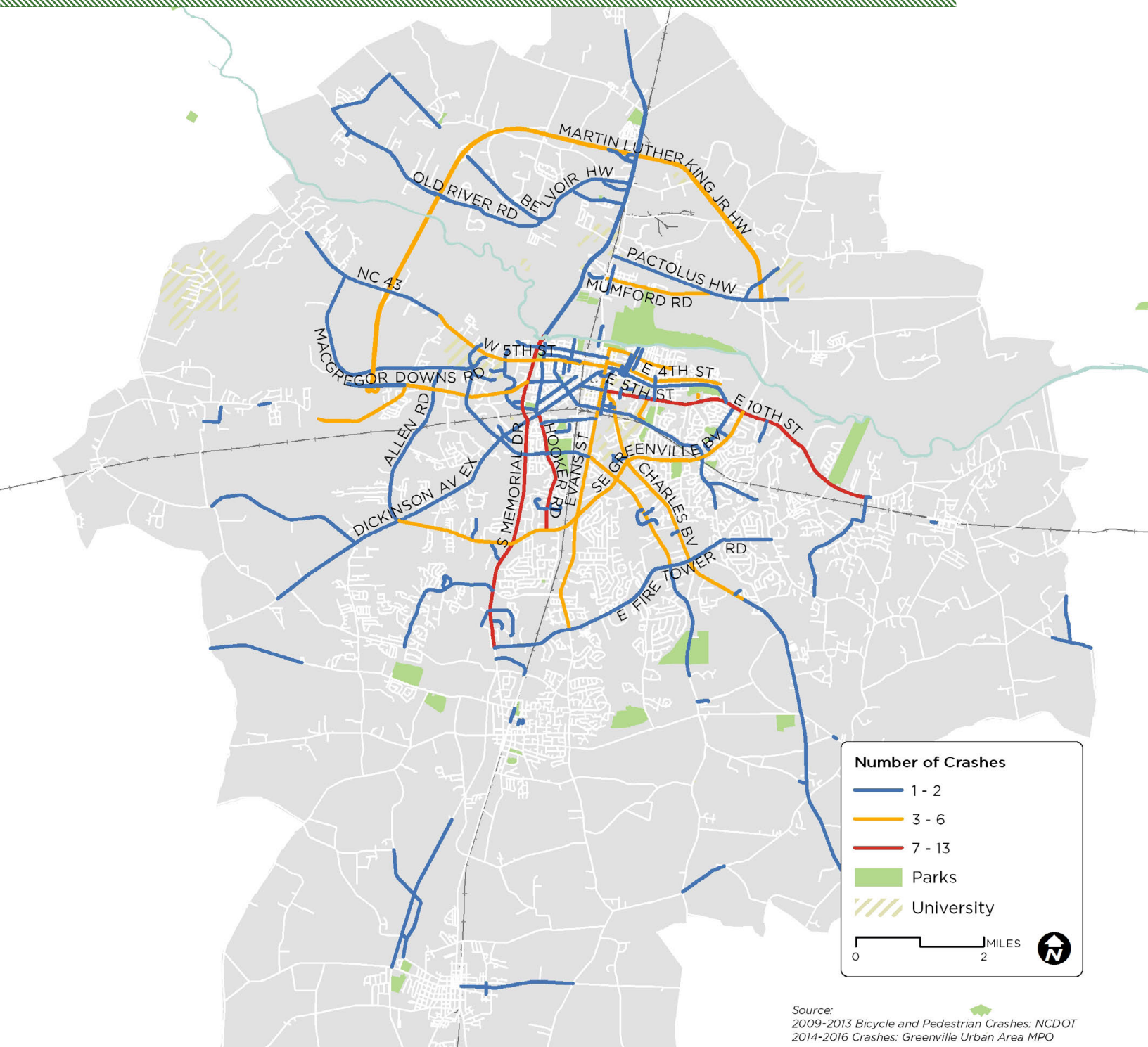
- *E 1st Street*
- *E 4th Street*
- *Arlington Boulevard*
- *Charles Boulevard*
- *College Hill Drive*
- *Evans Street*
- *Greenville Boulevard*
- *US 264/Martin Luther King Jr Highway*
- *Mumford Road*
- *Stantonsburg Road*

HIGHEST CRASH CORRIDORS (7 TO 13 REPORTED CRASHES)

- *E 10th Street*
- *Hooker Road*
- *S Memorial Drive*

MAP 2.4 HIGH INJURY NETWORK

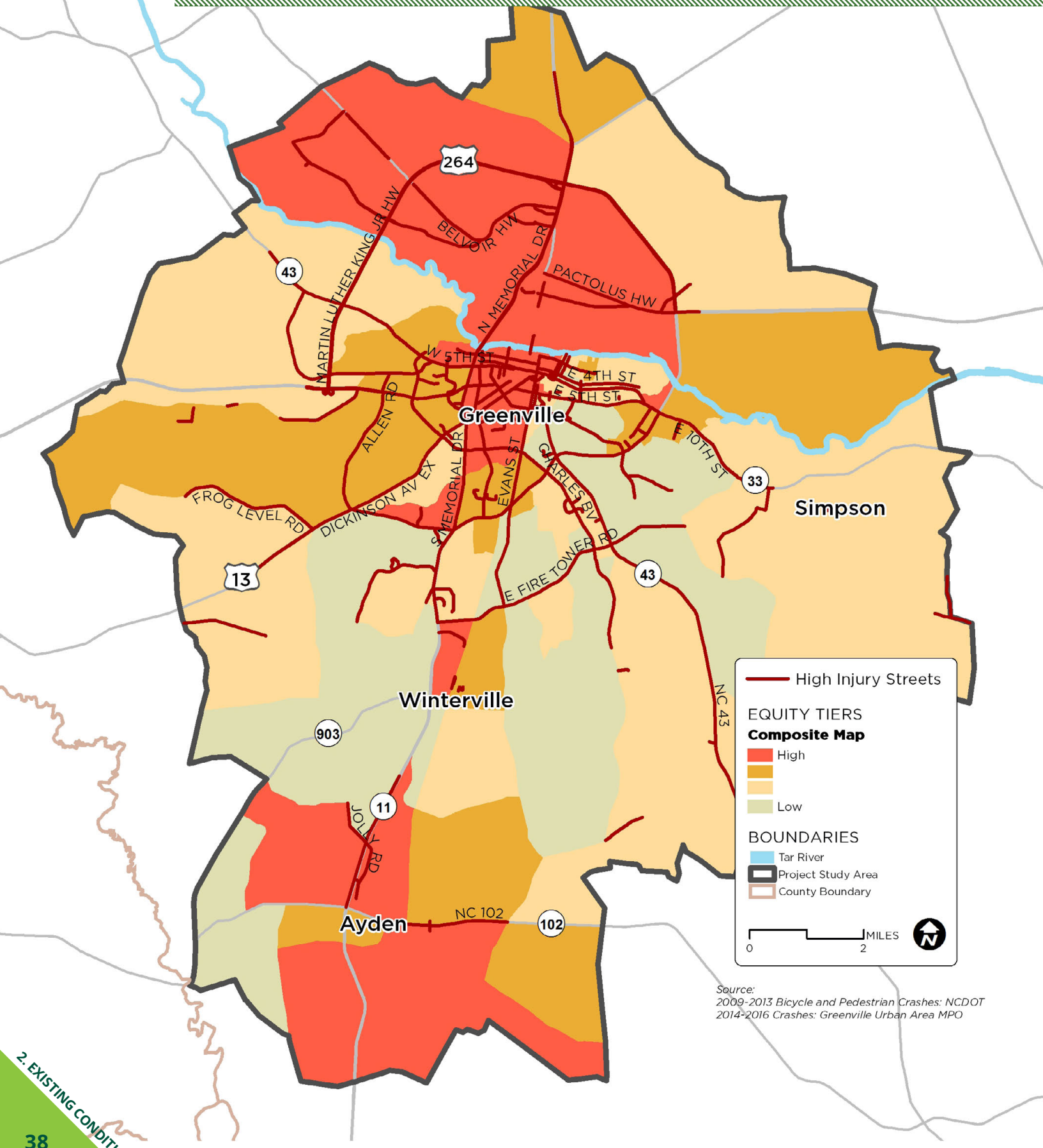
All fatal and severe injury pedestrian and bicycle crashes occur on just 15% of streets.



Source:
2009-2013 Bicycle and Pedestrian Crashes: NCDOT
2014-2016 Crashes: Greenville Urban Area MPO

MAP 2.5 HIGH INJURY NETWORK & EQUITY OVERLAY

77% of the high injury streets fall within the most vulnerable communities.



Source:
2009-2013 Bicycle and Pedestrian Crashes: NCDOT
2014-2016 Crashes: Greenville Urban Area MPO

Existing Bicycling Conditions

The Greater Greenville Area is generally not bicycle-friendly. There is a lack of a connected, bicycle facility system throughout the region.

The City of Greenville has taken several proactive steps to become more bicycle-friendly by installing bicycle lanes and bicycle racks around the downtown area. Greenville also has provided a number of trails and side paths throughout the city for recreation and transportation. These facilities provide a good foundation for a bicycle facility network throughout the city. Currently, downtown Greenville and neighborhoods close to the East Carolina University campus are generally easier for bicycling due to lower traffic speeds and street connectivity.

There are very limited bicycle facilities outside the City of Greenville. The only identified bicycle facilities are a few roadways with paved shoulders but these are often unconnected and located on busy roadways.

Existing Bicycle Facilities: There are various bicycle facilities throughout the Greenville MPO, mostly in the City of Greenville, with more in various stages of funding and design. A list of these facilities is below and shown on **Map 2.6**, page 41.

Bicycle facilities provide important connections for recreation and transportation in Greenville, but even where they exist, some are in need of repair and restriping.

Above: A fading section of bicycle lanes on E 5th Street (image from Google Streetview).

Existing Bicycle Routes: State Bicycle Route 2 (Mountains to Sea Route) serves as the main artery of the North Carolina bicycle route system, bisecting the state west to east, connecting many of North Carolina's larger cities. The original route went east-west through Greenville, north of the Tar River. Updates to this route were proposed in the 2012 WalkBikeNC Plan (the statewide pedestrian and bicycle plan), and NCDOT is in the process of making those updates official. The updates would bring portions of the route through the downtowns of both Greenville and Winterville.

The East Coast Greenway (ECG) is also planned to go through Greenville. The ECG is a developing trail system, linking many of the major cities of the Eastern Seaboard between Canada and Key West, FL. Over 30 percent of the route is already on traffic-free greenways. The planned section for Greenville goes from River Park North to points east along the Tar River (shown in Map 3.1).

Mileage/Amount per Existing Facility Type

- 39 Bicycle Racks
- 7.1 Miles of Bicycle Lanes
- 9.0 Miles of Greenways/Trails
- 0.7 Miles of Side Paths
- 25 Miles of Paved Shoulders

In addition, there are numerous roadways throughout the region that feature a wide outside lane. These provide opportunities for the implementation of bike lanes through simple striping rather than roadway widening.

Physical Barriers to Bicycling: In addition to a deficiency of on-street facilities for bicycling, a number of physical barriers may also deter people from venturing out on a bicycle. The most significant barriers include the following, many of which echo other aspects of this plan's analysis:

- ***Connectivity issues:*** There is a lack of connectivity between existing facilities and destinations.
- ***High-volume, high-speed roadways:*** There are many wide high-volume commercial roadways throughout the MPO with high speeds and little shoulder where bicyclists are not safe. Crossing these roadways by bicycle is also difficult and sometimes dangerous. Many of these roadways also have a high frequency of driveways and parking lot curb-cuts that present repeated hazards to cyclists as the automobile crosses the cyclists' paths of travel.
- ***Narrow roadways and lanes:*** There are also many roadways throughout the MPO that are too narrow for bicyclists to travel safely. These roads have little or no shoulder and have relatively high vehicle travel speeds which pose multiple hazards for bicyclists.
- ***Railroad crossing access issues:*** There is poor access across railroad tracks. At-grade crossings are the most common type of crossing throughout the Greenville MPO and many of these are dangerous for bicyclists because of the uneven surfaces with the roadway and tracks (not to mention the hazards they cause for people with strollers, wheelchairs, or walkers).

Bicyclist Behavior: The areas of highest bicycle activity observed during fieldwork included:

- Neighborhoods near W 5th Street, W 14th Street, Dickinson Avenue and Memorial Drive
- Neighborhoods near the Uptown District & ECU Campus
- Downtown areas of Ayden of Winterville

The majority of bicyclists were seen biking against traffic (on the wrong side of the road) or on the sidewalk. Also, the majority of bicyclists were not wearing helmets. This is likely due to a lack of education and a perceived notion that it is safer to bike against traffic or on a sidewalk.

High speed and high volume roadways present the greatest challenges for bicyclists in Greenville.

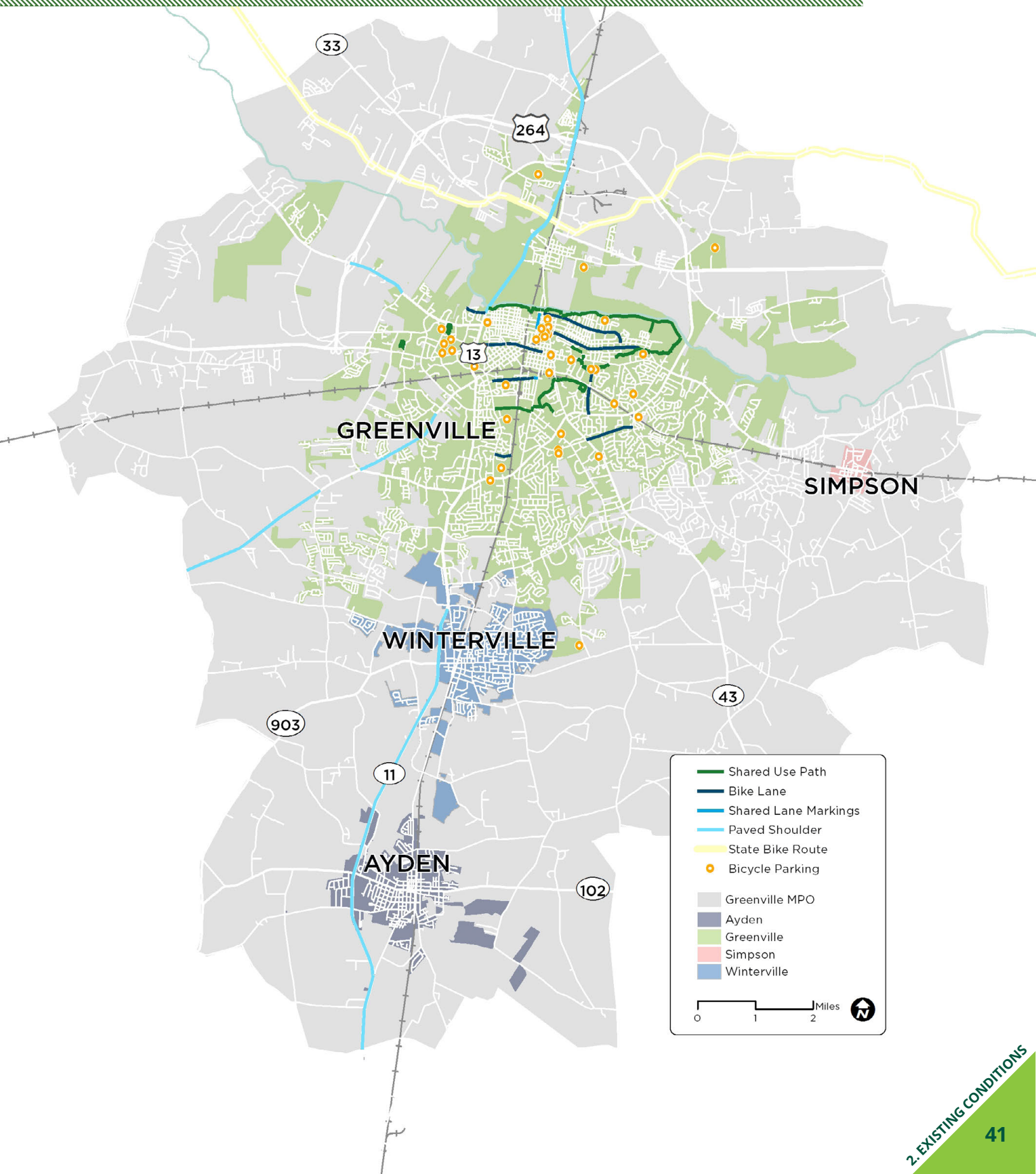
Above: The intersection of Arlington Boulevard and Greenville Boulevard (image from Google Streetview).

Many bicyclists in Greenville are more comfortable on sidewalks along busier roadways, where it is currently illegal to ride.

Above: A bicyclist riding along W 14th Street.

MAP 2.6 EXISTING BICYCLE FACILITIES

All existing bike lanes, shared-lane markings, and shared use paths (greenways) are located in the central part of the City of Greenville.



Level of Traffic Stress & Bicycle Connectivity

The methods used for the Level of Traffic Stress (LTS) Analysis were adapted from the Mineta Transportation Institute (MTI) report, *Low-Stress Bicycling and Network Connectivity*. **The approach used in this plan takes into account factors such as posted speed limit, the number of travel lanes, and the presence of bicycle lanes, as a proxy for bicyclist comfort level.** Road segments are then classified into one of four levels of traffic stress based on these factors. All four LTS definitions are listed at right, but LTS 1 and 2 are the most relevant, as they are used to define the "connectivity clusters" shown in **Map 2.7 Lower-Stress Clusters of Bicycle Connectivity (page 43)**.

On Map 2.7, each color represents a distinct cluster of roads where a bicyclist could travel with relative comfort, without using any link or crossing with a level of stress higher than LTS 2. The bicyclist would not be able to access another road network cluster (shown in a different color) without using a high-stress segment or crossing. Road segments classified as LTS 3 and 4 are deemphasized on the map, shown in white.

The downtown areas of Greenville, Winterville, and Ayden are each mostly connected at a low level of stress because of many roadways with lower posted speeds and investments that have been made to date. This is also true for several pockets of residential areas in southeastern Greenville.

Still, some of the connected clusters shown do not account for distance traveled. For example, the barrier roadways that separate the clusters may cause bicyclists to go far out of their way in order to make use of safe connections. More likely, they will opt for shorter, but more potentially dangerous routes.

For the rest of the study area, reduced road connectivity and higher-speed roads result in many separate islands of low stress connectivity. Bicyclists will not be able to travel far in these areas without making a high-stress crossing or using a high-stress segment.

LEVELS OF TRAFFIC STRESS (LTS) DEFINITIONS

LTS 1: Presenting little traffic stress and demanding little attention from cyclists, and attractive enough for a relaxing bike ride.

- *Suitable for almost all cyclists, including children trained to safely cross intersections that are easy to approach and cross. On links, cyclists are either physically separated from traffic, or are in an exclusive bicycling zone next to a slow traffic stream with no more than one lane per direction, or are on a shared road where they interact with only occasional motor vehicles with a low speed differential. Cyclists ride have ample operating space when riding alongside a parking lane.*

LTS 2: Presenting little traffic stress and therefore suitable to most adult cyclists but demanding more attention than might be expected from children.

- *On links, cyclists are either physically separated from traffic, or are in an exclusive bicycling zone next to a well-confined traffic stream with adequate clearance from a parking lane, or are on a shared road where they interact with only occasional motor vehicles with a low speed differential. Where a bike lane lies between a through lane and a right-turn lane, it is configured to give cyclists unambiguous priority where cars cross the bike lane and to keep car speed in the right-turn lane comparable to bicycling speeds. Crossings are not difficult for most adults.*

LTS 3: More traffic stress than LTS 2, yet markedly less than the stress of integrating with multilane traffic, and therefore welcome to many people currently riding bikes in American cities.

- *Offering cyclists either an exclusive riding zone (lane) next to moderate-speed traffic or shared lanes on streets that are not multilane and have moderately low speed. Crossings may be longer or across higher-speed roads than allowed by LTS 2, but are still considered acceptably safe to most adult pedestrians.*

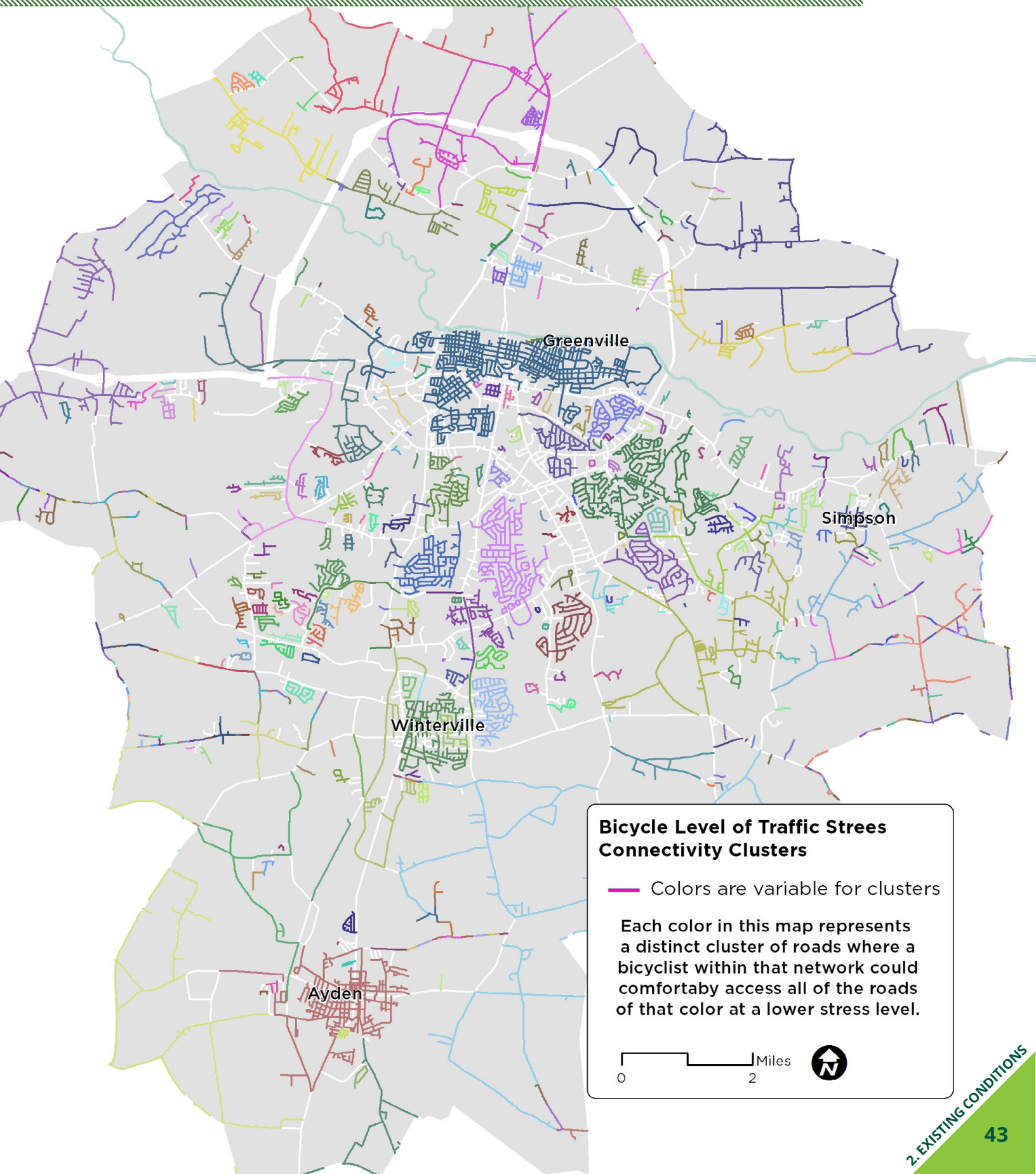
LTS 4: A level of stress beyond LTS3.

- *Only acceptable to "strong and fearless" bicyclists, who will tolerate riding on roadways with higher motorized traffic volumes and speeds.*

Source: Adapted from the Mineta Transportation Institute, Report 11-19

MAP 2.7 LOWER-STRESS CLUSTERS OF BICYCLE CONNECTIVITY

Each color represents a distinct cluster of roads where a bicyclist could travel with relative comfort (LTS 1 & 2), without using more difficult links or crossings.



Existing Pedestrian Conditions

The Greenville Area features some areas that are quite pedestrian-friendly. There are 168 miles of sidewalks in the MPO, mostly confined within the municipalities of Greenville, Winterville, and Ayden.

On any given day, hundreds of pedestrians can be observed throughout the Greater Greenville Area, especially near Downtown, near ECU, and in lower-income neighborhoods.

Sidewalks and crosswalks have existed in the Downtown areas in many cases since the early history of the cities. While some neighborhoods surrounding the Downtown areas have adequate pedestrian facilities, others, unfortunately contain none, leaving many areas disconnected from town cores, schools, parks, and businesses.

In recent years, area municipalities have taken proactive steps towards becoming more pedestrian-friendly. The City of Greenville has installed dozens of countdown signals and new sidewalks, and has an adopted greenway plan. In addition, the Greater Greenville Area has a number of trails and sidepaths for recreation and transportation. These facilities provide a good foundation for a more comprehensive pedestrian network throughout the region. Winterville recently adopted a pedestrian plan and is currently working on implementing the recommendations. Additionally, Ayden is actively constructing new sidewalks and crossings at the time of this study.

However, there are still many key gaps in the existing pedestrian network within the entire MPO. This lack of connectivity makes pedestrian travel difficult. The majority of intersections, despite having pedestrian accommodations, lack complete pedestrian solutions (see the Intersection Inventory in Appendix C).

Highlights of existing pedestrian conditions are presented below with recommendations in Chapter 3.

Existing Pedestrian Facilities: The majority of pedestrian facilities are found in the downtown cores and in scattered suburban neighborhoods. A table of these facility mileage totals is below and **Map 2.8** shows these facilities.

Existing Facility Types:

168	Miles of Sidewalk
9.0	Miles of Greenways/Trails
0.7	Miles of Side Path
25	Miles of Paved Shoulder

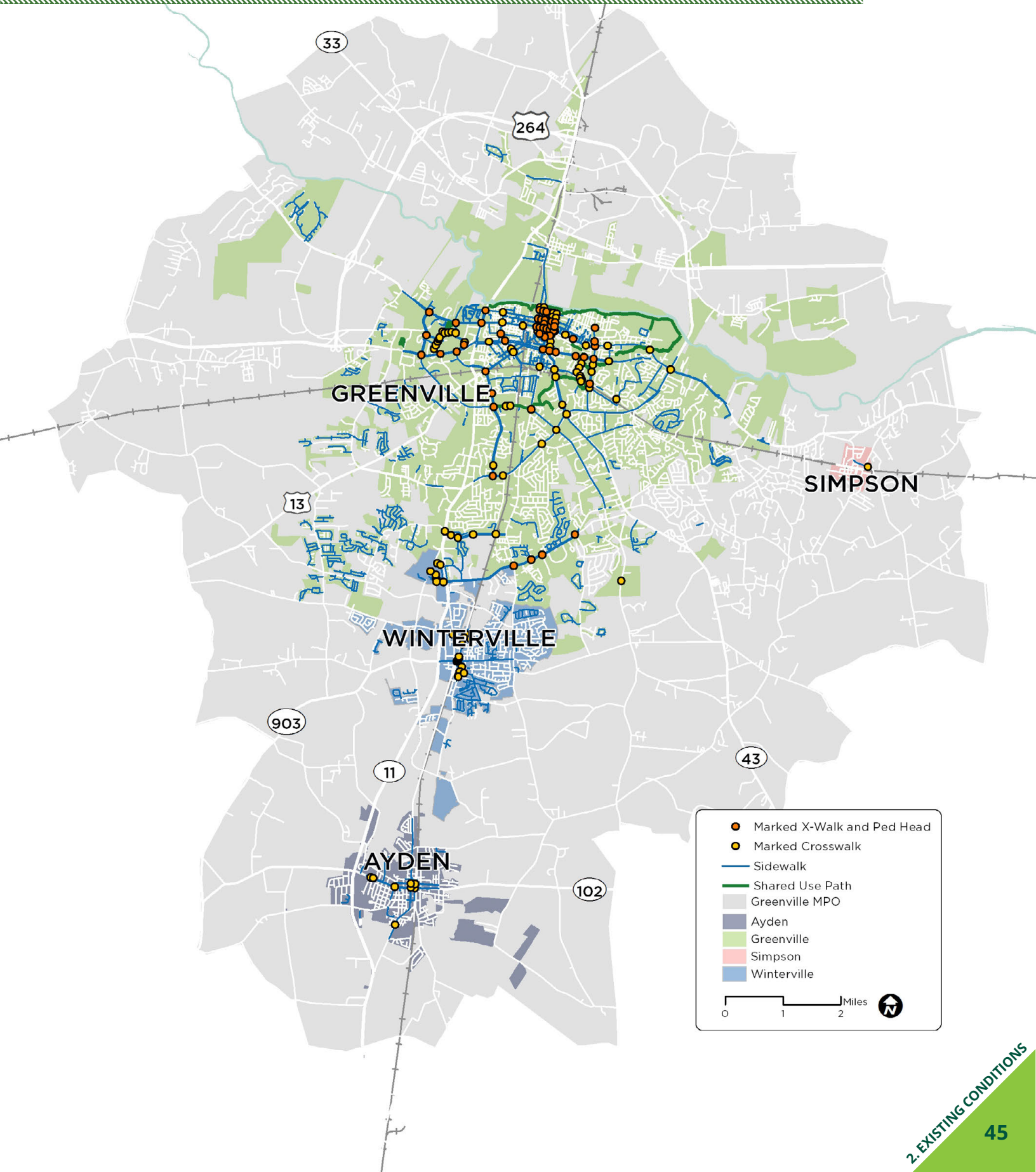
In addition to linear facilities, there are many crossing facilities found at intersections and at midblocks. Marked crosswalks, curb ramps, and signalization are common across the MPO but are largely inconsistent from crossing to crossing.

Many areas of the Greenville Urban Area MPO feature high-quality pedestrian environments. These include the following:

- ***Greenville Downtown:*** Due to the grid road network, short blocks, low traffic speeds, and existing sidewalks/crosswalks, the Downtown is a safe, comfortable environment for pedestrians. With many sections of on-street parking, curb extensions are commonplace creating shorter crossing distances for pedestrians and serving as traffic calming devices. The Town Commons Park and Greenway bridge provide excellent pedestrian-friendly destinations. The highest concentration of marked crosswalks and pedestrian signalization is found in Downtown Greenville (See Map 2.8).

MAP 2.8 EXISTING PEDESTRIAN FACILITIES

Existing sidewalks and crosswalks are concentrated in downtown areas and some subdivision areas, with notable gaps between the small networks of sidewalk.



ECU provides a high quality pedestrian network within its campus. *Above: Pedestrians walking along Faculty Way.*

- ***ECU and adjacent roadways*** (particularly area bordered by 5th Street, Cotanche Street, 10th Street, and Maple Street): Numerous sidewalks, high-visibility crosswalks, and pedestrian signalizations are found along bordering streets and within campus. This is critical as hundreds of student pedestrians walk and bike across campus and adjacent roadways each day.
- ***Downtown Ayden:*** With building fronts accessible from the sidewalk, Downtown Ayden has a walkable small-town feel. At the major intersections, marked crosswalks are textured and highly-visible, making the designated walkways very clear.

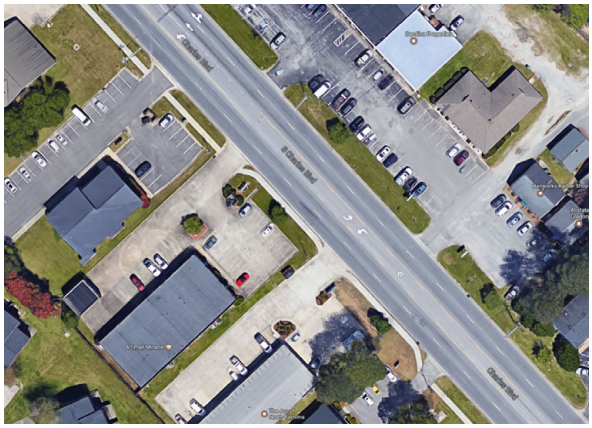
Physical Barriers to Walking

In addition to a deficiency of facilities for walking, a number of physical barriers may also deter people from venturing out on foot. An analysis of these barriers was developed by the consulting team and by input from the public through a "Community Walk" website. The most significant barriers include the following:

- ***Sidewalk connectivity issues*** (Maps 2.8-2.10 portray key gaps in the sidewalk system): There is a lack of sidewalk connectivity between existing facilities and destinations, including major arterial and collector roadways. Many sidewalks are incomplete, with gaps, and force pedestrians to walk in unsafe conditions alongside busy roadways. In many cases, worn foot paths can be found indicating the presence of pedestrians. Example key roadways that lack sidewalk along long stretches include:
  - Memorial Dr
  - Red Banks Rd.
  - Evans St. (from 14th St. to Fire Tower Rd.)
  - Charles Blvd (from Greenville Blvd. to Fire Tower Rd)
  - 14th Street (from ECU to Fire Tower Rd.)
  - Greenville Blvd. (throughout town, sidewalk mostly just on one side)
  - Dickinson Blvd. (from Hooker Rd. to Greenville Blvd.)
- ***High-volume, high speed roadways:*** There are numerous multi-lane, high-volume, high-speed roadways that are difficult to cross and navigate safely for pedestrians. These roads include Memorial Dr/NC11, 10th St, Greenville Blvd, Charles Blvd, Dickinson Ave, Arlington Blvd, Evans Street, Stantonsburg Road, and Fire Tower Road.

Intersections with high traffic volumes are problematic (and sometimes dangerous) for pedestrians, especially when there are no crossing facilities. *Above: A pedestrian waits to cross Greenville Boulevard (image from Google Streetview).*

- ***Inadequate crossing facilities:***
    - Most intersections do not feature high-visibility marked crosswalks (Most crosswalks are standard, parallel white stripes).
    - Curb ramps are often incomplete or inadequate and quite variable within each intersection.
    - The majority of key intersections do not feature pedestrian countdown signals (several do have signalization but without countdowns)
    - Median refuge islands are not commonplace although there are opportunities for their provision, especially in three or five lane roadway cross sections.
    - Marked crosswalks near schools often lack curb ramps, in-roadway signage, high-visibility marked crosswalks, and bulbouts (which would be particularly useful with on-street parking).
    - Where sidewalks exist along arterials and collectors, marked crosswalks and curb ramps are often missing crossing intersecting minor roadways.
- ***Railroad crossing access issues:*** There is poor access across railroad tracks. At-grade crossings are the most common type of crossing throughout the Greenville MPO and many of these are dangerous for pedestrians because of the uneven surfaces with the roadway and tracks (not to mention the hazards they cause for people with strollers and wheelchairs).
- ***Driveway access management:*** High frequencies and sizes of driveways and parking lot curb-cuts present repeated hazards to pedestrians as the automobile crosses the pedestrians' path of travel. This is a common issue along major commercial arterial roadways including the following:
    - Dickinson Avenue from Wilson Street to 10th Street
    - 10th Street from Dickinson Avenue to Evans Street
    - All major arterial commercial sections (Memorial, Greenville, Stantonsburg, Arlington)



When each individual site has its own driveway and parking area, it creates repeated hazards for pedestrians. *Above: Driveways for individual parking areas along S Charles Boulevard.*

- ***Roadways currently designed for automobile only:*** Many roads were designed around the automobile and need to be redesigned to become more pedestrian friendly. Adding traffic calming measures, improved crossings, planted medians, sidewalks, and shade trees would help reduce speeding and the hazards that speeding presents to pedestrians and drivers.
- ***Non-pedestrian friendly bus stops:*** Many bus stops feature only a sign with no sidewalk, shelter, or bench. While some stops did feature all of the above, these conditions should be consistent to create safe, accessible, and functional pedestrian spaces.

- ***Sidewalk maintenance issues:*** Many sidewalks are cracked, overgrown and/or are no longer level. This is a significant issue along stretches of 10th Street, Dickinson Avenue, and 14th Street near Downtown Greenville.

In addition to these barriers, a number of roadways and intersections were identified as needing significant pedestrian improvements. Without sidewalk and adequate crossing treatments, these roadways and intersections are barriers to walking. The Top roadway corridors are shown on Map 2.2

Pedestrian Behavior

Pedestrian activity is significant throughout portions of the Greenville Urban Area MPO. The areas of highest pedestrian activity include lower-income areas (where walking or biking is a transportation necessity), West Fifth Street/West 14th Street/Dickinson Avenue/Memorial Drive area, the Downtown areas, and ECU.

Pedestrians were often seen crossing roads not in the designated marked crosswalk. This is due to the pedestrian's decision to take the shortest route and the pedestrian's false perception that it is safer to cross at another location.

Pedestrian Level of Service

The reults of the Pedestrian Level of Service (PLOS) anlaysis can be see on **Map 2.9**. Similar to the Bicycle LTS, this map was created by analyzing a variety of roadway characteristics, such as existing sidewalks, number of travel lanes, traffic volumes, and traffic speeds.

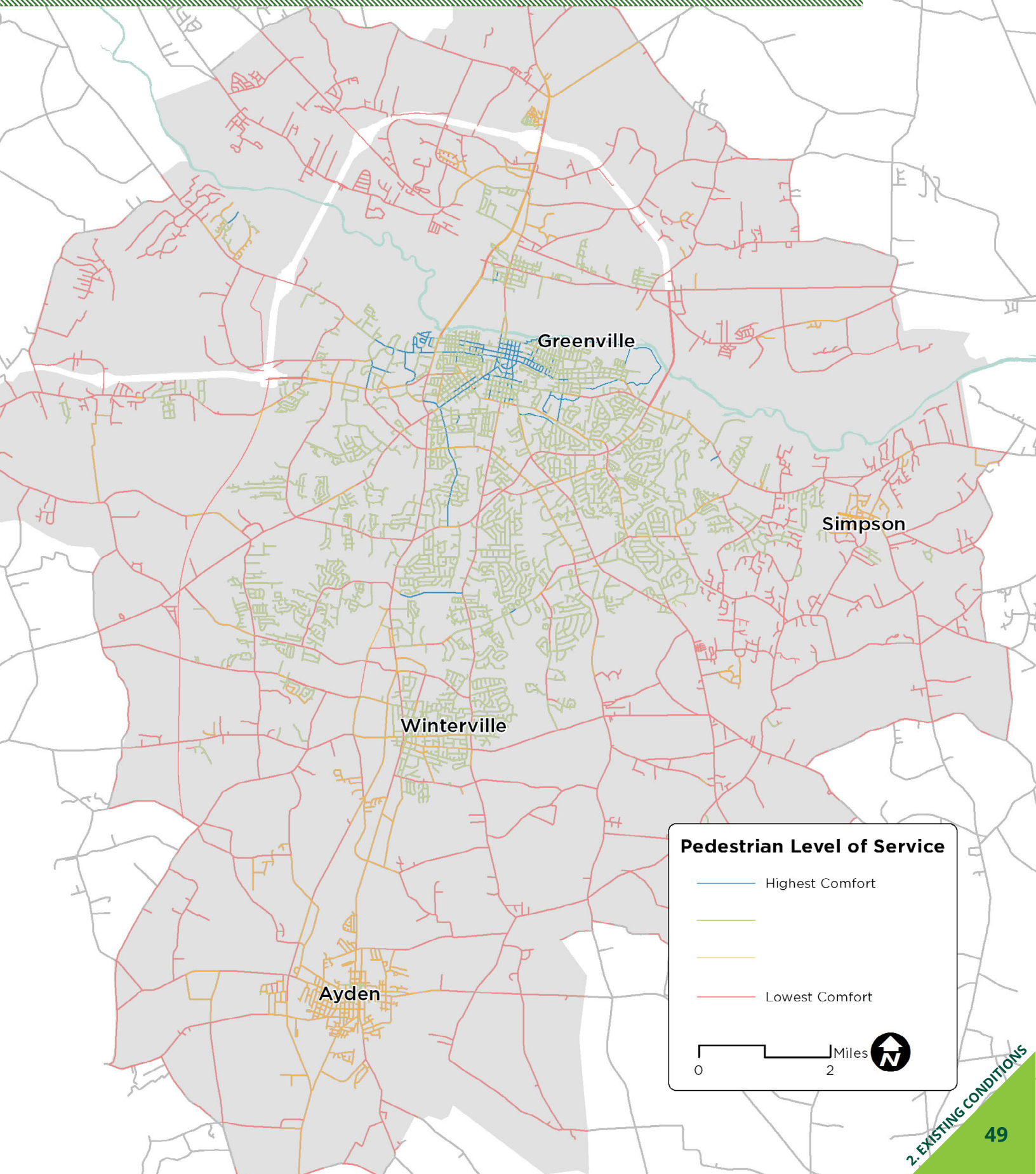
Each color shown on the map represents a different level of comfort for pedestrians under the current conditions. "Islands of connectivity" can be seen among the more comfortable conditions (shown in green & blue), bound by the less comfortable routes shown in red and orange. To a large degree, these "barrier" roadways match the ones seen and previously noted in the other analysis tools used in this planning process, in Maps 2.2, 2.4, and 2.7. This further supports the need for providing safe ways to walk along and across these major roadways.

Some sidewalk are cracked, overgrown and/or are no longer level. *Above: Sidewalk on Dickinson Avenue.*

Some pedestrians choose not to use crosswalks even when they are nearby. *Above: W 14th Ave and Chestnut Street.*

MAP 2.9 PEDESTRIAN LEVEL OF SERVICE

Each color represents a different level of comfort for pedestrians under current conditions. Similar to the Bicycle LTS, "islands" of connectivity can be seen below (in green & blue).



Existing Greenway Trail Conditions

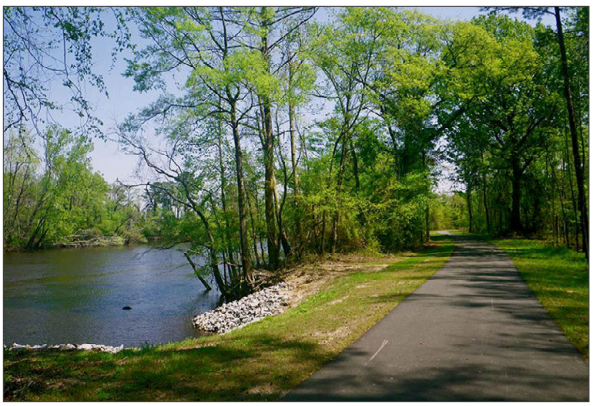
The total mileage for greenway trails in the study area nearly tripled since the 2011 Bicycle and Pedestrian Plan, going from just 3.3 miles to a total of nine miles in 2017 (with more underway).

Even with the recent growth in greenway trails, when compared to other areas in North Carolina, there are not many greenway trails on the ground in the Greater Greenville Area. In fact, the only existing greenway trails are mostly concentrated in a relatively small area, bound by the Tar River to the north, Memorial Drive to the west, and Greenville Boulevard to the south and east.

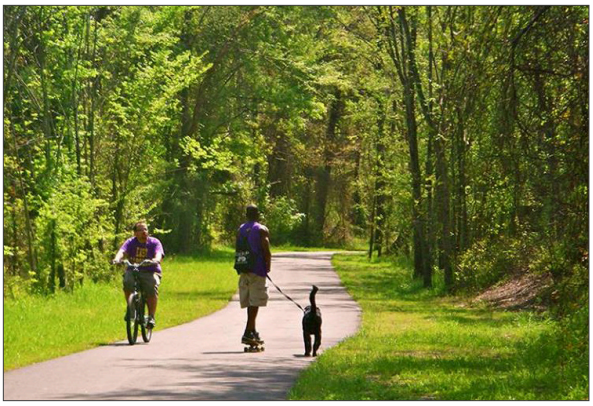
The good news is (according to public comments received in the 2016-17 public comment form), people in this region love the few trails that they have, and they want more. There are many greenway trails proposed in past plans, most notably in the 2011 Bicycle and Pedestrian Plan, and in Pitt County's Greenways Plan. These and other past plans helped to inform the recommendations for trails that are highlighted in Chapters 3 and 4.

This region is also fortunate to have an excellent local non-profit focused on greenway advocacy and programming: The Friends of Greenville Greenways (FROGGS). FROGGS was founded in 2004, originating from the efforts of early advocates in the 1980s, and later by members of the former Greenville Greenways Committee (GGC). Today, FROGGS is led by a board of volunteers, and according to their mission, continues to *"promote and elevate the quality of life for all citizens by maintaining existing greenways, planning expansions, and encouraging local communities and businesses to join in their advocacy for viable, environmentally conscious recreation and transportation opportunities."*

The Friends of Greenville Greenways (FROGGS) is a local non-profit that plays that plays a critical role in the past, current, and future successes for greenways in the Greater Greenville Area . *Photo from FROGGS.*



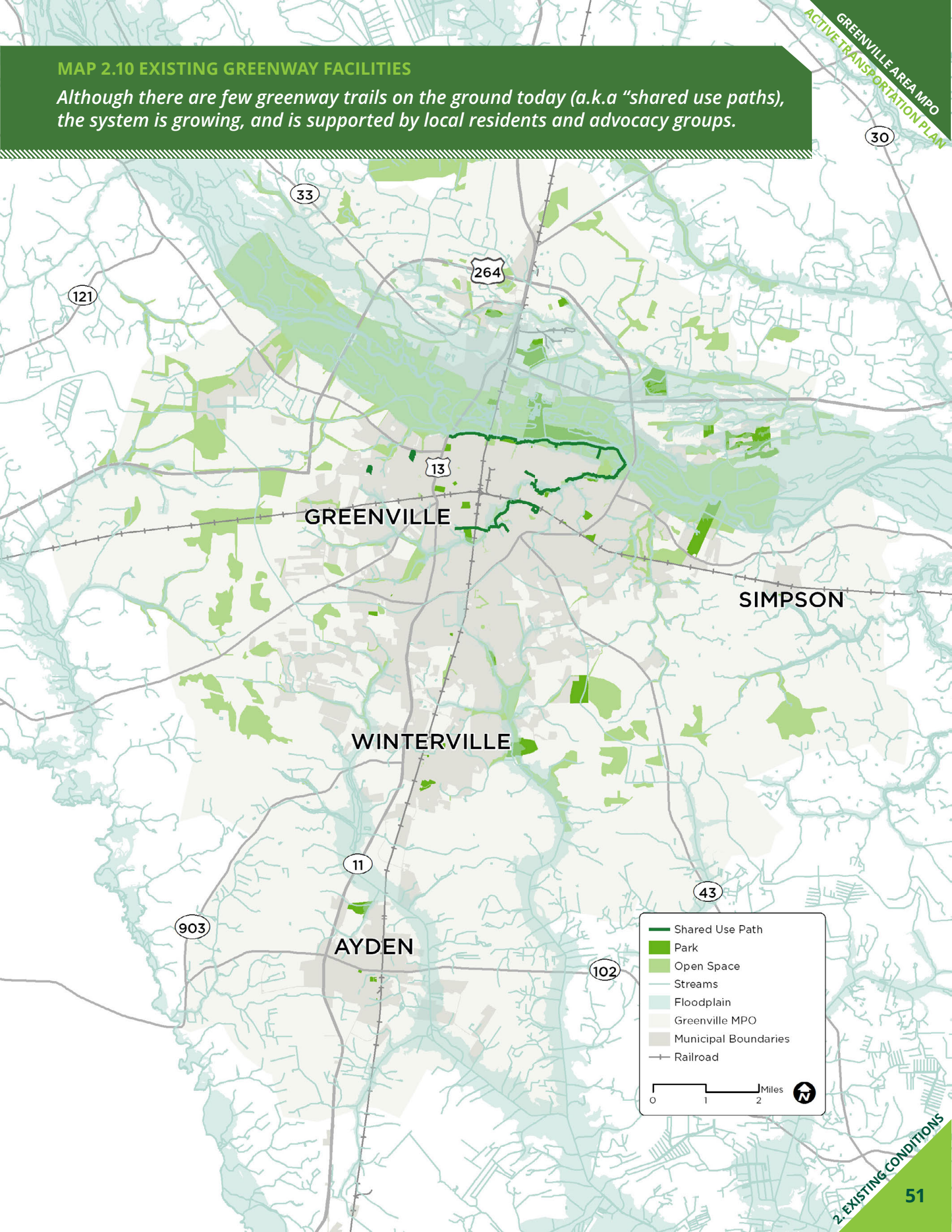
Beautiful sections of greenway trail were added in recent years. *Above: South Tar River Greenway; photo from FROGGS.*



Greenway trails accommodate multiple users, such as bicyclists, walkers, and runners. If you are lucky (and coordinated), you can also have your dog pull you on a skateboard! *Photo from FROGGS.*

MAP 2.10 EXISTING GREENWAY FACILITIES

Although there are few greenway trails on the ground today (a.k.a "shared use paths), the system is growing, and is supported by local residents and advocacy groups.



Existing Plans, Programs, and Policies

Past Initiatives in the Greater Greenville Area Support Active Transportation

Relevant plans, programs and policies were reviewed in preparation of this plan. The recommendations in the chapters that follow build upon these efforts (listed on the opposite page). See Chapter 6 for more on the policy review and related policy recommendations.

This plan builds upon many past plans and recent efforts that relate to bicycling, walking, trails, health, transportation, recreation, and quality of life in the Greater Greenville Area.

RELATED PLANS & GUIDELINES

2011 Greenville Urban Area Bicycle and Pedestrian Master Plan
Comprehensive Transportation Plan (Highway Map)
2014-2040 Long Range Transportation Plan
2012-2018 Metropolitan Transportation Improvement Program
Horizons 2026, Greenville's Community Plan
Greenville 2004 Greenway Master Plan
Greenville Comprehensive Recreation and Parks Master Plan
Greenville: Town Common Master Plan
Greenville: Tar River Legacy Plan
Greenville: Watershed Master Plans
Winterville Comprehensive Pedestrian Plan
Ayden 2009 Sidewalk Master Plan
Pitt County Greenways Plan 2025
Pitt County Comprehensive Land Use Plan 2030
Pitt County Comprehensive Transportation Plan
Pitt County Recreation and Parks Master Plan
Alice F. Keene District Park Master Plan
NCDOT Complete Streets Planning and Design Guidelines
ECU Campus Bicycle and Pedestrian Plan
Multiple FHWA, AASHTO & NACTO Guides

RELATED PROGRAMS & INITIATIVES

2013 Greenville Bike Map
Greenville Bicycle and Pedestrian Commission
Eastern Carolina Injury Prevention Program (ECIPP)
Safe Communities Coalition of Pitt County
Safe Kids Pitt County
Safe Routes to School (SRTS)
The Friends of Greenville Greenways (FROGGS)
East Carolina Road Racing
East Carolina Velo Cycling Club
ProTown BMX
Extreme Park
Recycle Bicycle Shop
Bicycle Post
Trail and River Rovers of East Carolina
Greenville Police Department Traffic Safety Unit

RELATED POLICIES & POLICY ANALYSIS

City of Greenville Zoning Ordinance and Subdivision Regulations
City of Greenville Manual of Standard Designs and Details
City of Greenville Development Code Review and Policy Gap Analysis
Pitt County Zoning Ordinance
Pitt County Subdivision Ordinance (applies to Pitt County communities, including Simpson)
Winterville Municipal Ordinance
Village of Simpson Zoning Ordinance
Town of Ayden Zoning Ordinance & Subdivision Regulations

Demand & Benefit Forecast

Comparison Cities and Mode Share Forecasts

Through increased investment in infrastructure, programs, and policies that support active transportation, the percentage of people who walk or bike in the Greater Greenville Area will gradually increase. Area residents and workers will experience health, environmental, and transportation-related benefits due to an increase in walking and biking and a decrease in single-occupancy vehicle trips.

The project team carried out a benefits analysis to forecast mode share goals and its corresponding benefits. The analysis utilizes a standard methodology for calculating health-, environmental-, and transportation-related benefits. All projections are based on American Community Survey (ACS) 2011-2015 five-year estimates from the U.S. Census Bureau, which are then extrapolated through the use of various multipliers derived from national studies and quantified in terms of monetary value where appropriate. The estimated monetary values are then calibrated to baseline values and compared to bicycling and pedestrian mode splits of peer cities that recently have implemented similar projects.

COMPARISON CITIES

In order to estimate anticipated increases in walking and biking rates in Greenville, the project team selected cities in the southeastern region of the United States that are considered to be peers of Greenville (the City of Greenville was used, as opposed to the Greenville Urban Area MPO, since city-to-city data is more readily available for comparison, especially when factoring Bicycle-Friendly Community status and Walk Friendly Community status, which are mostly municipally based designations). The comparison cities were also selected as "aspirational" cities in terms of their status as bicycle-friendly and walk-friendly communities (listed in the table below).

GENERAL CHARACTERISTICS OF COMPARISON CITIES

City	State	Population	Population Density (population per square mile)[1]	Bicycle Friendly Community (BFC) Designation[2]	Walk Friendly Community (WFC) Designation[3]
Greenville	NC	88,598	2443	None	None
Asheville	NC	86,789	1856	Bronze	Silver
Chapel Hill/Carrboro	NC	79,405	2710 (Chapel Hill) 3030 (Carrboro)	Silver (Carrboro), Bronze (Chapel Hill)	None
Wilmington	NC	111,998	2068	Bronze	None
Columbia	SC	131,958	977.8	Bronze	Bronze
Greenville	SC	61,734	2037	Bronze	None
Roanoke	VA	98,736	2280	Bronze	None

BICYCLE & WALK COMMUTE MODE SHARE FORECASTS

The project team analyzed data on how people commute to and from work in each city. Among the cities listed, Greenville has the lowest bicycle commute share (0.36%; this is to be expected since the comparison cities were chosen partially based on their Bicycle Friendly Community designation). The table below shows the existing bicycle commute shares for each city, as well as a range of forecasted commute mode shares for Greenville. The low, middle, and high forecasts are based on the 25th, 50th, and 75th percentile of existing commute mode shares in Greenville's comparison cities, respectively.

BICYCLE COMMUTE DATA IN GREENVILLE AND ITS PEER CITIES

City	Employed Population	Existing Bicycle Commute Trips per Day	Existing Bike Commute Mode Split	Forecasted Future Bicycle Mode Split		
				Low	Mid	High
Greenville	42,344	306	0.36%	0.61%	0.68%	1.30%
Asheville	42,730	634	0.74%			
Chapel Hill/Carrboro	39,903	2,446	3.06%			
Wilmington	53,164	1,582	1.49%			
Columbia	63,760	776	0.61%			
Greenville	30,432	368	0.60%			
Roanoke	45,584	486	0.53%			

Compared to the other cities, Greenville has the third lowest walk commute share (3.14%). The table below shows the range of walk commute shares in Greenville and its six comparison cities as well as the forecasted walk commute shares.

WALK COMMUTE DATA IN GREENVILLE AND ITS PEER CITIES

City	Employed Population	Existing Walk Commute Trips per Day	Existing Walk Commute Mode Split	Forecasted Future Walking Mode Split		
				Low	Mid	High
Greenville	42,344	2,660	3.14%	3.20%	4.56%	8.26%
Asheville	42,730	4,072	0.74%			
Chapel Hill/Carrboro	39,903	7,526	9.43%			
Wilmington	53,164	2,990	2.81%			
Columbia	63,760	27,282	21.39%			
Greenville	30,432	2,654	4.36%			
Roanoke	45,584	2,274	2.49%			

Mode share goals for walking and biking were based on the middle estimate of current walking and biking commute share in Greenville's aspirational cities. **These mode share goals correspond to the 50th percentile of the existing commute mode shares in the six aspirational cities.** If Greenville were to increase its commute bicycle share to the 50th percentile of its six aspirational cities, it would see a 0.32% increase in the number of bicycle commuters (from 0.36% to 0.68%). This increase in the number of bicycle commuters might result in an estimated reduction of 1,111,000 vehicle-miles traveled (VMT). If Greenville were to increase its commute walk share to the 50th percentile of its 6 aspirational cities, it would see a 1.42% increase in the number of commuters who walk to work (from 3.14% to 4.56%). This would correspond to a reduction of 1,117,000 vehicle-miles traveled.

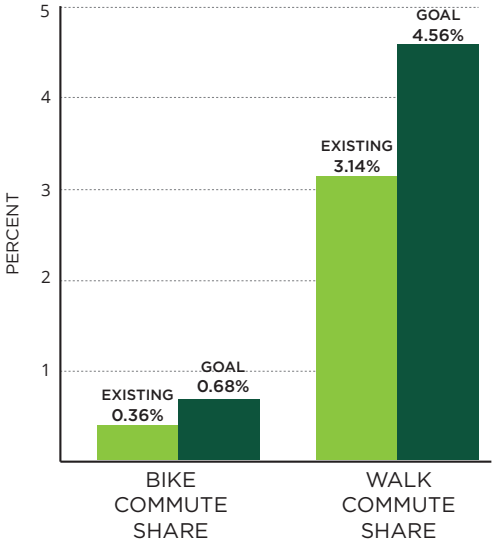
BENEFITS

Based on these goals for walking and biking as a means of transportation to and from work, the project team estimated the potential benefits that the city could experience. These benefits fall in three categories: health, environmental, and transportation. These benefits that could be realized due to a reduction in vehicle trips would greatly improve the overall quality of life in Greenville. The project team quantified health-related benefits, including estimated increase in hours of physical activity and annual savings from reduced healthcare costs. Estimates in reduction in VMT due to a greater number of commuters biking or walking were used to calculate changes in physical activity rates. In terms of environmental benefits, reductions in VMT were used to calculate changes in carbon dioxide emissions and other vehicle emissions. The most readily identifiable benefits of carrying out the recommendations in this plan is the increase in alternative modes of transportation and access to activity centers in Greenville. Savings can be estimated from the reduced costs associated with congestion, vehicle crashes, road maintenance, and household vehicle operations. The table below summarizes the health, environmental, and transportation benefits for Greenville.

FORECASTED ANNUAL HEALTH, ENVIRONMENTAL, & TRANSPORTATION BENEFITS

	Baseline		Mid Estimate (50th percentile of peer cities' existing commute mode shares)	
Benefits	Bike	Walk	Bike	Walk
HEALTH				
Annual trips	745,000	7,199,000	1,392,000	10,458,000
Annual miles	1,639,000	4,854,000	2,339,000	5,773,000
Annual hours of physical activity	164,000	1,618,000	234,000	1,924,000
Recommended physical activity minimum met	1,262	12,446	1,800	14,800
Regional physical activity need met	1.42%	14.05%	2.03%	16.70%
Healthcare cost savings	$87,000	$456,000	$163,000	$663,000
ENVIRONMENTAL				
CO2 emissions reduced (pounds)	2,492,000	2,492,000	4,657,000	3,620,000
Other vehicle emission reduced (pounds)	19,000	80,000	36,000	116,000
Total vehicle emission costs reduced	$20,000	$83,000	$37,000	$120,000
TRANSPORTATION				
Annual VMT reduced	595,000	2,469,000	1,111,000	3,586,000
Reduced traffic congestion costs	$42,000	$173,000	$78,000	$251,000
Reduced vehicle crash costs	$297,000	$1,234,000	$556,000	$1,793,000
Reduced road maintenance costs	$89,000	$370,000	$167,000	$538,000
Household vehicle operation cost savings	$339,000	$1,407,000	$633,000	$2,044,000
Total Benefits		$4,597,000		$7,043,000

Summary of Forecasted Annual Health, Environmental, and Transportation Benefits



If Greenville increased its bike mode share to 0.68% and increased its walk mode share to 4.56%, the city could experience a total of $7,043,000 in health-, environmental-, and transportation-related benefits per year. This corresponds to a difference of $2,446,000.

Limitations

The primary purpose of the analysis is to enable a more informed policy discussion on whether and how best to invest in a bicycle and pedestrian network. Even with extensive primary and secondary research incorporated into the analysis, it is impossible to accurately predict the exact impacts. Accordingly, all estimated benefit values are rounded and should be considered as estimates rather than exact amounts.

647,000 MORE BIKE TRIPS PER YEAR

3,259,000 MORE WALK TRIPS PER YEAR

$826,000 IN HEALTH BENEFITS PER YEAR

$157,000 IN ENVIRONMENTAL BENEFITS PER YEAR

$6,060,000 IN TRANSPORTATION BENEFITS PER YEAR

OVER

$7 MILLION

IN TOTAL BENEFITS PER YEAR

3 Bicycle Network

"Riding my bicycle feels good and makes me feel healthy. And I like the feeling of connection it gives me to my neighborhood and my city."

- Public Comment, 2016

Overview

This chapter provides a summary of the key types of bicycle facilities (including greenway trails) and features a series of maps showing where those facilities are recommended.

Four Types of Cyclists

The most common classification system used to describe biking comfort level was originally developed by Roger Geller, Bicycle Coordinator for the City of Portland. Geller's "Four Types of Transportation Cyclists" classified the general population into categories of transportation cyclists by their different needs and biking comfort levels given different roadway conditions. Based on Geller's work, the population of a city can be classified into the four types of cyclists listed in the table below.

According to the 2016 public comment for this planning process, the majority of respondents don't feel safe bicycling in the Greater Greenville Area (55%), and only 15% do feel safe (the rest are in between). This would suggest that **area residents mostly fall somewhere in the "Interested but Concerned" group below**, with exceptions in each direction. This helps to inform the types of recommendations, as **this group is generally less comfortable on major streets, and prefers separated pathways and low traffic neighborhood streets.**

Four Types of Cyclists.
(2009). Roger Geller, City of Portland Bureau of Transportation. Supported by data collected nationally since 2005.

<1% STRONG AND FEARLESS: *This group is willing to ride a bike on any roadway regardless of traffic conditions. Comfortable taking the lane and riding in a vehicular manner on major streets without designated bike facilities.*

5-10% ENTHUSIASTIC AND CONFIDENT: *This group consists of people riding bikes who are confident riding in most roadway situations but prefer to have a designated facility. Comfortable riding on major streets with a bike lane.*

60% INTERESTED BUT CONCERNED: *This group is more cautious and has some inclination towards biking but are held back by concern over sharing the road with cars. Not very comfortable on major streets, even with a striped bike lane, and prefer separated pathways or low traffic neighborhood streets.*

30% NO WAY NO HOW: *This group comprises residents who simply aren't interested at all in biking, may be physically unable or don't know how to ride a bike, and they are unlikely to adopt biking.*

Planning the Bicycle and Greenway Trail Network

The proposed bike network is a result of a collaborative planning process that involved extensive public engagement, data collection, and technical analysis.

Findings from the equity analysis, crash analysis, and level of traffic stress analysis provided quantitative data that directly informed the network recommendations. Additionally, more qualitative input from the public and the steering committee helped to inform the project team in developing a recommended network of well-connected, low-stress facilities. The end result is a recommended bicycle and greenway network that is designed to align with the vision of this plan, creating safe and convenient bicycle-friendly streets and trails for people of all ages, abilities, and incomes.

BASIS OF BICYCLE RECOMMENDATIONS *(and where to find more information)*

Committee & Public Input

Online Public Input Map & Committee Map Mark-ups (page 31)

Online Public Survey (page 28)

Public Outreach Events and Open Houses (page 22)

+

Connecting Destinations

Uptown District, East Carolina University, County Home Complex, medical centers, shopping centers, parks, schools, and downtown areas in Winterville, Ayden, and Simpson (page 31)

+

Mapping Analysis

Crash Analysis (page 36)

Demographic & Equity Analysis (page 34)

Level of Traffic Stress & Bicycle Connectivity Analysis (page 42)

+

Existing Plans & Facilities

2011 Bike/Ped Plan & Other Adopted Plans (page 52)

Existing Bicycle Facilities (page 39)

+

Existing Routes

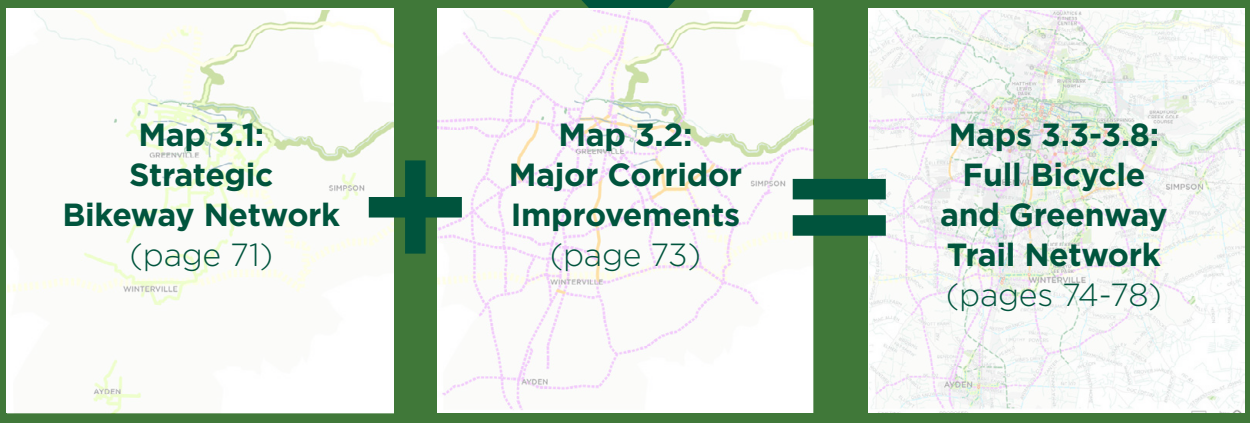
East Coast Greenway (page 39)

State Bike Route 2 (pages 39 and 41)

2013 Bike Map (page 52)

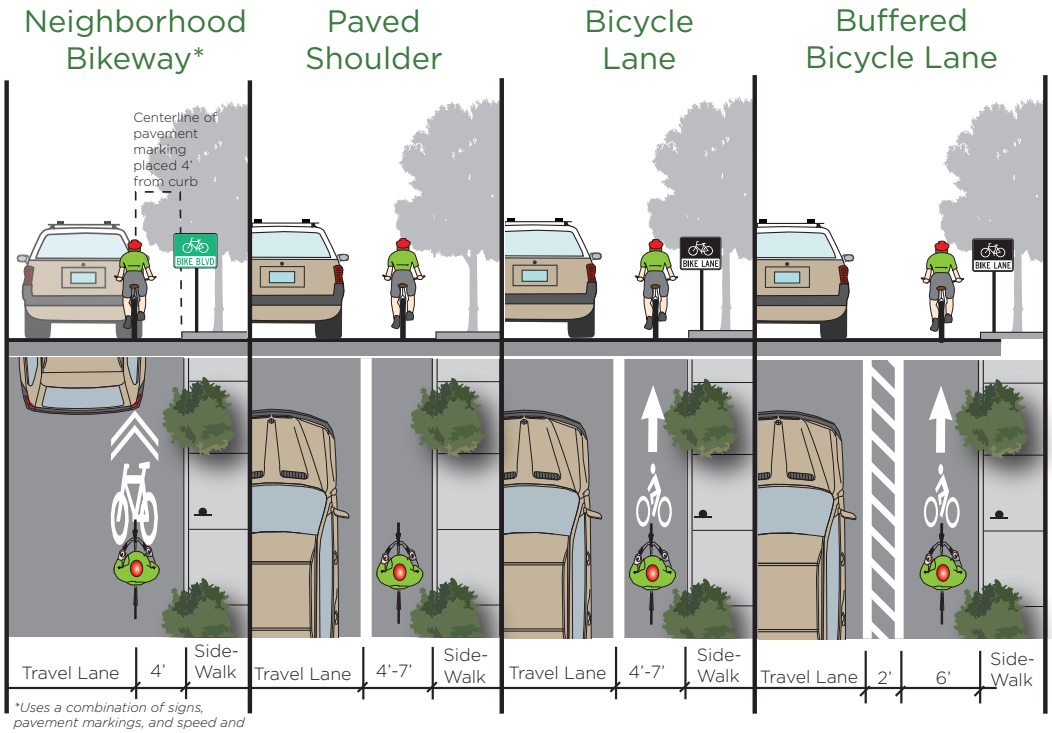
2016 Online Input Map (page 30)

BICYCLE & GREENWAY TRAIL NETWORK MAPS



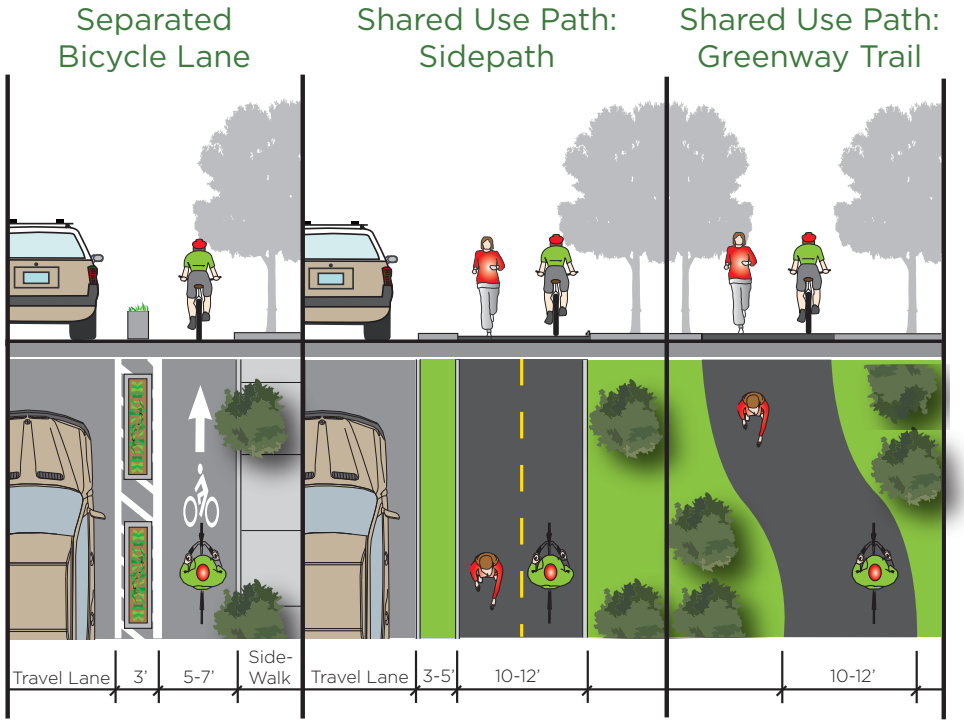
Types of Facilities in the Bikeway Network Maps

least separated



*Uses a combination of signs, pavement markings, and speed and volume management measures to create safe bicycle travel.

most separated



Neighborhood Bikeways

Neighborhood bikeways (also known as "bicycle boulevards") are low-volume, low-speed streets modified to enhance bicyclist comfort by using treatments such as signage, pavement markings, traffic calming and/or traffic reduction, and intersection modifications. These treatments allow through movements of bicyclists while discouraging similar through-trips by non-local motorized traffic.

Bike Boulevard Speed Bump Example, Portland, OR

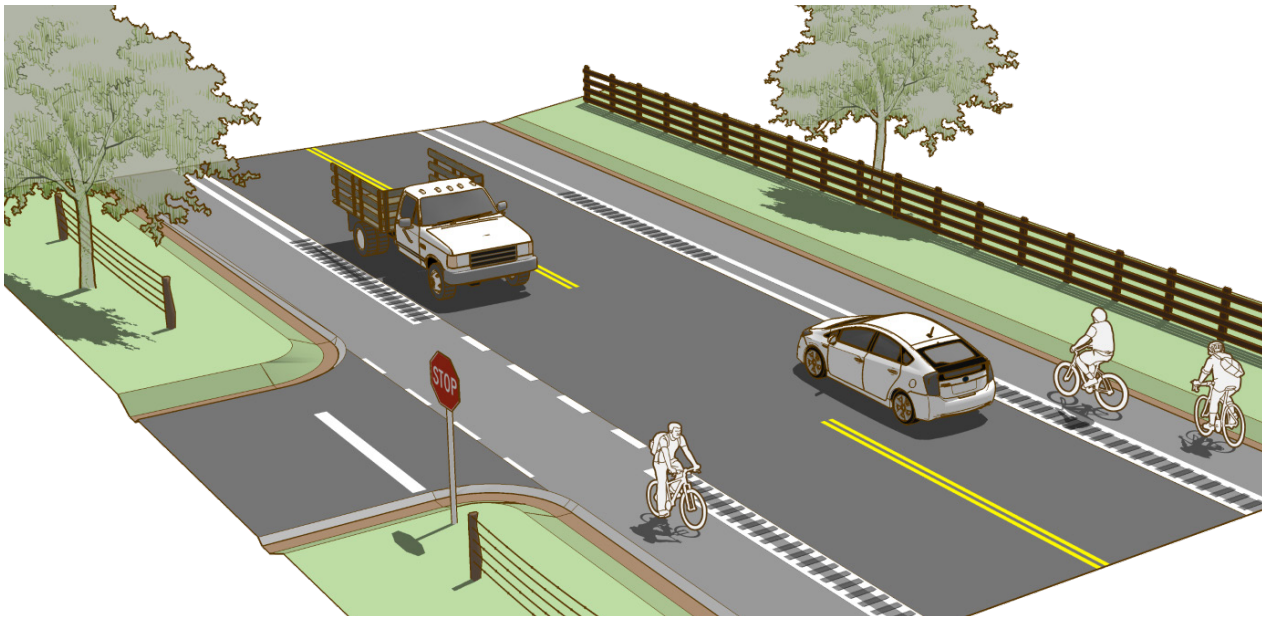
Bike Boulevard Marking and traffic reduction example, San Luis Obispo, CA

DESIGN GUIDELINES:

Neighborhood Bikeways: Page B-34
Traffic Calming: Page B-36
Volume Management: Page B-38
Minor Intersection Treatments: Page B-39
Major Intersection Treatments: Page B-40
Offset Intersection Treatments: Page B-41

Paved Shoulders

Paved shoulders on the edge of roadways can be enhanced to serve as a functional space for bicyclists and pedestrians to travel in the absence of other facilities with more separation. If rumble strips are used, they should be located on the edge line or within a buffer area that will not reduce usable space for bicyclists.



Paved shoulder example on a four-lane divided highway.

Paved shoulder example on a rural two-lane road.

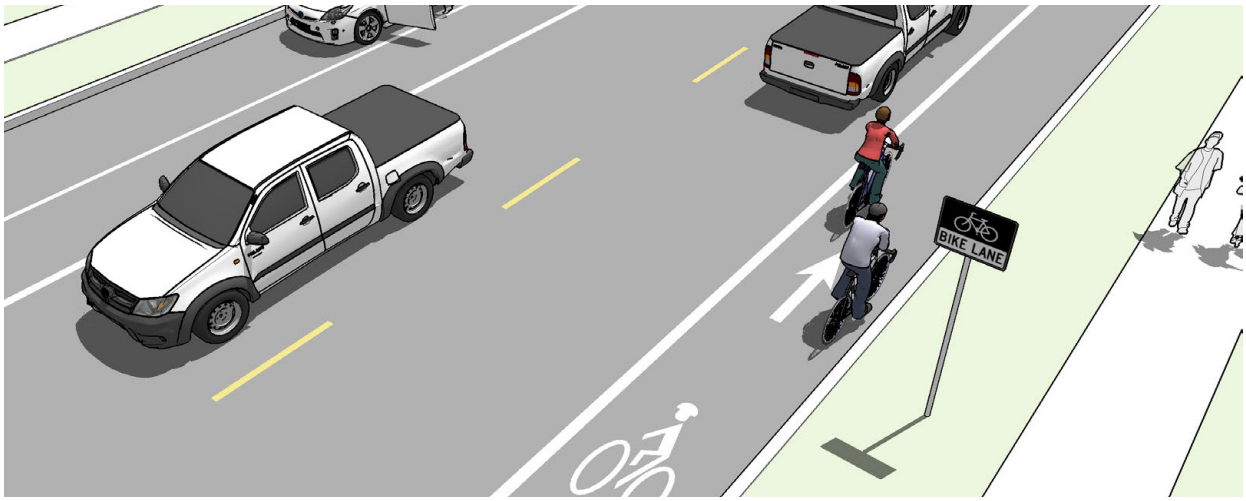
DESIGN GUIDELINES:

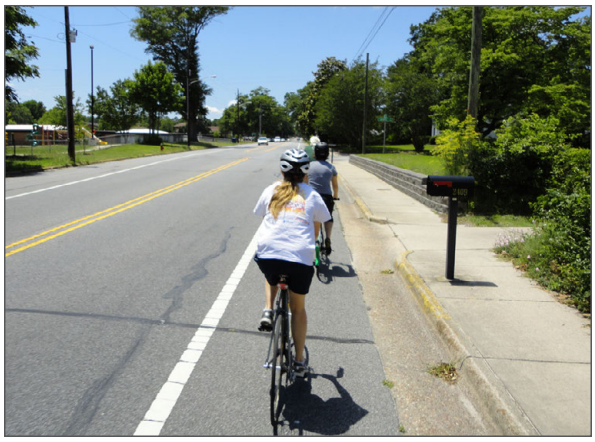
The Small Town and Rural Design Guide:

http://ruraldesignguide.com/visually-separated/paved-shoulder

Bicycle Lanes

On-street bike lanes designate an exclusive space for bicyclists through the use of pavement markings and signs. The bike lane is located directly adjacent to motor vehicle travel lanes and is used in the same direction as motor vehicle traffic. Bike lanes are typically on the right side of the street, between the adjacent travel lane and curb, road edge or parking lane.





Bike Lane, Greenville, NC

Bike Lane, Greenville, NC

DESIGN GUIDELINES:

Bicycle Lanes: Page B-22

Buffered Bicycle Lanes: Page B-26

Intersection Crossing Markings: B-42

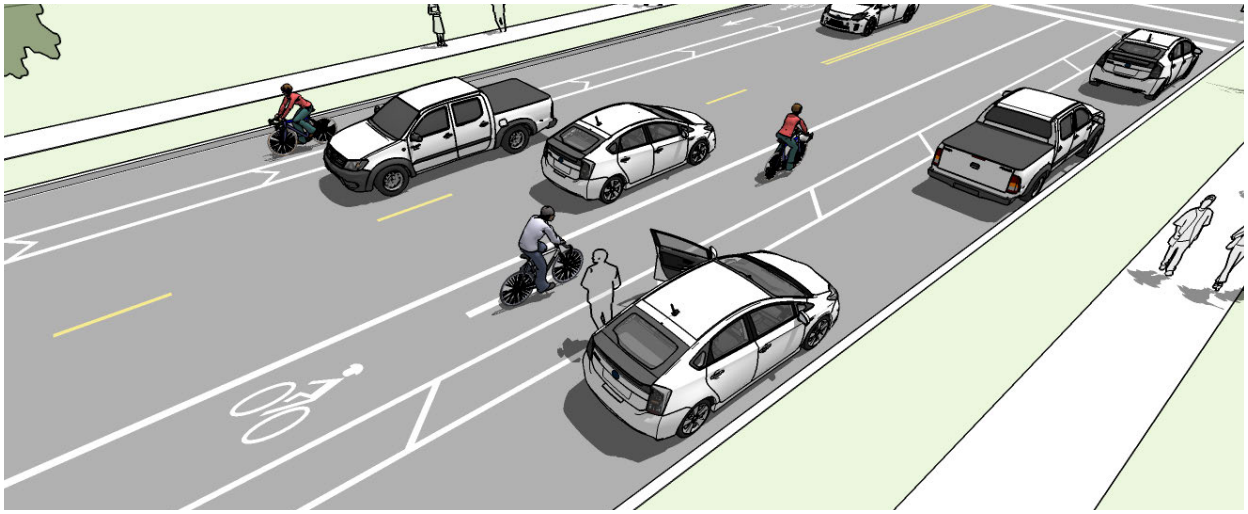
Bike Box: B-44

Bike Lanes at Added Right Turn Lanes: B-46

Combined Bike Lane/Turn Lane: B-48

Buffered Bicycle Lanes

Buffered bike lanes are conventional bicycle lanes paired with a designated buffer space, separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane.



The use of pavement markings delineates space for cyclists to ride in a comfortable facility.

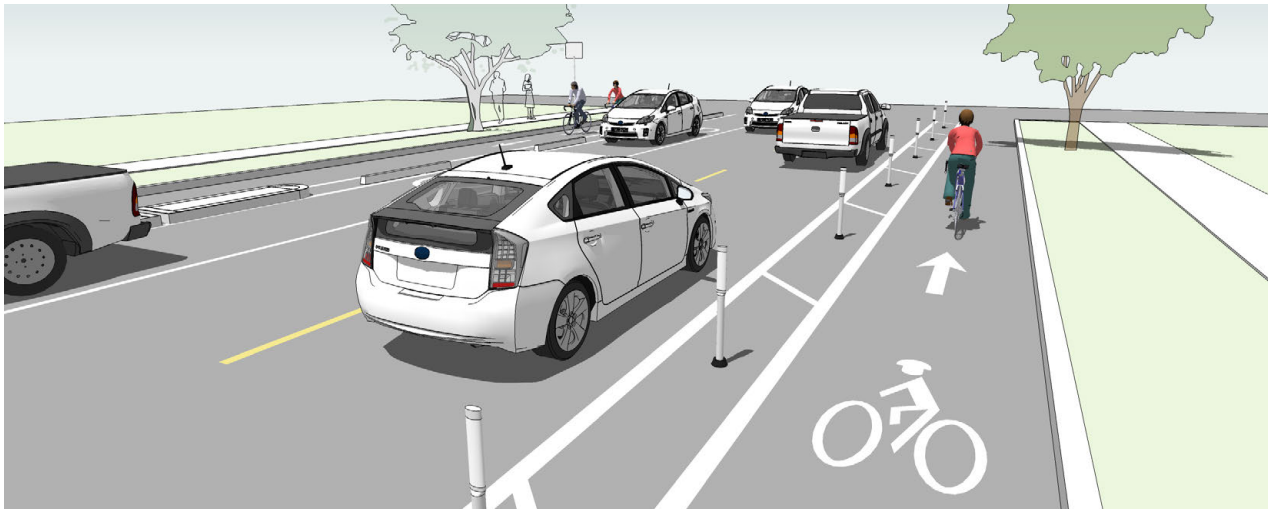
Buffered Bike Lane, Goldsboro, NC (from Google Street View)

DESIGN GUIDELINES:

Bicycle Lanes: Page B-22
Buffered Bicycle Lanes: Page B-26
Intersection Crossing Markings: B-42
Bike Box: B-44
Bike Lanes at Added Right Turn Lanes: B-46
Combined Bike Lane/Turn Lane: B-48

Separated Bicycle Lanes

When retrofitting separated bike lanes onto existing streets, a one-way street-level design may be most appropriate. This design provides protection through physical barriers and can include flexible delineators, curbs, on-street parking or other barriers. A street level separated bike lane shares the same elevation as adjacent travel lanes.



Separated Bikeway, Washington, D.C - Photo from FHWA

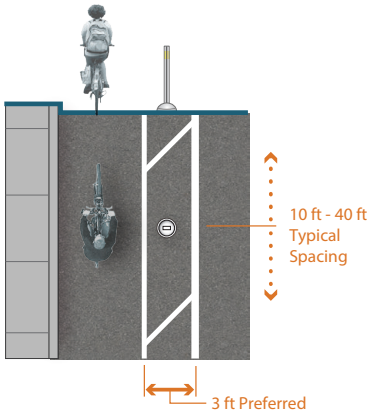
Separated Bikeways, Russellville, AR

DESIGN GUIDELINES:

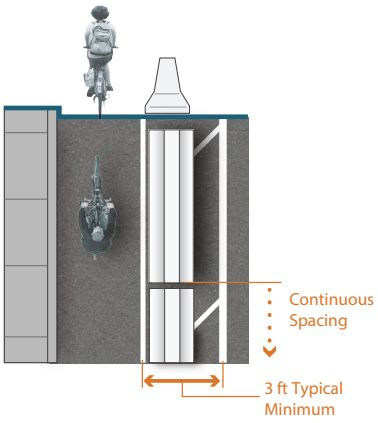
One-Way Separated Bicycle Lanes: Page B-28
Two-Way Separated Bicycle Lanes: Page B-30
Separation Methods: Page: B-32

Types of Physical Separators

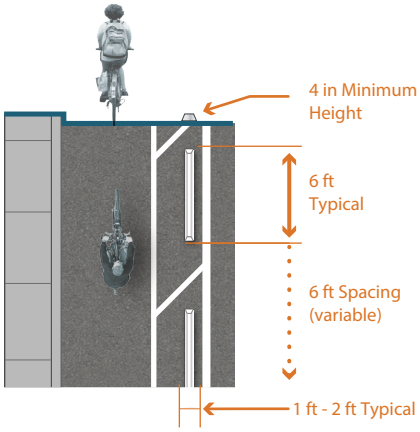
Delineator Posts



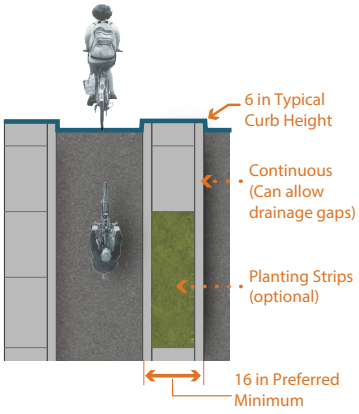
Concrete Barrier



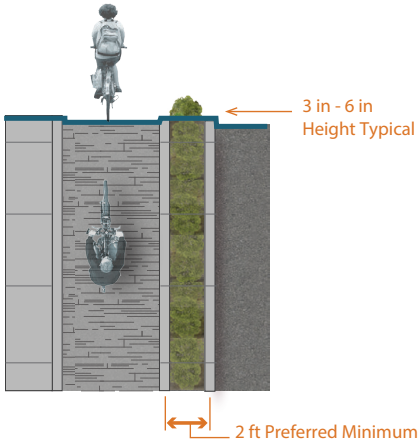
Parking Stops



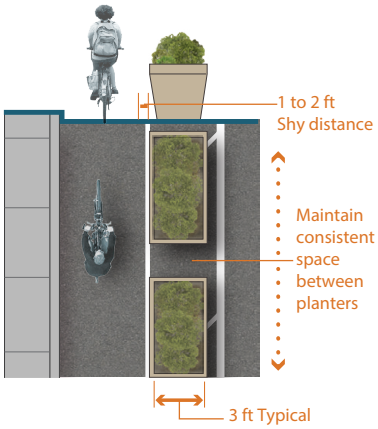
Raised Median



Raised Lane



Planters



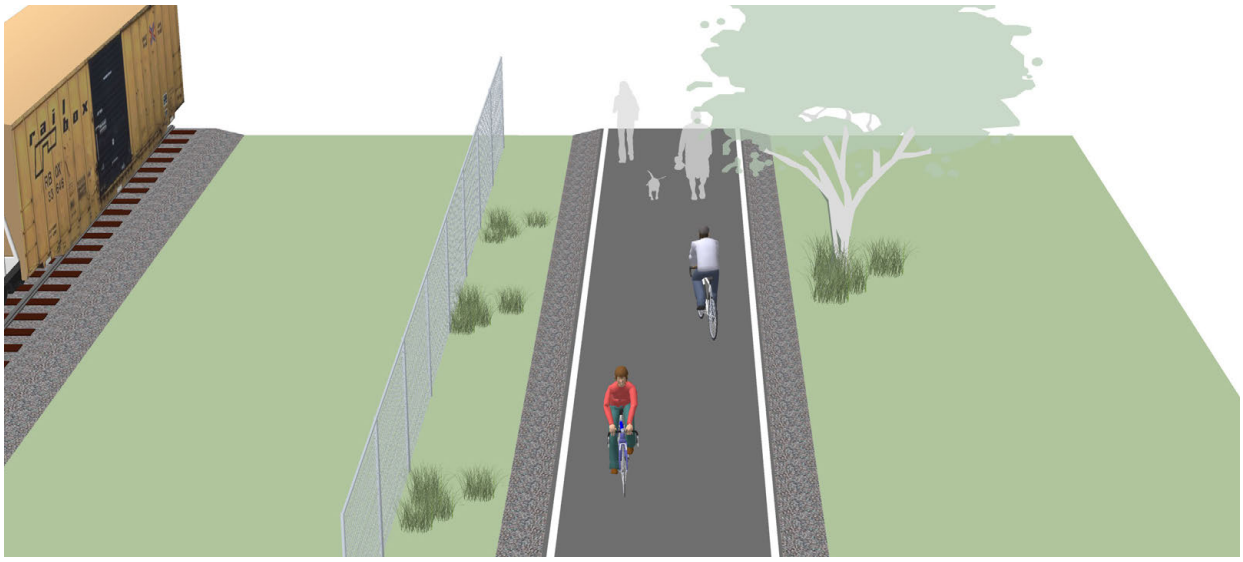
Shared Use Paths

Shared Use Paths

Shared use paths are defined by the Federal Highway Administration as multi-use trails or other paths, physically separated from motorized vehicular traffic by an open space or barrier, either within a highway right-of-way or within an independent right-of-way, and usable for transportation purposes. Shared use paths can provide a desirable facility, particularly for recreation, and users of all skill levels preferring separation from traffic.

Greenway Trails

For the purposes of this plan, the term "greenway trail" refers to shared use paths that are independent of the roadway right-of-way, often along natural riparian corridors, utility corridors, or along railroad corridors.

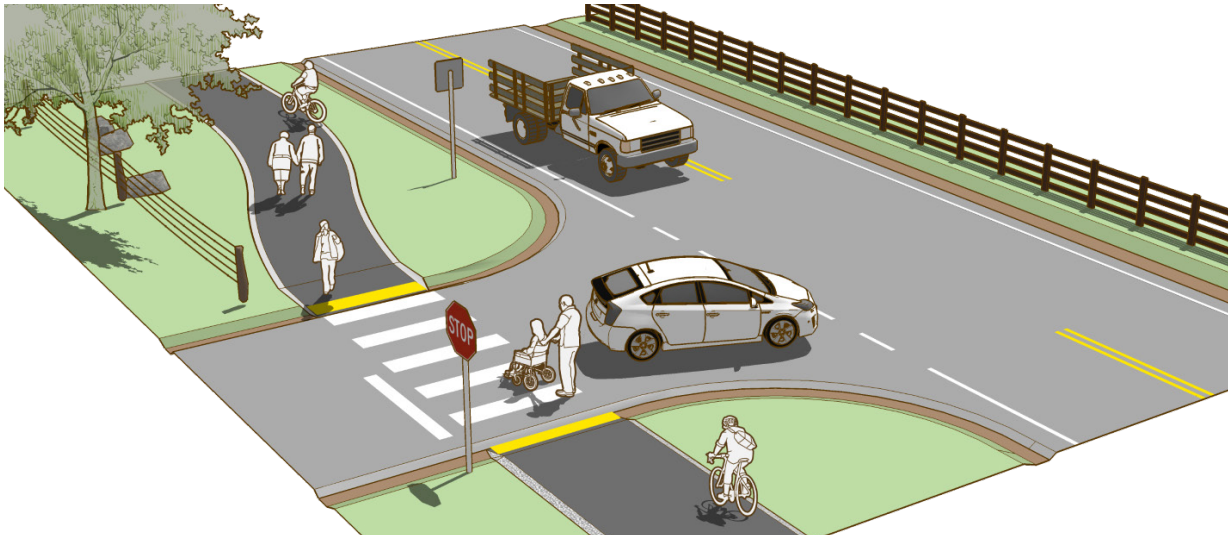


Tar River Greenway link to Town Commons, Greenville, NC - Photo from Google Streetview

Tar River Greenway, Greenville NC

Sidepaths

Sidepaths are shared use paths that are alongside roadways, often within the roadway right-of-way. They may be appropriate on streets with few intersections or driveways, such as along parkland or other large properties with few driveways and cross streets. Sidepaths are generally inappropriate in built-up areas with land use access desired on both sides of the street.



Sidepath in Conover, NC

Sidepath in Raleigh, NC

DESIGN GUIDELINES:

Shared Use Path: Page B-68
Local Neighborhood Accessways: Page: B-70
Natural Surface Trails: Page B-71
Single Track Mountain Bike Trails: Page B-72
Accessible Trails: Page B-73
Boardwalks: Page B-74
Vegetative Screenings: Page B-75
Marked Trail Crossing: Page B-76
Median Trail Crossing: Page B-77
Active Enhanced Trail Crossing: Page B-78
Route Users to Signalized Crossing: Page B-79
Grade-Separated Crossings: Page B-80

Bicycle and Greenway Trail Network Maps

The Strategic Bikeway Network

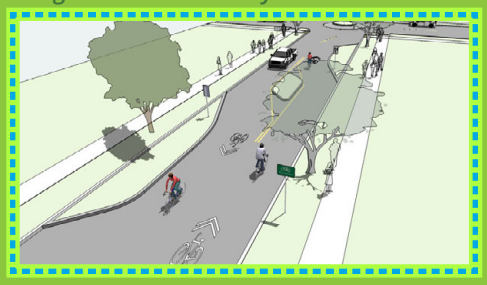
The Strategic Bikeway Network builds upon existing infrastructure and areas that are bicycle friendly today, especially neighborhoods. These projects can be thought of as 'low-hanging fruit', consisting of lower cost, easier to implement projects that are critical to the overall network.

Map 3.1 on the following page shows an overview of this network; its key features include:

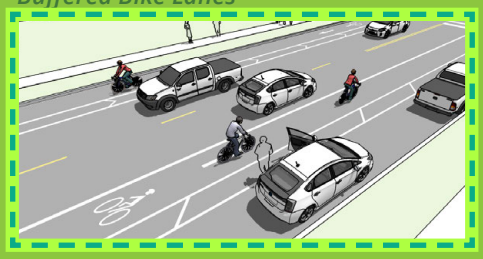
- Relative ease of implementation
- Potentially greater return on investment
- Connects to the existing greenway network
- Connects key destinations
- Avoids barrier roadway corridors that carry high automobile traffic volumes and speeds
- Uses neighborhood streets, many of which already have traffic calming features such as speed tables
- Uses some neighborhood streets that are very wide, allowing an opportunity to stripe buffered bike lanes (this space can also aid pedestrians).
- Highlights strategic crossings of major roadway corridors
- Proposes short sections of shared use paths to make key links where necessary
- Complements the ongoing process of improvements to major corridors (see pages 72-73) that presently do not accommodate bicyclists (and that only minimally accommodate pedestrians).

FEATURED FACILITY TYPES IN MAP 3.1 STRATEGIC BIKE NETWORK:

Neighborhood Bikeways

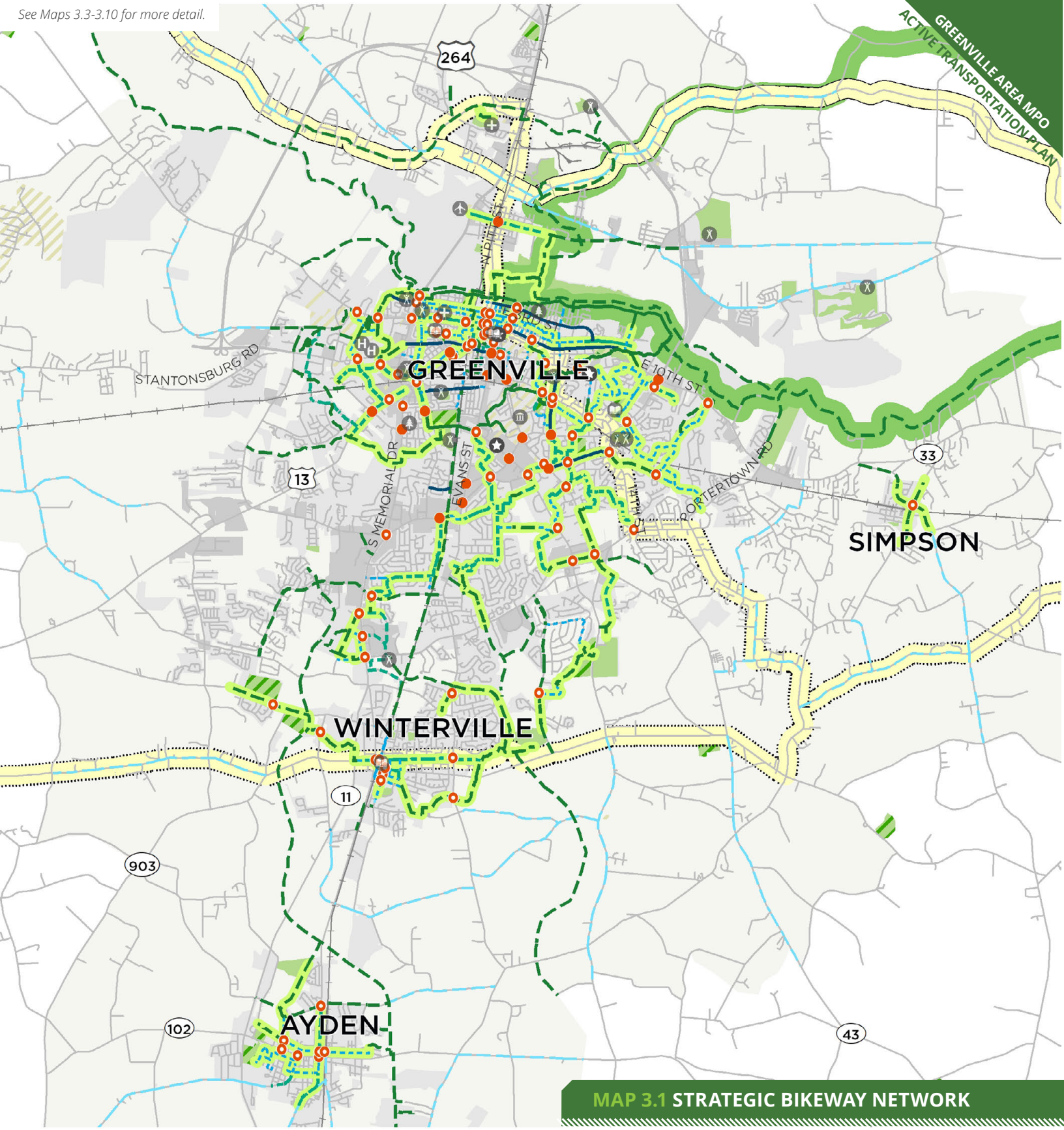


Buffered Bike Lanes



Shared Use Paths

See Maps 3.3-3.10 for more detail.



MAP 3.1 STRATEGIC BIKEWAY NETWORK

EXISTING
- Shared Use Path
- Bike Lane
- State Bike Route
- Updated State Bike Route (Unsigned)

PROPOSED
- Crossing Improvement
- In Development
- Shared Use Path
- Buffered Bike Lane
- Neighborhood Bikeway
- Paved Shoulder
- East Coast Greenway
- STRATEGIC BIKEWAY NETWORK

DESTINATIONS & BOUNDARIES
- Airport
- Community Center
- Hospital
- Library
- Playground
- Rec Center
- Stadium
- Bike Shops
- Park
- School
- East Carolina University
- Greenville MPO
- Municipal Boundaries
- Commercial Areas

0 0.5 1 Miles

Major Corridor Improvements

Much of the analysis in Chapter Two revealed that **major corridors throughout the study area are serving as barriers to safe movement and community-wide connectivity for bicyclists and pedestrians**. Many people reported being able to bike and walk comfortably on neighborhood streets and greenways, while feeling unsafe biking and walking along or crossing major corridors. Unfortunately, many of these corridors cannot be made bicycle-friendly by the simple addition of a standard bicycle lane with no buffer. More substantial improvements are needed that will require additional roadway width, meaning significant changes to the overall corridor.

Map 3.2 identifies the major corridors that are in need of such improvements. In order to make the most cost-effective investments in the overall transportation network, this plan recommends that as these major corridors are planned for widening, resurfacing, and/or reconstruction, they should by redesigned as "complete streets". NCDOT's *Complete Streets Policy* defines Complete Streets as *"North Carolina's approach to interdependent, multi-modal transportation networks that safely accommodate access and travel for all users."*

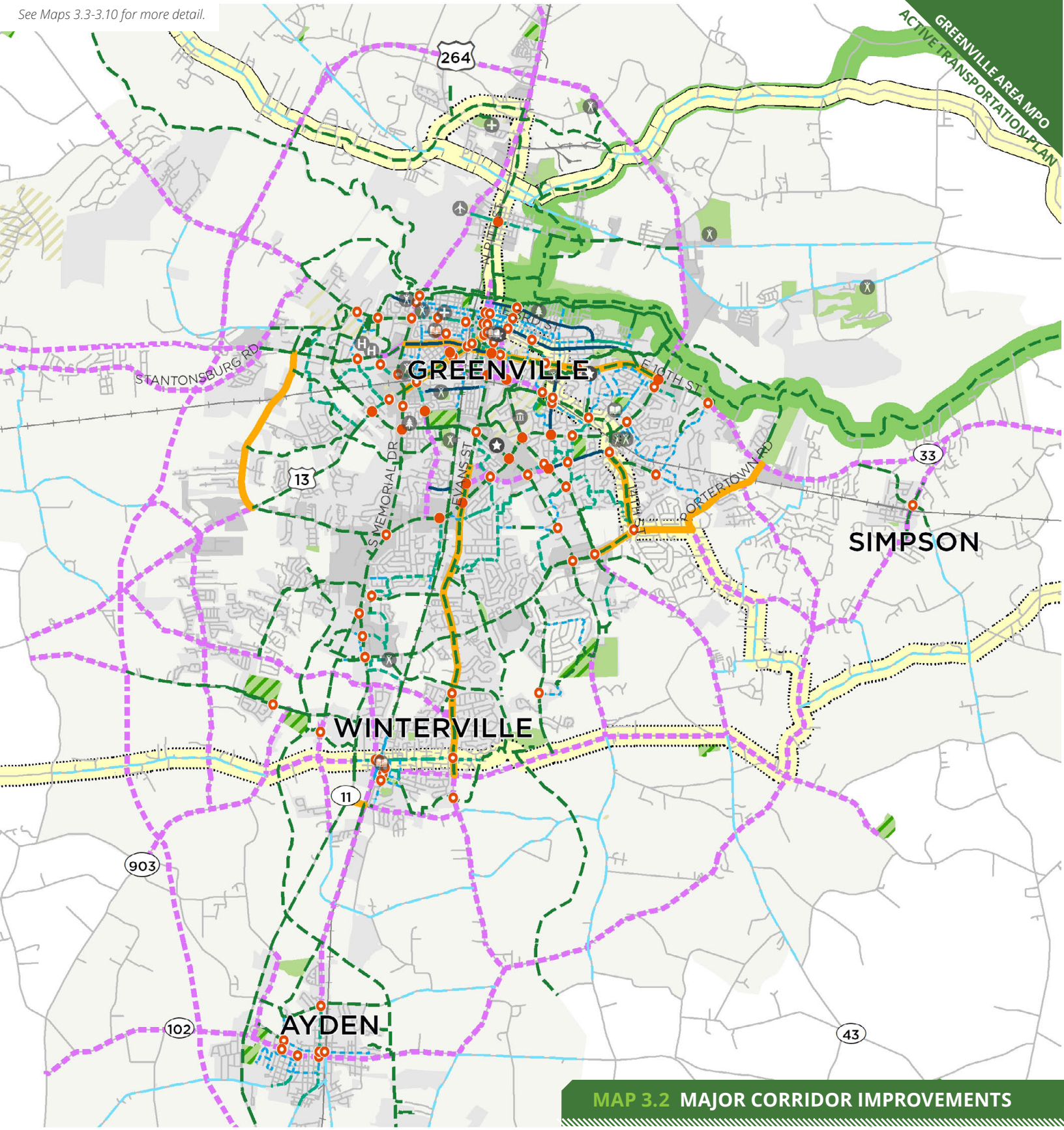
Implementing Complete Streets along roadway corridors originally designed for automobiles will require full redesign, involving driveway consolidation and reduction, landscaping, intersection improvements, possible lane reconfigurations, enhanced bus stops and transit facilities, and physical separation for bicyclists and pedestrians from automobile traffic. Full corridor studies are needed to address these issues during (or in advance of) the desgn phase. **This plan lays the groundwork for these future projects by identifying and recommending these corridors for future redesign, to include separated bikeways and pedestrian facilities with physical separation from motor vehicle traffic.** The type of physical separation will depend on the context of the corridor. Separated bikeway examples are included on pages 66-67, and on pages B-28 to B-32 in Appendix B.

At the time of this writing, several major roadway corridors were at various stages of the reconstruction process (in orange on Map 3.2):

- Evans St/Old Tar Rd widening - Greenville Blvd in Greenville to Worthington Rd in Winterville
- 10th St Connector - 10th St extension from Evans St to Stantonsburg Rd.
- 10th St Corridor Study - 10th St from Evans St to Greenville Blvd
- Allen Rd widening - Stantonsburg Rd to Dickinson Ave
- Fire Tower Rd/Portertown Rd widening - Charles Blvd to NC 33
- 14th St improvements - Fire Tower Rd to Red Banks Rd
- Dickinson Ave improvements - Reade Cir to Memorial Dr
- Laurie Ellis Rd extension - from the existing western terminus at Mill St to NC 11

While the projects above will be completed at various points over the next 10 years, these as well as the next generation of major roadway improvement projects should be required to include separated bikeways and pedestrian facilities appropriate for people of all ages and abilities (in pink dash on Map 3.2).

See Maps 3.3-3.10 for more detail.



MAP 3.2 MAJOR CORRIDOR IMPROVEMENTS

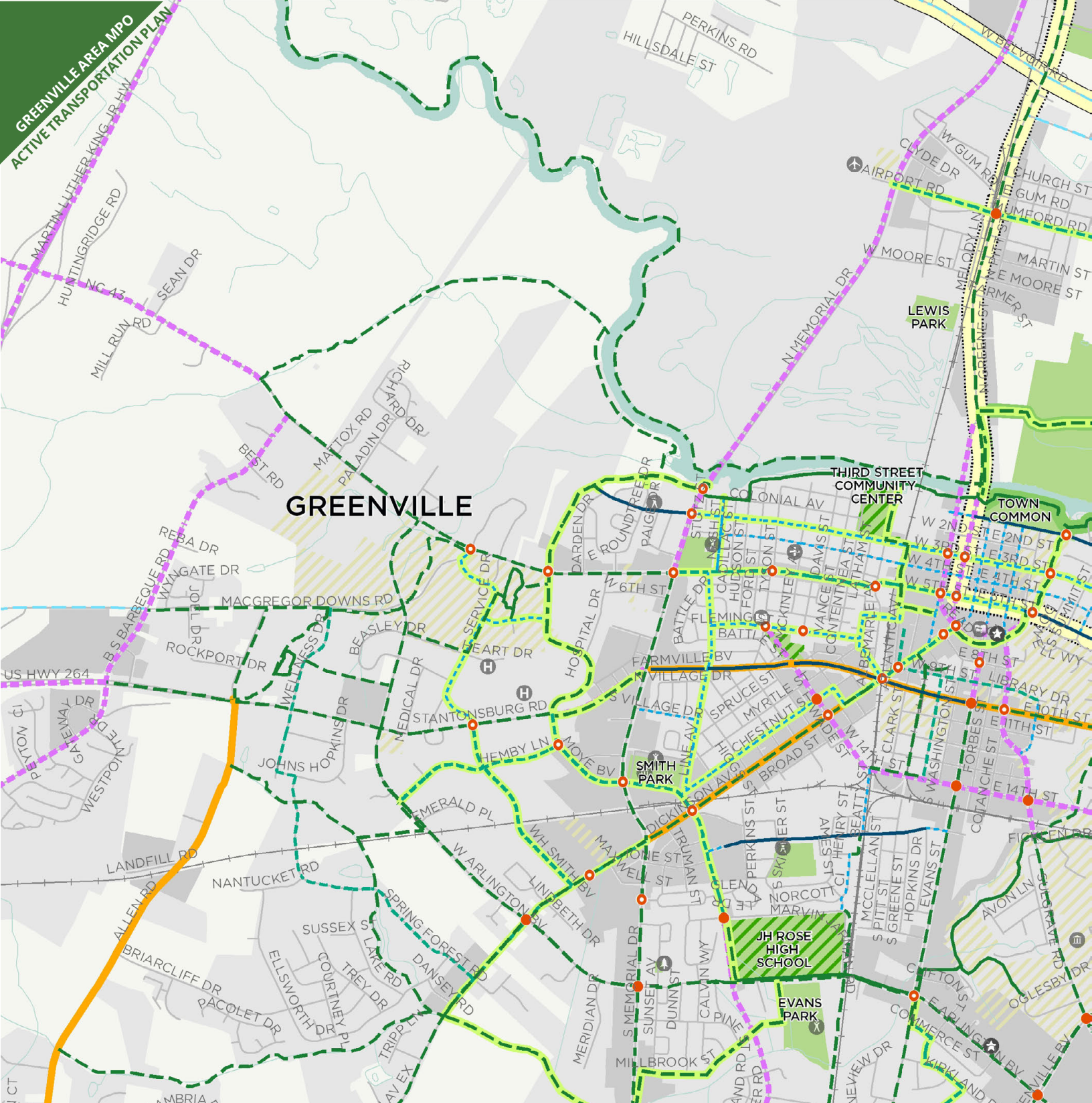
EXISTING
- Shared Use Path
- Bike Lane
- State Bike Route
- Updated State Bike Route (Unsigned)

PROPOSED
- Crossing Improvement
- In Development
- Shared Use Path
- Buffered Bike Lane
- Neighborhood Bikeway
- Paved Shoulder
- East Coast Greenway

MAJOR CORRIDOR IMPROVEMENTS
- In Development
- Separated Bikeway (and Pedestrian Facilities)

DESTINATIONS & BOUNDARIES
- Airport
- Community Center
- Hospital
- Library
- Playground
- Rec Center
- Stadium
- Bike Shops
- Park
- School
- East Carolina University
- Greenville MPO
- Municipal Boundaries
- Commercial Areas

Miles 0 0.5 1



MAP 3.3 FULL BICYCLE & GREENWAY TRAIL NETWORK: NORTHWEST GREENVILLE

EXISTING
- Shared Use Path
- Bike Lane
- State Bike Route
- Updated State Bike Route (Unsigned)

PROPOSED
- Crossing Improvement
- In Development
- Shared Use Path
- Buffered Bike Lane
- Neighborhood Bikeway
- Paved Shoulder
- East Coast Greenway
- STRATEGIC BIKEWAY NETWORK

MAJOR CORRIDOR IMPROVEMENTS
- In Development
- Separated Bikeway (and Pedestrian Facilities)

0 0.5 1 Miles

DESTINATIONS & BOUNDARIES
- Airport
- Community Center
- Hospital
- Library
- Playground
- Rec Center
- Stadium
- Bike Shops
- Park
- School
- East Carolina University
- Greenville MPO
- Municipal Boundaries
- Commercial Areas

MAP 3.4 FULL BICYCLE & GREENWAY TRAIL NETWORK: NORTHEAST GREENVILLE

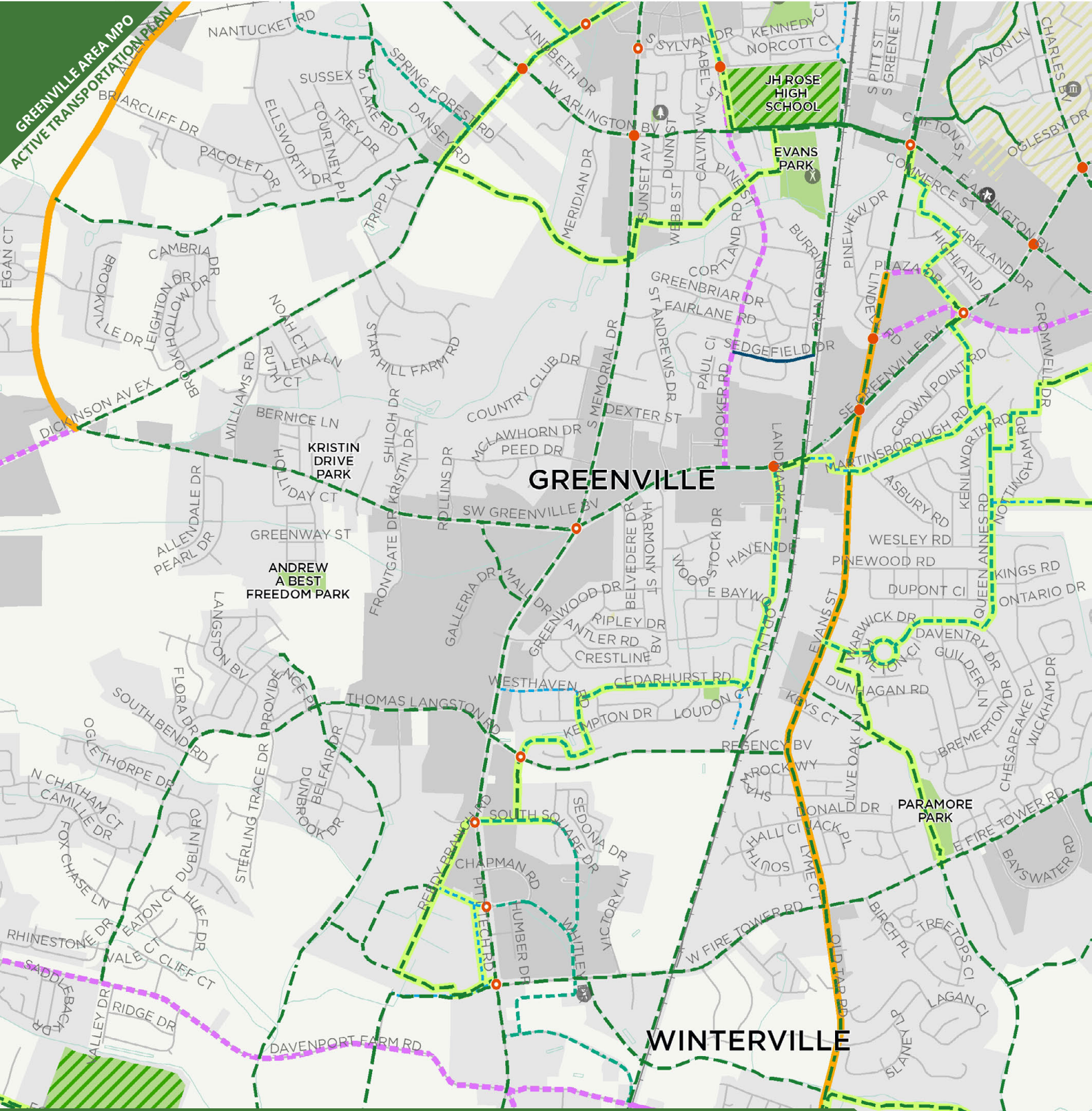
EXISTING
- Shared Use Path
- Bike Lane
- State Bike Route
- Updated State Bike Route (Unsigned)

PROPOSED
- Crossing Improvement
- In Development
- Shared Use Path
- Buffered Bike Lane
- Neighborhood Bikeway
- Paved Shoulder
- East Coast Greenway
- **STRATEGIC BIKEWAY NETWORK**

MAJOR CORRIDOR IMPROVEMENTS
- In Development
- Separated Bikeway (and Pedestrian Facilities)

0 0.5 1 Miles

DESTINATIONS & BOUNDARIES
- Airport
- Community Center
- Hospital
- Library
- Playground
- Rec Center
- Stadium
- Bike Shops
- Park
- School
- East Carolina University
- Greenville MPO
- Municipal Boundaries
- Commercial Areas



MAP 3.5 FULL BICYCLE & GREENWAY TRAIL NETWORK: SOUTHWEST GREENVILLE

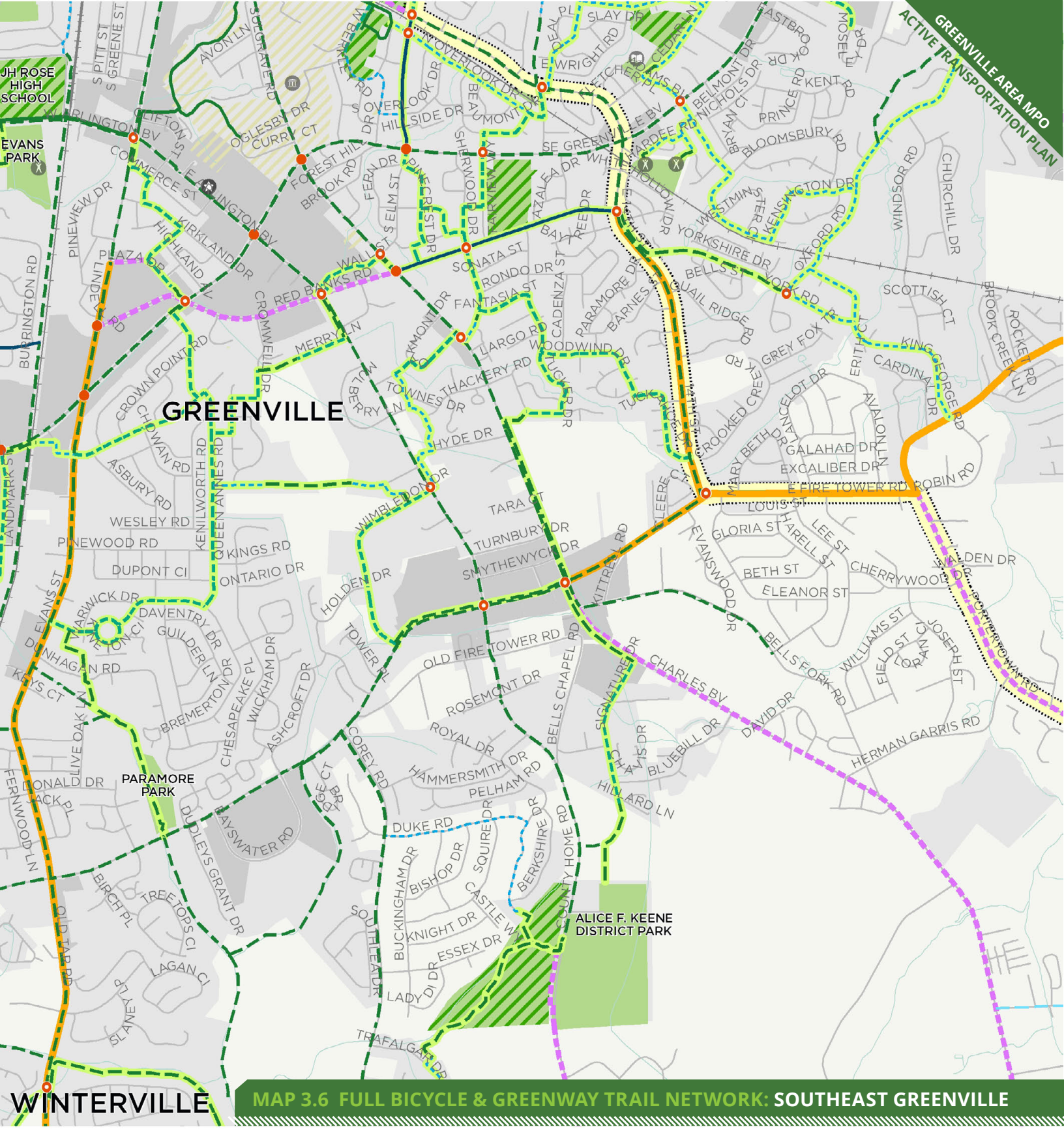
EXISTING
- Shared Use Path
- Bike Lane

PROPOSED
- Crossing Improvement
- In Development
- Shared Use Path
- Buffered Bike Lane
- Neighborhood Bikeway
- **STRATEGIC BIKEWAY NETWORK**

MAJOR CORRIDOR IMPROVEMENTS
- In Development
- Separated Bikeway (and Pedestrian Facilities)

0 0.5 1 Miles

DESTINATIONS & BOUNDARIES
- Playground
- Rec Center
- Stadium
- Bike Shops
- Park
- School
- East Carolina University
- Greenville MPO
- Municipal Boundaries
- Commercial Areas



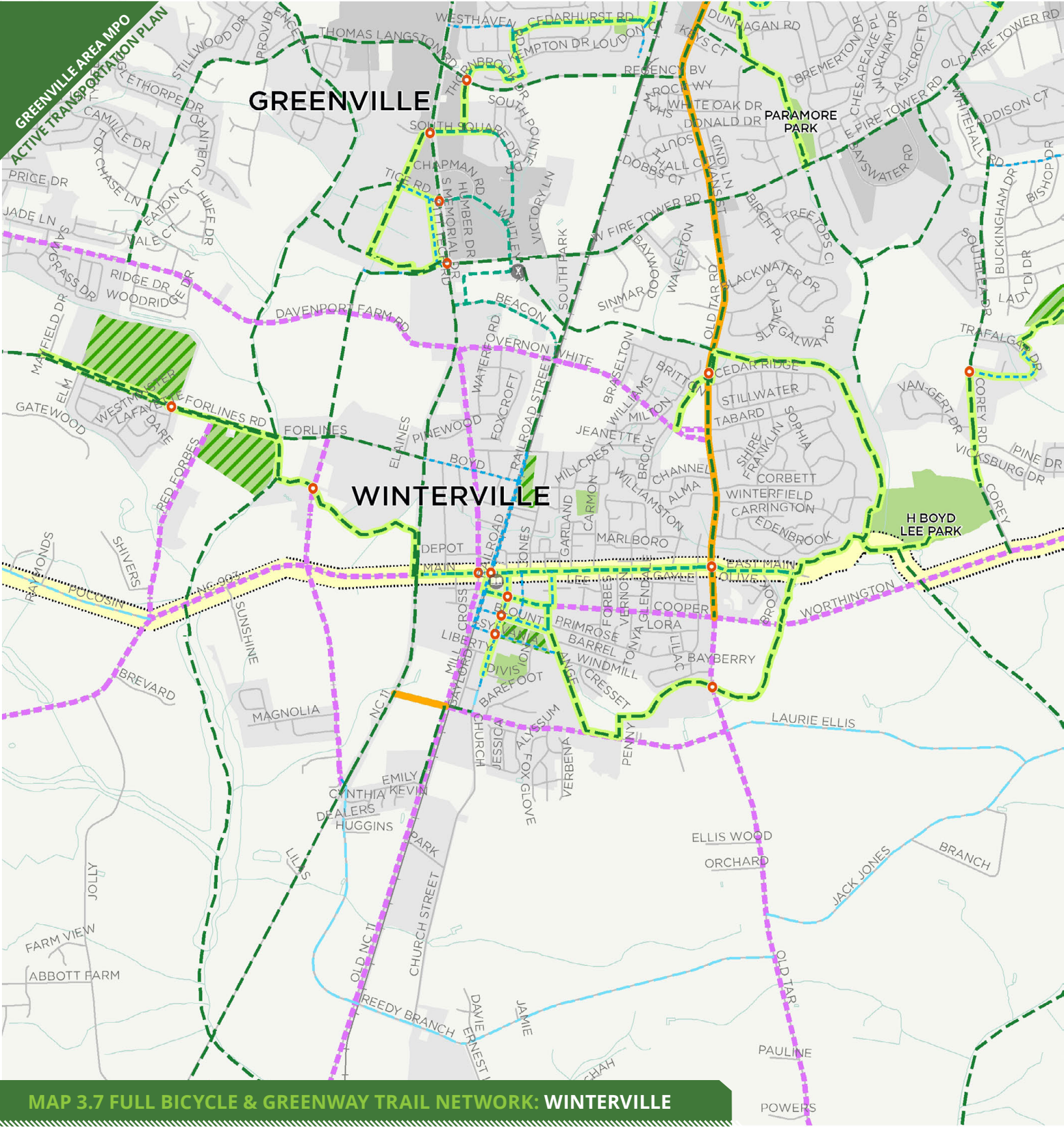
MAP 3.6 FULL BICYCLE & GREENWAY TRAIL NETWORK: SOUTHEAST GREENVILLE

EXISTING
- Shared Use Path
- Bike Lane
- Updated State Bike Route (Unsigned)

PROPOSED
- Crossing Improvement
- In Development
- Shared Use Path
- Buffered Bike Lane
- Neighborhood Bikeway
- Paved Shoulder
- East Coast Greenway
- **STRATEGIC BIKEWAY NETWORK**

MAJOR CORRIDOR IMPROVEMENTS
- In Development
- Separated Bikeway (and Pedestrian Facilities)

DESTINATIONS & BOUNDARIES
- Library
- Rec Center
- Stadium
- Bike Shops
- Park
- School
- East Carolina University
- Greenville MPO
- Municipal Boundaries
- Commercial Areas



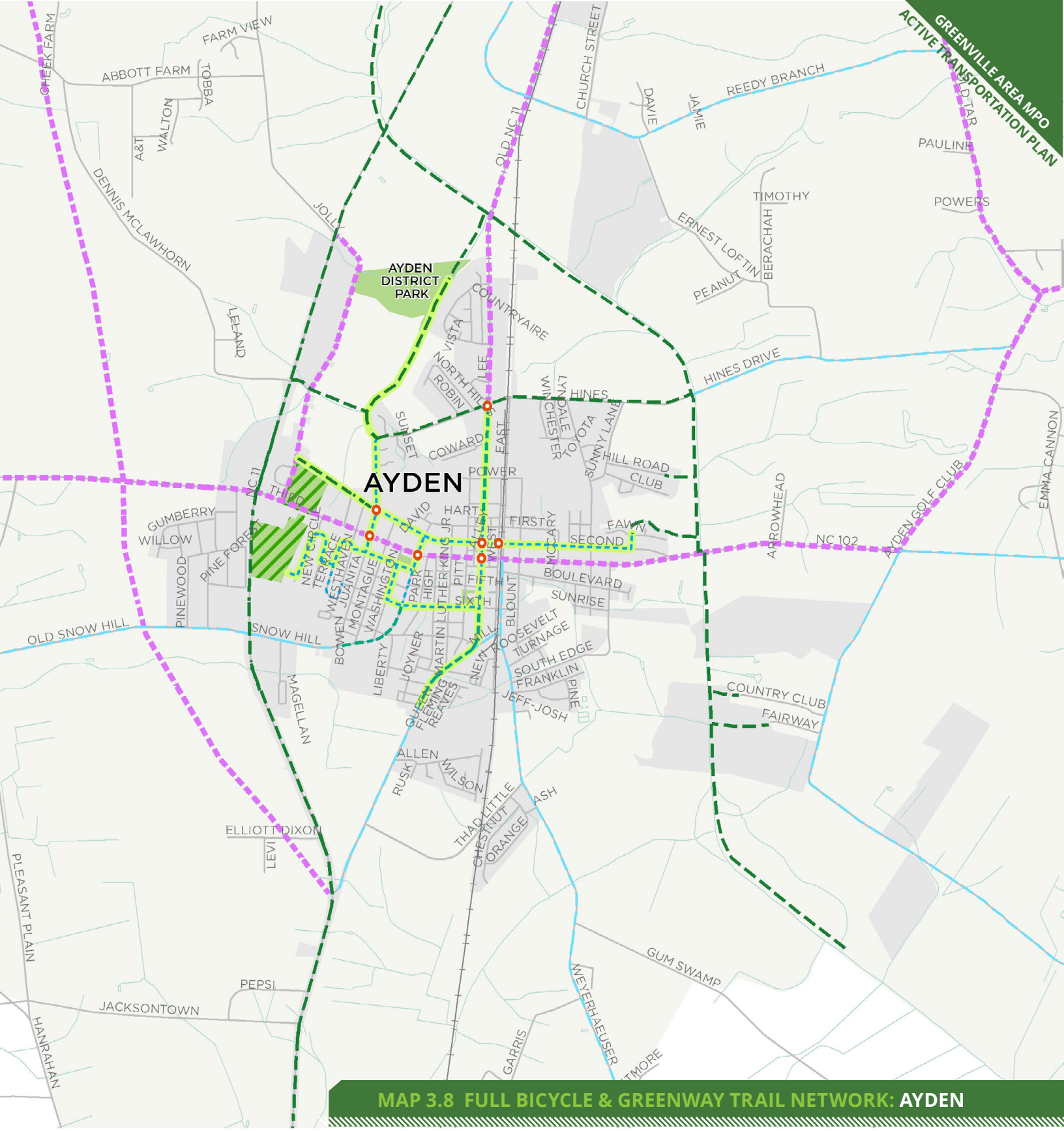
MAP 3.7 FULL BICYCLE & GREENWAY TRAIL NETWORK: WINTERVILLE

EXISTING
- Updated State Bike Route (Unsigned)

PROPOSED
- Crossing Improvement
- Shared Use Path
- Buffered Bike Lane
- Neighborhood Bikeway
- Paved Shoulder
- **STRATEGIC BIKEWAY NETWORK**

MAJOR CORRIDOR IMPROVEMENTS
- In Development
- Separated Bikeway (and Pedestrian Facilities)

DESTINATIONS & BOUNDARIES
- Library
- Rec Center
- Park
- School
- Greenville MPO
- Municipal Boundaries
- Commercial Areas

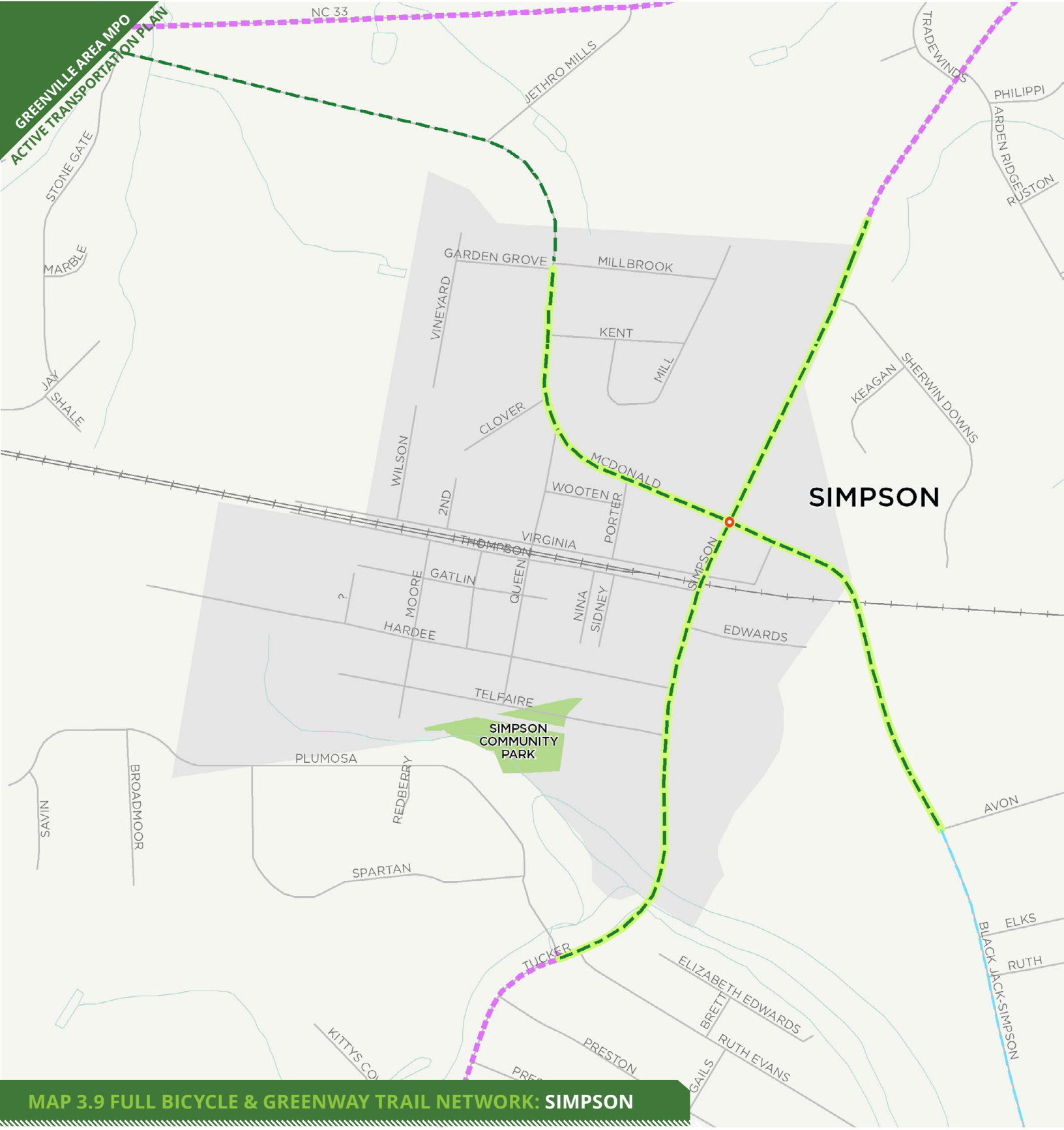


MAP 3.8 FULL BICYCLE & GREENWAY TRAIL NETWORK: AYDEN

PROPOSED
- Crossing Improvement
- Shared Use Path
- Buffered Bike Lane
- Neighborhood Bikeway
- Paved Shoulder
- **STRATEGIC BIKEWAY NETWORK**
- Separated Bikeway (and Pedestrian Facilities)

0 0.5 1 Miles

DESTINATIONS & BOUNDARIES
- Park
- School
- Greenville MPO
- Municipal Boundaries

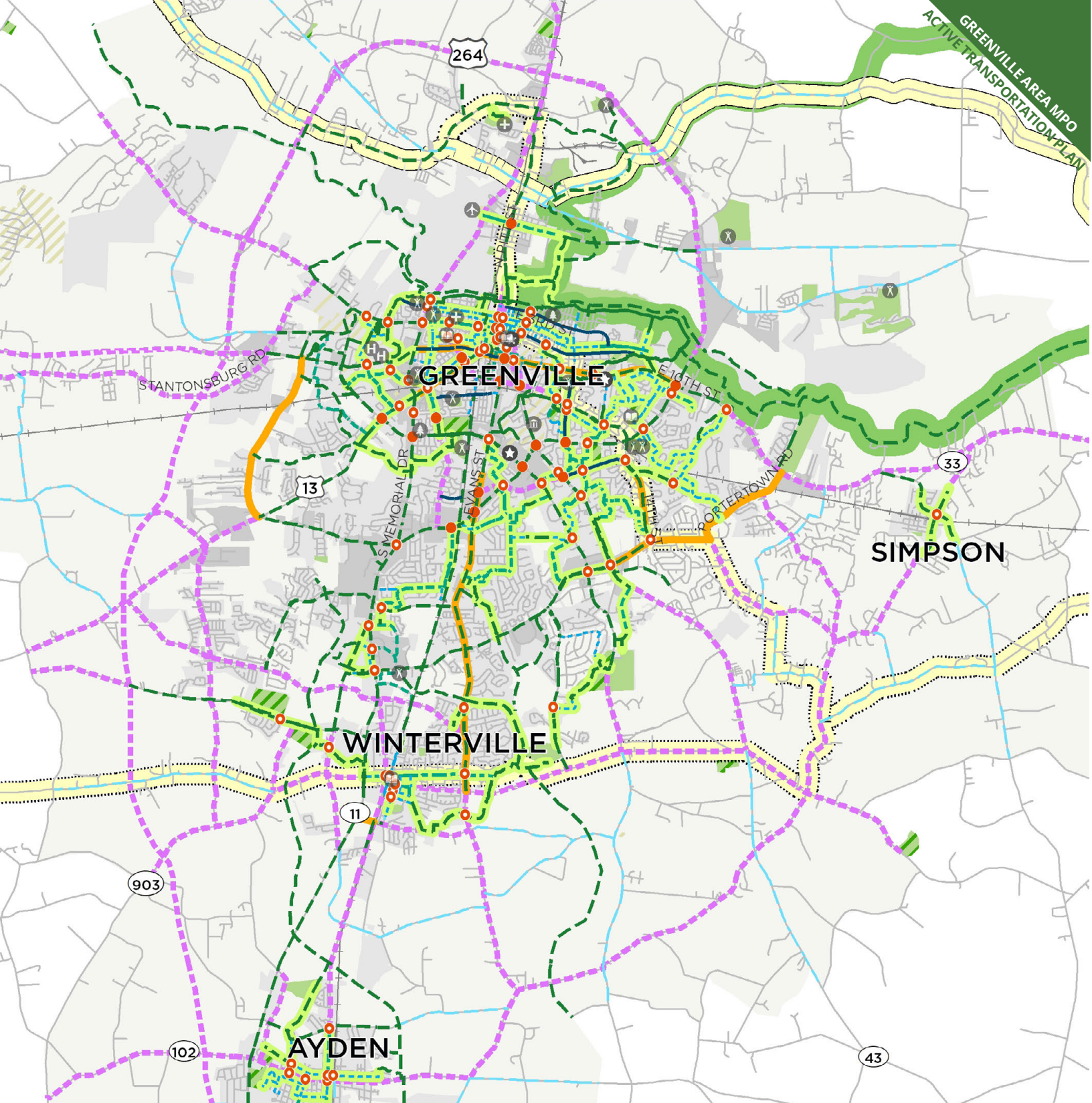


MAP 3.9 FULL BICYCLE & GREENWAY TRAIL NETWORK: SIMPSON

PROPOSED
- Crossing Improvement
- Shared Use Path
- Paved Shoulder
- **STRATEGIC BIKEWAY NETWORK**
- Separated Bikeway (and Pedestrian Facilities)

DESTINATIONS & BOUNDARIES
- Park
- Greenville MPO
- Municipal Boundaries

0 500 1,000 Feet



MAP 3.10 FULL BICYCLE & GREENWAY TRAIL NETWORK: FULL STUDY AREA

EXISTING
- Shared Use Path
- Bike Lane
- State Bike Route
- Updated State Bike Route (Unsigned)

PROPOSED
- Crossing Improvement
- In Development
- Shared Use Path
- Buffered Bike Lane
- Neighborhood Bikeway
- Paved Shoulder
- East Coast Greenway
- STRATEGIC BIKEWAY NETWORK

MAJOR CORRIDOR IMPROVEMENTS
- In Development
- Separated Bikeway (and Pedestrian Facilities)

DESTINATIONS & BOUNDARIES
- Airport
- Community Center
- Hospital
- Library
- Playground
- Rec Center
- Stadium
- Bike Shops
- Park
- School
- East Carolina University
- Greenville MPO
- Municipal Boundaries
- Commercial Areas

0 0.5 1 Miles

4 Pedestrian Network

"I don't walk because there are not a lot of sidewalks and I don't feel safe walking near traffic."

- Public Comment, 2016

Overview

This chapter provides a summary of the key types of pedestrian facilities (including greenway trails) and features a series of maps showing where those facilities are recommended.

Key Inputs

Similar to the development of the proposed bikeway network, the proposed pedestrian network is the result of extensive public input and review of existing conditions. According to the 2016 public comment for this planning process, **about a third (31%) of all respondents do not feel safe walking in the Greater Greenville Area**; about a quater of them (24%) do feel safe, and rest (45%) feel "somewhat safe". This would suggest that there is plenty of room for improvement, especially when combined with other key inputs, such as the **Equity Analysis (Map 2.3), the High Injury Network Analysis (Map 2.4), and the Pedestrian Level of Service Analysis (Map 2.9). These inputs help to form the basis for recommendations in this chapter**, which aims to provide a safe and comfortable experience for pedestrians of all ages and abilities.

Many respondents to the 2016-17 public comment form expressed feeling safest walking along Greenville's greenway trails and along neighborhood streets, far away from roadways with busy traffic. *Above: New bridge along the Greens Mill Run Greenway (Photo by FROGGS)*

Planning the Pedestrian and Greenway Trail Network

The proposed pedestrian network is a result of a collaborative planning process that involved extensive public engagement, data collection, and technical analysis.

Findings from the equity analysis, crash analysis, and level of service analysis provided quantitative data that directly informed the network recommendations. Additionally, more qualitative input from the public and the steering committee helped to inform the project team in developing a recommended network of well-connected, low-stress facilities. The end result is a recommended pedestrian and greenway network that is designed to align with the vision of this plan, creating safe and convenient pedestrian-friendly streets and trails for people of all ages, abilities, and incomes.

BASIS OF PEDESTRIAN RECOMMENDATIONS *(and where to find more information)*

Committee & Public Input

Online Public Input Map & Committee Map Mark-ups (page 30)

Online Public Survey (page 28)

Public Outreach Events and Open Houses (page 22)

+

Connecting Destinations

Uptown District, East Carolina University, County Home Complex, medical centers, shopping centers, parks, schools, and downtown areas in Winterville, Ayden, and Simpson (page 31)

+

Mapping Analysis

Crash Analysis (page 36)

Demographic & Equity Analysis (page 34)

Pedestrian Level of Service (PLOS) Analysis (page 48)

+

Existing Plans & Facilities

2011 Bike/Ped Plan & Other Adopted Plans (page 52)

Existing Pedestrian Facilities (page 44)

+

Existing Routes

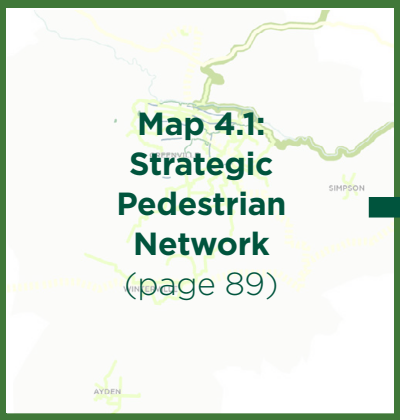
East Coast Greenway (page 39)

State Bike Route 2 (pages 39 and 41)

2013 Bike Map (page 52)

2016 Online Input Map (page 30)

PEDESTRIAN & GREENWAY TRAIL NETWORK MAPS



Map 4.1: Strategic Pedestrian Network (page 89)

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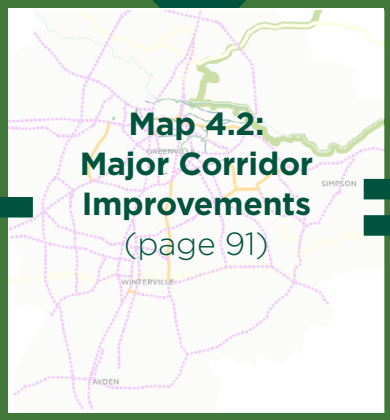

Map 4.2: Major Corridor Improvements (page 91)

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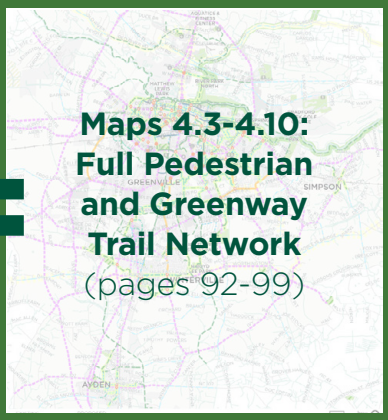


Maps 4.3-4.10: Full Pedestrian and Greenway Trail Network (pages 92-99)

Types of Facilities in the Pedestrian Network Maps

Sidewalks

Sidewalks are the most fundamental element of the walking network, as they provide an area for pedestrian travel separated from vehicle traffic. Providing adequate and accessible facilities can lead to increased numbers of people walking, improved safety, and the creation of social space.

Wide sidewalks in Greenville, NC's Uptown District.

Sidewalk with grass buffer on Hooker Road in Greenville, NC.

DESIGN GUIDELINES:

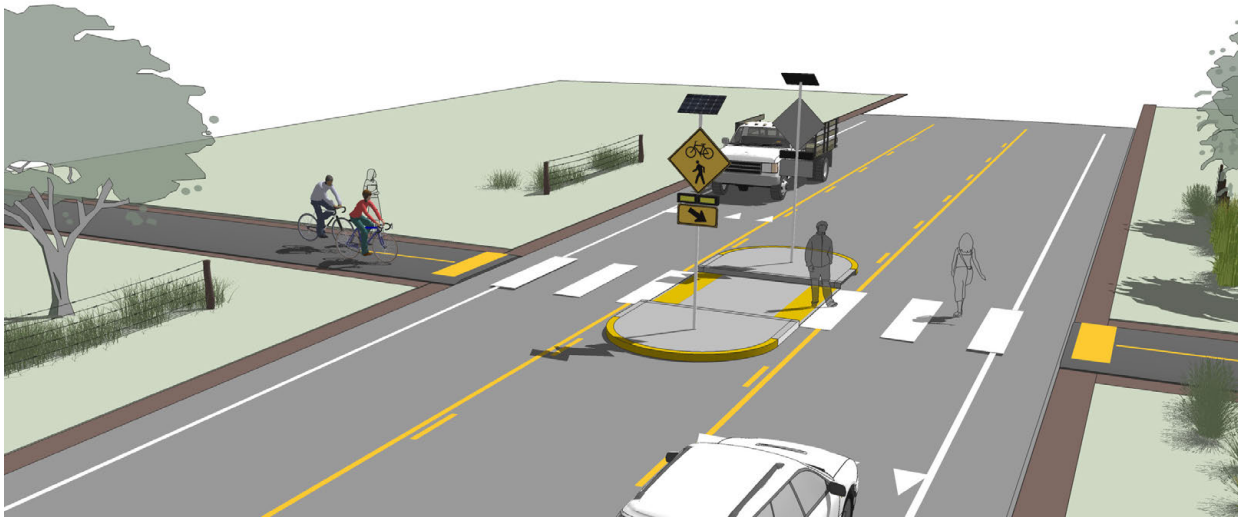
Sidewalk Zones & Widths: Page B-6
Green Infrastructure: Page B-8
Driveways: Page B-10
Access Through Construction Zones: Page B-11
Parklets: Page B-12

Shared Use Paths*

*For an overview of shared use paths, greenway trails, and sidepaths, see pages 68-69.

Pedestrian Intersection Treatments

Sidewalks and shared use paths provide mobility along linear paths. But eventually, people need to cross roads and streets at intersections. These intersections, where the paths of people and vehicles come together, can be the most challenging part of negotiating a pedestrian network. The pedestrian intersection treatments recommended in this plan can be found on the maps that follow, as well in the tables of Appendix C.



Intersection of 14 St & Fleming St, with crosswalks, curb ramps, and countdown signals.

Intersection of Cotanche St and Reade Cir, with brick crosswalks.

DESIGN GUIDELINES:

Accessible Curb Ramps: Page B-14
Curb Extensions: Page B-15
Median Refuge Island: Page B-16
Pedestrian Signal Strategies: Page B-17
Active Enhanced Trail Crossing: Page B-78
Route Users to Signalized Crossing: Page B-79
Grade-Separated Crossings: Page B-80

Recommended Crossing Improvements

Many intersections in the Greater Greenville Area lack even basic crossing features, such as crosswalks, curb ramps, and pedestrian countdown signals. **These crossing locations are identified in the recommendations maps that follow (Maps 4.1-4.10).** At each of these locations, at least one curb ramp or marked crosswalk is missing and should be improved to meet ADA accessibility standards. Priority intersection improvements are highlighted in the priority project cutsheets. For a complete list of crossing improvement needs, please see Appendix C. In order to meet the goals of this plan, it is critical that standard crossing facilities are incorporated into each crossing location for future roadway projects.

KEY COMPONENTS OF INTERSECTION DESIGN

These attributes will vary with context but should be considered in all design processes.

- *CLEAR SPACE: Corners should be clear of obstructions. They should also have enough room for curb ramps, for transit stops where appropriate, and for street conversations where pedestrians might congregate.*
- *VISIBILITY: It is critical that pedestrians on the corner have a good view of vehicle travel lanes and that motorists in the travel lanes can easily see waiting pedestrians.*
- *LEGIBILITY: Symbols, markings, and signs used at corners should clearly indicate what actions the pedestrian should take.*
- *ACCESSIBILITY: All corner features, such as curb ramps, landings, call buttons, signs, symbols, markings, and textures, should meet accessibility standards and follow universal design principles.*
- *SEPARATION FROM TRAFFIC: Corner design and construction should be effective in discouraging turning vehicles from driving over the pedestrian area. Crossing distances should be minimized.*
- *LIGHTING: Adequate lighting is an important aspect of visibility, legibility, and accessibility (pages 128-129).*

Sidewalk and Greenway Trail Network Maps

The Strategic Pedestrian Network

Design of the Strategic Pedestrian Network faces similar challenges as that of the Strategic Bicycle Network. Pedestrian friendly areas such as neighborhoods and uptown Greenville are separated by high-speed, high traffic volume "barrier" roadways. Many of these roadways have existing sidewalks, but due to lack of or limited buffer space, a lack of driveway access management, and high traffic volumes and speeds, some existing sidewalks still offer a low level of service to pedestrians. Examples include sidewalks along Greenville Blvd, Arlington Blvd, and Memorial Dr.

The Strategic Pedestrian Network builds upon the extensive existing network of sidewalks. There are over 160 miles of existing sidewalks in the study area, found in the downtown area of each community, in many neighborhoods, and along more recently (re)constructed major roadways.

Map 4.1 on the following page shows an overview of this network (highlighted in lime green), which has the following key features:

- Connects to the existing greenway network and existing extensive sidewalk network
- Connects key destinations
- Improves pedestrian conditions along barrier roadway corridors that carry high automobile traffic volumes and speeds
- Highlights strategic crossings of major roadway corridors
- Proposes short sections of shared use paths to make key links where necessary
- Complements the ongoing process of improvements to major corridors (see pages 90-91) that presently only minimally accommodate pedestrians (and that do not accommodate bicyclists).

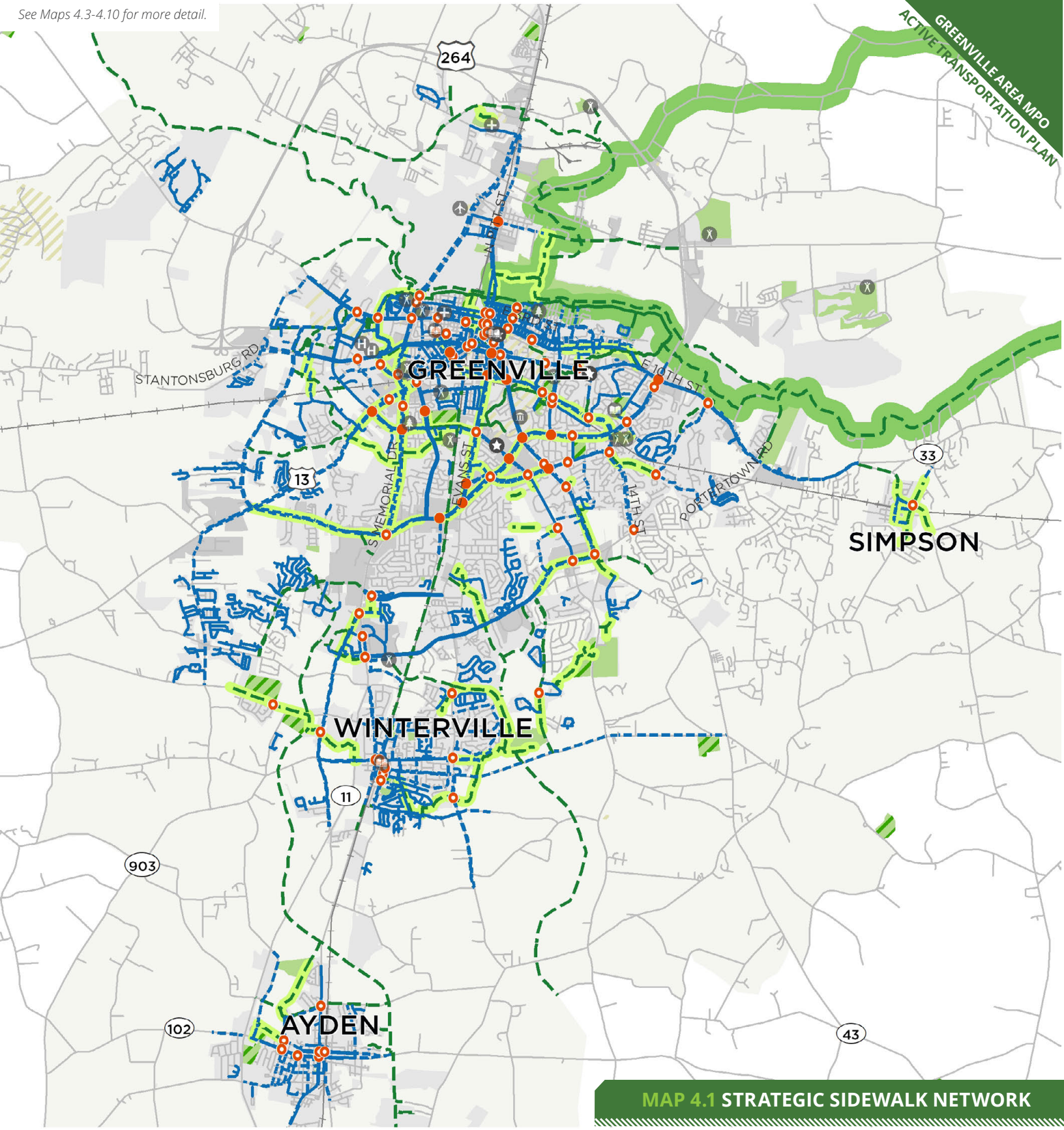
FEATURED FACILITY TYPES IN MAP 4.1 STRATEGIC PEDESTRIAN NETWORK:

Sidewalks

Shared Use Paths

Crossing Improvements

See Maps 4.3-4.10 for more detail.



MAP 4.1 STRATEGIC SIDEWALK NETWORK

EXISTING
- Sidewalk
- Shared Use Path

PROPOSED
- Crossing Improvement
- In Development
- Sidewalk
- Shared Use Path
- East Coast Greenway
- STRATEGIC PEDESTRIAN NETWORK

DESTINATIONS & BOUNDARIES
- Airport
- Community Center
- Hospital
- Library
- Playground
- Rec Center
- Stadium
- Bike Shops
- Park
- School
- East Carolina University
- Greenville MPO
- Municipal Boundaries
- Commercial Areas

0 0.5 1 Miles

Major Corridor Improvements*

The text on this page is repeated from the previous chapter, as this section applies to both the bicycle and pedestrian networks. *Likewise, the Major Corridor Improvments shown on Map 4.2 are identical to those on Map 3.2, the main difference being that Map 4.2 shows these corridors as they relate to the pedestrian network, rather than the bicycle network.*

Much of the analysis in Chapter Two revealed that **major corridors throughout the study area are serving as barriers to safe movement and community-wide connectivity for bicyclists and pedestrians**. Many people reported being able to bike and walk comfortable on neighborhood streets and greenways, while feeling unsafe walking along or crossing major corridors. Unfortunately, many of these corridors cannot be made bicycle-friendly by the simple addition of a standard bicycle lane with no buffer. More substantial improvements are needed that will require additional roadway width, meaning significant changes to the overall corridor.

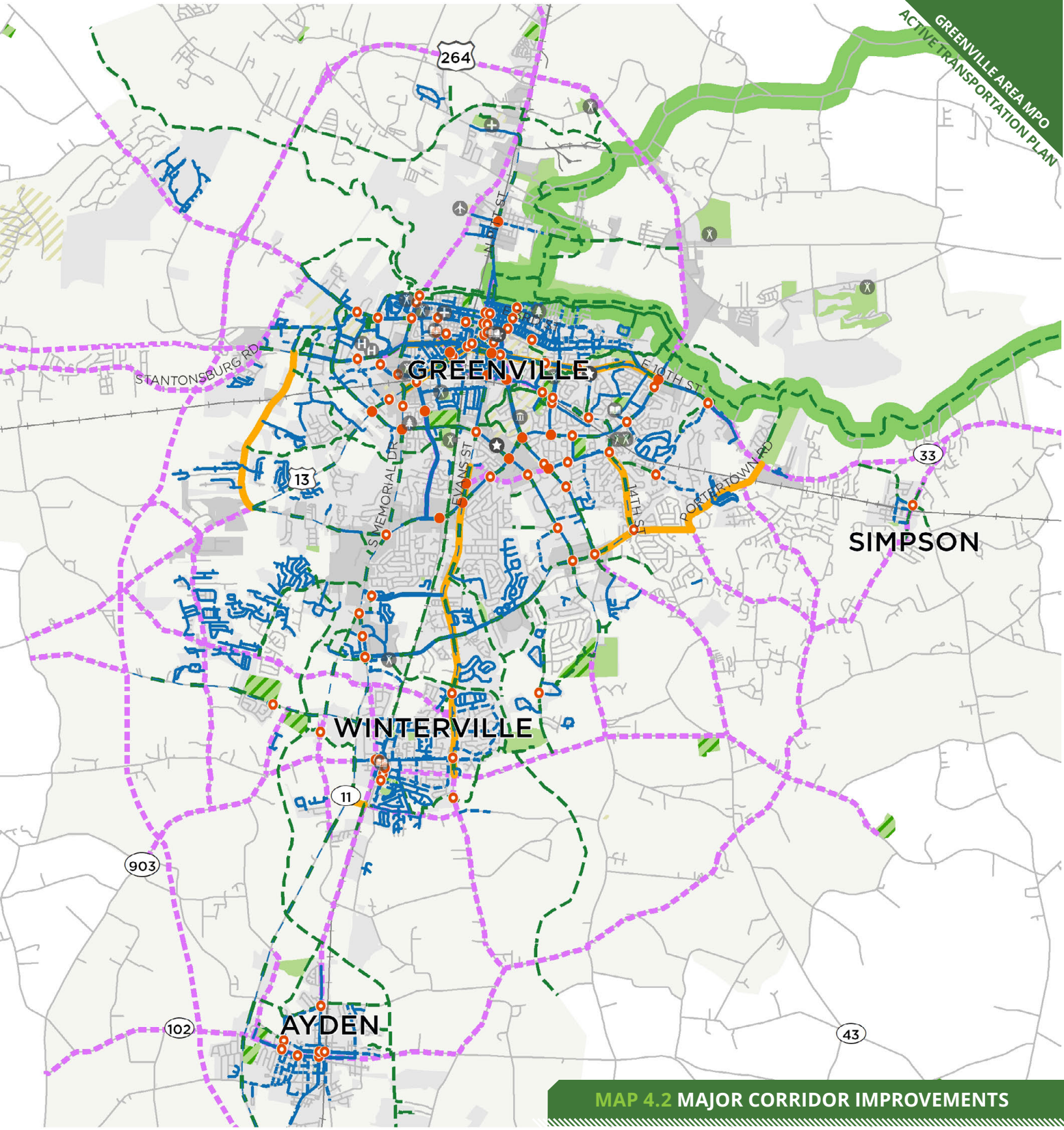
Map 4.2 identifies the major corridors that are in need of such improvements. In order to make the most cost-effective investments in the overall transportation network, this plan recommends that as these major corridors are planned for widening, resurfacing, and/or reconstruction, they should by redesigned as "complete streets". NCDOT's *Complete Streets Policy* defines Complete Streets as *"North Carolina's approach to interdependent, multi-modal transportation networks that safely accommodate access and travel for all users."*

Implementing Complete Streets along roadway corridors originally designed for automobiles will require full redesign, involving driveway consolidation and reduction, landscaping, intersection improvements, possible lane reconfigurations, enhanced bus stops and transit facilities, and physical separation for bicyclists and pedestrians from automobile traffic. Full corridor studies are needed to address these issues during (or in advance of) the desgn phase. **This plan lays the groundwork for these future projects by identifying and recommending these corridors for future redesign, to include separated bikeways and pedestrian facilities with physical separation from motor vehicle traffic.** The type of physical separation will depend on the context of the corridor. A comprehensive design guide and list of design resources are provided in Appendix B.

At the time of this writing, several major roadway corridors were at various stages of the reconstruction process (in orange on Map 4.2):

- Evans St/Old Tar Rd widening - Greenville Blvd in Greenville to Worthington Rd in Winterville
- 10th St Connector - 10th St extension from Evans St to Stantonsburg Rd.
- 10th St Corridor Study - 10th St from Evans St to Greenville Blvd
- Allen Rd widening - Stantonsburg Rd to Dickinson Ave
- Fire Tower Rd/Portertown Rd widening - Charles Blvd to NC 33
- 14th St improvements - Fire Tower Rd to Red Banks Rd
- Dickinson Ave improvements - Reade Cir to Memorial Dr
- Laurie Ellis Rd extension - from the existing western terminus at Mill St to NC 11

While the projects above will be completed at various points over the next 10 years, the next generation of major roadway improvement projects should be required to include separated bikeways and pedestrian facilities appropriate for people of all ages and abilities (in pink dash on Map 4.2).



MAP 4.2 MAJOR CORRIDOR IMPROVEMENTS

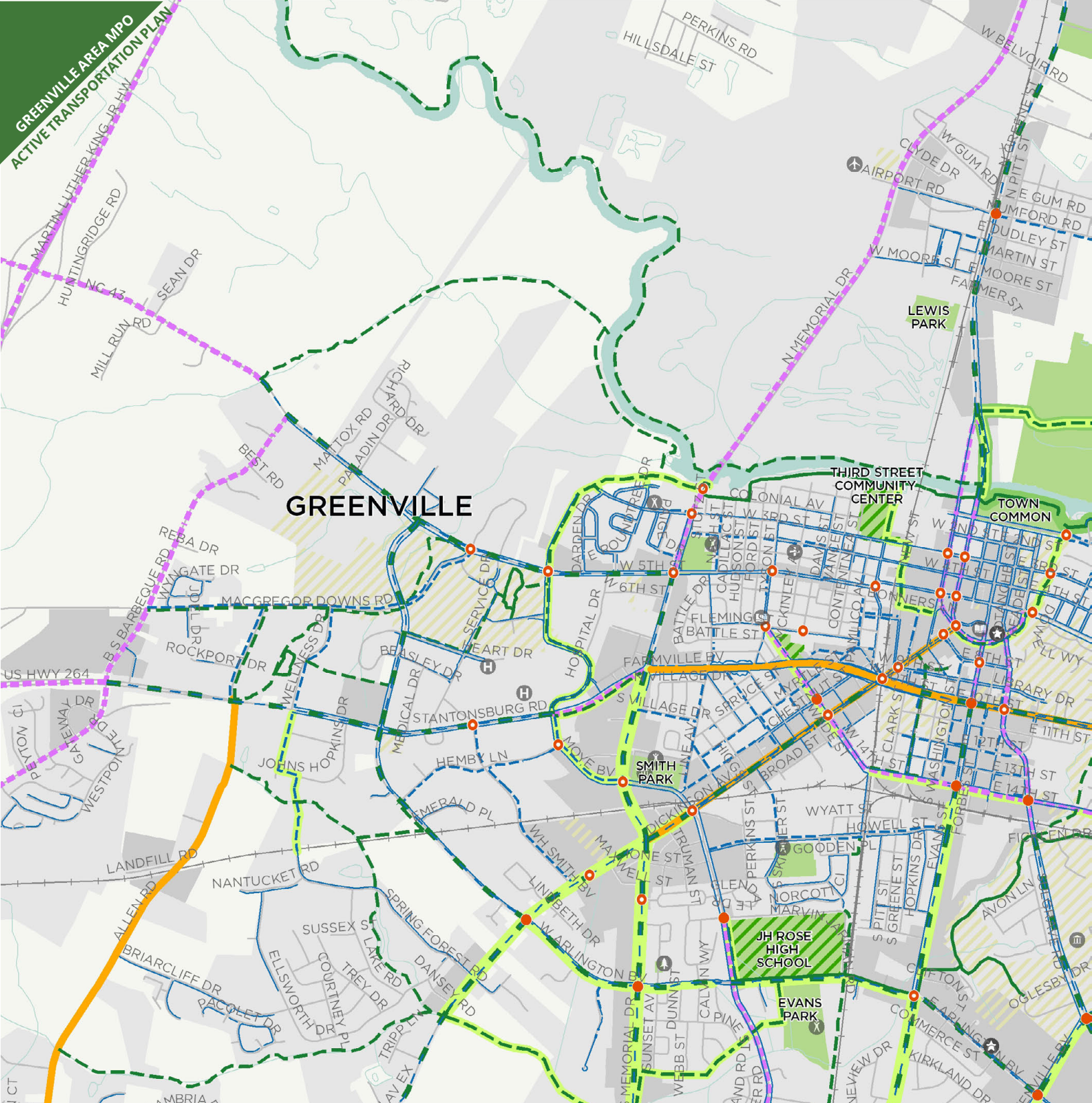
EXISTING
- Sidewalk
- Shared Use Path

PROPOSED
- Crossing Improvement
- In Development
- Sidewalk
- Shared Use Path
- Sidepath and Sidewalk
- East Coast Greenway

MAJOR CORRIDOR IMPROVEMENTS
- In Development
- Separated Bikeway (and Pedestrian Facilities)

DESTINATIONS & BOUNDARIES
- Airport
- Community Center
- Hospital
- Library
- Playground
- Rec Center
- Stadium
- Bike Shops
- Park
- School
- East Carolina University
- Greenville MPO
- Municipal Boundaries
- Commercial Areas

0 0.5 1 Miles



MAP 4.3 FULL SIDEWALK & GREENWAY TRAIL NETWORK: NORTHWEST GREENVILLE

EXISTING
- Sidewalk
- Shared Use Path

PROPOSED
- Crossing Improvement
- In Development
- Sidewalk
- Shared Use Path
- Sidepath and Sidewalk
- East Coast Greenway
- **STRATEGIC PEDESTRIAN NETWORK**

MAJOR CORRIDOR IMPROVEMENTS
- In Development
- Separated Bikeway (and Pedestrian Facilities)

0 0.5 1 Miles

DESTINATIONS & BOUNDARIES
- Airport
- Community Center
- Hospital
- Library
- Playground
- Rec Center
- Stadium
- Bike Shops
- Park
- School
- East Carolina University
- Greenville MPO
- Municipal Boundaries
- Commercial Areas

MAP 4.4 FULL SIDEWALK & GREENWAY TRAIL NETWORK: NORTHEAST GREENVILLE

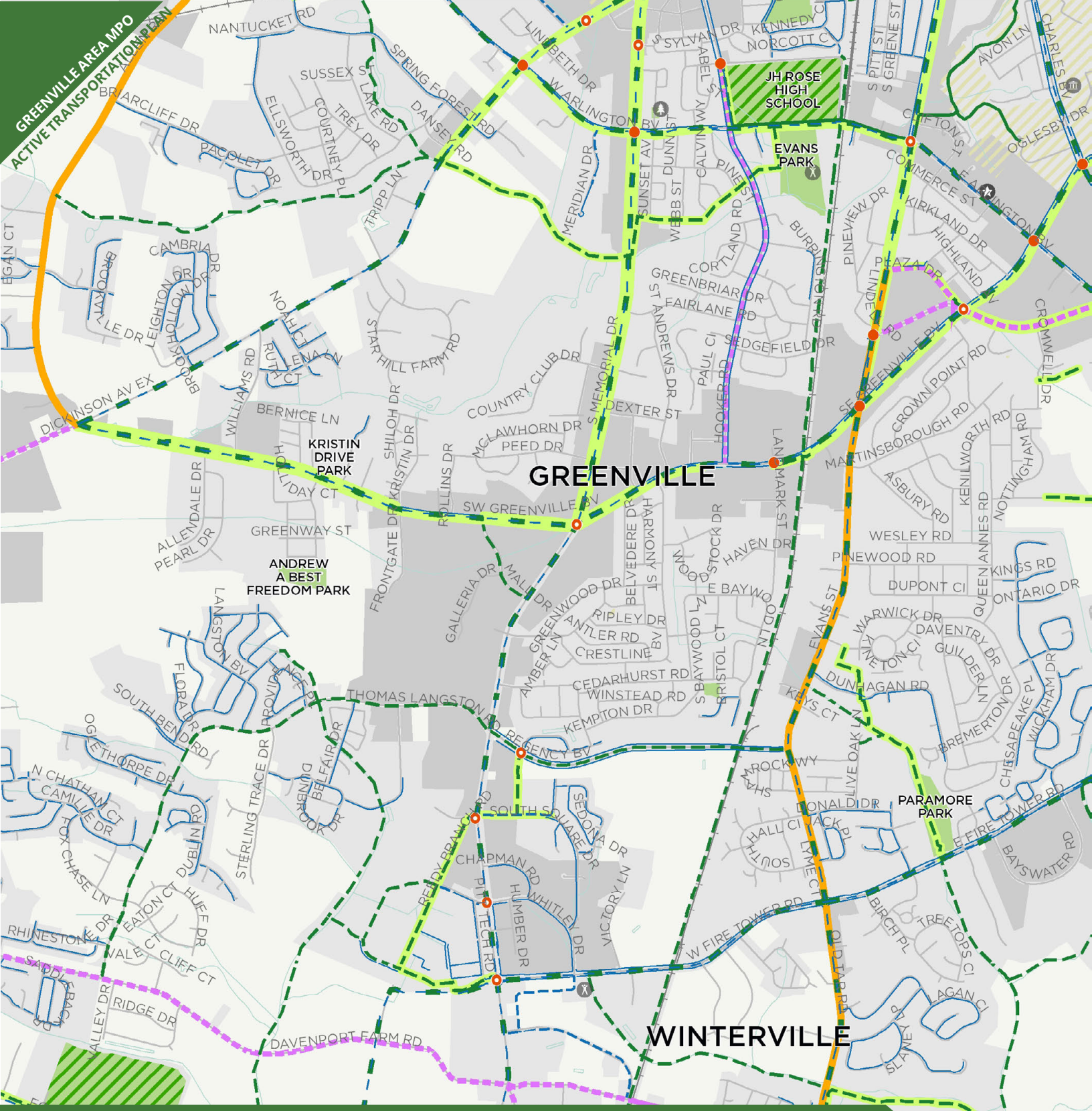
EXISTING
- Sidewalk
- Shared Use Path

PROPOSED
- Crossing Improvement
- In Development
- Sidewalk
- Shared Use Path
- Sidepath and Sidewalk
- East Coast Greenway
- **STRATEGIC PEDESTRIAN NETWORK**

MAJOR CORRIDOR IMPROVEMENTS
- In Development
- Separated Bikeway (and Pedestrian Facilities)

0 0.5 1 Miles

DESTINATIONS & BOUNDARIES
- Airport
- Community Center
- Hospital
- Library
- Playground
- Rec Center
- Stadium
- Bike Shops
- Park
- School
- East Carolina University
- Greenville MPO
- Municipal Boundaries
- Commercial Areas



MAP 4.5 FULL SIDEWALK & GREENWAY TRAIL NETWORK: SOUTHWEST GREENVILLE

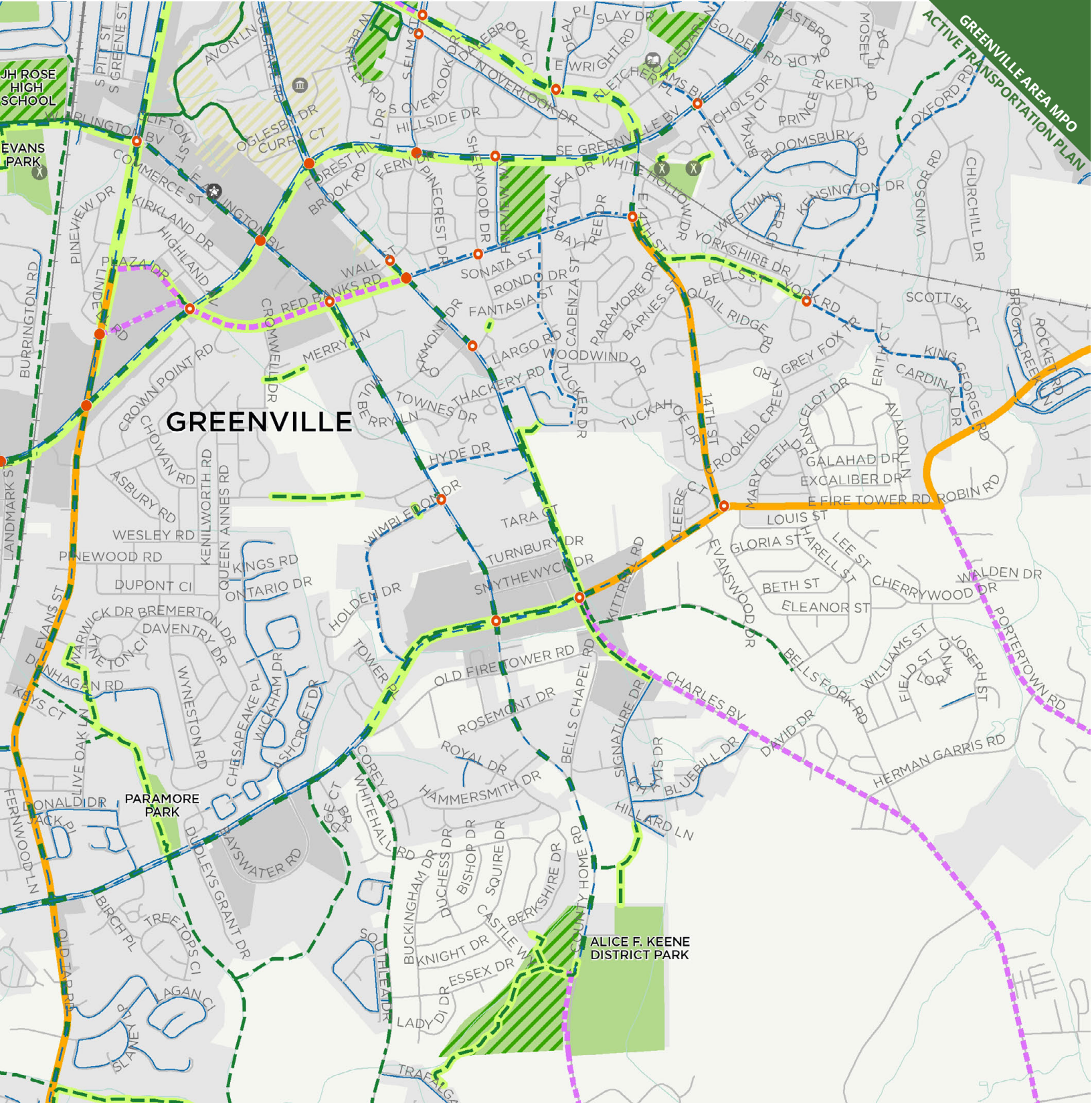
EXISTING
- Sidewalk
- Shared Use Path

PROPOSED
- Crossing Improvement
- In Development
- Sidewalk
- Shared Use Path
- Sidepath and Sidewalk
- STRATEGIC PEDESTRIAN NETWORK

MAJOR CORRIDOR IMPROVEMENTS
- In Development
- Separated Bikeway (and Pedestrian Facilities)

0 0.5 1 Miles

DESTINATIONS & BOUNDARIES
- Playground
- Rec Center
- Stadium
- Bike Shops
- Park
- School
- East Carolina University
- Greenville MPO
- Municipal Boundaries
- Commercial Areas



MAP 4.6 FULL SIDEWALK & GREENWAY TRAIL NETWORK: SOUTHEAST GREENVILLE

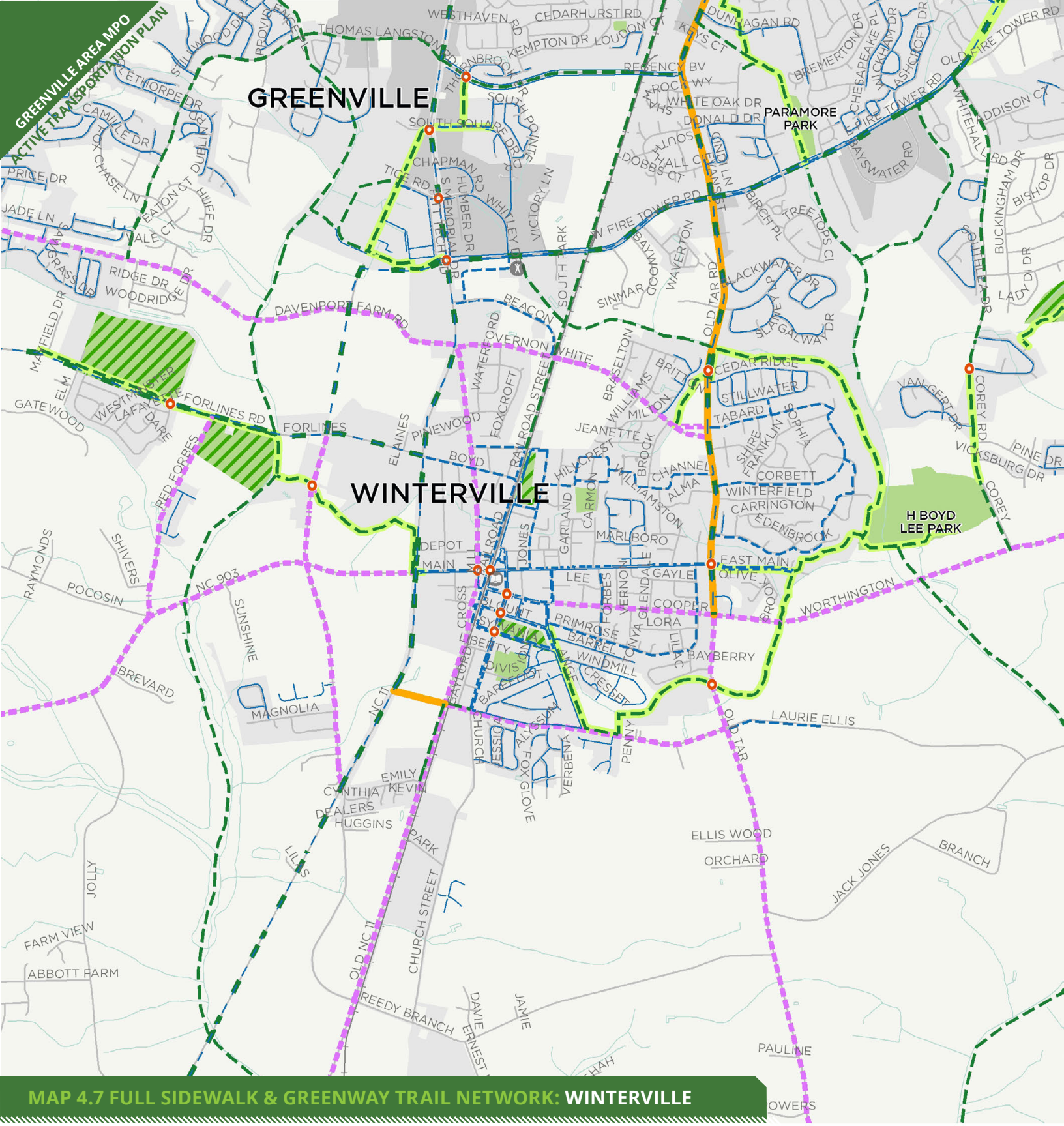
EXISTING
- Sidewalk
- Shared Use Path

PROPOSED
- Crossing Improvement
- In Development
- Sidewalk
- Shared Use Path
- Sidepath and Sidewalk
- East Coast Greenway
- **STRATEGIC PEDESTRIAN NETWORK**

MAJOR CORRIDOR IMPROVEMENTS
- In Development
- Separated Bikeway (and Pedestrian Facilities)

0 0.5 1 Miles

DESTINATIONS & BOUNDARIES
- Library
- Rec Center
- Stadium
- Bike Shops
- Park
- School
- East Carolina University
- Greenville MPO
- Municipal Boundaries
- Commercial Areas



MAP 4.7 FULL SIDEWALK & GREENWAY TRAIL NETWORK: WINTERVILLE

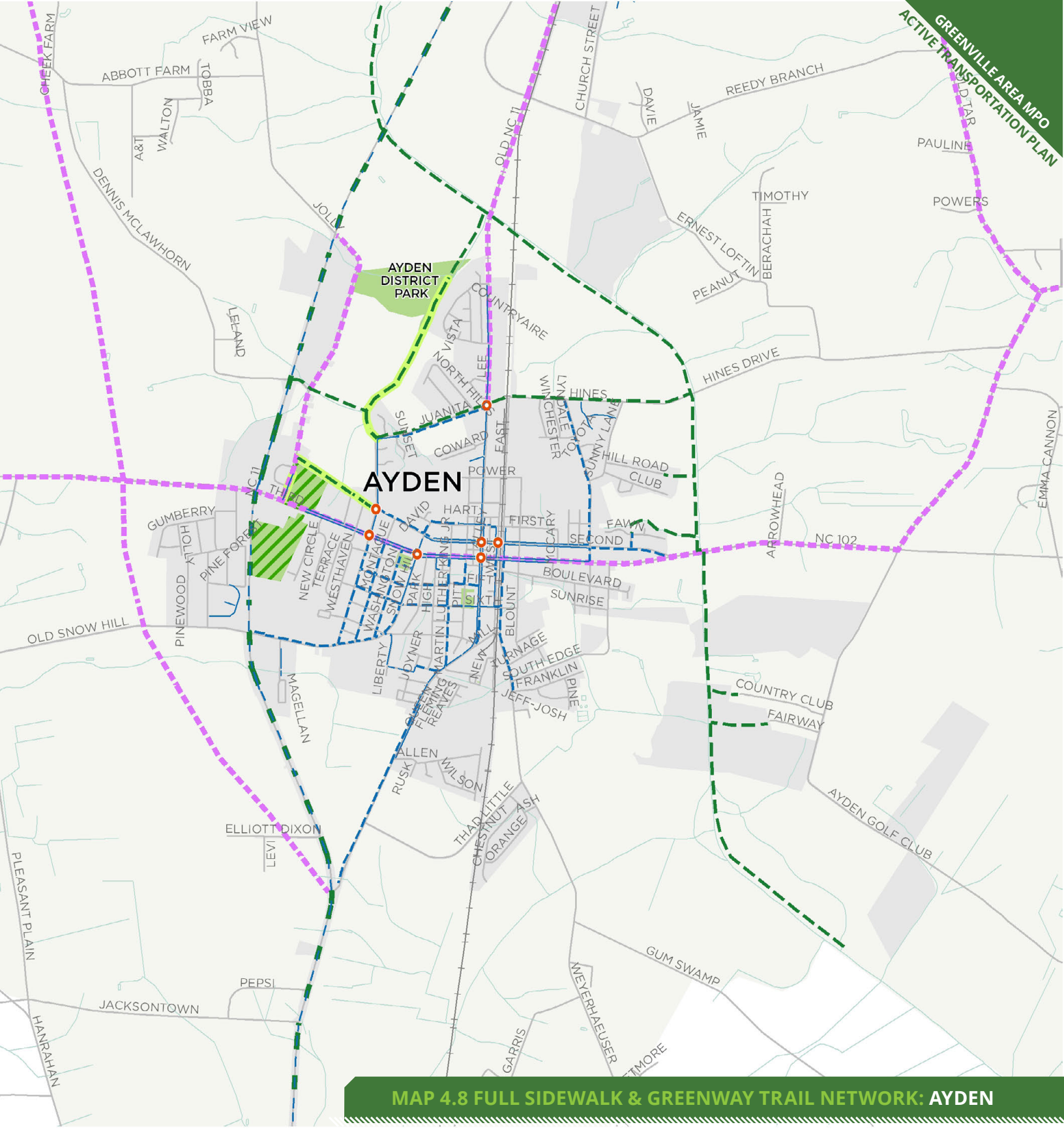
EXISTING
- Sidewalk

PROPOSED
- Crossing Improvement
- Sidewalk
- Shared Use Path
- Sidepath and Sidewalk
- STRATEGIC PEDESTRIAN NETWORK

MAJOR CORRIDOR IMPROVEMENTS
- In Development
- Separated Bikeway (and Pedestrian Facilities)

0 0.5 1 Miles

DESTINATIONS & BOUNDARIES
- Library
- Rec Center
- Park
- School
- Greenville MPO
- Municipal Boundaries
- Commercial Areas



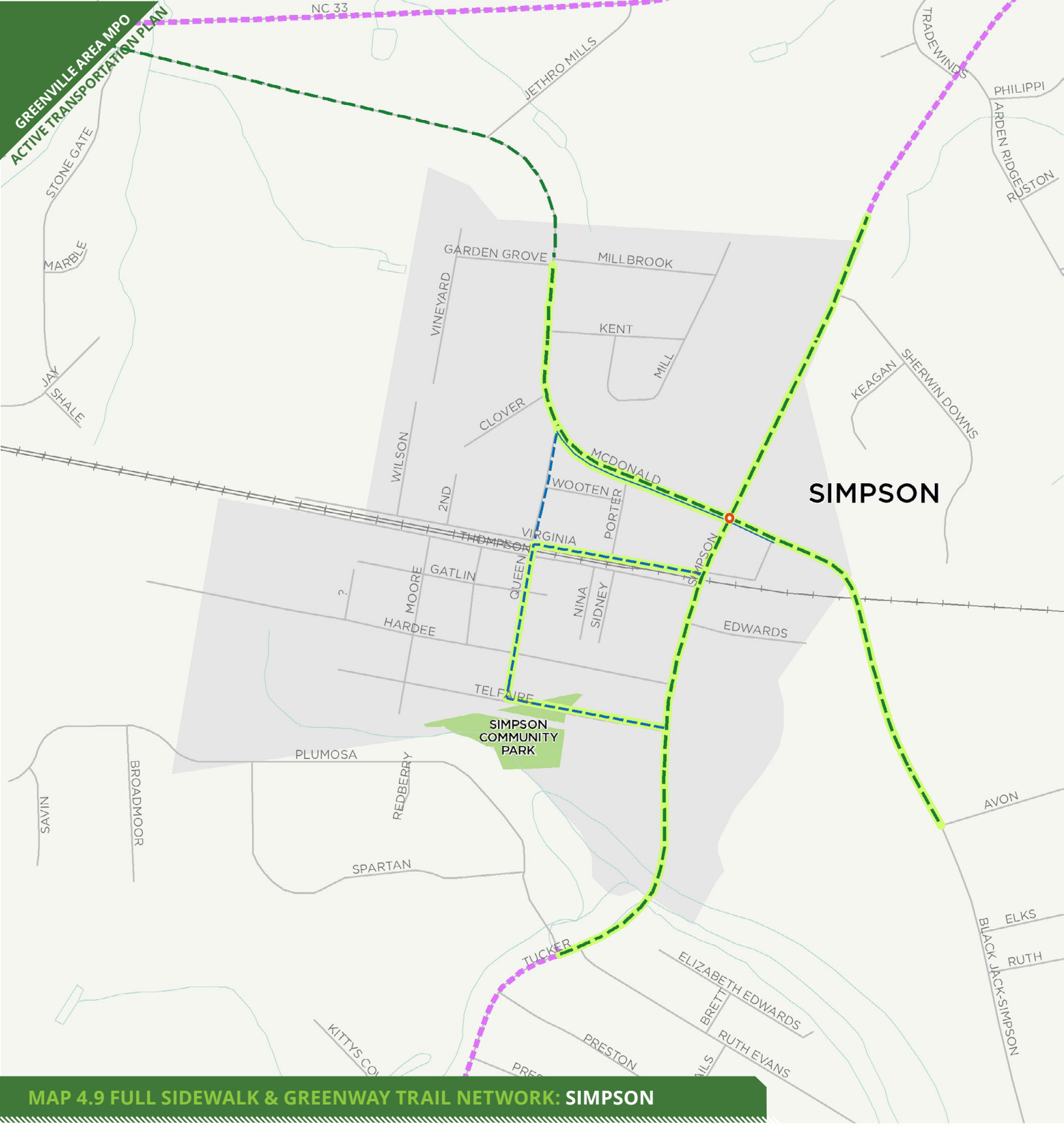
MAP 4.8 FULL SIDEWALK & GREENWAY TRAIL NETWORK: AYDEN

EXISTING
- Sidewalk

PROPOSED
- Crossing Improvement
- Sidewalk
- Shared Use Path
- Sidepath and Sidewalk
- STRATEGIC PEDESTRIAN NETWORK
- Separated Bikeway (and Pedestrian Facilities)

0 0.5 1 Miles

DESTINATIONS & BOUNDARIES
- Park
- School
- Greenville MPO
- Municipal Boundaries



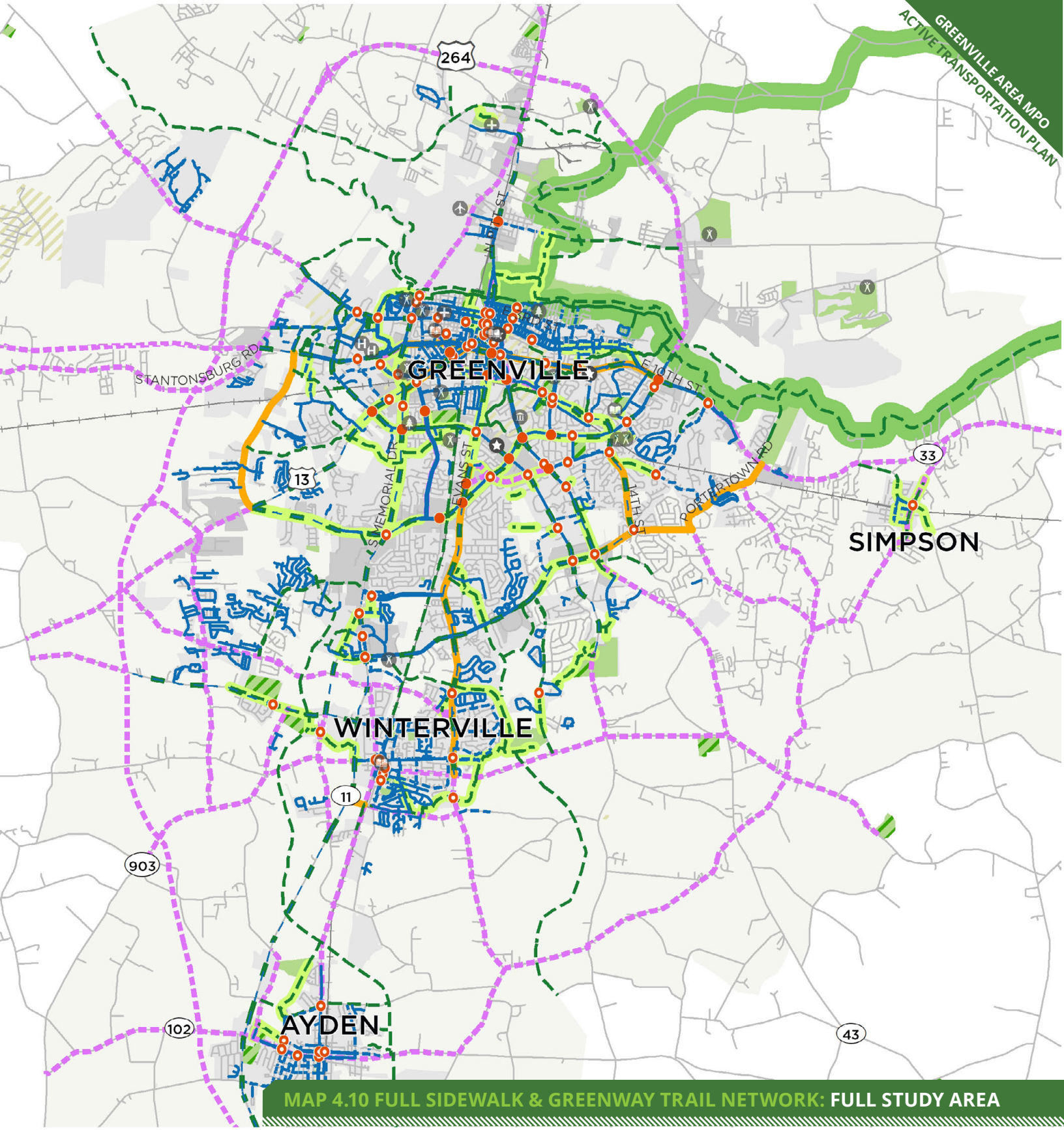
MAP 4.9 FULL SIDEWALK & GREENWAY TRAIL NETWORK: SIMPSON

EXISTING
- Sidewalk

PROPOSED
- Crossing Improvement
- Sidewalk
- Shared Use Path
- **STRATEGIC PEDESTRIAN NETWORK**
- Separated Bikeway (and Pedestrian Facilities)

DESTINATIONS & BOUNDARIES
- Park
- Greenville MPO
- Municipal Boundaries

0 500 1,000 Feet



MAP 4.10 FULL SIDEWALK & GREENWAY TRAIL NETWORK: FULL STUDY AREA

EXISTING
- Sidewalk
- Shared Use Path

PROPOSED
- Crossing Improvement
- In Development
- Sidewalk
- Shared Use Path
- Sidepath and Sidewalk
- East Coast Greenway
- STRATEGIC PEDESTRIAN NETWORK

MAJOR CORRIDOR IMPROVEMENTS
- In Development
- Separated Bikeway (and Pedestrian Facilities)

DESTINATIONS & BOUNDARIES
- Airport
- Community Center
- Hospital
- Library
- Playground
- Rec Center
- Stadium
- Bike Shops
- Park
- School
- East Carolina University
- Greenville MPO
- Municipal Boundaries
- Commercial Areas

0 0.5 1 Miles

5 Priority Projects

"It is most important to find a way to link and connect all our neighborhoods."

- Public Comment, 2016

Overview

This chapter features detailed information on 28 potential projects. These were selected through a combination of prioritization factors and each project's potential to create a connected network.

This plan is designed as a long-term visionary document that provides a framework for the Greater Greenville Area to continue moving forward with active transportation and greenway trail development. To that end, the plan identifies a strategic network of 28 projects as a way of prioritizing the overall system. The order of actual project development will vary depending upon available local, state, and federal funding, and on development opportunities with other NCDOT projects (see Chapter 7 for more on project development). Still, in order to make informed decisions about project development, detail is provided for each of the priority facility segments in the pages that follow.

Prioritization Process

The main factors used for prioritization were based upon the criteria developed in the original 2011 Bicycle and Pedestrian Plan, and were updated for this planning process, **based on Steering Committee input and on updated input from the 1,000+ public comments received in 2016-17.** The full set of criteria used, and the weights assigned to each are listed on the following page.

The key steps in selecting projects included:

1. Dividing the proposed facilities in Chapters 3 & 4 into segments based on logical end-points such as existing facilities, major intersections, and key destinations;
2. Scoring and ranking the segments according to criteria on the following page; and,
3. Creating a logical and connected network of priorities out of the top projects.

Steering committee members ranked the factors used for prioritization during committee meeting #3, and then provided initial feedback on draft cutsheets in committee meeting #4.

Above: Steering Committee Meeting #4 in February 2017.

RANKED & WEIGHTED PRIORITIZATION CRITERIA

CRITERIA	WEIGHT
Improves Access to a Park or Recreation Center	5
Improves Access to an Existing or Funded Trail	5
Improves Access to a School	5
Improves Access to ECU	4
Serves Area with Bike/Ped Accidents	4
Improves Access to Uptown Greenville	4
Serves Area Identified in 2016 Public Input Map/Comment Form	4
Improves Access to Medical Center	4
Serves Area Identified in the Equity Analysis	4
Improves Access to Higher Density Residential Areas	4
Improves Access to Major Shopping Centers	4
Priority Project from 2011 Plan	3

Project Cut-Sheets

The following pages offer detailed information on each of the priority projects, including individual project maps. These sheets were designed based on the types of information required by potential funding partners, and feature the following information:

- Project length
- Facility Types
- Jurisdiction
- Trip Generators
- Previous Planning
- ROW needs
- Permitting needs
- Partnerships
- Traffic Volumes (AADTs)
- Projected Future Traffic Volumes
- Estimated Construction Costs
- Estimated Land Acquisition Costs
- Annotated Map of Project Corridor

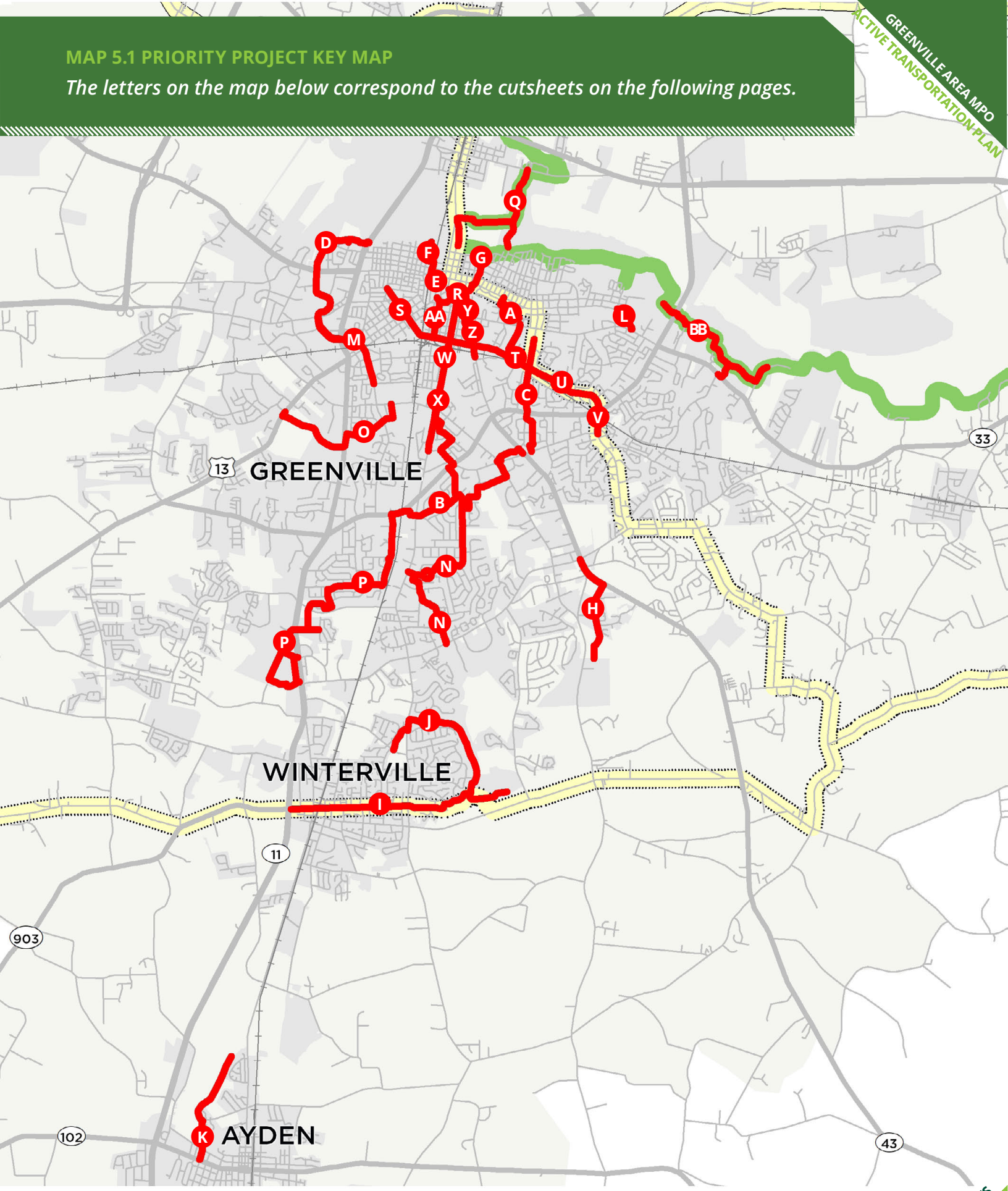
How to Use the Estimated Costs on the Following Pages:

When reviewing the the estimated costs in the following cut sheets, please take into account the following important notes and caveats:

- The cost estimates represent a planning-level of analysis and will likely change as more information becomes available in the design phase.
- Costs are listed in the base year of 2017, and should be escalated at a rate of 5% each year thereafter.
- Design costs can range between 10-15% of construction costs. Higher ranges will be encountered on projects utilizing federal funds that require a high level of regulatory compliance and on projects that impact FEMA regulated floodways that require detailed flood modeling and permitting. Small projects will also see higher percentages for design cost.
- Permitting needs and ROW costs are not included in this planning-level analysis, and will vary greatly depending on factors typically addressed in the design phase.

MAP 5.1 PRIORITY PROJECT KEY MAP

The letters on the map below correspond to the cutsheets on the following pages.



EXISTING
- State Bike Route
- Updated State Bike Route (Unsigned)

PROPOSED
- Priority Projects
- East Coast Greenway

BOUNDARIES
- Greenville MPO
- Municipal Boundaries

0 0.5 1 Miles

A. NORTH/SOUTH ROUTE 1

Project length: 0.8 miles

Facility Types: Neighborhood bikeway, shared use path segment (sidepath), crossing improvements

Jurisdiction: City of Greenville

Trip Generators: Elm Street Park, Greens Mill Run and Stadium Greenway, Elmhurst Elementary, ECU, Uptown, multiple residential and commercial areas

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan; 2013 ECU Bicycle & Pedestrian Plan

ROW needs: Shared use path segment (side-path) along 14th St/Berkley Rd may require ROW acquisition

Partnerships: City of Greenville, ECU, Uptown Greenville, Tar River neighborhood/homeowner's association, Carolina Costal Railway, Norfolk Southern

Estimated Construction Costs: $390,000

Project Details

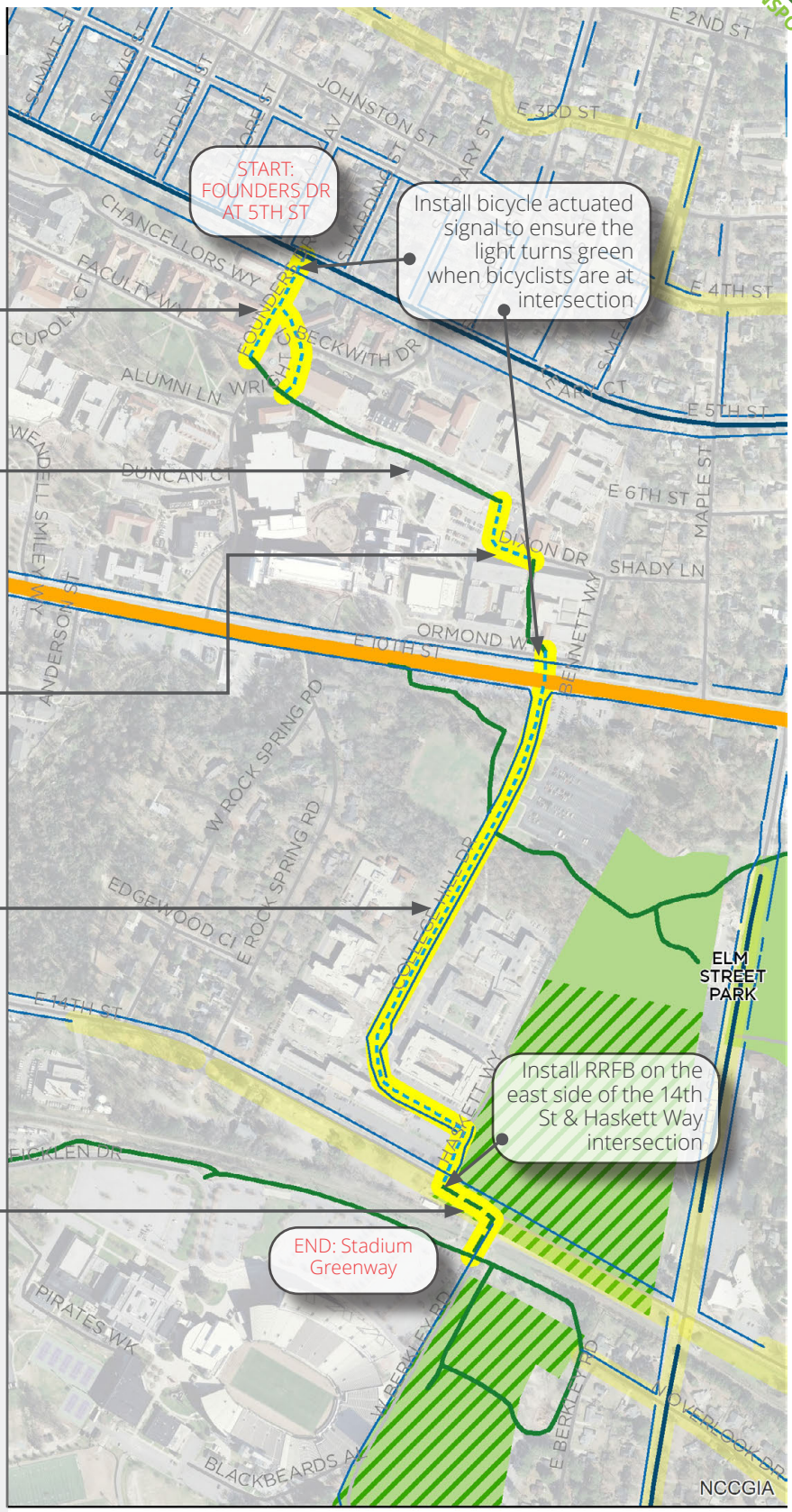
Implement neighborhood bikeway treatments along Founders Dr, and Wright Circle (for northbound bicyclists) to the Student Plaza shared use path through the heart of ECU campus.

The existing student plaza is a high volume pedestrian corridor, and bicyclists should proceed with caution through this area.

Implement neighborhood bikeway treatments along Dixon Dr from the Student Plaza shared use path to shared use path connection between the Music Library and Center for Natural Hazards Research, leading to the 10th St/College Hill Dr intersection.

Implement neighborhood bikeway treatments along College Hill Dr from 10th St to Haskett Way & the 14th St intersection; consider constructing separated bike lanes long term (see ECU Bicycle & Pedestrian Plan).

Construct short shared use path segment from the southeast corner of the Haskett Way/14th St intersection to the Stadium Greenway (widening the short section of sidewalk along the west side of Berkley Rd and crossing the railroad tracks).



B. NORTH/SOUTH ROUTE 1 (CONTINUED)

Project length: 1.8 miles

Facility Types: Neighborhood bikeway/buffered bike lanes, shared use path segment (sidepath), crossing improvements

Jurisdiction: City of Greenville

Trip Generators: Greens Mill Run and Stadium Greenway, ECU, Uptown, multiple residential and commercial areas

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: Shared use path segment along Plaza Dr and Greenville Blvd/Granville Dr may require ROW acquisition

Partnerships: City of Greenville, ECU, Uptown Greenville, Plaza Dr shopping center businesses, BB&T, businesses on southeast corner of Arlington Blvd & Evans St, Lynndale neighborhood/home-owner's associations

Estimated Construction Costs: $570,000

Project Details

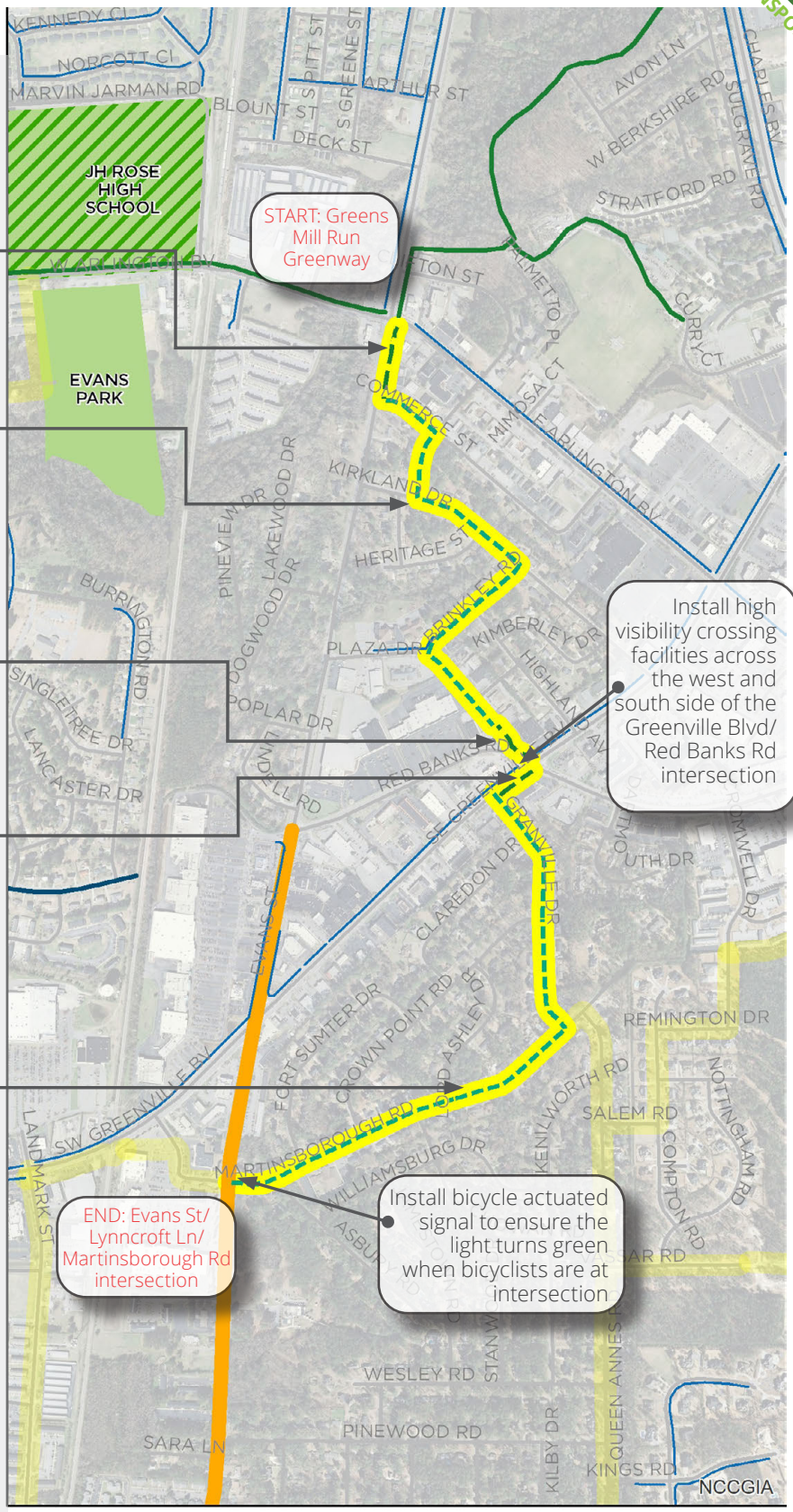
Continue short shared use path segment from the Greens Mill Run Greenway along the east side of Evans St to Commerce St.

*Implement either neighborhood bikeway treatments or stripe a separated bikeway along Commerce St, Clifton St, Kirkland Dr, Brinkley Rd, and Plaza Dr from Evans St to the Plaza Dr/ Red Banks Rd intersection.

Construct shared use path segment along the north side of Plaza Dr from the east side of the shopping center driveway (Paint Center) to the northwest corner of the Greenville Blvd/Red Banks Rd intersection.

Construct shared use path segment along the southeast side of Greenville Blvd from Red Banks Rd to Granville Dr, bringing the path to the west side of the BB&T driveway along the northeast side of Granville Dr.

* Implement either neighborhood bikeway treatments or stripe a separated bikeway along Granville Dr and Martinsborough Rd to the Evans St/Lynncroft Ln/Martinsborough Rd intersection.



C. NORTH/SOUTH ROUTE 2

Project length: 2.8 miles

Facility Types: Neighborhood bikeway/buffered bike lanes, greenway/sidepath, crossing improvements

Jurisdiction: City of Greenville

Trip Generators: Greens Mill Run and Stadium Greenway, ECU, Uptown, multiple residential and commercial areas

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: Shared use path segment between Merry Ln and Cromwell Dr

Partnerships: City of Greenville, ECU, Arlington Village shopping center businesses, Southgate Apartments, Lynndale, Drexelbrook, Englewood, and Forest Hills neighborhood/homeowner's associations

Estimated Construction Costs: $1,310,000

Project Details

*Consider removing parking along Elm Street to allow for increased safety for bicyclists along Elm Street by striping buffered bike lanes.

*Implement either neighborhood bikeway treatments or stripe a buffered bike lane along Elm St, Pinecrest Dr, Oakview Dr, and Churchside Dr to the existing bike lanes on Red Banks Rd.

Construct shared use path segment along the west side of Charles Blvd from the Red Banks Rd intersection to Wall St by widening the existing sidewalk.

Construct a separated bikeway along Wall St from Charles Blvd to Arlington Blvd/Yadkin Bank parking lot.

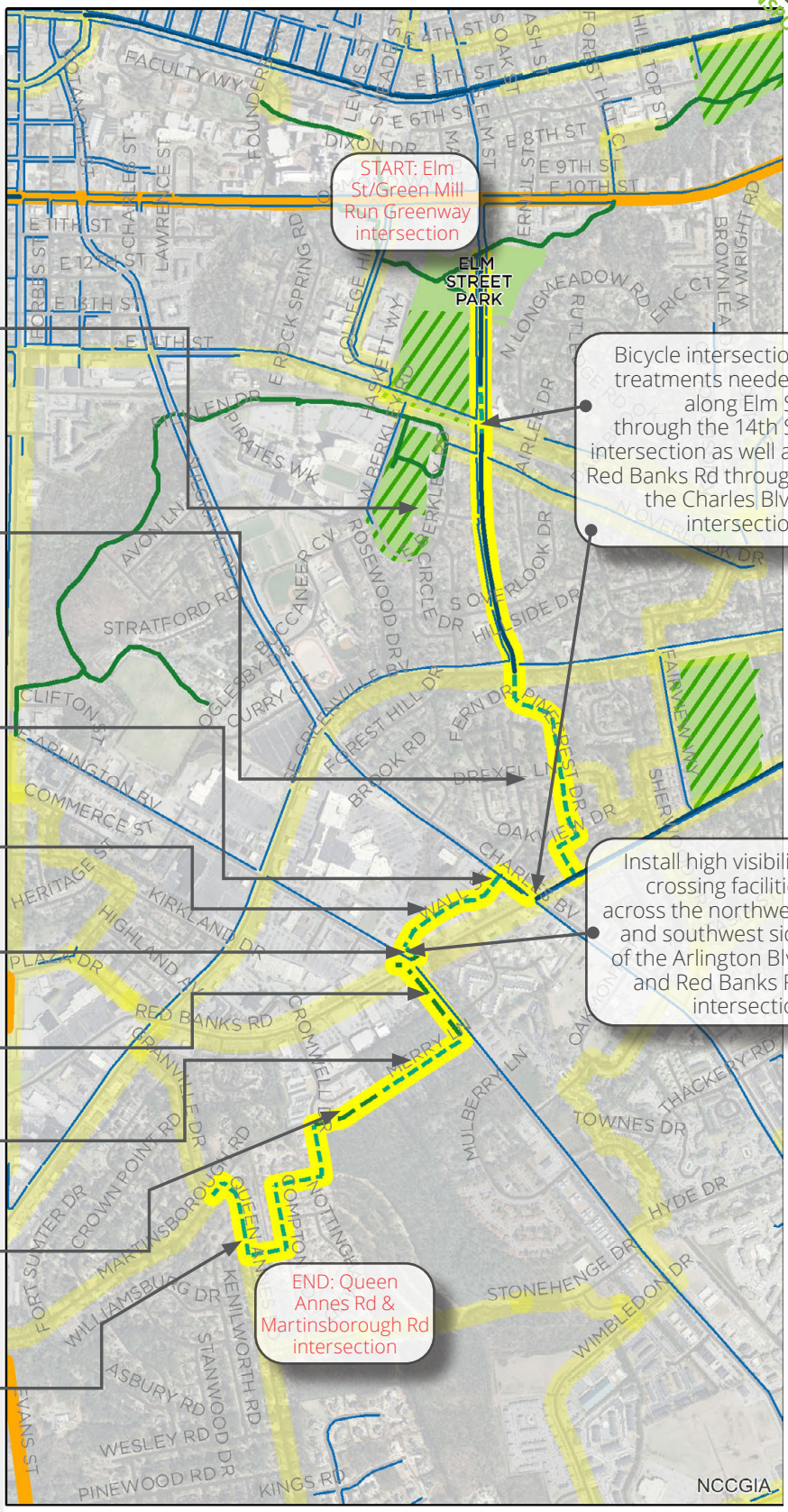
Construct shared use path segment from Wall St/Yadkin Bank parking lot to the northeast corner of the Arlington Blvd/Red Banks Rd intersection.

Continue shared use path segment along the west side of Arlington Blvd from Red Banks Rd to Merry Ln.

Construct separated bikeway along Merry Ln from Arlington Blvd to the western terminus of Merry Ln.

Continue shared use path segment from the western terminus of Merry Ln to Cromwell Dr along the existing utility easement.

* Implement either neighborhood bikeway treatments or stripe a separated bikeway along Cromwell Dr, Salem Rd, and Queen Annes Rd to Martinsborough Rd.



D. TAR RIVER GREENWAY TO MEDICAL DISTRICT

Project length: 1.42 miles

Facility Types: Greenway and side path

Jurisdiction: City of Greenville

Trip Generators: Tar River Greenway, Medical District, ECU, Uptown, and multiple residential areas

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: Most of this project corridor would require ROW acquisition (Housing Authority owns section north of the Conley St)

Partnerships: City of Greenville, Uptown Greenville, ECU, Greenville VA Healthcare Center, Treybroooke Apartments, The Heritage at Arlington Apartments

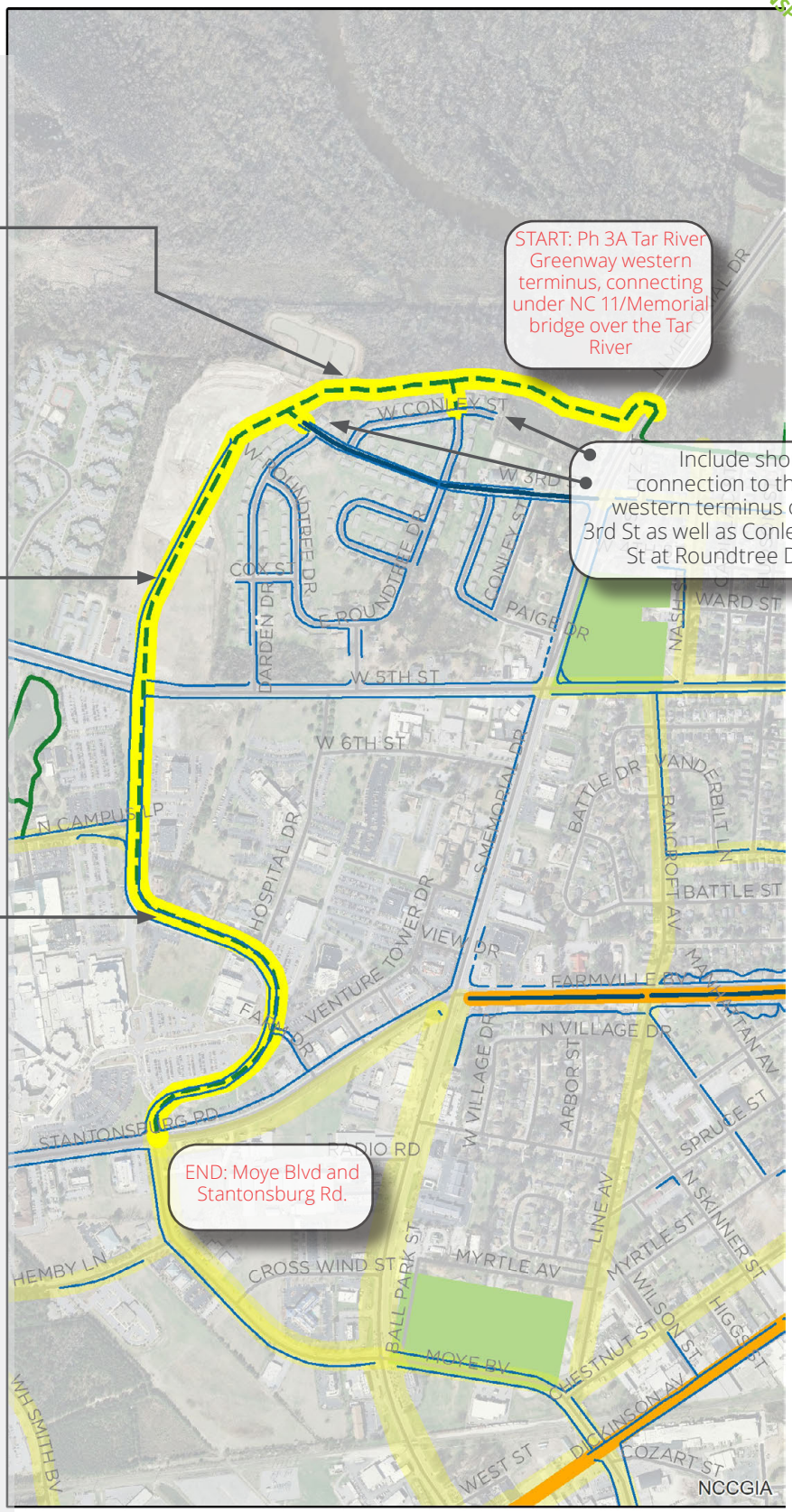
Estimated Construction Costs: $2,500,000

Project Details

See the 2013 South Tar River Greenway Phase 3 preliminary alignment and design for this segment (from the start to the Greenville VA Healthcare Center).

Ensure adequate connectivity to the VA's internal sidewalk network and add sharrows along Moye Blvd to 5th St at a minimum; for ideal trail link, consider constructing greenway link along berm between the VA and Darden St neighborhood to 5th St (trailhead opportunity in the space between the Residence Inn and the VA)

Upgrade existing sidewalk to sidepath on one side of Moye Blvd .



E. GTAC TO ECU CONNECTOR

Project length: 0.2 miles

Facility Types: Upgrade sidewalk to side path, crossing improvements

Jurisdiction: City of Greenville

Trip Generators: ECU, Uptown, residential areas/ apartment complexes

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: None

Partnerships: City of Greenville, Uptown Greenville, ECU, redevelopment stakeholders

Estimated Construction Costs: $340,000

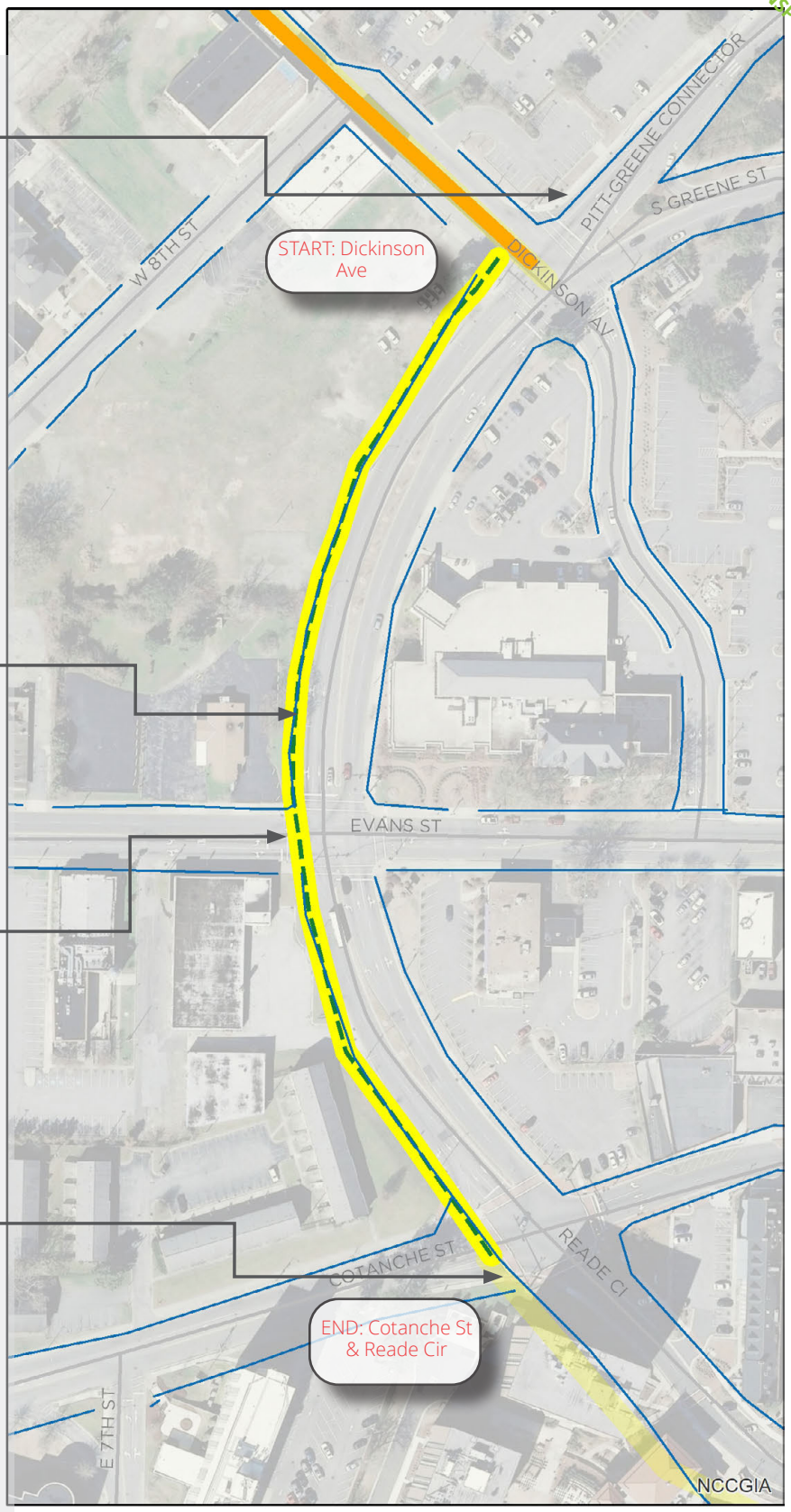
Project Details

New building built directly to sidewalk prevents upgrading to side path on Reade Cir west of Dickinson Ave.

Upgrade existing sidewalk to side path, from Dickinson Ave to Contache St. See side path design guidelines in following chapter.

Improve Reade Cir/ Evans St intersection with high visibility crosswalks for the side path

Tie into project G here.



F. TAR RIVER GREENWAY TO GTAC CONNECTOR

Project length: 0.6 miles

Facility Types: Greenway, crossing improvements

Jurisdiction: City of Greenville

Trip Generators: GTAC, Tar River Greenway, Third Street Community Center, ECU, Uptown, multiple residential areas

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: Shared use path segment between 3rd St and 5th St

Partnerships: City of Greenville, Uptown Greenville, Third Street Community Center, ECU, Redevelopment stakeholders, Nathaniel Village apartments (Redevelopment Commission of Greenville), Skinnerville and Cherry View neighborhood/homeowner's associations, CSX

Estimated Construction Costs: $1,530,000

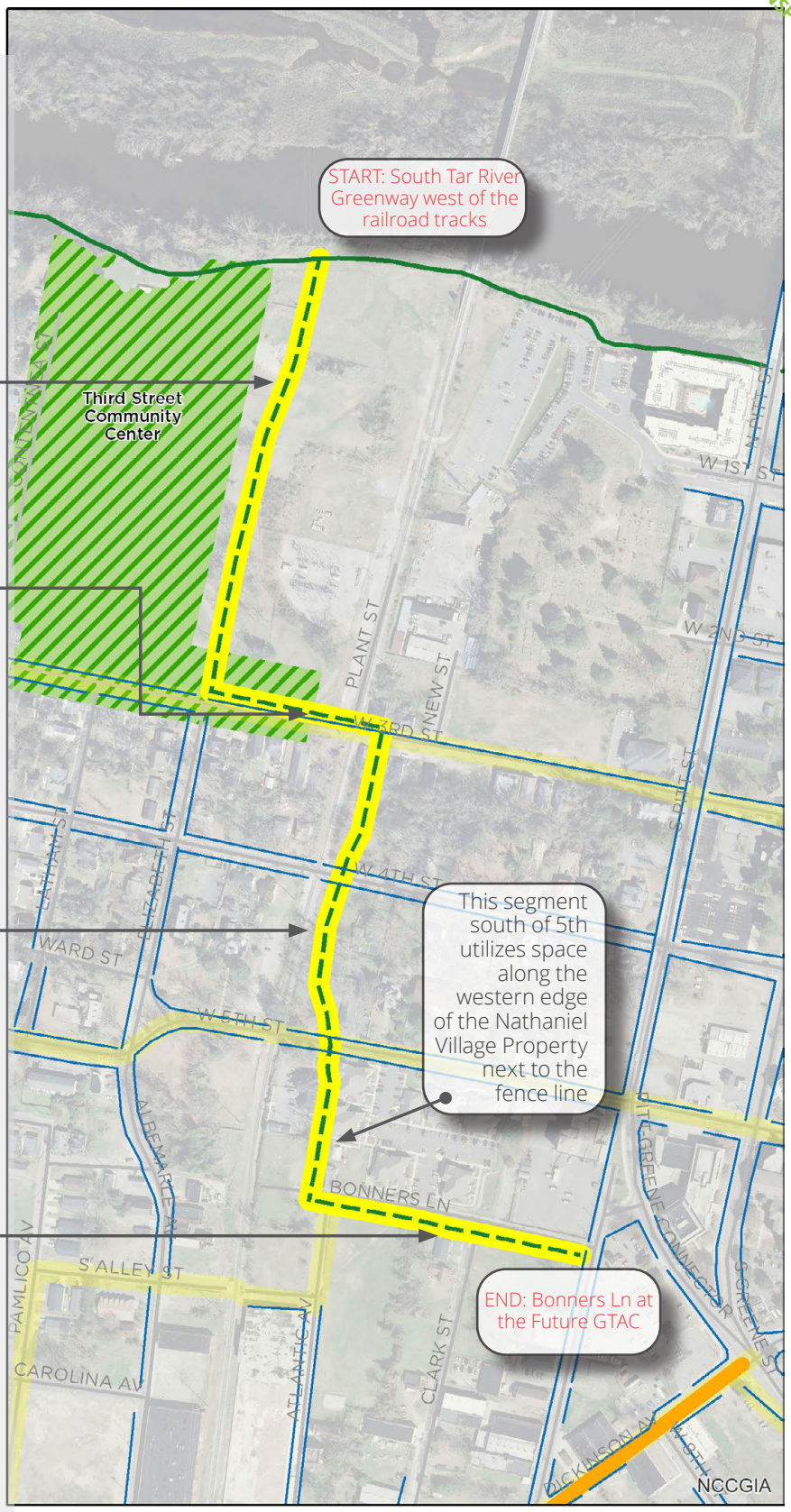
Project Details

Utilize greenspace between Third Street Community Center and electric substation to construct greenway segment from the existing S Tar River Greenway to 3rd St.

Construct short sidepath segment along the north side of 3rd St from the Third Street Community Center to the east side of the railroad tracks by expanding or replacing the existing sidewalk.

Construct greenway segment from 3rd Street to the Greenville Transportation Activity Center (GTAC) (construction Nov 2016). High visibility marked crosswalks will be needed across 3rd St, 4th St, and 5th St. Utilize vacant property east of the railroad tracks (and west of existing housing) for this segment.

Construct sidepath segment along the south side of Bonners Ln from Atlantic Ave, linking to the GTAC - parts of this section should be included as part of the GTAC development.



G. TOWN CREEK CULVERT (TCC) GREENWAY

Project length: 0.43 miles

Facility Types: Greenway, crossing improvements

Jurisdiction: City of Greenville

Trip Generators: Tar River Greenway, Town Commons, ECU, Uptown, multiple residential areas

Previous Planning: 2013 ECU Bicycle and Pedestrian Plan

ROW needs: Length of project is ECU property

Partnerships: City of Greenville, Uptown Greenville, ECU, Tar River neighborhood/home-owner's association

Estimated Construction Costs: $830,000

Project Details

Construct the Town Creek Culvert (TCC) greenway from ECU campus to Town Commons, following the eastern boundary of parking lots on the east side of Reade St.

Upgrade the existing sidewalk to a sidepath along the east side of Reade Circle to link to Cotanche St.

H. KEENE PARK GREENWAY LINK

Project length: 1.3 miles

Facility Types: Greenway, sidepath, buffered bike lanes

Jurisdiction: City of Greenville, Pitt County

Trip Generators: Fire Tower Rd/Charles Blvd businesses, multiple residential areas

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: Shared use path segment from the southern terminus of Signature Dr to Keene Park

Partnerships: City of Greenville, Pitt County, Bellamy Student Apartments, Fire Tower Rd/ Charles Blvd businesses, redevelopment stakeholders (potential development between southern terminus of Signature Dr and Keene Park)

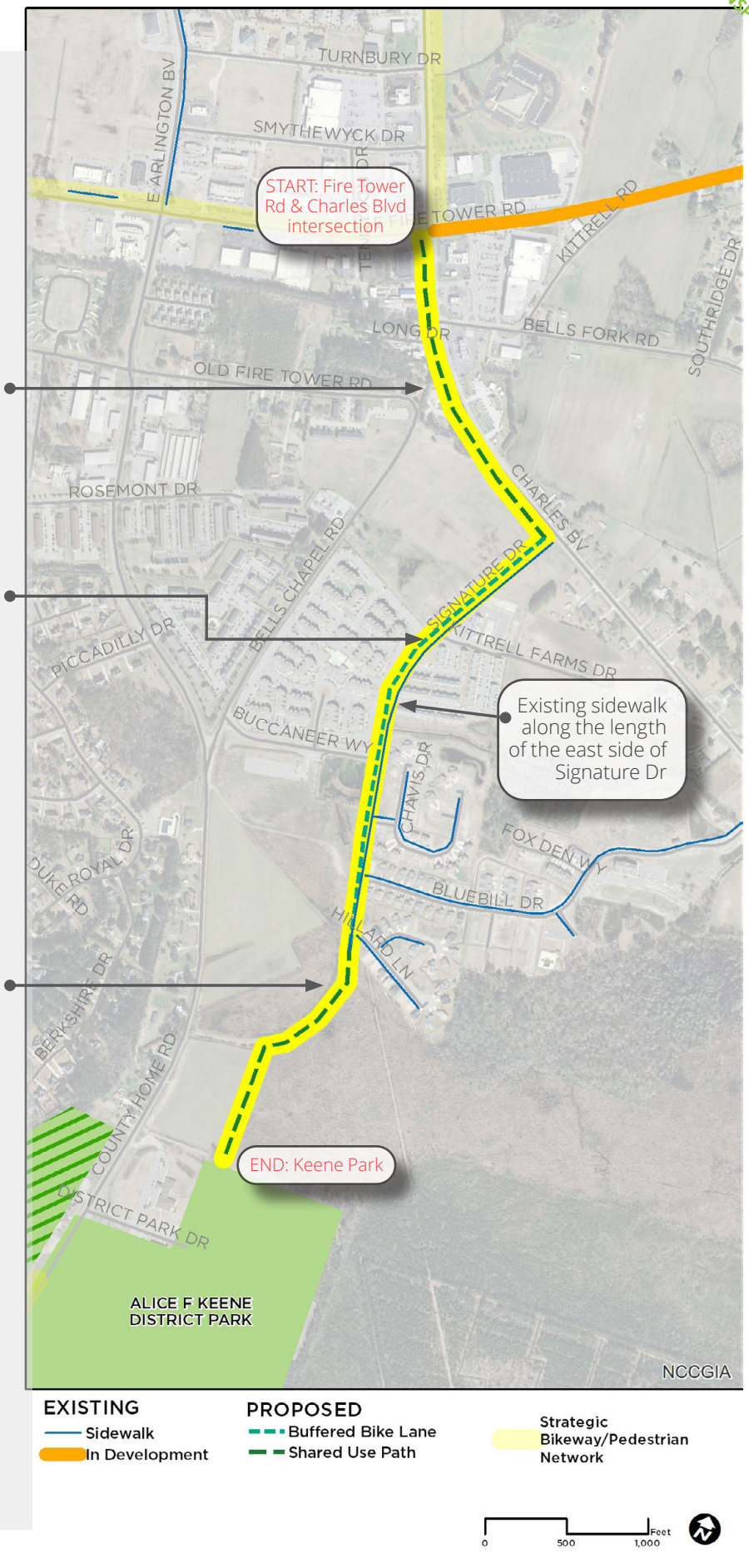
Estimated Construction Costs: $1,230,000

Project Details

Construct sidepath on the west side of Charles Blvd from Fire Tower Rd to Signature Dr. If project is completed with roadway improvements and/or widening of Charles Blvd, construct separated bikeways and pedestrian facilities to accommodate bicyclists & pedestrians on both sides of the road.

Construct buffered bike lanes along Signature Dr from Charles Blvd to the southern terminus of Signature Dr by striping (existing pavement width is 38-40ft). Removing on-street parking along Signature Dr is recommended.

Construct greenway link from the southern terminus of Signature Dr to Alice Keene Park. It should be noted that future development through this section could include an extension of Signature Dr to County Home Rd - if this were to happen, continue separated bikeway along Signature Dr to County Home Rd with a sidewalk on the south/east side of the road at a minimum (include greenway link from roadway extension to Keene Park).



I. WINTERVILLE TO BOYD LEE PARK

Project length: 2.5 miles

Facility Types: Greenway, buffered bike lanes, shared lane markings, sidewalk, crossing improvements

Jurisdiction: City of Greenville, Town of Winterville

Trip Generators: H. Boyd Lee Park, Downtown Winterville, businesses north of the Main St/Old Tar Rd intersection, multiple residential areas

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan, 2009 Winterville Pedestrian Plan

ROW needs: None

Partnerships: City of Greenville, Town of Winterville, downtown Winterville businesses, businesses north of the Main St/Old Tar Rd intersection, CSX

Estimated Construction Costs: $2,600,000

Project Details

Construct greenway from the eastern terminus of Main St to Boyd Lee Park, utilizing town owned property between Main St and the park.

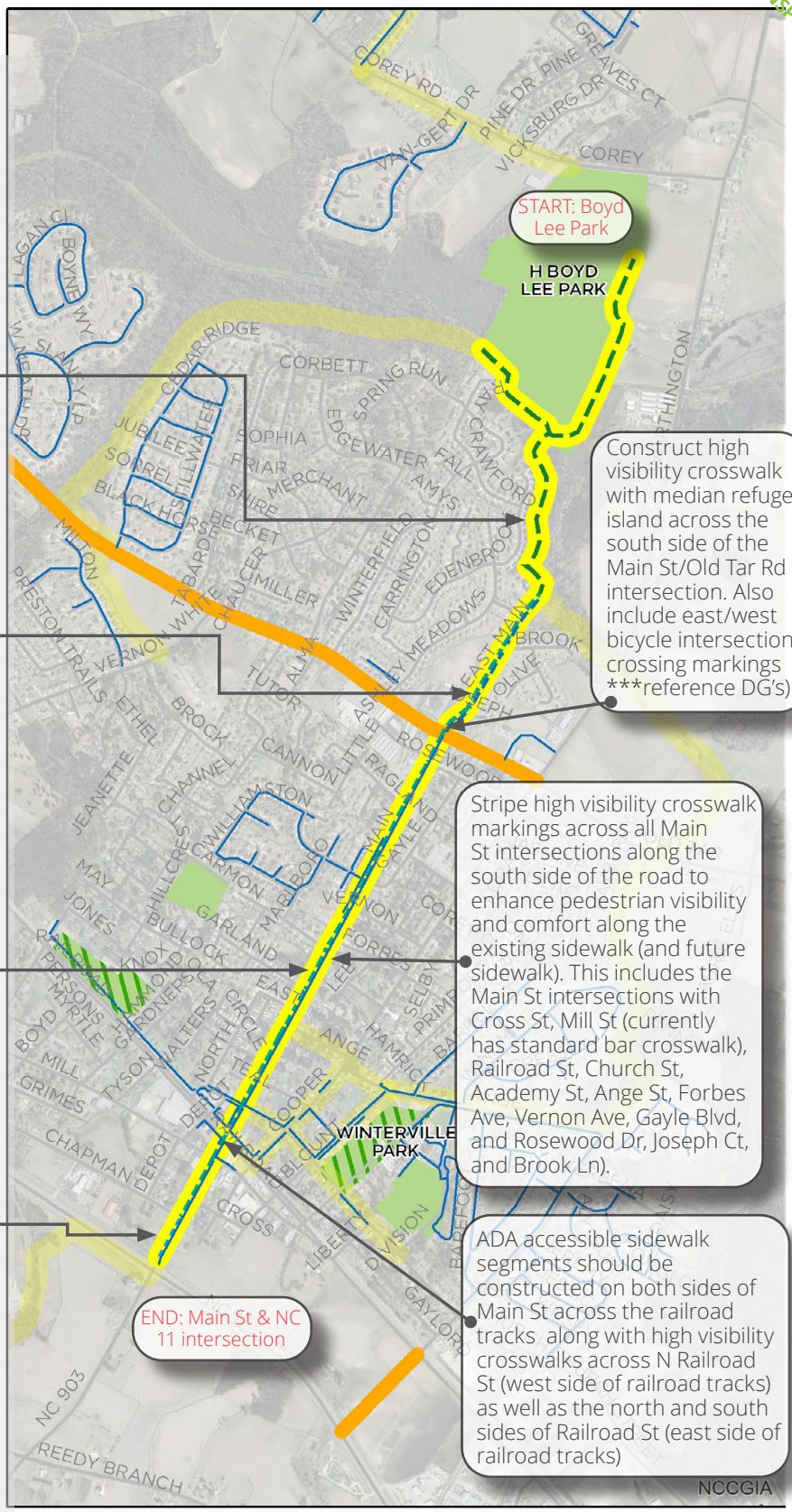
Construct sidewalk on the south side of Main St from Old Tar Rd to the eastern terminus of Main St. Stripe buffered bike lanes along this section of Main St within the existing pavement width (38'-40'). Bike lanes are currently striped along this section, but parking is also used along this space - consider removing on-street parking along this stretch.

Restripe Main St from Chapman St to Old Tar Rd to two travel lanes and buffered bike lanes within the existing pavement width (36'-40', AADT = 4,600-6,000). This requires removal of the center turn lane between Graham St and Old Tar Rd and the removal of seven parking spaces along the south side of Main St between Mill St & N Railroad St in downtown Winterville. Other options for bicycle facilities along this stretch would require significant investment in roadway widening or sidepath construction.

Implement neighborhood bikeway treatments (shared lane markings) along Main St from Chapman St to NC 11.

*Installing separated bicycle facilities will significantly enhance the pedestrian level of service along this stretch of Main St by adding to the minimal buffer space that currently exists between pedestrians and automobile traffic.

*This section along Main Street from the NC 11 intersection to Boyd Lee Park should be designated as NC bike route 2B.



J. WINTERVILLE GREENWAY

Project length: 1.55 miles

Facility Types: Greenway, crossing improvements

Jurisdiction: City of Greenville, Town of Winterville, Pitt County

Trip Generators: H. Boyd Lee Park, multiple residential areas

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan, 2009 Winterville Pedestrian Plan

ROW needs: Part of greenway segment along Fork Swamp from the Cedar Ridge Dr neighborhood to H. Boyd Lee Park; greenway segment between Old Tar Rd and Vernon White Rd

Partnerships: City of Greenville, Town of Winterville, Pitt County, Redevelopment stakeholders (potential development between southern terminus of Signature Dr and Keene Park)

Estimated Construction Costs: $3,200,000

Project Details

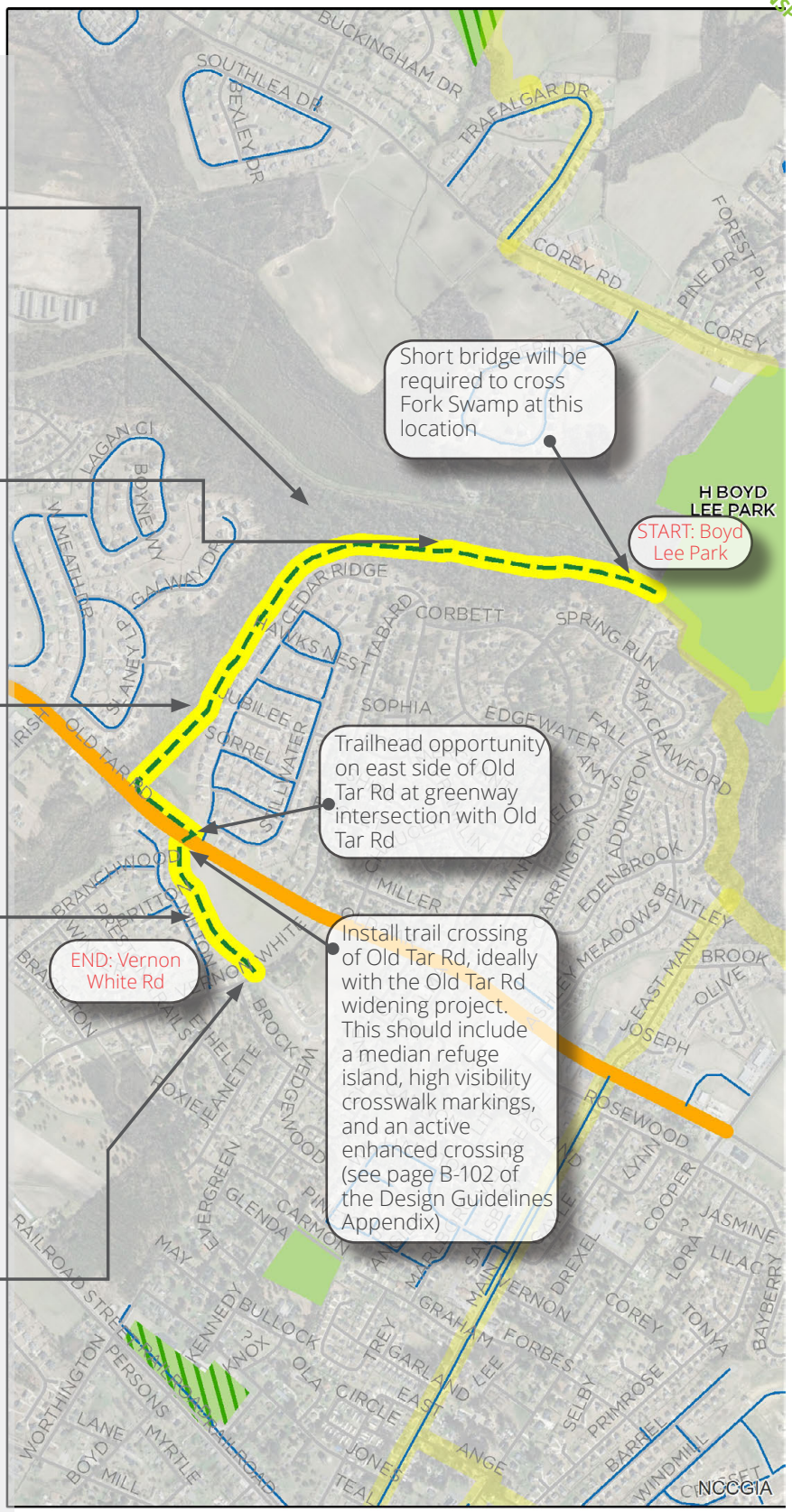
Construct greenway from Boyd Lee Park to Vernon White Rd.

This proposed section runs north/ south along the west side of the Fork Swamp - part of this section is owned by the Town of Winterville.

This proposed section runs east/west from the Fork Swamp to Old Tar Rd. The greenway should follow Town of Winterville property which is complete along this corridor in the space south of the Fork Swamp branch and the Cedar Ridge Dr properties.

This proposed section runs northeast/ southwest from Old Tar Rd to Vernon White Rd. The development of this section of greenway should be coordinated with future development that is likely on this vacant land (bounded by Old Tar Rd, Vernon White Rd , and the Milton Dr residences).

A marked crosswalk should be constructed at the Vernon White Rd terminus to Bridgestone Dr. Complementary sidepaths should be extended west to Brock Ave and Milton Dr on both sides of the road as well as to Old Tar Rd to the east, at a minimum. If Vernon White Rd is widened or reconstructed as part of future development and/ or roadway improvements, some type of separated bicycle facilities (and pedestrian facilities) should be included as part of the project.



K. DISTRICT PARK GREENWAY

Project length: 1.3 miles

Facility Types: Greenway, neighborhood bikeway, crossing improvements

Jurisdiction: Town of Ayden, Pitt County

Trip Generators: Ayden District Park, multiple residential areas

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: Greenway segment from the southern end of Ayden District Park to Juanita Ave

Partnerships: Town of Ayden, Pitt County

Estimated Construction Costs: $1,730,000

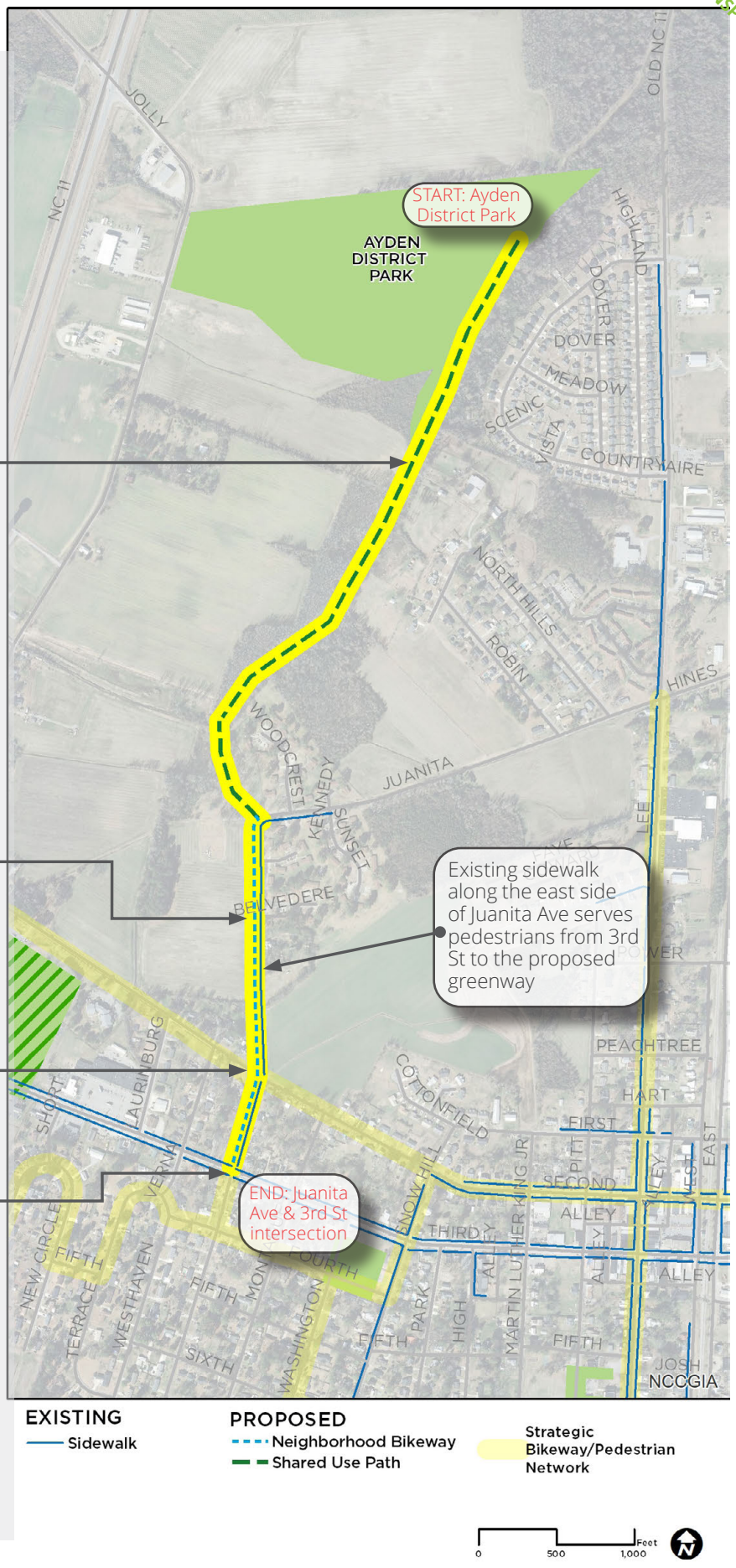
Project Details

Construct greenway from Ayden District Park to Juanita Ave, utilizing the cleared space along the west side of the drainage ditch. This will require coordination and partnerships with local adjacent landowners.

Implement neighborhood bikeway along Juanita Ave from the proposed greenway to 3rd St. Include speed tables for traffic calming along this stretch.

Install high visibility crosswalk along the east side of the Second St/Juanita Ave intersection.

Install high visibility crosswalk along the east side of the Juanita Ave/3rd St intersection, linking pedestrians to the sidewalk on the south side of 3rd St.



L. TAR RIVER GREENWAY LINK

Project length: 0.3 miles

Facility Types: Sidepath, sidewalk, crossing improvements

Jurisdiction: City of Greenville

Trip Generators: Tar River Greenway, Greens Springs Park, Wahl Coates Elementary School, ECU, 10th St/5th St businesses, multiple residential areas

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: None

Partnerships: City of Greenville, 10th St/5th St businesses, Tar River neighborhood/homeowner's association

Estimated Construction Costs: $500,000

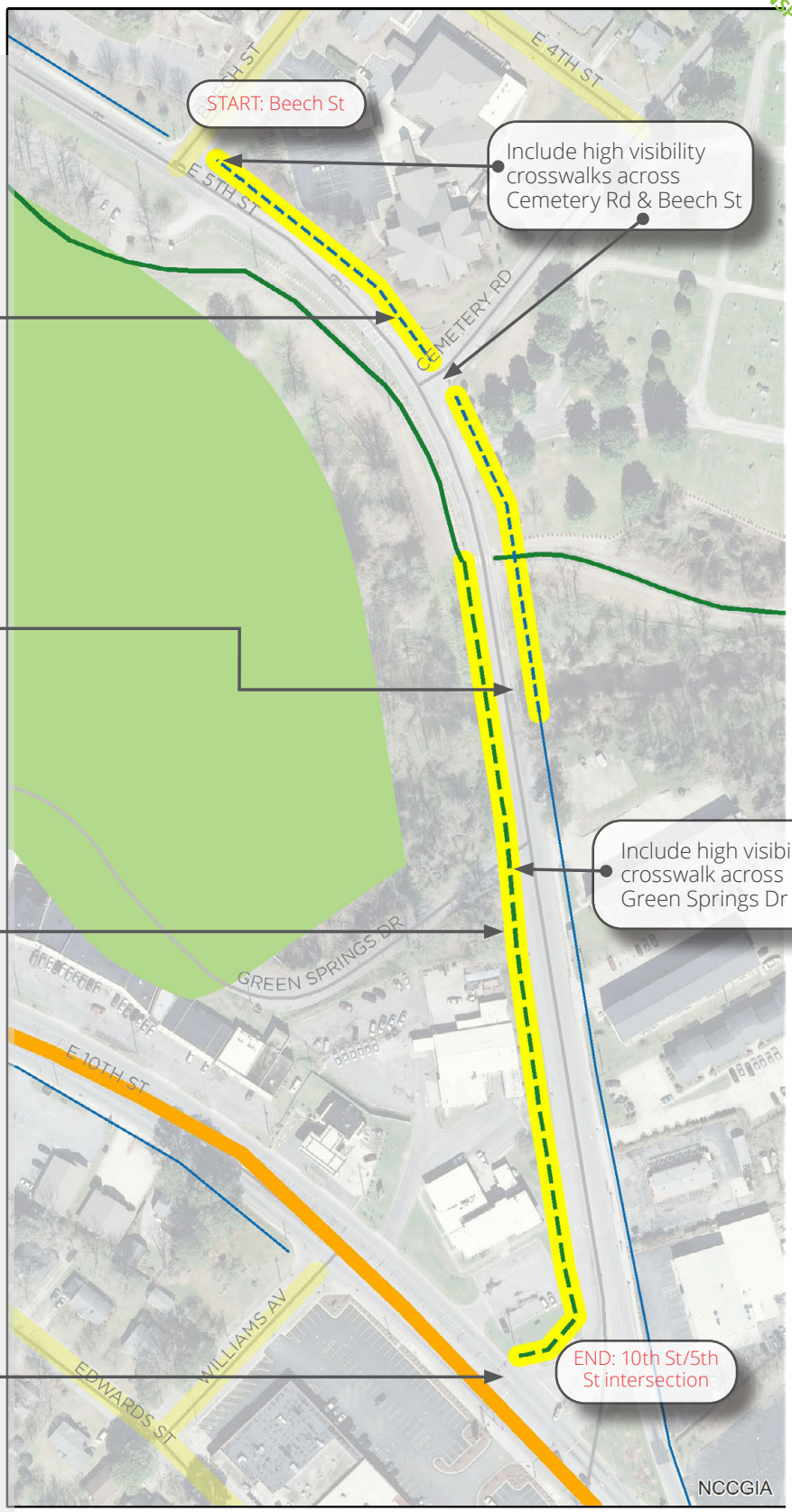
Project Details

Construct sidewalk along the north/ east side of 5th St from the existing sidewalk at Beech St to the existing sidewalk just south of the greenway to fill gap.

The 5th St bridge over Greens Mill Run is narrow (30' wide) with a low concrete railing (safe but functionally obsolete by NCDOT standards). Construct short pedestrian bridge addition on the east side and short sidepath addition on the west side. This bridge is functionally obsolete - consider making bicycle/pedestrian improvements with overall bridge improvements.

Construct sidepath link along the west side of 5th St from the 10th St intersection to the existing greenway.

Reference the 10th Street Corridor Study (completed 2016), for proposed improvements to the 5th St/10thSt intersection.



M. SOUTHWEST GREENVILLE LINK

Project length: 1.1 miles

Facility Types: Buffered bike lanes, sidewalk, and crossing facilities

Jurisdiction: City of Greenville

Trip Generators: Medical District, Uptown, Guy Smith Park, JH Rose High School, businesses along the corridor, multiple residential areas

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: None

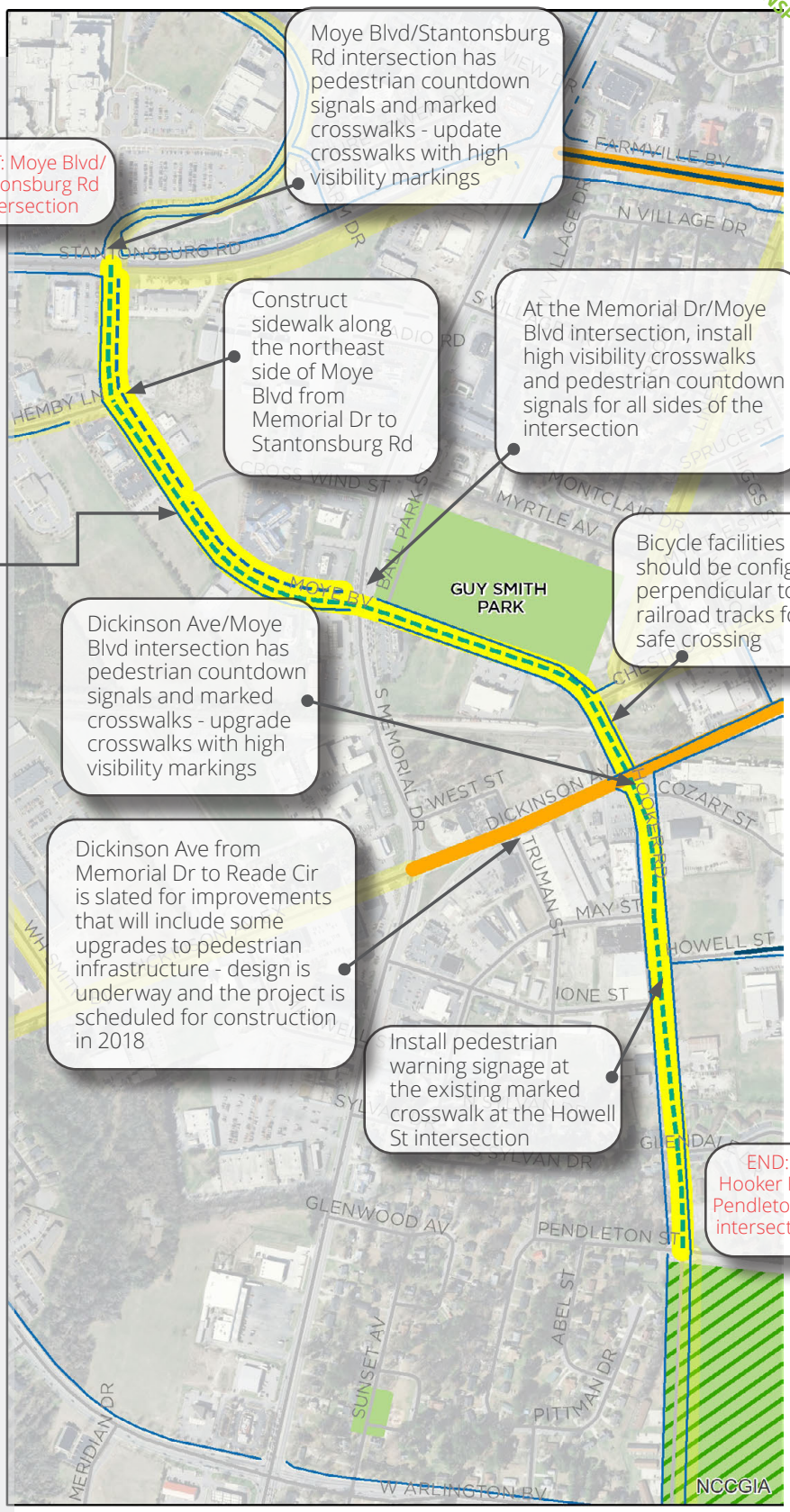
Partnerships: City of Greenville, businesses along the corridor, JH Rose High School, Village Grove and Higgs Brothers neighborhood/homeowners associations, Carolina Coastal Railway, Norfolk Southern

Estimated Construction Costs: $240,000

Project Details

With an existing pavement width of 60'-62' and 8,500 - 12,000 AADT along this section, consider reconfiguring Moye Blvd/Hooker Rd from Stantonsburg Rd to Pendleton St from five lanes to three lanes - one travel lane in each direction with a center turn lane. This will allow space to stripe buffered bike lanes or create some form of physically separated bicycle lanes, connecting JH Rose High School to the neighborhood grid leading to Uptown as well as directly connecting to the Medical District.

*See the Design Guidelines appendix for further detail on pedestrian & bicycle facility options.



N. PARAMORE PARK LINK

Project length: 2.4 miles

Facility Types: Greenway, neighborhood bikeway/ buffered bike lanes

Jurisdiction: City of Greenville

Trip Generators: Paramore Park, multiple residential and commercial areas

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: Greenway section from Caversham Rd to the drainage ditch

Partnerships: City of Greenville, businesses along Fire Tower Rd, Bedford, residential development stakeholders, Lynndale, Pinewood Forest, and Grayleigh neighborhood/homeowner's associations

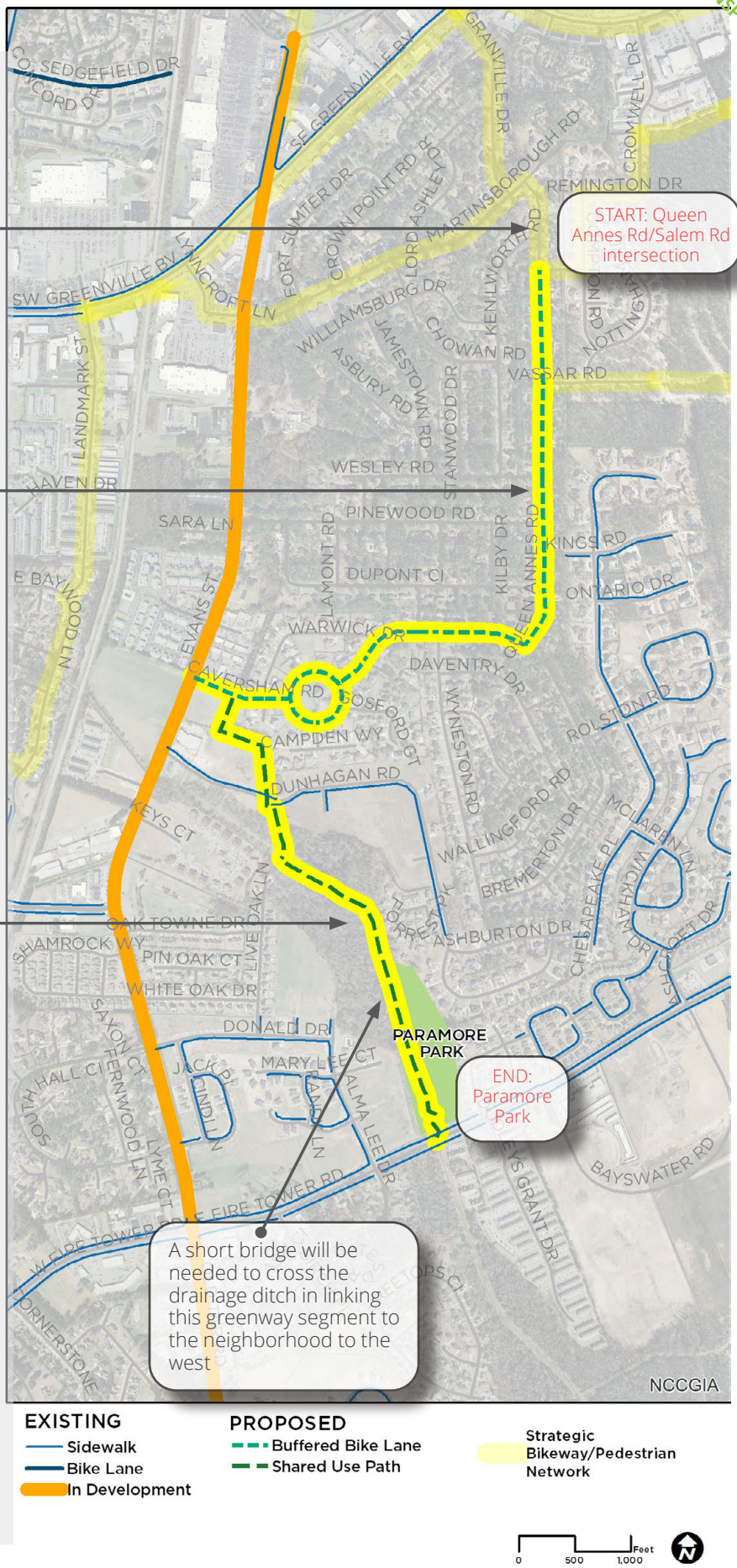
Estimated Construction Costs: $2,400,000

Project Details

Connectivity opportunities to projects B and C, linking north toward Greenville Blvd commercial areas and further north toward ECU and Uptown.

*Implement either neighborhood bikeway treatments or stripe a buffered bike lane along Queen Annes Rd, Bremerton Dr, Kineton Cir, and Caversham Rd to Evans St.

This proposed greenway section follows an existing cleared utility road, connecting to Paramore Park from Dunhagan Rd. Most of this greenway segment is owned by the City of Greenville.



O. GREENS MILL RUN GREENWAY EXTENSION

Project length: 1.74 miles

Facility Types: Greenway

Jurisdiction: City of Greenville, Pitt County

Trip Generators: Greens Mill Run Greenway, JH Rose High School, Evans Park, multiple residential and commercial areas

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: City of Greenville owns several sections of this greenway corridor but will need to acquire ROW for most of the corridor

Partnerships: City of Greenville, Pitt County, businesses at the Evans St/Arlington Blvd intersection, residential development stakeholders, CSX, Hillsdale and Lakewood Pines neighborhood/ homeowner's associations

Estimated Construction Costs: $4,100,000

Project Details

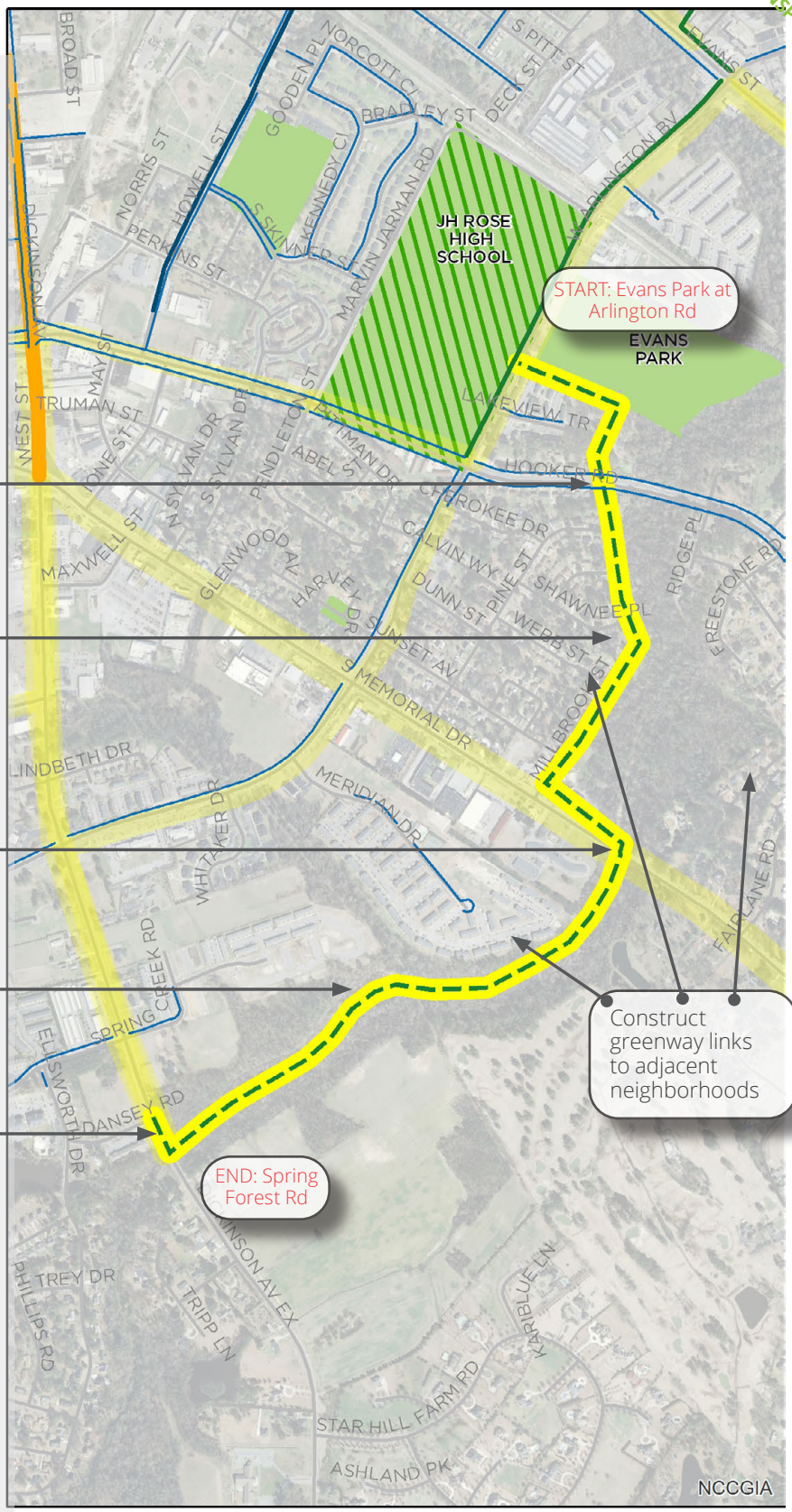
Ideally, the greenway would cross under the bridge where Greens Mill Run flows under Hooker Rd, although an at-grade crossing is another feasible option to link to Millbrook St - further study needed.

Construct a sidepath along the south side of Millbrook St from Hooker Rd to Memorial Dr.

Construct greenway crossing at Memorial Dr - the center turn lane should be converted into a median pedestrian island and consider installing an Active Enhanced Crossing.

Construct greenway along Mills Run between Memorial Dr and Dickinson Ave.

Construct a shared use path along the east side of Dickonson Ave, connecting to the existing sidewalk at the Spring Forest Rd intersection.



P. PITT COUNTY COMMUNITY COLLEGE LINK

Project length: 4.2 miles

Facility Types: Greenway, neighborhood bikeway/buffered bike lanes, sidewalk, crossing improvements

Jurisdiction: City of Greenville, Pitt County

Trip Generators: Pitt County Community College, multiple residential and commercial areas

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: Each shared use path segment will require ROW acquisition

Partnerships: City of Greenville, Pitt County, Pitt County Community College, businesses along Memorial Dr, businesses along Greenville Blvd, CSX, Sheraton Village Townhomes, Westhaven, Club Pines, and South Pointe neighborhood/home-owner's associations

Estimated Construction Costs: $3,620,000

Project Details

*Implement neighborhood bikeway treatments through the Best Buy parking lot from the shared use path terminus to the Lynncroft Ln/Evans St intersection.

Construct a short shared use path link from the southeast corner of the Greenville Blvd/Landmark St intersection to the Best Buy parking lot.

Construct a sidewalk along the west side of Landmark St from Greenville Blvd to Baywood Ln.

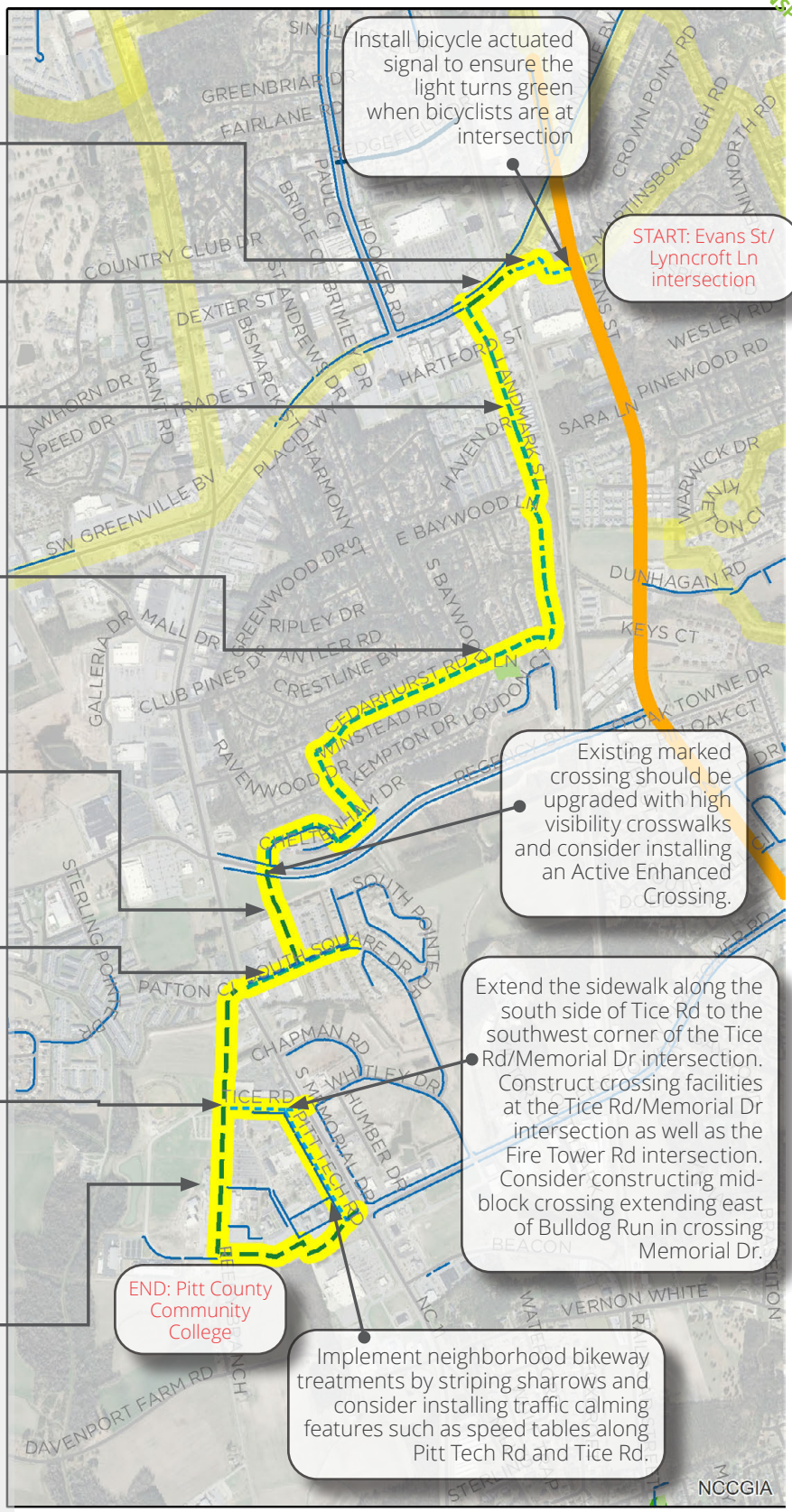
*Implement either neighborhood bikeway treatments or stripe a buffered bike lane along Landmark St, Baywood Ln, Cedarhurst Rd, Westhaven Rd, Cheltenham Dr, and Thornbrook Dr from Greenville Blvd to Regency Blvd.

Construct a short greenway segment from Square Dr to the Regency Blvd/ Thornbrook Dr intersection. Utilize space that is cleared for an existing utility easement between Tractor Supply Co and the South Heaven Apartments.

Construct a sidewalk along the north side of Square Dr from Granada Dr to the Memorial Dr intersection, coupled with striping a buffered bikeway. The posted speed limit should be lowered to 25 mph for this neighborhood.

Extend the existing sidewalk along the south side of Tice Rd to the southeast corner of the Reedy Branch Rd/Tice Rd intersection, and install crossing facilities to the proposed shared use path.

Construct a shared use path along the west side of Reedy Branch Rd from the Memorial Dr intersection to Warren Dr. Continue this path to the east, following the north side of Dr Fulford Rd to the Memorial Dr intersection. Construct crossing facilities at the Fire Tower Rd/Memorial Dr intersection as well as the Reedy Branch Rd/Memorial Dr intersection.



Q. RIVER PARK NORTH

Project length: 1.75 miles

Facility Types: Greenway, Bike/Ped bridge

Jurisdiction: City of Greenville

Trip Generators: Tar River Greenway, River Park North, Town Commons, ECU, Uptown, multiple residential areas north and south of the Tar River

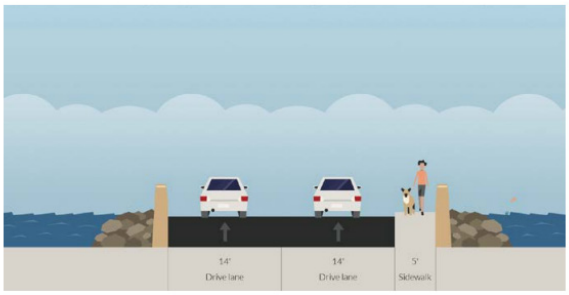
Previous Planning: 2016 Tar River Pedestrian Bridge Study, 2014 Tar River Legacy Plan, 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: Much of this space is City of Greenville property, ROW needs will depened on final route selection.

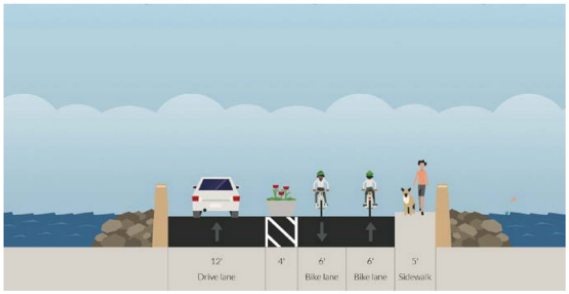
Partnerships: City of Greenville, Uptown Greenville, ECU, Uptown businesses and stake-holders, East Coast Greenway

Estimated Construction Costs: $3,800,000

Existing



Potential Lane Reallocation: Protected Bike Lane



The Tar River Pedestrian Bridge Study was commissioned in 2016 by the City of Greenville and several options were investigated for crossing the Tar River, including a low build option using the northbound Greene Street Bridge as shown above. This is the preferred alternative due to high costs of an independednt bike/ped bridge.

Project Details

Connect through River Park North, beginning with a direct link to Mumford Rd.

Depending the exact bridge location, the connection to River North Park will likely include an east/west connection from Greene St just north of the Speedway station and follows approximately along the power lines just south of the retention pond.

The Tar River Pedestrian Bridge Study was commissioned in 2016 by the City of Greenville and several options were investigated, including reallocating one travel lane on the Greene Street bridge for protected two-way bicycle lane that connects Town Common to a shared use path to the north (see opposite page and page 9 of the study for details).

*This section of greenway should be designated as part of the East Coast Greenway

R. EVANS ST (1)

Project length: 0.2 miles

Facility Types: Corridor study needed with a focus on separated bikeway and crossing facilities

Jurisdiction: City of Greenville

Trip Generators: Uptown, ECU, Greenville Museum of Art, GTAC (future), businesses along and near corridor, Boundary at West End Apartments

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: None

Partnerships: City of Greenville, Uptown Greenville, ECU, Greenville Museum of Art, Boundary at West End Apartments, redevelopment stakeholders, businesses along the corridor, Glen Arthur neighborhood/homeowner's association

Estimated Construction Costs: $80,000

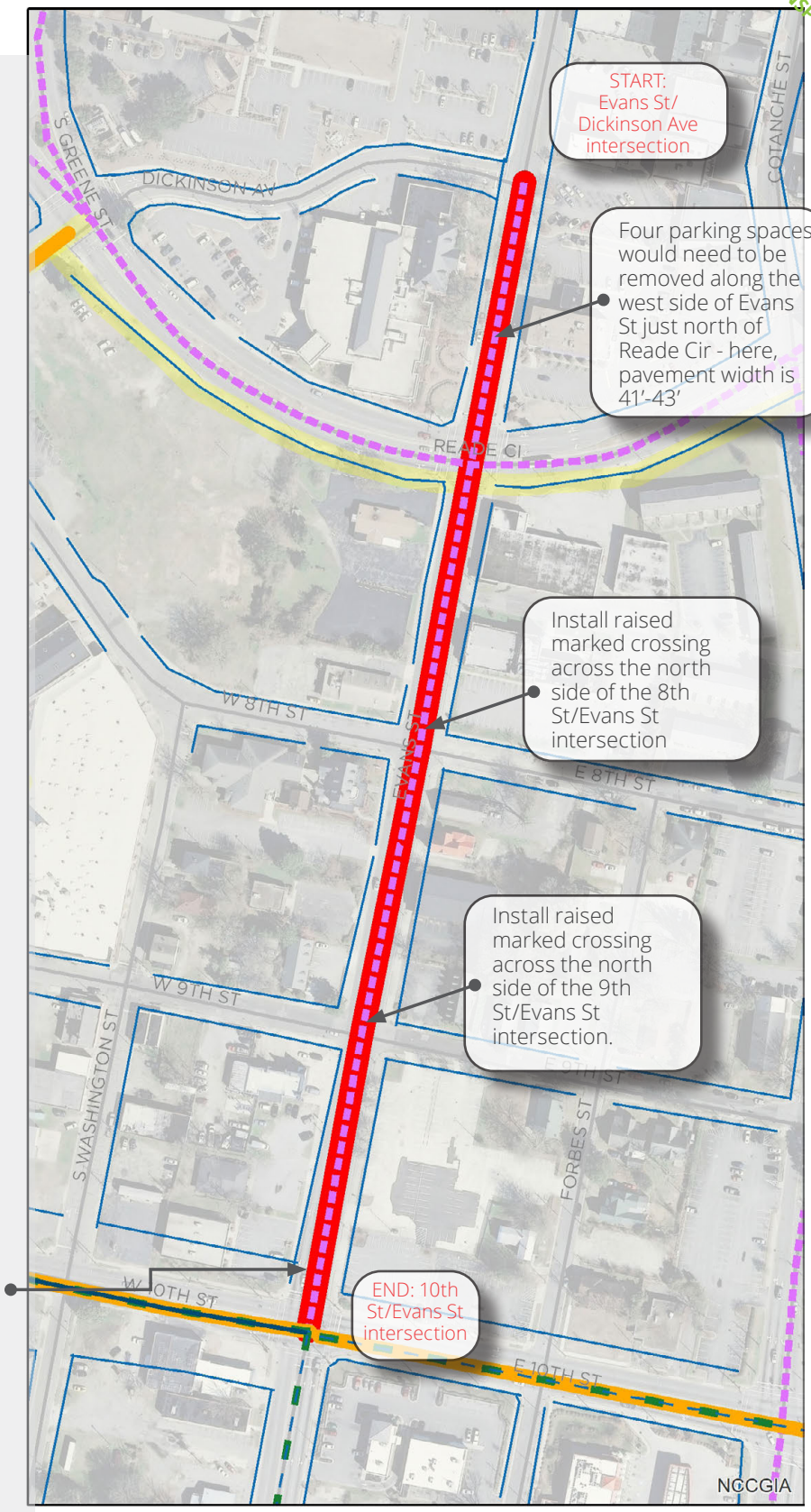
Project Details

*From Dickinson Ave to 10th St along Evans St, a detailed corridor study should be completed to evaluate bicycle & pedestrian facility options along with changing traffic conditions related to the 10th St Connector project that is currently under construction. Different types of physically separated bicycle lane separation methods should be considered (see page B-46 of the Design Guidelines appendix) as well as pedestrian facility options (see beginning on page B-5 of the Design Guidelines appendix). As part of this study, consider the following:

With an existing pavement width of 46'-48 and 11,000 AADT along the section south of Reade Cir, consider reconfiguring Evans St from Reade Cir to 10th St to three lanes - one travel lane in each direction with a center turn lane. This will allow space to stripe buffered bike lanes or create some form of physically separated bicycle lanes, connecting Uptown to 10th St. Lower speed limit to 25 mph.

The 10th St connector is currently under construction from Stantonsburg Rd to Evans St. East of Evans St, reference the 10th St Corridor Study for proposed improvements along 10th St.

*See the Design Guidelines appendix for further detail on pedestrian & bicycle facility options



S. 14TH ST (PART 1)

Project length: 1.2 miles

Facility Types: Corridor study needed with a focus on separated bikeway, sidewalk, and crossing facilities

Jurisdiction: City of Greenville

Trip Generators: Uptown, ECU, Medical District, Sadie Saulter Elementary School, Greens Mill Run Greenway, businesses along the corridor, multiple residential areas

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: None

Partnerships: City of Greenville, businesses along the corridor, Higgs Brothers and Glen Arthur neighborhood/homeowners associations

Estimated Construction Costs: $460,000

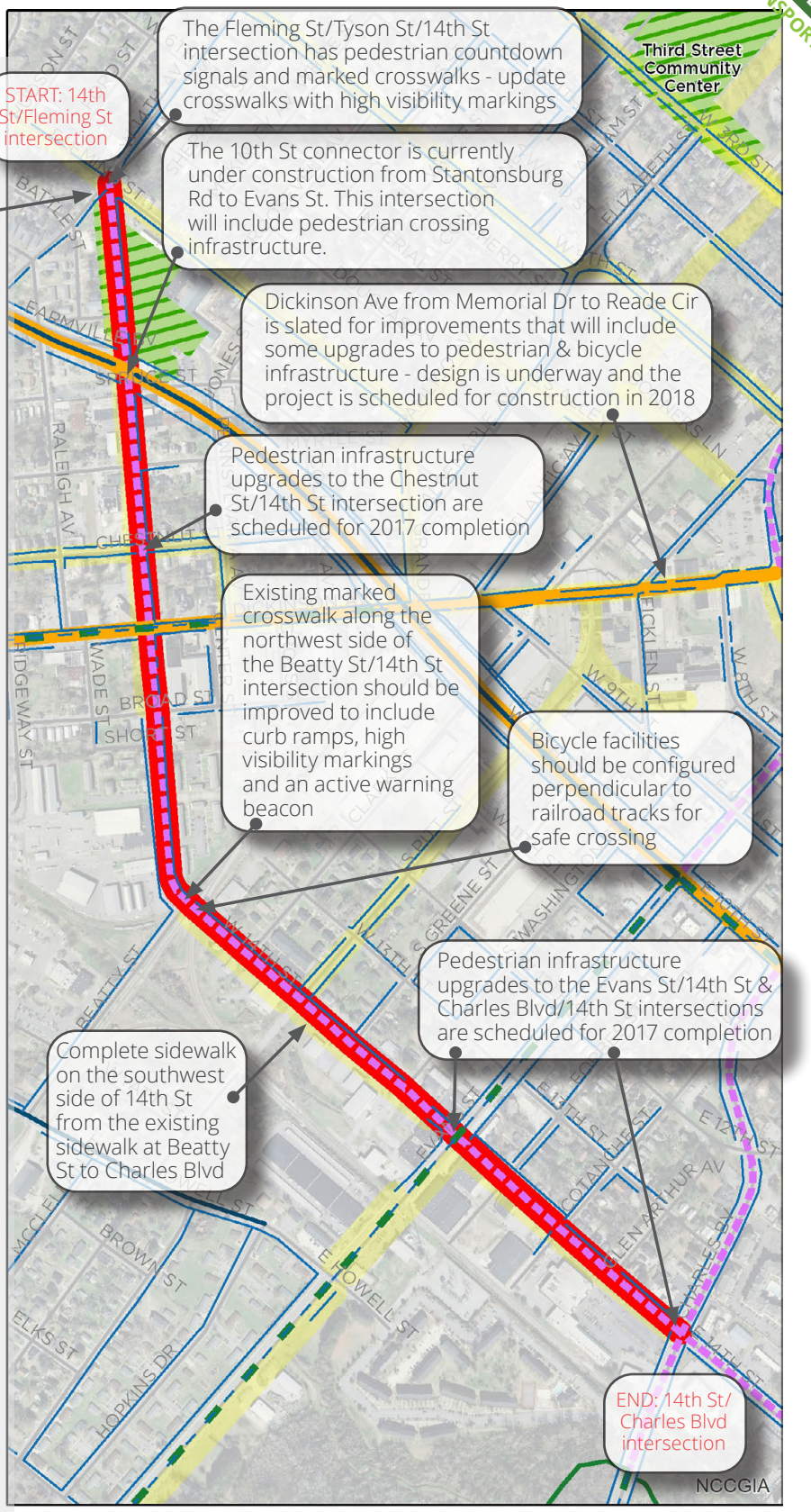
Project Details

*From Fleming St to Charles Blvd along 14th St, a detailed corridor study should be completed to evaluate bicycle & pedestrian facility options along with changing traffic conditions related to the 10th St Connector project that is currently under construction. Different types of physically separated bicycle lane separation methods should be considered (see page B-46 of the Design Guidelines appendix) as well as pedestrian facility options (see beginning on page B-5 of the Design Guidelines appendix). As part of this study, consider the following:

With an existing pavement width that varies from 42'-50' and AADT of 12,000-14,000 along this section (not including the 10th St to Fleming St section), consider reconfiguring 14th St from 10th St to Charles Blvd from five lanes to three lanes - one travel lane in each direction with a center turn lane. This will allow space to stripe buffered bike lanes or create some form of physically separated bicycle lanes, providing an essential link through the heart of Greenville. Sidewalk exists on the north/east side of 14th St - complete the sidewalk network on the south/west side of the street.

*Installing separated bicycle facilities will significantly enhance the pedestrian level of service along this stretch of14th St by creating buffer space between the existing sidewalk and automobile traffic. Presently, no buffer space exists.

*See the Design Guidelines appendix for further detail on pedestrian & bicycle facility options



T. 14TH ST (PART 2)

Project length: 0.6 miles

Facility Types: Corridor study needed with a focus on separated bikeway, sidewalk, and crossing facilities

Jurisdiction: City of Greenville

Trip Generators: ECU, Uptown, Stadium Greenway, Eppes Middle School, Elmhurst Elementary School, businesses at the 14th St/Charles Blvd intersection, multiple residential areas

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: Segment on north side of 14th St west of ECU to the Charles Blvd intersection; ROW needs to be coordinated with ECU on all other sections east of the Rite Aid property

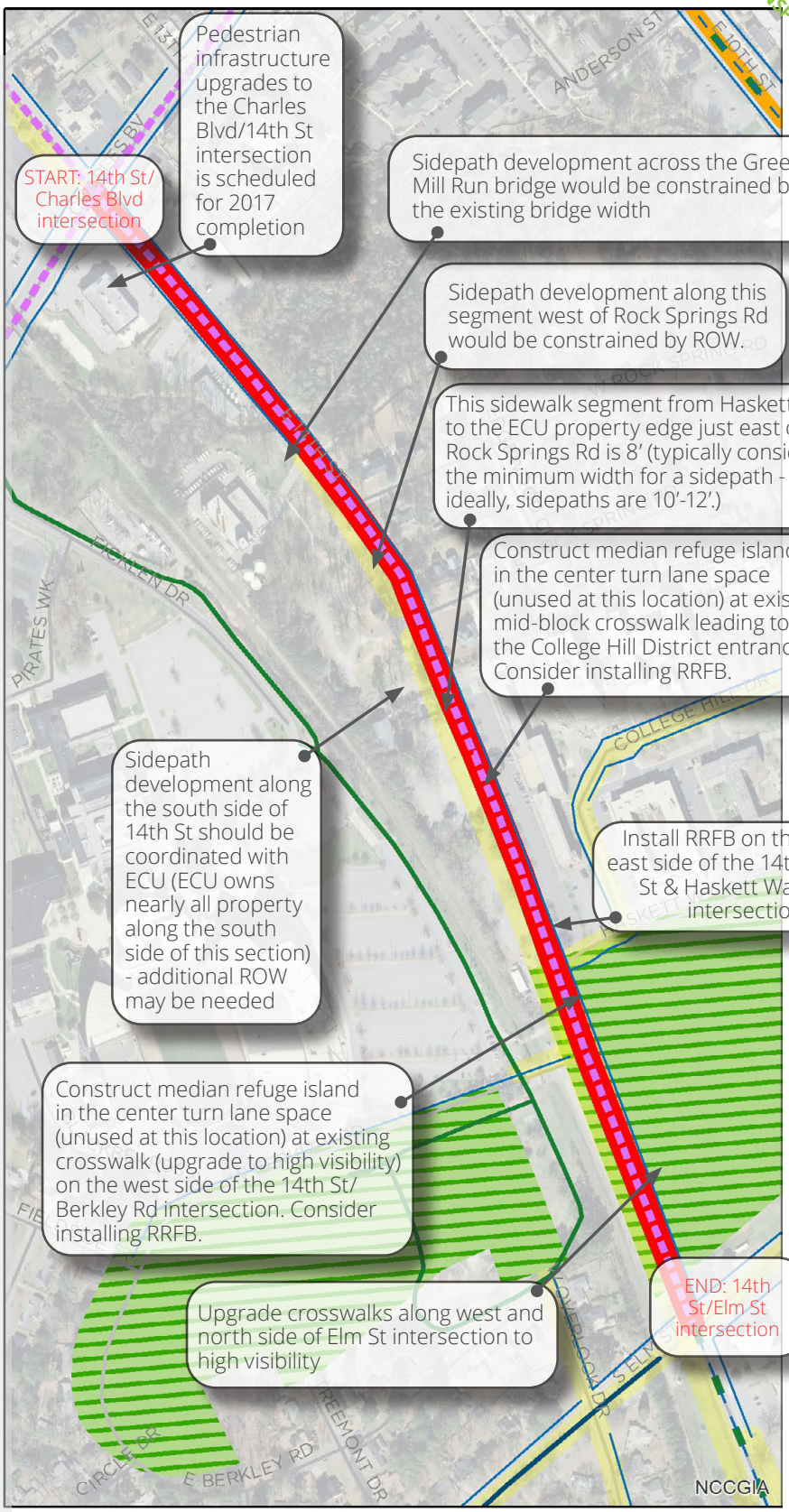
Partnerships: City of Greenville, ECU, businesses at the 14th St/Charles Blvd intersection, Rock Springs and Forest Hills neighborhood/homeowners associations

Estimated Construction Costs: $800,000

Project Details

*From Charles Blvd to Elm St along 14th St, a detailed corridor study should be completed to evaluate bicycle & pedestrian facility options. Different types of physically separated bicycle lane separation methods should be considered (see page B-46 of the Design Guidelines appendix) as well as pedestrian facility options (see beginning on page B-5 of the Design Guidelines appendix). As part of this study, consider the following:

With an existing pavement width that is 32'-34', an AADT of 13,000, and three travel lanes (one travel lane in each direction with a center turn lane) along this section, no space is available for on-road bicycle infrastructure within the existing roadway pavement. Sidewalk exists along the length of the north side, along with a short segment on the south side leading to the Charles Blvd intersection. Consider constructing a sidepath along the south side of 14th St, beginning from the existing sidewalk segment near the Charles Blvd intersection. Consider transitioning the existing sidewalk on the north side (and the short existing segment on the south side) of 14th St from the Charles Blvd intersection to the 8' segment along ECU property to sidepath when sidewalk repairs are needed, with future development, and/or major roadway work (in the meantime, allow bicycle riding with caution on the existing sidewalk). The existing sidewalk segment from Haskett Way to Elm St should be replaced with a sidepath as part of this project.



U. 14TH ST (PART 3)

Project length: 1 mile

Facility Types: Corridor study needed with a focus on sidepath, sidewalk, and crossing facilities.

Jurisdiction: City of Greenville

Trip Generators: ECU, Stadium Greenway, Elm Street Park, Peppermint Park, Jaycee Park, Perkins Athletic Complex, Sheppard Memorial Library, Eastern Elementary School, Elmhurst Elementary School, Eppes Middle School, Aycock Middle School, 14th St/Greenville Blvd businesses, multiple residential areas

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: None

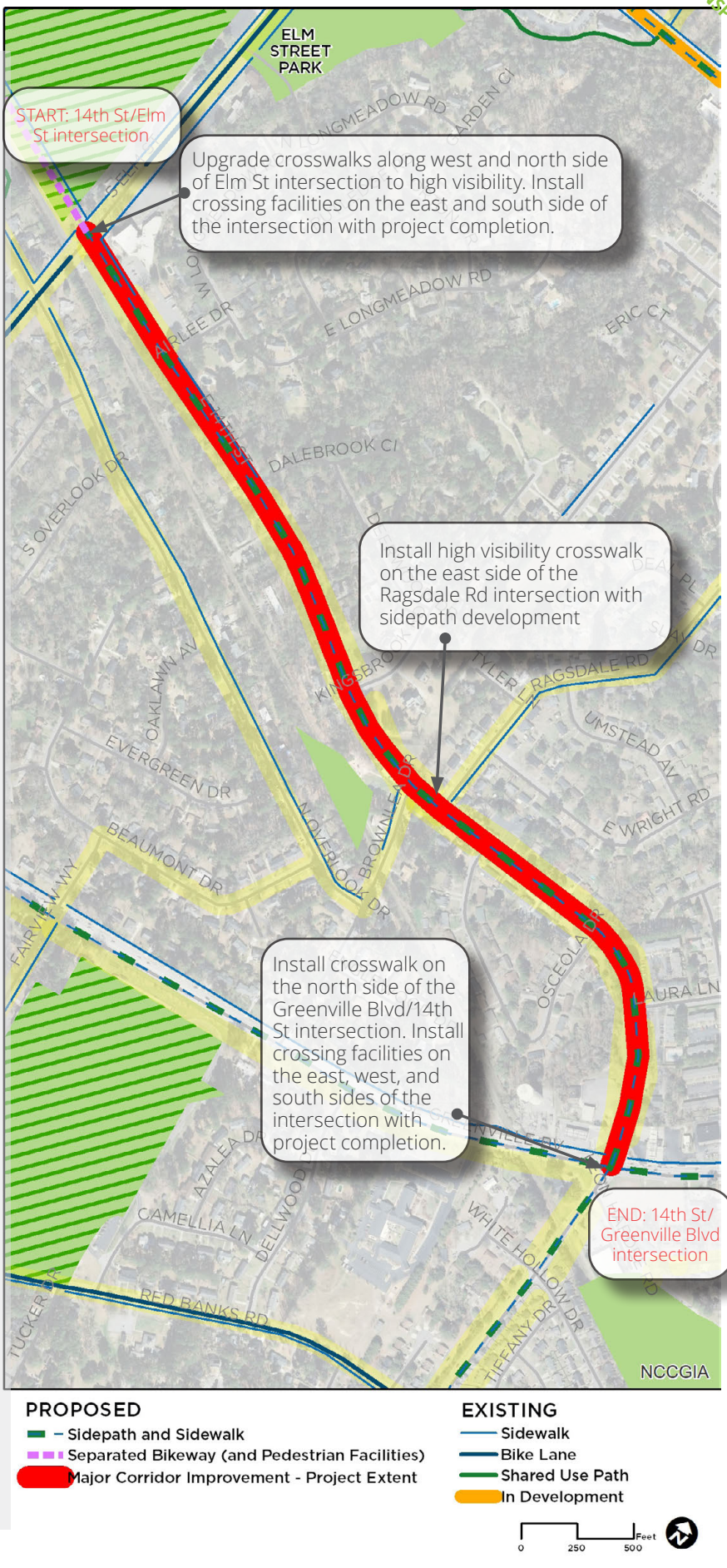
Partnerships: City of Greenville, ECU, businesses at the 14th St/Greenville Blvd intersection, Brookgreen, Englewood, and Coghill neighborhood/homeowner's associations

Estimated Construction Costs: $1,560,000

Project Details

*From Elm St to Greenville Blvd along 14th St, a detailed corridor study should be completed to evaluate bicycle & pedestrian facility options. Different types of physically separated bicycle lane separation methods should be considered (see page B-46 of the Design Guidelines appendix) as well as pedestrian facility options (see beginning on page B-5 of the Design Guidelines appendix). As part of this study, consider the following:

With an existing pavement width that is 22'-24', an AADT of 9,000, and two travel lanes along this section, no space is available for on-road bicycle infrastructure within the existing pavement. A short segment of sidewalk exists along the north side of 14th St from Elm St to Dalebrook Cir, but otherwise, no sidewalks exist along this corridor. construct a sidepath and sidewalk, one on each side (side to be determined during the design phase).



V. 14TH ST (PART 4)

Project length: 0.3 miles

Facility Types: Corridor study needed with a focus on sidepath, sidewalk, and crossing facilities.

Jurisdiction: City of Greenville

Trip Generators: Jaycee Park, Sheppard Memorial Library, Eastern Elementary, Perkins Athletic Complex, 14th St/Greenville Blvd businesses, multiple residential areas

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: ROW is consistently 60 ft along this section of 14th St. Additional ROW acquisition would be needed to construct sidewalk on one or both sides of the street.

Partnerships: City of Greenville, businesses at the 14th St/Greenville Blvd intersection, Carolina Coastal Railway, Norfolk Southern, Eastwood neighborhood/homeowner's association

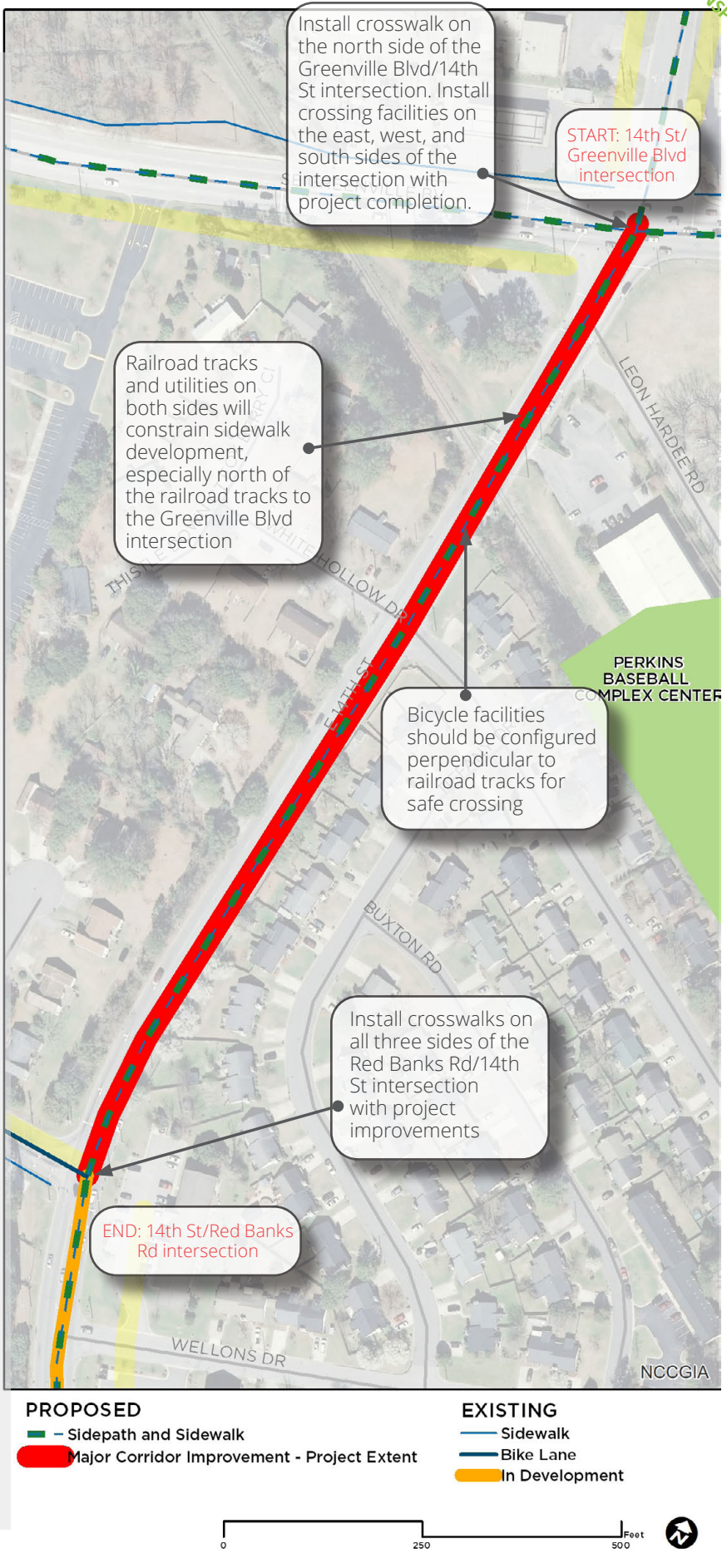
Estimated Construction Costs: $190,000

Project Details

*From Greenville Blvd to Red Banks Rd along 14th St, a detailed corridor study should be completed to evaluate bicycle & pedestrian facility options. Different types of physically separated bicycle lane separation methods should be considered (see page B-46 of the Design Guidelines appendix) as well as pedestrian facility options (see beginning on page B-5 of the Design Guidelines appendix). As part of this study, consider the following:

With an existing pavement width that is 50'-52', an AADT of 17,000, and four travel lanes (two in each direction) construct a sidepath and sidewalk, one on each side (side to be determined during the design phase).

*Installing separated bicycle facilities would significantly enhance the pedestrian level of service along this stretch of14th St by creating buffer space between any future sidewalk and automobile traffic.



W. EVANS ST (2)

Project length: 0.5 miles

Facility Types: Corridor study needed with a focus on sidepath, sidewalk, and crossing facilities.

Jurisdiction: City of Greenville

Trip Generators: Uptown, ECU, businesses along and near corridor, multiple residential areas

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: None

Partnerships: City of Greenville, Uptown Greenville, ECU, redevelopment stakeholders, businesses along the corridor, Carolina Coastal Railway, Norfolk Southern, Glen Arthur neighborhood/ homeowner's association

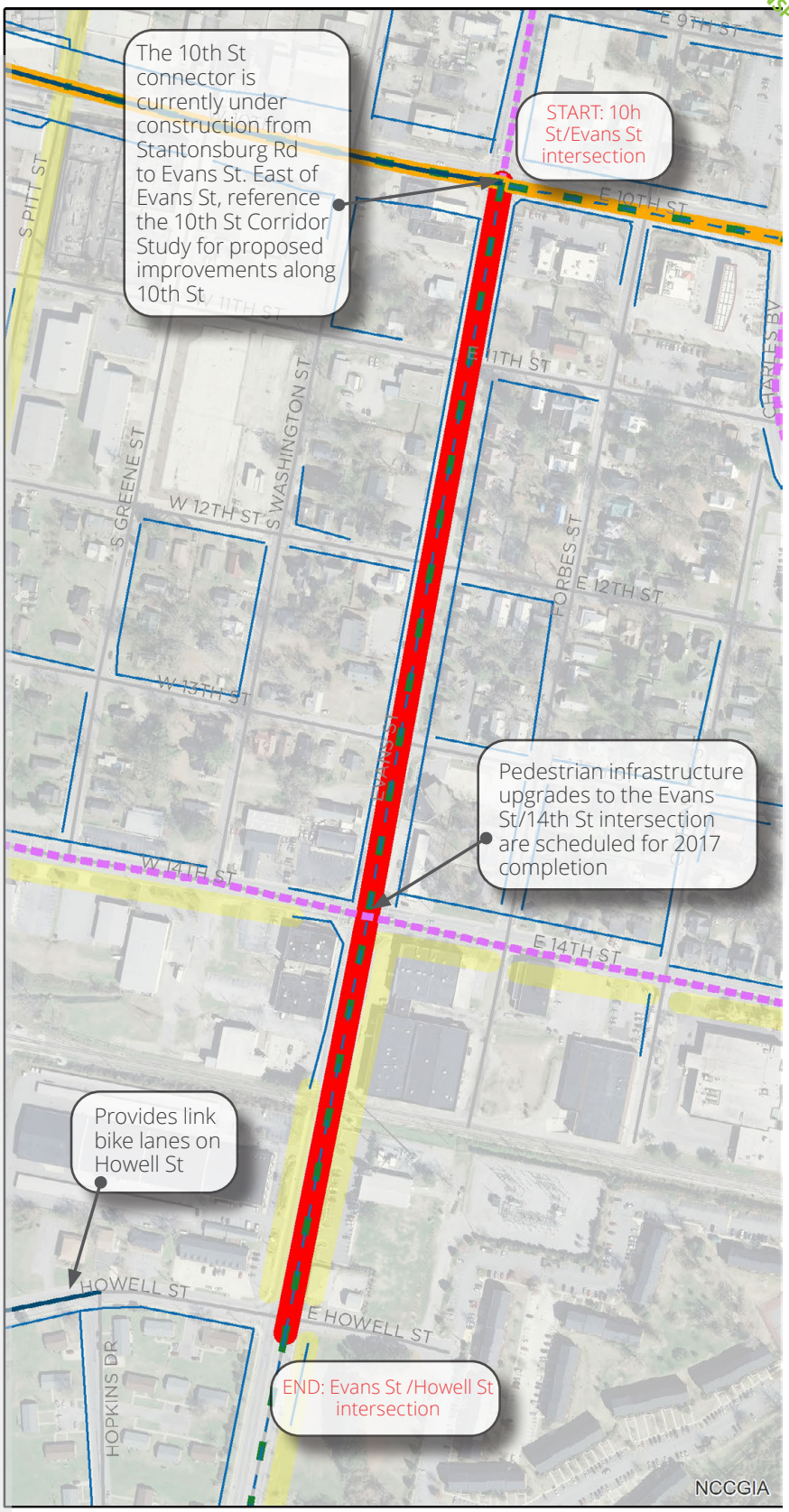
Estimated Construction Costs: $150,000

Project Details

*From 10th St to Howell St along Evans St, a detailed corridor study should be completed to evaluate bicycle & pedestrian facility options along with changing traffic conditions related to the 10th St Connector project that is currently under construction. Different types of physically separated bicycle lane separation methods should be considered (see page B-46 of the Design Guidelines appendix) as well as pedestrian facility options (see beginning on page B-5 of the Design Guidelines appendix). As part of this study, consider the following:

With an existing pavement width that is 57'-59', an AADT that transitions from 11,000 to 18,000, and five travel lanes (two in each direction with a center turn lane), construct a sidepath and sidewalk, one on each side (side to be determined during the design phase).

Due to high traffic volumes and speeds and no buffer space, the current sidewalks along this stretch of Evans St offer a low level of service (see Map*** in Chapter 2). Installing separated bicycle facilities will significantly enhance the pedestrian level of service.



X. EVANS ST (3)

Project length: 1.2 miles

Facility Types: Corridor study needed with a focus on sidepath, sidewalk, and crossing facilities.

Jurisdiction: City of Greenville

Trip Generators: Uptown, ECU, Greens Mill Run Greenway, JH Rose High School, South Greenville Elementary, businesses along corridor, multiple residential areas

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: None

Partnerships: City of Greenville, businesses along the corridor, Lakewood Pines neighborhood/ homeowner's association

Estimated Construction Costs: $760,000

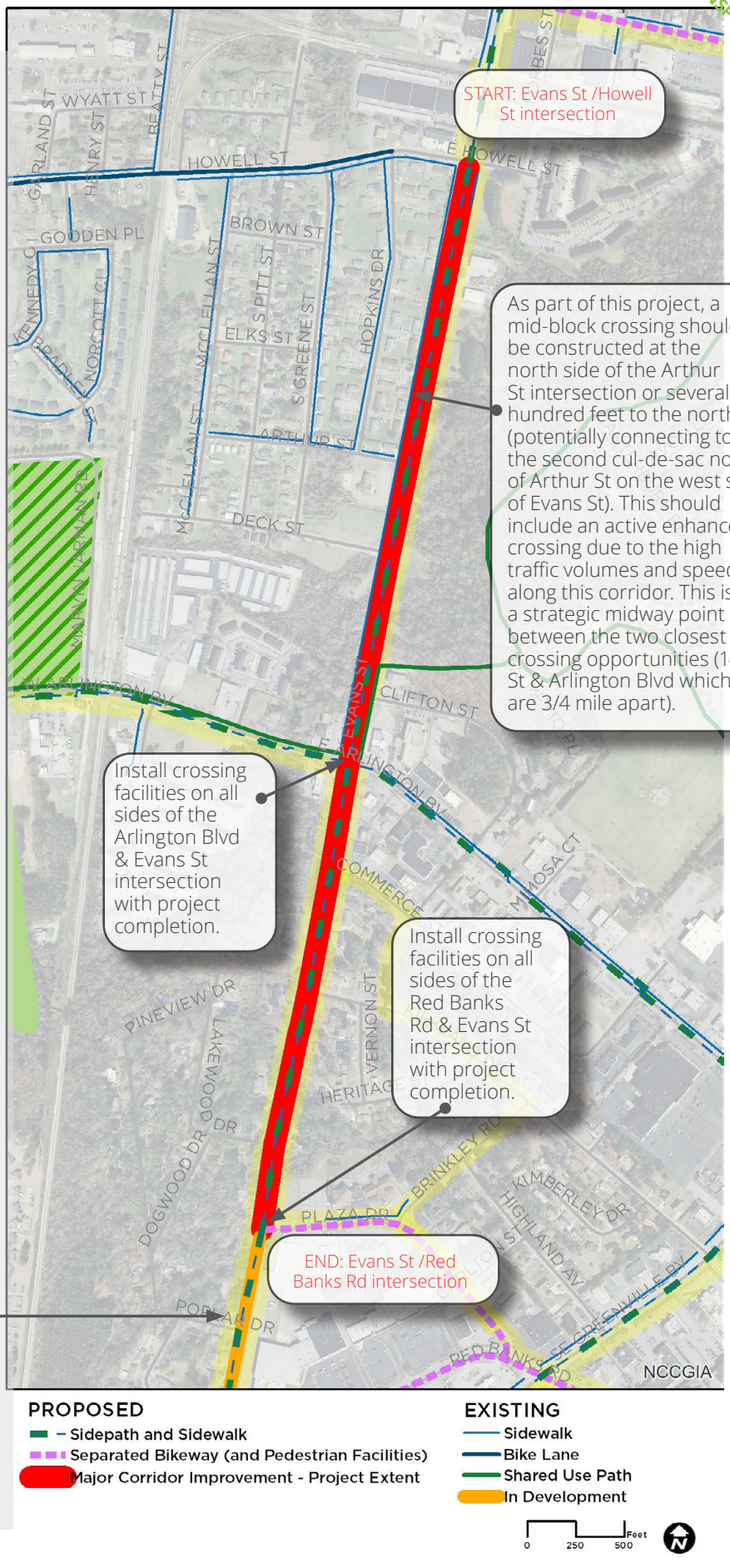
Project Details

*From Howell St to Red Banks Rd, along Evans St, a detailed corridor study should be completed to evaluate bicycle & pedestrian facility options along with changing traffic conditions related to the 10th St Connector project that is currently under construction and the Evans St/Old Tar Rd widening project that is currently in design. Different types of physically separated bicycle lane separation methods should be considered (see page B-46 of the Design Guidelines appendix) as well as pedestrian facility options (see beginning on page B-5 of the Design Guidelines appendix). As part of this study, consider the following:

With an existing pavement width that is 62'-64', an AADT that transitions from 18,000 to 20,000, and five travel lanes (two in each direction with a center turn lane), construct a sidepath and sidewalk, one on each side (side to be determined during the design phase).

Due to high traffic volumes and speeds and no buffer space, the current sidewalks along this stretch of Evans St offer a low level of surface.

The Evans St/Old Tar Rd widening project is currently in design. Separated bicycle & pedestrian facilities should be required for this project.



Y. COTANCHE ST

Project length: 0.3 miles

Facility Types: Corridor study needed with a focus on separated bikeway, sidewalk, and crossing facilities

Jurisdiction: City of Greenville

Trip Generators: Uptown, ECU, 10th St/Cotanche St businesses, Boundary at West End Apartments

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: None

Partnerships: City of Greenville, Uptown Greenville, ECU, redevelopment stakeholders, 10th St/Cotanche St businesses, Boundary at West End Apartments

Estimated Construction Costs: $100,000

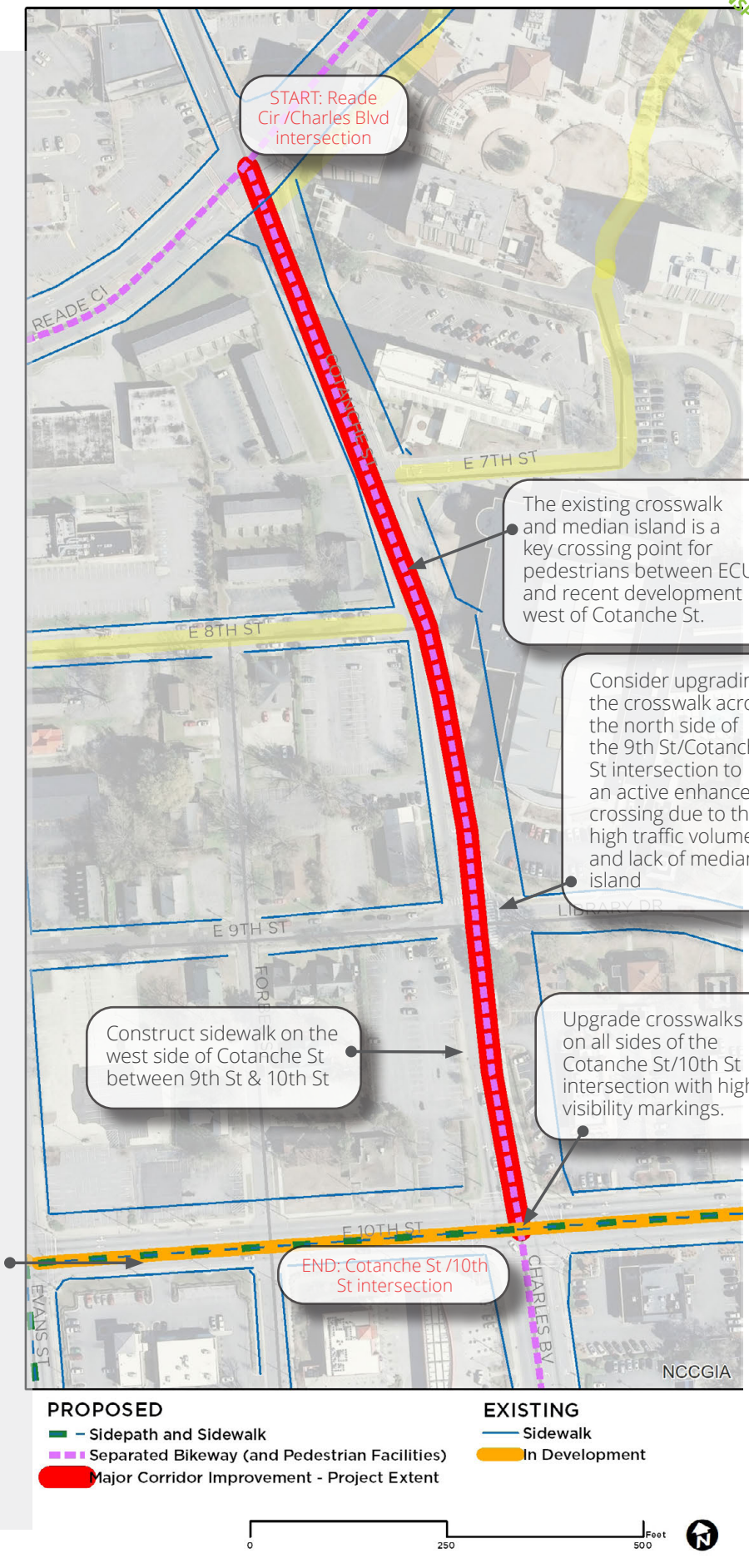
Project Details

*From Reade Cir to 10th St along Cotanche St, a detailed corridor study should be completed to evaluate bicycle & pedestrian facility options along with changing traffic conditions related to the 10th St Connector project that is currently under construction. Different types of physically separated bicycle lane separation methods should be considered (see page B-46 of the Design Guidelines appendix) as well as pedestrian facility options (see beginning on page B-5 of the Design Guidelines appendix). As part of this study, consider the following:

With an existing pavement width that is 44'-45', an AADT of 14,000, and three travel lanes (one in each direction with a center turn lane (and median island between 7th St and 8th St), consider the possibility of reconfiguring the lane width to 10'. This will allow space to stripe buffered bike lanes or create some form of physically separated bicycle lanes. Other options for installing separated bicycle facilities will require significant investment in roadway widening and/or overall corridor redevelopment.

Due to high traffic volumes and no buffer space, installing separated bicycle facilities will significantly enhance the pedestrian level of service by creating additional buffer space between automobile traffic and the existing sidewalks.

The 10th St Corridor Study shows a conceptual design for bicycle & pedestrian improvements along 10th St from Evans St to Greenville Blvd. Implementing this study along with improvements along this section of Cotanche St will significantly enhance walking and bicycling safety between Uptown and east Greenville.



Z. CHARLES BLVD

Project length: 0.5 miles

Facility Types: Corridor study needed with a focus on separated bikeway, sidewalk, and crossing facilities

Jurisdiction: City of Greenville

Trip Generators: Uptown, ECU, businesses along the corridor, Greens Mill Run Greenway, multiple residential areas

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: None

Partnerships: City of Greenville, Uptown Greenville, ECU, redevelopment stakeholders, businesses along the corridor, Glen Arthur neighborhood/homeowner's association

Estimated Construction Costs: $130,000

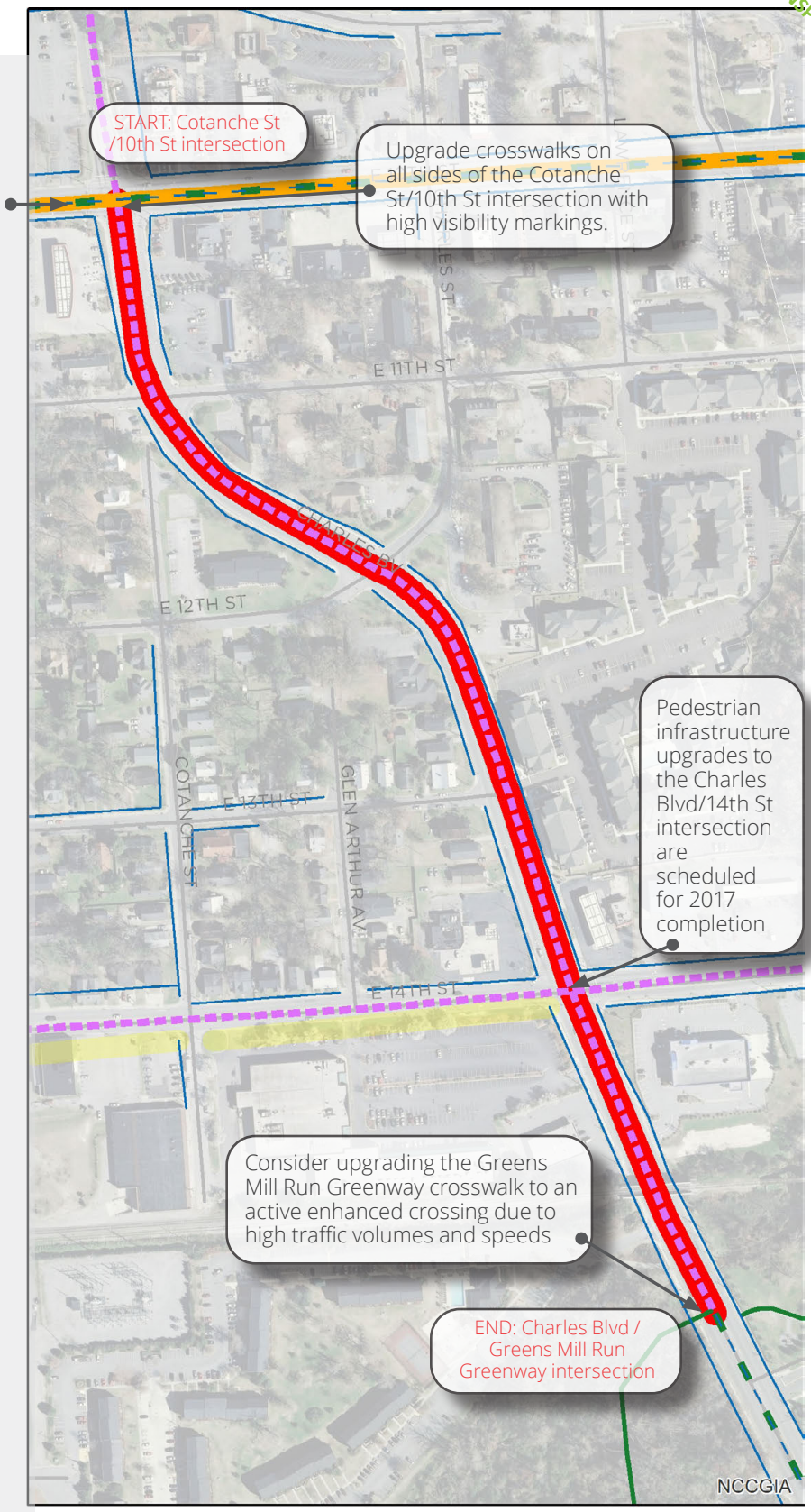
Project Details

The 10th St Corridor Study shows a conceptual design for bicycle & pedestrian improvements along 10th St from Evans St to Greenville Blvd. Implementing this study along with improvements along this section of Charles Blvd will significantly enhance walking and bicycling safety.

*From 10th St to the Greens Mill Run Greenway intersection along Charles Blvd, a detailed corridor study should be completed to evaluate bicycle & pedestrian facility options along with changing traffic conditions related to the 10th St Connector project that is currently under construction. Different types of physically separated bicycle lane separation methods should be considered (see page B-46 of the Design Guidelines appendix) as well as pedestrian facility options (see beginning on page B-5 of the Design Guidelines appendix). As part of this study, consider the following:

With an existing pavement width that is 66'-68', an AADT that transitions from 15,000 to 21,000, and five travel lanes (two in each direction with a center turn lane before the center turn lane is replaced by a median south of the Greens Mill Run Greenway), consider the possibility of reconfiguring to three lanes (one in each travel direction with a center turn lane). This will allow space to stripe buffered bike lanes or create some form of physically separated bicycle lanes, connecting with the proposed facilities continuing north toward Uptown. Other options for installing separated bicycle facilities without lane reconfiguration will require significant investment in roadway widening and/or overall corridor redevelopment.

Due to high traffic volumes and limited to no buffer space, installing separated bicycle facilities will significantly enhance the pedestrian level of service by creating additional buffer space between automobile traffic and the existing sidewalks.



AA. DOWNTOWN RAIL TRAIL

Project length: 0.5 miles

Facility Types: Shared use path, crossing improvements

Jurisdiction: City of Greenville

Trip Generators: ECU, Uptown, residential areas/ apartment complexes

Previous Planning: 2014 Dickinson Avenue Corridor Study

ROW needs: Partially - Norfolk Southern owns section south of 10th St.

Partnerships: City of Greenville, Norfolk Southern, Uptown Greenville, ECU, redevelopment stakeholders

Estimated Construction Costs: $940,000

Estimated Construction Costs with Alternate 10th St Crossing at Dickinson Ave: $1,270,000

Estimated Construction Costs with Alternate 10th St Crossing at Greene St: $1,105,000

Existing conditions along the project corridor, looking north, just north of 9th St, where the main line and spur converge.

Photo rendering of proposed trail with public art (example at left is "The Fence" project, https://fence.photoville.com) and trail-oriented business.

Project Details

Construct a shared use path on the inactive rail corridor spur between Dickinson Ave and 14th St. The section north of 10th St could be coordinated with redevelopment opportunities, serving as a central bicycle/pedestrian between businesses.

The 10th Street intersection will need a major crossing improvement for bicyclist, pedestrian, and motorist safety. This crossing should include a pedestrian hybrid beacon or a Rectangular Rapid Flash Beacon (RRFB) with thermoplastic rumble strips.

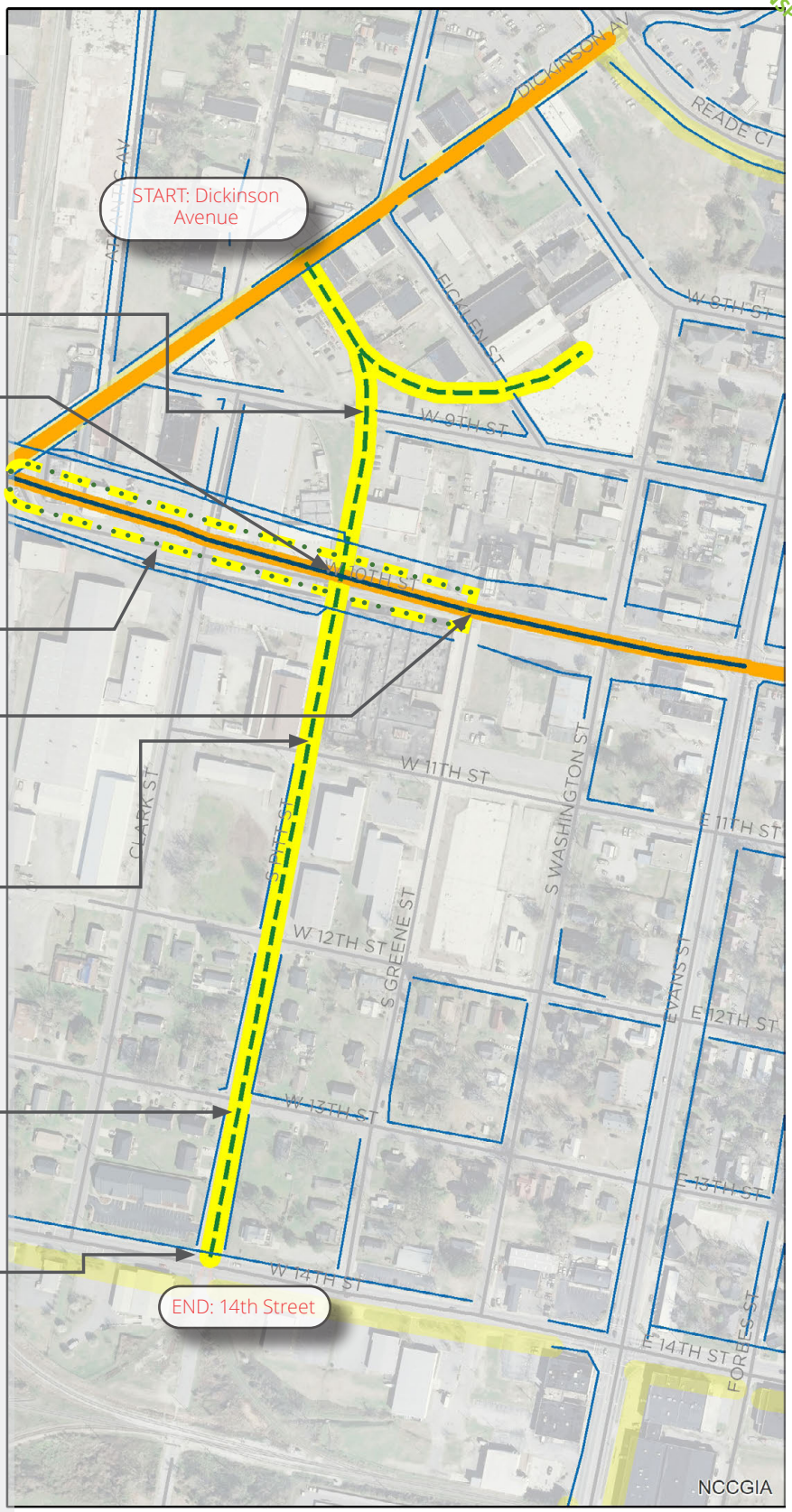
An alternative to crossing 10th St mid-block with a hybrid beacon could be to route the trail west to cross underneath at Dickinson Ave.

A second alternative could be routing the crossing to Greene St

Between 10th St and 12th St, the rail corridor runs along the east side of Pitt St. Construct a sidepath along this section.

Between 12th St and 14th St, the rail corridor runs between the divided north/south segments of Pitt St. Construct a sidepath along this section between the north/south segments of Pitt St.

See Project S for further information on recommendations for 14th St.



BB. TAR RIVER GREENWAY EXTENSION

Project length: 1.6 miles

Facility Types: Greenway

Jurisdiction: City of Greenville

Trip Generators: Tar River Greenway, multiple residential areas

Previous Planning: 2011 Greenville Bicycle & Pedestrian Plan

ROW needs: ROW needed for length of corridor

Partnerships: City of Greenville, property owners along corridor, East Coast Greenway

Estimated Construction Costs: $6,100,000

Existing conditions along the project corridor, looking east, just east of Greenville Blvdt.

Photo rendering of proposed boardwalk section of trail.

Project Details

Construct Tar River Greenway extension from the eastern end of the existing Tar River Greenway to the 10th St and Oxford Rd intersection. This project should approximately follow the existing water/sewer easement.

A short connector trail should be constructed to the Sunchase apartments on the west side of Greenville Blvd.

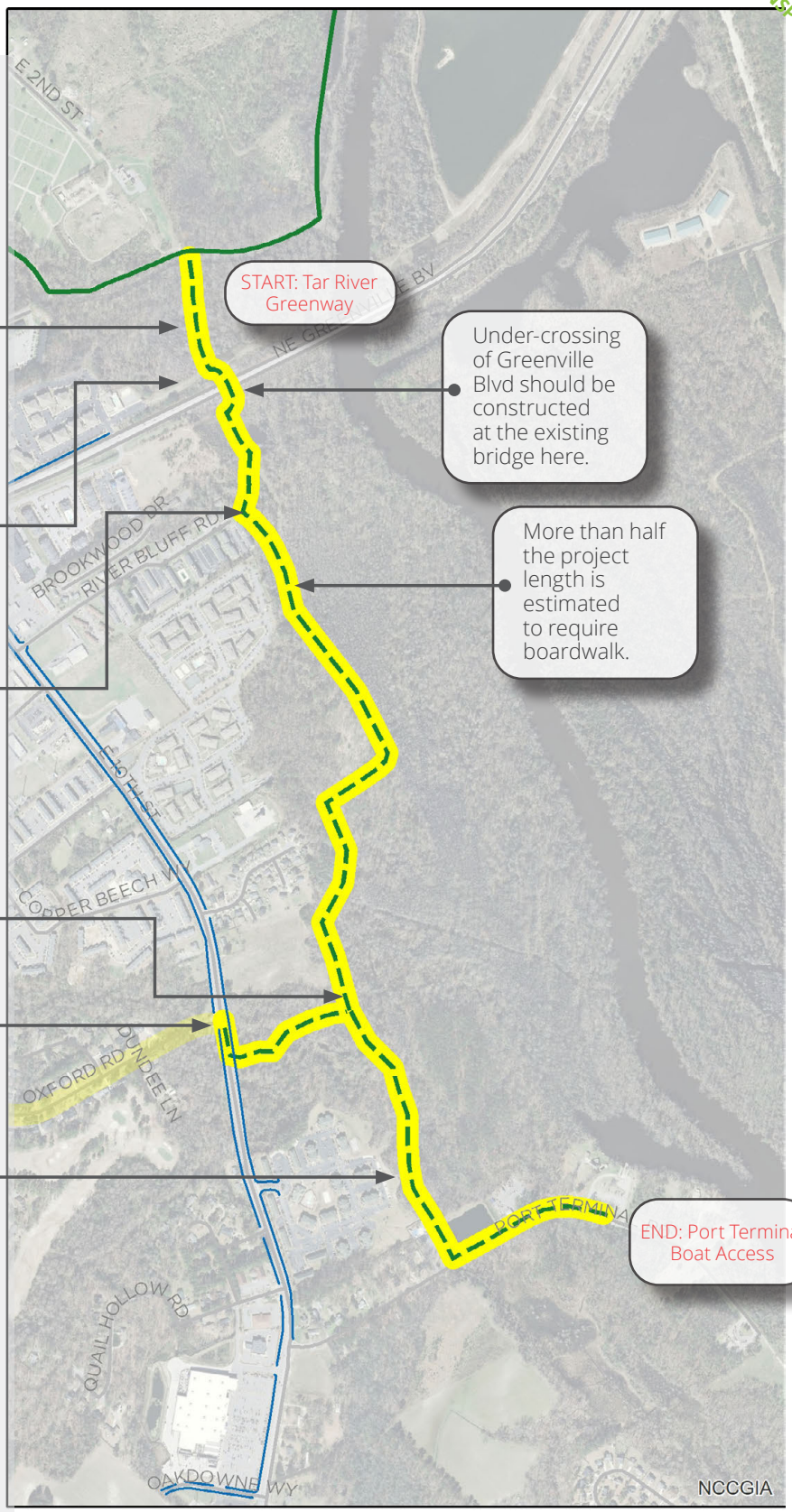
Construct multiple connection points to the businesses, apartments, and residences adjacent to the south of the greenway east of Greenville Blvd.

Hardee Creek crossing needed here.

Construct connection to Oxford Rd. Intersection improvements needed for the crossing of 10th St here.

Construct connector trail to the University Manor apartments.

*This section of greenway should be designated as part of the East Coast Greenway



6 Recommendations

75% of respondents are "very willing" or "willing" to support a bond referendum or additional funding for improvements to the City's streets and sidewalks, bike lanes, and street lighting.

- Greenville Citizen's Survey, 2014

Overview

A comprehensive approach to making the Greater Greenville Area more pedestrian-friendly and bicycle-friendly will need to integrate policy, programmatic, design, and implementation elements.

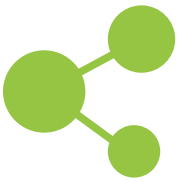
In order to realize the plan's goals and objectives, the Greater Greenville Area should use a multi-pronged strategy. Simply building more bike-ways and sidewalks will not enable the Greater Greenville area to reach the goals that are outlined in this plan. Multiple approaches should be taken to support bicycle and pedestrian facility development and programming. It is important to secure the funding necessary to undertake priority projects but also to develop a long-term funding strategy to allow continued development of the overall system. Dedicated local funding sources will be important for the implementation of this plan.

In this chapter, rationale is provided for why each recommendation is needed as well as specific guidance and key action steps. Case studies and lessons learned from cities across the U.S. are also included as part of the recommendations. Each recommendation is designed as a cut-sheet so that they can be easily referenced and implemented either as standalone projects or in conjunction with other recommendations.

Policy

Recommendations that fall under this category focus on policy-oriented strategies to send a signal to visitors, residents, and workers that the Greater Greenville area is undertaking a long-term commitment to improving walkability and bikeability. These policies touch on different aspects of the pedestrian and cyclist experience such as conflicts with motor vehicles, walking or biking through construction areas, or improving safety through traffic calming strategies.

Policy Topic	*Page number*
Local development ordinances	164
Bike parking	166
Shared active transportation	168
Traffic calming and speed reduction policy	170
Bike and pedestrian access in construction zones	172



Programmatic

Education, encouragement, enforcement, and promotional programs will help people discover, feel more confident, and learn how to safely travel along sidewalks and bikeways in the Greater Greenville area. Programs that are tailored to people of all ages and abilities will help them to realize the full potential of new and proposed walkways and bikeways. The recommended programmatic actions will increase the visibility of people who walk and bike, communicate that all road users are expected to look for each other no matter how they travel, create safer streets, and develop a common understanding of traffic safety.

Programmatic Topic	*Page number*
Staffing for bike and pedestrian planning & programs	174
Safety campaign	176
Implement Vision Zero Policy and Plan	178
Wayfinding System	180

Design

When designing bikeways and walkways, practitioners and leaders in the Greater Greenville area should consult national standards and guidelines for the most up-to-date innovations and best practices. The Federal Highway Administration (FHWA), National Association of Transportation Officials (NACTO), and American Association of State Highway and Transportation Officials (AASHTO) have a wealth of resources and reports to reference for current design standards of pedestrian and bike facilities. In addition, other cities across the United States could serve as models for how to design safe streets for all users. The design recommendations included in this chapter will provide guidance beyond the construction of standard bikeways and sidewalks.

Implementation

Aside from policy, programmatic, and design elements, this plan provides recommendations for how the Greater Greenville area can forge partnerships to further support walking and biking. Given the present-day economic challenges that local governments face, it is difficult to know the extent of financial resources available at different timeframes during implementation of this plan. These recommendations provide guidance on how the Greater Greenville area can leverage resources with other government agencies and external agencies to efficiently implement bicycle and pedestrian projects.

Local Development Ordinances

MODE

RECOMMENDATION:

Municipal and county planners and planning board members should update their local ordinances to better support active transportation.

Part I. Background

One of the most cost-effective active transportation implementation strategies for communities in the Greater Greenville Area is to establish land development regulations and street design policies that promote walkable and bikeable new development and capital projects. As part of a comprehensive approach to developing recommendations for a more walkable and bikeable Greenville MPO area, the consultant team reviewed Greenville MPO community ordinances, development standards and policies to identify general issues and opportunities impacting the bicycle and pedestrian environments across jurisdictions.

The team analyzed the regulatory standards and policies through the lens of this plan's vision statement:

"The Greater Greenville Area will offer residents and visitors many options for walking and bicycling, through well-designed and beautifully maintained greenway trails, and through walkable, bicycle-friendly streets. People of all ages, abilities, and incomes will be able to safely and conveniently get to where they want to go." – Vision Statement from the Active Transportation Plan Steering Committee

The consultant team has identified model regulatory and policy language from around North Carolina and the U.S. for elements including land use/transportation integration, connectivity, Complete Streets, and bicycle parking, enabling the City and County jurisdictions to maximize bicycle/pedestrian and greenway improvements in conjunction with new development, redevelopment, and corridor improvement projects. In addition, the review includes recommended policy language additions to enhance greenway development.

Part II. Details

Timeframe

- ☑ **SHORT-TERM**
- ○ **MID-TERM**
- ○ **LONG-TERM**

Funding Needs

- ☑ **LOW**
- ○ **MEDIUM**
- ○ **HIGH**

Responsible Party

LEAD ROLE

Municipal and county planners

SUPPORT ROLE

Planning board members

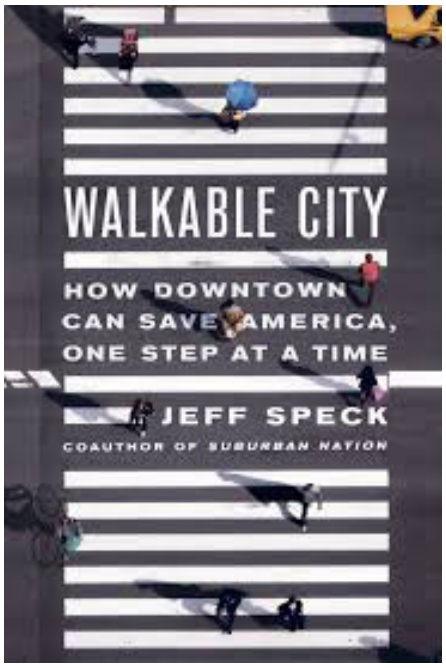
Part III. Action Steps

Action Steps	Person(s)/ Organization(s) Responsible	Target Completion Date
Read through the policy review memorandum from this planning process	Municipal and county planning directors	2017
Select policy updates and revisions that are appropriate for your community	Municipal and county planning directors	2017
Present these proposed updates to planning boards for discussion	Planning Boards	2018
Adopt and incorporate new policies and policy updates	Planning Boards & Elected Officials	2018

Case Study

Some members of this plan's Steering Committee attended workshops by city planner and walkability advocate, Jeff Speck. Speck's *Ten Steps of Walkability* were considered in selecting which regulatory and policy issues would be most important for the Greater Greenville Area's communities to focus on. These include:

1. ***Put Cars in Their Place***
2. ***Mix the Uses***
3. ***Get the Parking Right***
4. ***Let Transit Work***
5. ***Protect the Pedestrian***
6. ***Welcome Bikes***
7. ***Shape the Spaces***
8. ***Plant Trees***
9. ***Make Friendly and Unique Spaces***
10. ***Pick Your Winners.***



Several Steering Committee members communicated that author Jeff Speck could be an inspiration to active transportation policy in the region. *Above: Cover of the Jeff Speck's book, "Walkable City: How to Save America One Step at a Time".*

Bike Parking Program

MODE

RECOMMENDATION:

- Implement a bike rack program which allows for business owners and residents to request bike parking and for bike parking to be provided within the street right-of-way
- Develop a policy for how to administratively retrofit on-street parking as bike corrals in areas with high bike volumes

Part I. Background

A bike parking program should be established where the jurisdictions within the Greater Greenville area provide, install, and maintain bike racks. Installation of bike racks could occur in areas with high bike traffic or at the request of business owners or residents. The Greater Greenville area should consider a requirement for developers to provide bike parking within their development or on the streets adjacent to the development. If developers do not want to provide bike parking, then they could instead pay a fee to the city that would fund bike racks.

The current parking code should be amended to allow for bike parking to be provided in the public right-of-way when adequate space is available and when the right-of-way provides for better visibility of bike racks. Greenville could administer a program and provide an application for business owners to apply for bike racks that are placed within the public right-of-way. This will increase the supply of bicycle parking in the city while also increasing visibility for bicycling as a means of transportation.

Furthermore, many areas within Greenville's street right-of-way are occupied by on-street vehicular parking spaces, some of which are metered. This bike rack program should identify a process for administrative approval by Public Works without individual hearings and that is based on bike parking density for bike corral locations. Through this program, bike corrals may replace parking spaces. NACTO guidelines should be consulted for ideal bike parking density.

Part II. Details

Timeframe

- ☐ SHORT-TERM
- ☑ MID-TERM
- ☐ LONG-TERM

Funding Needs

- ☐ LOW
- ☑ MEDIUM
- ☐ HIGH

Responsible Party

LEAD ROLE

Greenville MPO

SUPPORT ROLE

Greenville Parking Enforcement, Greenville Community Development Department, Greenville Public Works

Bike parking in Greenville (Source: FROGGS)

Case Study

Pittsburgh, PA

The City of Pittsburgh installs sidewalk bike racks on a district-wide basis and does not charge a fee. Applicants can apply to install a standard bike rack using their own contractor or apply for a sidewalk rack permit where the city installs the rack through their rack installation program. The applications are evaluated to make sure they meet the public space regulations.

Minneapolis, MN

The City of Minneapolis provides guidelines for where on-street bike corrals can be located. The applicant and the city share the costs equally, and the city owns the corrals with the intention that the locations exist for a minimum of 5 years. The applicant is responsible for the day-to-day upkeep.

Seattle, WA

Racks are installed at the request of citizens and business or property owners. Racks remain the property of Seattle Department of Transportation (SDOT). SDOT assumes responsibility for the racks but not for bicycles parked at them. Several criteria are used in siting the racks; one criteria is that they must be installed in public space within the City of Seattle limits, usually on a sidewalk with six feet or more of clear sidewalk space remaining. Racks on private property are usually paid for by the property owner. City racks are not available for purchase, but Bicycle Program staff can help property owners choose appropriate racks and installation locations. SDOT will also consider bike corrals upon request of the adjacent business owner. Converting a vehicle space is typically warranted where bike parking demand exists and where sidewalks are constrained.

Source: http://pittsburghpa.gov/dcp/bicycleparking
http://www.minneapolismn.gov/www/groups/public/@publicworks/documents/webcontent/wcmsp-172354.pdf
http://www.seattle.gov/transportation/bikeparking.htm

Part III. Action Steps

Action Steps	Person(s)/ Organization(s) Responsible	Target Completion Date
Develop bike rack program, including an application for requesting bike racks	Greenville MPO, Greenville Public Works	Early 2018
Propose policy that would allow for on-street bike corrals	Greenville MPO	End of 2018
Develop program and guidelines for bike corral program and obtain approval from municipalities within Greater Greenville area	Greenville MPO	Early 2019
Identify funding source and staff for implementation of bike rack program where bike racks are provided by the local jurisdictions	Greenville MPO	Ongoing

Top right: Bike parking in Pittsburgh; Bottom left: Bike corral outside a cafe in Minneapolis, MN (Source: Finance & Commerce); Bottom right: Bike corral in Seattle, WA (Source: City of Seattle)

Shared Active Transportation

MODE

Part I. Background: What is Shared Active Transportation?

Companies rent small, shared-use-specific, vehicles to the public from multiple locations within the right-of-way. As of 2019, these small vehicles include: bikes, e-bikes, scooters, and e-scooters, but other vehicles may be under development. Typically, Shared Active Transportation small vehicles are stored in the public right-of-way. This is a dynamic topic for cities, and best practices are likely to evolve quickly in coming years. The report outlined on the opposite page offers some of the best guidance to-date on the subject, and there are likely to be updates to the report in the future.

When and where governments choose to exercise their authority varies from city to city. However, the mechanisms for how and why cities can regulate generally fall into similar categories:

- *Commerce on the public right-of-way:* In most places, business cannot be conducted in the public right-of-way without an appropriate permit.
- *Zoning regulations*: Most zoning codes designate what kinds of businesses are permitted where.
- *Regulating where small vehicles are permitted:* If a municipality permits an operation – whether it be an ice cream stand, outdoor dining, or a parked bike/scooter – it can designate the area where the activity is permitted to be
- *Existing Contracts:* Municipalities with existing contracts with vendors to run local bikeshare systems may have exclusivity or other provisions which limit the municipalities' ability to permit additional vendors/operators of bikeshare to operate or do business within the municipality

RECOMMENDATION:

- ☑ **Policy areas where all cities should be in alignment include: 1) oversight & authority, 2) data standards, and 3) small vehicle standards**
- ☑ **Policy areas where issues should be evaluated at a local level include: 1) small vehicle parking, and 2) community engagement and equity programs**
- ☑ **The NACTO report outlined on the following page offers dozens of policy recommendations and considerations on this topic. See full document for details. Examples include:**
  - **Companies operating in the public right of way should provide cities and local governments with accurate, complete, and timely data about how Shared Active Transportation services are used and, in an appropriately anonymized fashion, who is riding.**
  - **Companies should provide small vehicles and other equipment that is safe for public use and developed for the shared-use context.**
  - **Cities should require companies to remove small vehicles (e.g. damaged, abandoned, improperly placed etc) within contractually agreed-upon time frames and assess penalties for failure to do so.**

Part II. Details

Timeframe

- ○ SHORT-TERM
- ☑ MID-TERM
- ○ LONG-TERM

Funding Needs

- ☑ LOW
- ○ MEDIUM
- ○ HIGH

Responsible Party

LEAD ROLE

Greenville MPO

SUPPORT ROLES

Greenville Parking Enforcement, Greenville Community Development Department, Greenville Public Works

Note: The source of content on this page and the previous page is the NACTO Shared Active Transportation Guidelines. Please see the full document for more information and details:

https://nacto.org/wp-content/uploads/2018/07/NACTO-Shared-Active-Transportation-Guidelines.pdf

Topics Covered in the NACTO Shared Active Transportation Guidelines:

Policy Areas Where All Cities Should Be in Alignment:

- Oversight & Authority (General Provisions, Operations Oversight, Public Communications Oversight
- Data Standards (Provision & Access, Quality & Accuracy, Privacy
- Small Vehicle Standards for the Shared-Use Context

Policy Areas Where Issues Should Be Evaluated at a Local Level:

- Small Vehicle Parking (Locking Options; Where in the Right of Way?; How can space be provided or marked?)
- Community Engagement and Equity Programs (Discount Programs; Engagement Programs)

State of Practice:

- Fleet Size and Service Area
- Small Vehicle Distribution
- Fees and Pricing
- Equity Programming
- Permit Overview

Dockless bike share at ECU, and scooters in Raleigh, NC.

Traffic Calming and Speed Reduction Policy

MODE 

RECOMMENDATION:

- Implement traffic calming measures on neighborhood streets
- Develop clear and concise guidelines for traffic calming measures
- Identify 5 pilot projects to implement 20 mph zones near intersections with high collision history and/or near high pedestrian and bicycling generators

Part I. Background

Traffic calming is used to mitigate the effects of speeding and cut-through traffic in residential neighborhoods. Traffic calming measures improve safety for pedestrians, cyclists, and motorists who travel along neighborhood streets. A common traffic calming strategy is to reduce posted speed limits. Lowering speed limits on streets can dramatically reduce the likelihood as well as severity of injuries and fatalities that result from pedestrian and cyclist collisions. According to the ITE Transportation Planning Council, the risk of fatality decreases from 45% to 5% when the speed limit is reduced from 30-35 mph to 20-25 mph.

Residential streets in Greenville and Ayden already have posted speed limits of 25 mph. Most residential streets in Winterville have either 20 or 25 mph posted speed limits.

The City of Greenville could consider piloting 20 mph zones in areas that have a high number of pedestrian or bicycle collisions or near areas with generators of bicycle and pedestrian activity, such as schools and parks. The city should further evaluate major thoroughfares for opportunities to reduce traffic speeds along those corridors.

In addition to lowering the speed limit, other design features can be added to the streets to reduce the speed of vehicle traffic. Examples of design features are traffic circles and speed bumps.Design guidelines for traffic calming can be found in Appendix B.

Part II. Details

Timeframe

- ◯ SHORT-TERM
- ☑ MID-TERM
- ◯ LONG-TERM

Funding Needs

- ◯ LOW
- ☑ MEDIUM
- ◯ HIGH

Responsible Party

LEAD ROLE

Public Works, Planning

SUPPORT ROLE

Greenville MPO, Greenville Police Department

Case Study

Raleigh, NC

The City of Raleigh addresses traffic calming through its Neighborhood Traffic Management program. Through the City of Raleigh website, residents can apply to have their street evaluated for traffic calming. Evaluation criteria include the amount of traffic speeding on the street, number of speed-related collisions on the street, and the amount of pedestrian activity. Residents can also petition to reduce the speed on their street if that residential street carries less than 4,000 vehicles per day. At least 75% of adult residents or property owners on the street must agree to the speed limit reduction. Once a petition is received for a street, the request will be reviewed by City Council.

Treatments are considered based on street width. Streets wider than 31 feet are eligible for the Neighborhood Streetscape Program, which uses treatments such as enhanced landscaping and landscape islands to reduce speed. Streets narrower than 31 feet are eligible for traditional traffic calming measures. There are no fees or assessments for Neighborhood Streetscape Projects; they are funded by Transportation Bond and Capital Improvement Funds. Each year the city reviews and approves projects.

Source: City of Raleigh

http://bikeportland.org/2016/09/27/seattle-just-passed-a-citywide-20-mph-speed-limit-and-portland-could-be-next-192316

Part III. Action Steps

Action Steps	Person(s)/ Organization(s) Responsible	Target Completion Date
Develop traffic calming program	Greenville MPO	2018
Identify 5 pilot projects for 20 mph slow zones. Install devices to monitor the speed of cars in these slow zones and identify opportunities for expansion and improvements in future phases	Greenville MPO	2018
Change signs and road markings, where applicable	Greenville Public Works	Ongoing

Seattle, WA

In September 2016, Seattle City Council unanimously approved a measure to reduce speeds on arterials to 25 mph and speeds on residential streets to 20 mph. This new policy change will affect about 2,400 miles of neighborhood streets. Advocates were instrumental in pushing the reduced speed limit. Traffic studies confirmed that lowering the speed limit would not cause traffic delay. This builds upon the city's existing 20 mph zones program, called "Designing Safer Streets," where six neighborhoods were piloted as 20 mph zones.

Advocates in favor of lowering the speed limit of neighborhood streets to 20 mph (Source: Seattle Neighborhood Greenways)

Bike and Pedestrian Access in Construction Zones

RECOMMENDATION:

- Develop and adopt an ordinance that addresses construction closures in bikeways and walkways during construction
- Implement a monitoring and enforcement program with penalties for unpermitted closures and the identification of dedicated staff to manage the program
- Establish a clear and easy to use guidebook that outlines the planning and approval process for sidewalk and bikeway closures

MODE

Part I. Background

The Greater Greenville area should consider the development and adoption of a countywide ordinance that will address bicycle and pedestrian safety in construction zones. The ordinance should require adoption of temporary traffic control plans when closures exceed 20 days. It must also address the regular closure of lanes and sidewalks in high construction areas and the reduced safety of pedestrians and cyclists.

Developers would need to seek a permit for lane closures and pay a fee for each day that sidewalks or bikeways are closed to the public. Sidewalk and lane closures result in out of way routing, which causes pedestrians to often walk in the street instead of taking the alternate route.

In order to deter and reduce long-term closures of bikeways and sidewalks, Greenville should increase fees for construction sites. Sidewalk closures, especially in high traffic areas, should be the last option and only be allowed on a temporary basis. Greenville should establish a maximum distance for sidewalk and bikeway detours. Additionally, Greenville should evaluate a requirement for enclosed and covered walkways in high impact areas to promote the safe passage of pedestrians. Lastly, Greenville should adopt a platform for all public right-of-way management (emergency, development and utility coordination) to minimize disruption to residents and businesses, enforce no duplicate digging, and ensure cost sharing of work.

Part II. Details

Timeframe

- ◯ SHORT-TERM
- ☑ MID-TERM
- ◯ LONG-TERM

Funding Needs

- ◯ LOW
- ☑ MEDIUM
- ◯ HIGH

Responsible Party

LEAD ROLE

Greenville MPO

SUPPORT ROLE

Greenville Public Works, Greenville Police Department

Case Study

Raleigh, NC

In 2014, the City of Raleigh's Public Works Department created a safety manual called "Making Great Strides – A guide to accommodating pedestrians in active work zones." In order to reduce confusion around codes and legislative documents, this document uses laymen's terms to explain best practices for pedestrian accommodations in work zones, the planning and approval process, and examples of how it's being done. Topics covered in this manual include planning and design, detour options, protective barriers, safety measures, and consideration for utilities.

Seattle, WA

The City of Seattle instituted the Construction Hub Coordination Program in 2014 to address construction impacts to sidewalks. The program was initiated as a response to the access challenges experienced during the unprecedented growth and development of the city. The hub team of project and on-site coordinators assess permitted construction holistically, across public and private lines, in areas with multiple simultaneous construction projects in close proximity—otherwise known as construction hubs.

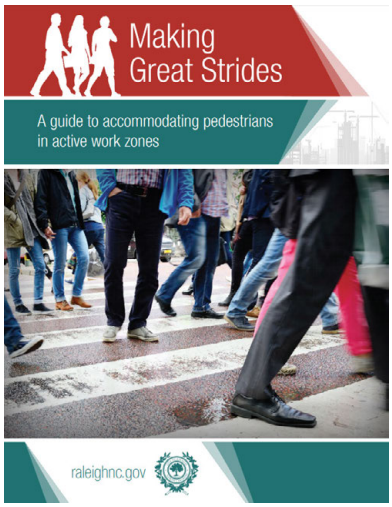
Source: Currier, S. "'Making Great Strides' to Keep Pedestrians Safe in Active Work Zones." 12 April 2016. http://www.dsinsider.com/blog/30-development-services/161-raleigh-is-making-great-strides-to-keep-pedestrians-safe

Part III. Action Steps

Action Steps	Person(s)/ Organization(s) Responsible	Target Completion Date
Develop and adopt ordinance that addresses bike and pedestrian safety in construction zones	Greenville MPO	2018
Establish fees for closures	Greenville MPO and leaders in Pitt County	2018
Establish monitoring and enforcement program	Greenville MPO	2018
Evaluate policy and how it addresses closures, maximum detour distances, and covered and protected walkways	Greenville MPO	2019
Establish platforming for right-of-way (ROW) management	Greenville MPO	2019
Develop guidebook	Greenville MPO	2019

Site coordinators bring together leads from all public and private projects in a hub to encourage:

- Pedestrian detours to the opposing sidewalk at the nearest crossing
- Advanced warning signs for closures and detour signs
- Walkthrough scaffolding, to provide overhead protection and full-time pedestrian access



Staffing for Bike and Pedestrian Planning & Programs

MODE

Part I. Background

Establishing a Bicycle and Pedestrian Manager that is dedicated solely to active transportation projects would increase efficiency, provide greater oversight of active transportation projects, and serve as a central hub for all sidewalk, bikeway, and greenway projects and programs. Furthermore, the creation of this position signifies a long-term commitment to improving walkability and bikeability in the Greater Greenville area. Currently, the Greenville MPO Director is responsible for bicycle and pedestrian planning and projects in the Greenville metropolitan area, and has many duties outside of just bicycle and pedestrian projects. Establishing a Bicycle and Pedestrian position within the Greenville MPO would allow a that manager to focus directly on leveraging local funds with state and federal dollars, while also expanding much needed local education, enforcement, and encouragement programs for active transportation and work with existing efforts such as the City of Greenville Bicycle & Pedestrian Advisory Commission, Friends of Greenville Greenways, ECU, and interdepartmental partners across each community in the MPO.

RECOMMENDATION:

Provide dedicated staff for bicycle and pedestrian projects

Part II. Details

Timeframe

- [x] **SHORT-TERM**
- [ ] **MID-TERM**
- [ ] **LONG-TERM**

Funding Needs

- [x] **LOW**
- [ ] **MEDIUM**
- [ ] **HIGH**

Responsible Party

LEAD ROLE

Greenville MPO

SUPPORT ROLE

Greenville Public Works, Community Development, Parks & Recreation, Greenville Bicycle and Pedestrian Commission

Community members fill out public input survey during Freeboot Friday in Greenville

Case Study

The City of Austin's Active Transportation Division is housed within its Department of Transportation. The division, which was created in 2014, is responsible for the planning, design, and implementation of pedestrian and bicycle facilities as well as programs and services that promote walking and biking. Aside from overseeing the update of the sidewalk master plan and bicycle master plan, the division manages several programs, including Smart Trips (an active transportation encouragement program), Austin B-cycle, and VIVA! Streets (open streets event). The Active Transportation Division works closely with the Public Works Department for planning, constructing, and maintaining sidewalks, trails, and bikeways. As of 2016, a total of 14 staff work on bicycle and pedestrian projects.

While Austin is a larger city, it serves as a good example of the necessity for dedicated staff to manage active transportation elements efficiently. In cities cross the US as well as North Carolina, creating bicycle and pedestrian manager positions are often one of the first steps in dedicating staff focused on active transportation.

Part III. Action Steps

Action Steps	Person(s)/ Organization(s) Responsible	Target Completion Date
Meet with municipal partners including Greenville Public Works, Community Development, Parks & Recreation, and the Greenville Bicycle and Pedestrian Commission to discuss the need to create a Bicycle and Pedestrian Manager as well as to develop the responsibilities of this position.	GUAMPO	2018
Coordinate with all staff who currently work on active transportation projects, ensuring effective communication with the new manager position.	GUAMPO, New Bike/ Ped Coordinator Position	Ongoing
Apply for federal and state funding for active transportation projects.	New Bike/Ped Coordinator Position	Ongoing
Apply for Bicycle Friendly Community (BFC) and Walk Friendly Community (WFC) designation.	New Bike/Ped Coordinator Position	2019

Implementation of active transportation infrastructure and programming requires coordination among multiple departments, agencies, and stakeholders

Safety Campaign

MODE

RECOMMENDATION:

- Implement a comprehensive safety campaign that includes education, encouragement, and enforcement components
- Implement safety campaign to include current Safe Routes to School programming

Part I. Background

The Greater Greenville area does not have an education or outreach campaign that has a broad reach. Previous education efforts include campaigns for short periods of time that aimed to improve pedestrian safety. These initiatives include "El Walkador" and Walk this Way Pedestrian Safety Task Force. Through the planning process, residents have continually expressed that they don't feel safe walking or biking along corridors where cars are traveling at high speeds or where motorists are not looking out for pedestrians or bicyclists.

Aside from engineering improvements, the Greater Greenville area should invest in programming that focuses on the other E's: education, enforcement, and encouragement.

Advocacy groups and nonprofit organizations, such as the Eastern Carolina Injury Prevention Program, would be important partners in this comprehensive safety campaign. Any future safety campaign would need to reach residents of all ages and abilities. Programming would need to be tailored for specific age groups, such as seniors and students in K-12 schools. A safety campaign should include current Safe Routes to School efforts and potentially try to apply for more funding to expand the program.

Part II. Details

Timeframe

- [x] **SHORT-TERM**
- [ ] **MID-TERM**
- [ ] **LONG-TERM**

Funding Needs

- [ ] **LOW**
- [x] **MEDIUM**
- [ ] **HIGH**

Responsible Party

LEAD ROLE

Greenville MPO

SUPPORT ROLE

Eastern Carolina Injury Prevention Program, Pitt County Community Schools and Recreation, Greenville Police Department,Pitt County Sheriff Department, nonprofit organizations, advocacy groups

Case Study

Watch for Me NC is a comprehensive campaign aimed at reducing the number of bicyclists and pedestrians hit and injured in crashes with vehicles. The campaign consists of educational messages on traffic laws and safety, and an enforcement effort by area police.

Watch for Me NC is a statewide grant program administered by the NCDOT Division of Bicycle and Pedestrian Transportation (NCDOT DBPT). The Greenville MPO should contact NCDOT DBPT to request materials and guidance. As a part of this program, the MPO, in partnership with local agencies, could:

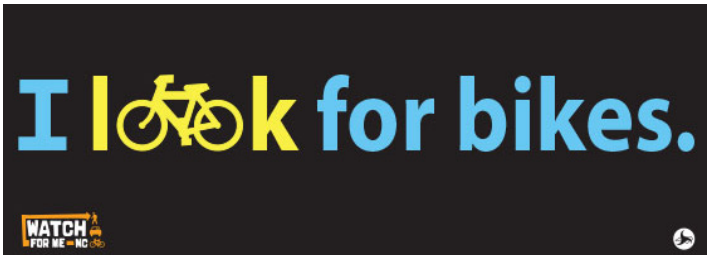
- Distribute the educational materials made available by NCDOT at local festivals and other events, at local bike shops and other businesses, and in renters' information packets and property owners' guest information books. Include brochures developed for this plan.
- Work with police officers to hand out bicycle lights along with bicycle and pedestrian safety cards.
- Broadcast program promotions and educational videos on the local government access channels.

Sample Programs and Resources:

- Watch for Me NC: https://www.watchformenc.org/
- Watch for Me NC program materials: https://www.watchformenc.org/program-materials/

Part III. Action Steps

Action Steps	Person(s)/ Organization(s) Responsible	Target Completion Date
Implement education programming for K-12 schools and for seniors ages 65+	Greenville MPO, Pitt County Community Schools and Recreation	2018
Create new pedestrian/bike/motor vehicle safety campaign, such as **Watch for Me NC**	Greenville MPO, Eastern Carolina Injury Prevention Program	2018
Partner with Police Department to strategize and implement targeted enforcement, possibly in areas with high number of crashes or near schools	Greenville MPO, Greenville Police Dept, Pitt County Sheriff Dept	Ongoing
Continue Safe Routes to School programming; Explore the possibility of expanding the program to more schools	Eastern Carolina Injury Prevention Program	Ongoing
Partner with local advocacy groups and non-profit organizations to organize encouragement events to promote safe walking and biking	Greenville MPO	Ongoing



"Watch for Me NC" materials can be placed in strategic places, including at gas stations, where drivers will see them (above).

Implement Vision Zero Policy and Plan

MODE

RECOMMENDATION:

- Adopt a Vision Zero policy and plan
- Commit to a goal of zero traffic fatalities by 2026
- Implement education, enforcement, and street design strategies that align with Vision Zero

Part I. Background

The Greater Greenville area recognizes that it is essential to address the issue of pedestrian and bicyclist safety, particularly in areas with high numbers of crashes. In the first six months of 2016, five pedestrians were killed by vehicles in Pitt County and fourteen fatalities have occurred between January 2015 and August 2016. Focusing on high crash locations could result in a dramatic improvement to safety in the Greater Greenville area. A number of cost-effective pedestrian and bicycle safety countermeasures exist that can be used to improve safety for non-motorized modes.

In August 2016, Greenville City Council unanimously approved a Public Transportation and Parking Commission motion to consider adopting a Vision Zero commitment to reduce pedestrian fatalities to zero by 2026. Through this commitment, Greenville is set to become the first community in North Carolina that adopts Vision Zero. A formalized Vision Zero policy and plan signifies that Greenville is committed to improving road safety for all users. A citywide Vision Zero effort would be a concerted effort between various city departments, advocacy groups, schools, businesses, and nonprofit organizations. Implementing Vision Zero in Greenville would require education, enforcement, and design components in order to make a broad scale impact. Strategies for implementation could include enforcement efforts to target behaviors that could endanger all types of road users, outreach efforts to community members, and safety improvements to the downtown area where there are the largest numbers of pedestrians and bicyclists.

Part II. Details

Timeframe

- ◯ SHORT-TERM
- ☑ MID-TERM
- ◯ LONG-TERM

Funding Needs

- ◯ LOW
- ☑ MEDIUM
- ◯ HIGH

Responsible Party

LEAD ROLE

Greenville City Council

SUPPORT ROLE

Public Works, Greenville MPO, GREAT

Case Study

While the rate of traffic fatalities in Seattle has steadily declined, the city has adopted the view that one death is too many. The Seattle Vision Zero Plan sets a goal of eliminating traffic fatalities by 2030. Support from the mayor's office and partnerships with multiple city departments, government agencies, and community groups is integral in achieving this goal. Near-term actions are categorized into three groups: (1) street design, policies, and regulation, (2) education and public engagement, and (3) enforcement. Examples of some street design, policies, and regulations include a 20 mph zone program to reduce speeds on residential streets, reduce speed limits to 25 mph throughout downtown, construction coordination, and improving transit safety such as lane allocation improvements. Examples of education and public engagement include targeted outreach such as pedestrian safety for seniors (ages 50 and up), public engagement, and a vision zero campaign to serve as an overarching outreach effort. Enforcement efforts include school zone photo enforcement, corridor safety patrols, and high visibility enforcement.

Sources: Seattle Vision Zero Plan

Part III. Action Steps

Action Steps	Person(s)/ Organization(s) Responsible	Target Completion Date
Complete a Vision Zero Plan	Greenville MPO, Greenville Public Works	2018
Adopt Vision Zero Plan	Mayor's Office, Greenville Council	2018
Develop and implement targeted education programs geared towards improving pedestrian and bicyclist safety	Greenville MPO	2019
Target enforcement efforts towards top 50 high-crash intersections	Greenville Police	Ongoing
Collaborate with Greenville GREAT to improve safety along transit corridors	Greenville MPO,	Ongoing

In 2016, the city implemented a distracted driving campaign to encourage drivers to put away their phones while on the road. The city has also partnered with ridesharing services, Uber and Lyft, to offer discounted rides in order to prevent drunk driving. The city reports on its Vision Zero progress through an annual report. A city website for Vision Zero is also updated regularly.

Seattle Distracted Driving Campaign (Source: Seattle Department of Transportation)

Wayfinding System

MODE

RECOMMENDATION:

- Implement a comprehensive wayfinding system to help users navigate pedestrian routes, bikeways, and greenway trails
- Develop signage that conveys distance and direction to major directions

Part I. Background

Wayfinding elements such as signage and mile markers will help to draw visitors, help users to identify the best routes, and enhance their ability to connect to major destinations. A wayfinding system will give users a unique experience while improving safety by alerting both users and motorists of the presence of pedestrian and bicycle routes.

The 2013-2017 Greenville Capital Improvement Program (CIP) includes a budget line item for a wayfinding system that will include major attractions and destinations within Greenville. This wayfinding system should be expanded to include bicycle routes and greenway trails within Greenville and across jurisdictional boundaries (if possible) since they are also major destinations for residents and visitors. A wayfinding system is increasingly important since Greenville serves as a regional hub for commerce, education, and medical services. A comprehensive wayfinding system will enable all users to easily navigate through the non-motorized network.

Part II. Details

Timeframe

- ○ SHORT-TERM
- ✓ MID-TERM
- ○ LONG-TERM

Funding Needs

- ○ LOW
- ✓ MEDIUM
- ○ HIGH

Responsible Party

LEAD ROLE
Greenville MPO

SUPPORT ROLE
Public Works

A sign at the entrance of the Tar River Greenway in Greenville

Case Study

Bicycle Wayfinding: Berkeley, CA

In 2002-2003, Berkeley, CA implemented a bicycle signage system for their bikeways and bicycle boulevards. Many of the bicycle boulevards are along residential streets with few landmarks and thus the city wanted a better way to distinguish these routes to provide more guidance for bicyclists. The city decided to use a nonstandard purple color for all signs with a prominent and recognizable logo. The system includes seven types of signs to identify routes and destinations and to provide guidance and information when the route changes or for intersecting routes. Signs and legends are reflective and visible at night. Berkeley also uses pavement markings that designate a bicycle boulevard and these pavement markings take up almost the full width of a travel lane.

Pedestrian Wayfinding: New York, NY

WalkNYC is New York City's pedestrian wayfinding system that was implemented in the summer of 2013. Although the city is known as a pedestrian-friendly city, there was a need to create a universal design that would apply to all the diverse boroughs and neighborhoods that make up the city. WalkNYC provides clear visuals and graphics to orient pedestrians and to provide a system of signs to help pedestrians navigate throughout the city. The maps are designed to encourage people to walk, bike, use public transit, and to help guide users to major landmarks and destinations. Each kiosk displays a large map of the streets within a 5-minute walking distance and another map showing the area in relation to a larger section of the city. The maps use a "head-up" orientation in which the compass direction corresponds with the direction in which the user is facing. WalkNYC maps are installed at all subway stations, Staten Island Railway stations, and Citi Bike station kiosks.

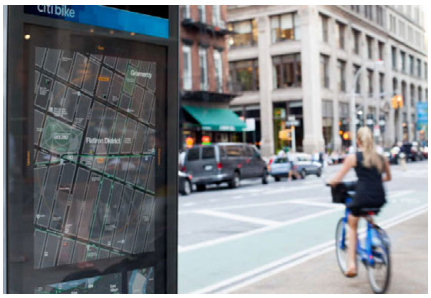
Sources: Pedestrian and Bicycle Information Center, City of Berkeley, CA
http://nacto.org/case-study/bicycle-way-finding-signage-berkeley-ca/

http://www.nyc.gov/html/dot/html/pedestrians/walknyc.shtml
https://segd.org/walknyc-pedestrian-wayfinding
http://www.aiga.org/case-study-walknyc-pedestrian-wayfinding

Part III. Action Steps

Action Steps	Person(s)/ Organization(s) Responsible	Target Completion Date
Conduct a wayfinding study and/or wayfinding plan; deliverables will include concepts and placement plan	Greenville City Council, Public Works, Community Development	2018
Consult NACTO Urban Bikeway Design Guide and MUTCD for design standards	Public Works, Community Development	Ongoing
Apply and obtain funding for a wayfinding system	Public Works	2018
Install wayfinding signage and pavement markings	Public Works	2019
Conduct regular maintenance for wayfinding signs and pavement markings (if applicable)	Public Works	Ongoing

Bicycle boulevard/neighborhood bikeway signage in Berkeley, CA



WalkNYC kiosk in New York City (Source: Society for Experiential Graphic Design)

Introduction to Design Resources

RECOMMENDATION:

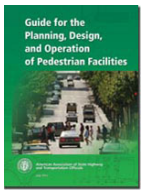
Local governments in the Greenville Urban Area MPO should update design guidelines to include current, innovative treatments found in these design resources. See Appendix B for a comprehensive active transportation design toolbox that draws upon these resources.

A number of notable federal and state resources are available for bike and pedestrian planning and design. These design guidelines and treatments represent tools for creating a more walkable and bikeable communities in the Greenville Urban Area MPO. A thorough evaluation by an engineering and/or design professional should be conducted prior to construction of any facility. Below is a brief description of each resource.

National Guidance

American Association of State Highway Transportation Officials (AASHTO)

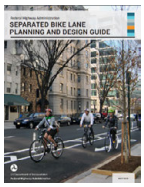
Guide for the Development of Bicycle Facilities, 4th Edition (2012) is geared towards planners and designers and provides guidance on how to accommodate bike travel and operations in most riding environments and situations. Because these are guidelines, there is flexibility in tailoring the designs so that it is sensitive to local context.



Guide for the Planning, Design, and Operation of Pedestrian Facilities (2004) aims to provide guidance on the planning, design, and operation of pedestrian facilities along streets and highways. In particular, the guide focuses on identifying effective measures for accommodating pedestrians on public rights-of-way.

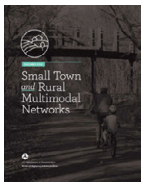
Federal Highway Administration (FHWA)

Achieving Multimodal Networks (2016) is intended to serve as a resource for practitioners on how to build multimodal transportation networks. The focus of this publication is to provide guidance on how to reduce multimodal conflicts and to improve the connectivity of multimodal networks so that walking and biking are more attractive transportation modes.



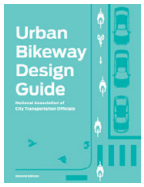
Separated Bike Lane Planning and Design Guide (2015) outlines planning considerations for separated bike lanes, which are also known as cycle tracks or protected bike lanes and provides design options for one-way and two-way separated bike lanes. This guide captures the current state of practice and covers other topics such as options for providing separation, intersection design, and lessons learned from around the U.S.

Incorporating On-Road Bicycle networks into Resurfacing Projects (2016) provides recommendations on how roadway agencies can incorporate bicycle facilities into their resurfacing program. In addition, the guide provides recommendations on how to accommodate bicycle facilities on existing roadways, cost considerations, and case studies. While the guide doesn't provide specific design guidance, it offers best practices for providing bikeways in conjunction with resurfacing projects.



FHWA Small Town and Rural Multimodal Networks Guide (2016) translates existing street design guidance and facility types for bicycle and pedestrian safety and comfort for the smaller scale places not addressed in guides such as the NACTO Street Design Guide and ITE Walkable Urban Thoroughfares report. The guide provides clear examples of how to interpret and apply design flexibility to improve bicycling and walking conditions. An interactive online edition of the guide is available at ruraldesignguide.com.

NATIONAL ASSOCIATION OF TRANSPORTATION OFFICIALS (NACTO)



Urban Bikeway Design Guide (2014) is a guide developed by reviewing best practices in cities across the world and the intended audience is cities. The guide provides state-of-the-practice solutions for creating complete streets that are safe for bicyclists.

Urban Street Design Guide (2013) serves as a toolkit for making city streets safer, more livable, and more economically vibrant. Topics covered in the guide include street design elements, interim design strategies, intersections, and design controls.

North Carolina Guidance

North Carolina Department of Transportation (NCDOT)

NCDOT Complete Streets Policy was adopted in 2009. This policy created a set of design guidelines called the Complete Streets Planning and Design Guidelines, which was released in 2012. These documents guide NCDOT's consideration for bicyclists and pedestrians as part of the roadway or bridge design process. The policy and sample projects can be found at www.completestreetsnc.org

WalkBikeNC is North Carolina's statewide Bicycle and Pedestrian Plan that was adopted in by the NCDOT Board of Transportation in December 2013. The plan includes information about the many benefits of walking and bicycling related to mobility, safety, health, economy, and environment. The WalkBikeNC website (www.ncdot.gov/bikeped/walkbikenc), serves as a portal where users can access the many bicycle and pedestrian resources across the state.

Evaluating Temporary Accommodations for Pedestrians During Construction is a NCDOT document that provides guidelines for NCDOT engineers when evaluating the need for temporary pedestrian accommodations during construction. Contents of the document include responsible parties, scheduling, procedures, and policy, regulatory, and legal requirements. A copy of this document can be found at www.connect.ncdot.gov/projects/BikePed/Pages/Guidance.

Typical Street Cross Sections

MODE

RECOMMENDATION:

- Local governments in the Greenville Urban Area MPO should update typical street cross-sections, using the examples on the following pages for guidance.
- Use the typical street cross sections (on following pages) to inform the design process for roadway projects; see sections under "Arterial Streets" for the Major Corridor Improvements identified in this plan.

Part I. Background The following typical street cross-sections could be used as a reference point for the City of Greenville, the Town of Winterville, the Town of Ayden, the Village of Simpson, and Pitt County. They should be used to guide comprehensive updates to local standards, and as a point of discussion and consideration when new roadway projects are in the design process with NCDOT. This relates especially to the bikeways and sidewalks recommended as part of the **"Major Corridor Improvements"** identified in Chapters 3 & 4.

Part II. Details

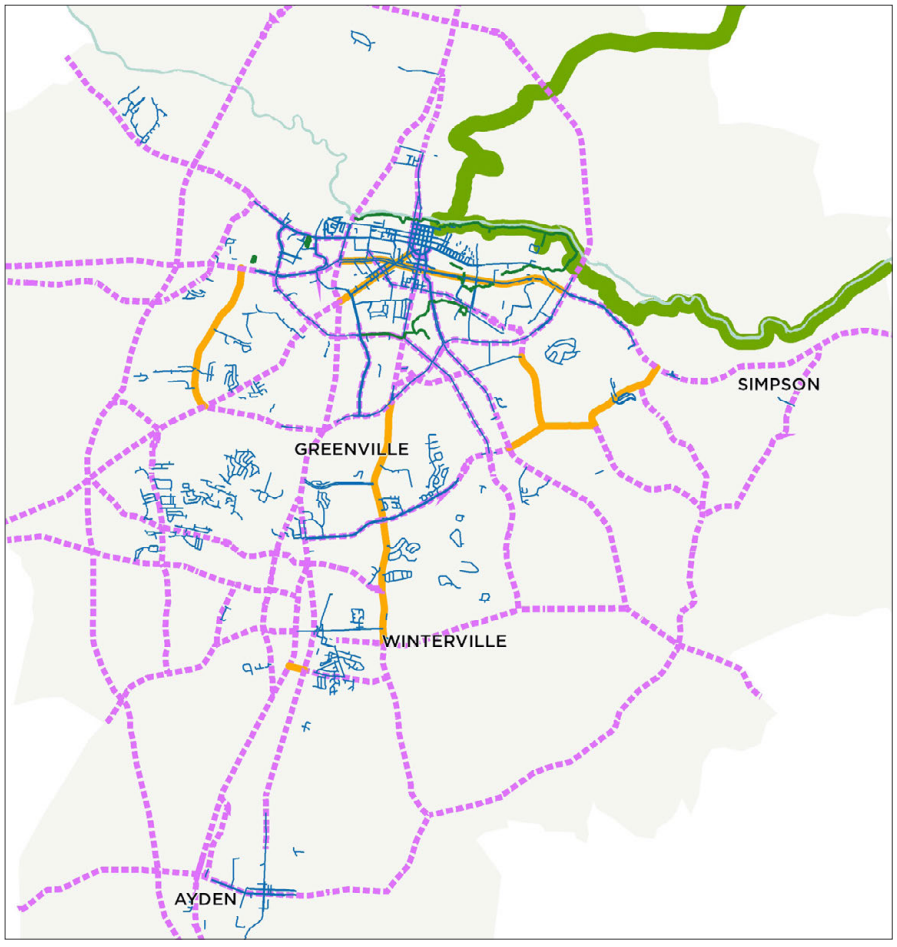
Timeframe
- ◯ SHORT-TERM
- ☑ MID-TERM
- ◯ LONG-TERM

Funding Needs
- ◯ LOW
- ◯ MEDIUM
- ☑ HIGH

Responsible Party

LEAD ROLE
Greenville MPO

SUPPORT ROLE
NCDOT Division 2



See maps in Chapters 3 & 4 for recommemded "Major Corridor Improvemnts" (shown here in a pink/purple dash).

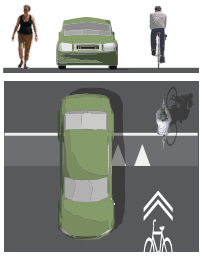
Example Local Street Cross Sections

Existing (typical)

NO CENTERLINE

20′

Neighborhood Bikeway



NO CENTERLINE

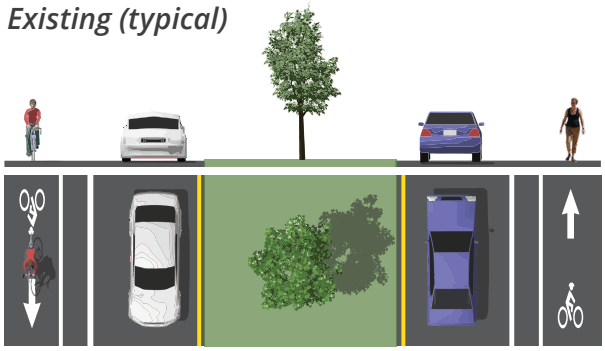
20′

APPLICATION:
On streets with less than 3,000 cars per day and a posted speed of 25 mph or less.

IMPLEMENTATION:
Repurpose existing roadway space

Example Collector Street Cross Sections

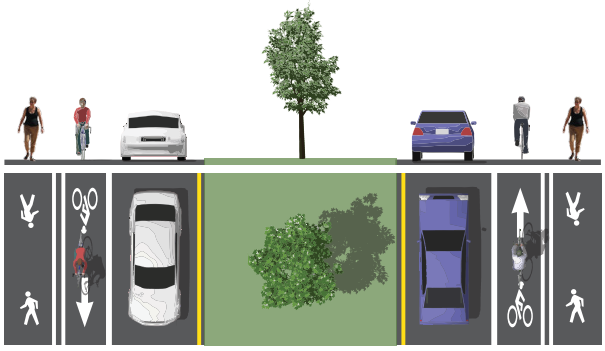
Existing (typical)



6′ | 2′ | 12′ | 20′ | 12′ | 2′ | 6′

60′

Low Speeds and Volumes



5′ | 5′ | 10′ | 20′ | 10′ | 5′ | 5′

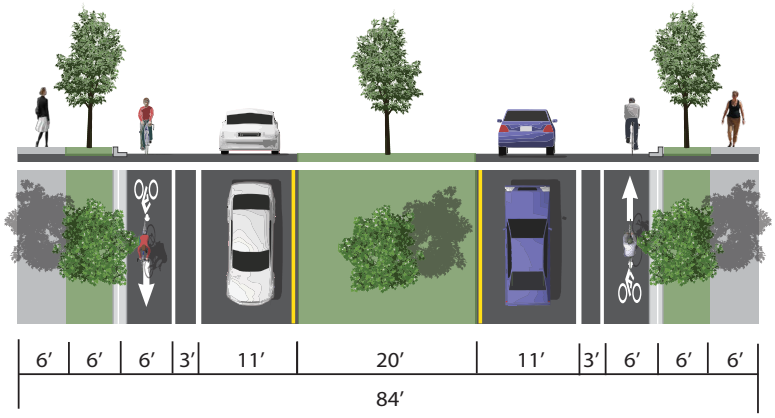
60′

APPLICATION:
On streets with less than 6,000 cars per day and a posted speed of 30 mph or less.

IMPLEMENTATION:
Repurpose existing roadway space

Example Collector Street Cross Sections (continued)

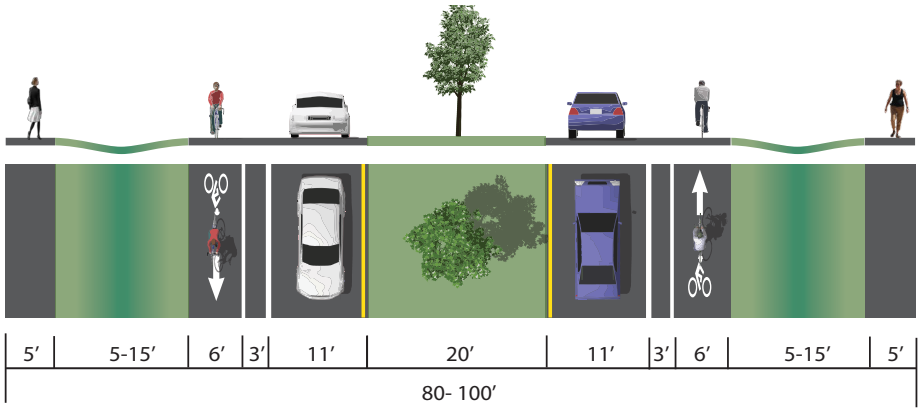
Moderate Speeds and Volumes: Conventional Apporach



APPLICATION:
On streets with up to 20,000 cars per day and a posted speed of 35 mph or less.

IMPLEMENTATION:
Install curb, gutter, closed stormwater system, and concrete sidewalks.

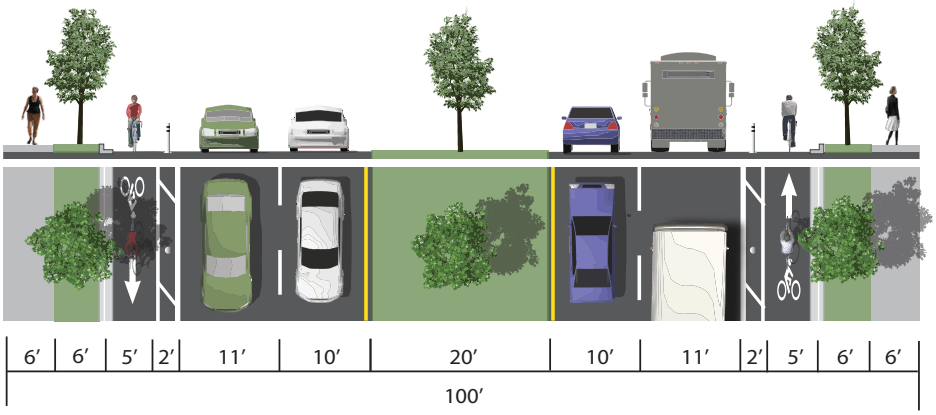
Moderate Speeds and Volumes: Lower-Cost Alternative



APPLICATION:
On streets with up to 20,000 cars per day and a posted speed of 35 mph or less.

IMPLEMENTATION:
Add flush asphalt or concrete sidewalks. Maintain existing swale for drainage.

Higher Speeds and Volumes

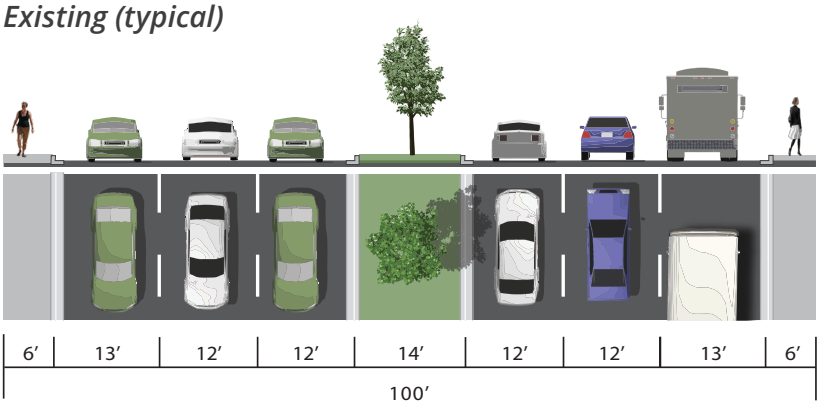


APPLICATION:
On streets with more than 20,000 cars per day and a posted speed of 35 mph or less.

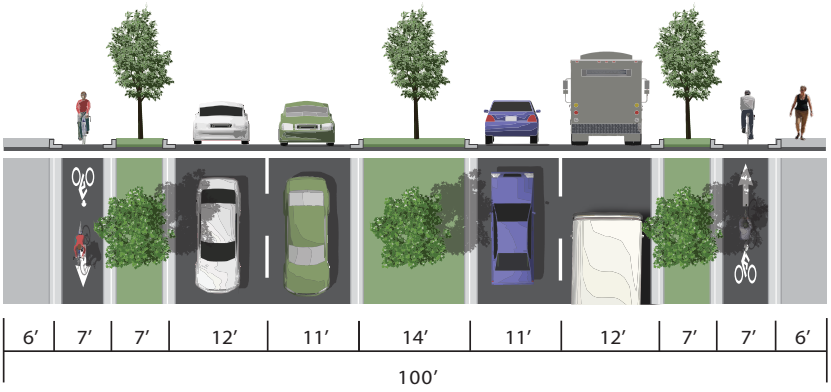
IMPLEMENTATION:
Expand roadway. Add curb, gutter, and install closed stormwater system. Construct concrete sidewalk with planting strip.

Example Arterial Street Cross Sections

Existing (typical)



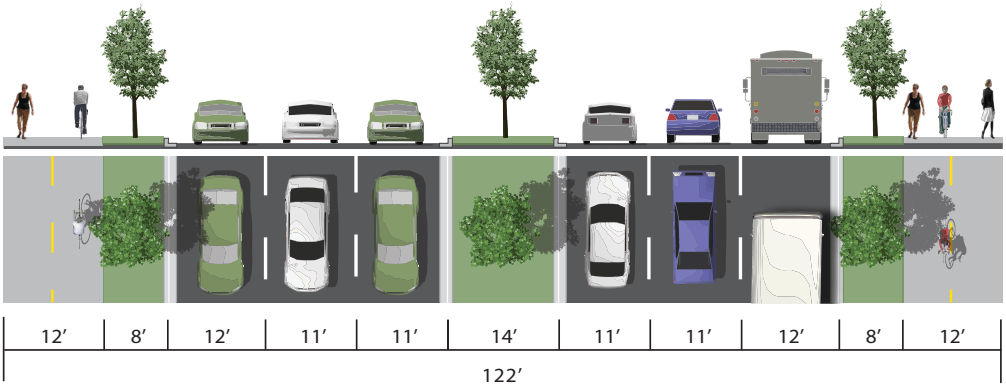
Separated Bike Lanes and Sidewalks (Road Diet)



APPLICATION:
On streets with more than 20,000 cars per day and a posted speed of 35 mph or less.

IMPLEMENTATION:
Repurpose outside travel lane with raised median and separated bike lane.

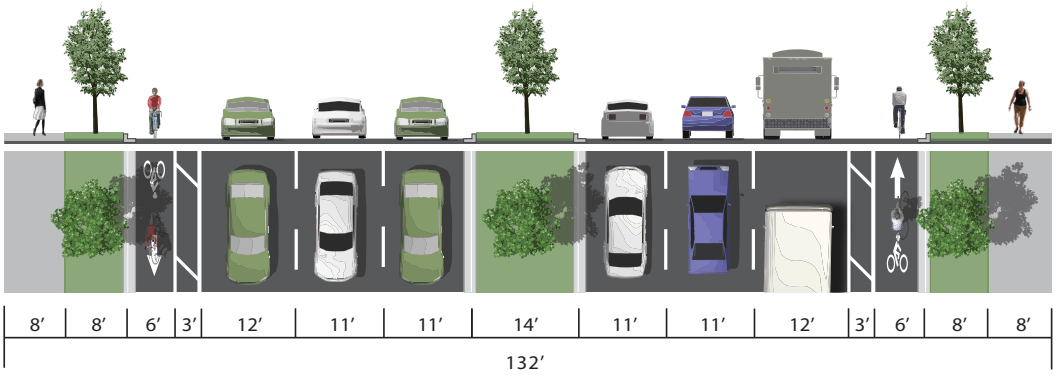
Shared Use Paths (Sidepaths)



APPLICATION:
On streets with more than 40,000 cars per day and a posted speed greater than 35 mph.

IMPLEMENTATION:
Expand roadway to accomodate planting strip and multi-use path. Requires ROW acquisition in most cases.

Buffered Bicycle Lanes and Sidewalks



APPLICATION:
On streets with more than 40,000 cars per day and a posted speed greater than 35 mph.

IMPLEMENTATION:
Expand roadway to accomodate planting strip and multi-use path. Requires ROW acquisition in most cases.

Sidepath Crossings at Driveways and Intersections

MODE

SIDEPATHS

A sidepath is a bi-directional shared-use path located immediately adjacent and parallel to a roadway. Sidepaths can offer a high-quality experience for bicyclists where traffic speeds and/or volumes are too high to share the roadway. Sidepaths along major roadways should be set back further from the street than the minimum AASHTO guidance of 5 feet and feature design cues that encourage people driving to yield to path users at driveways.

RECOMMENDATION:

- **Use the "Bend In" or the "Bend Out" at street crossings to minimize potential conflicts.**
- **Use signage and markings at street crossings and high volume driveways to clearly communicate right-of-way to all modes.**

DRIVEWAY CROSSINGS

Guidance

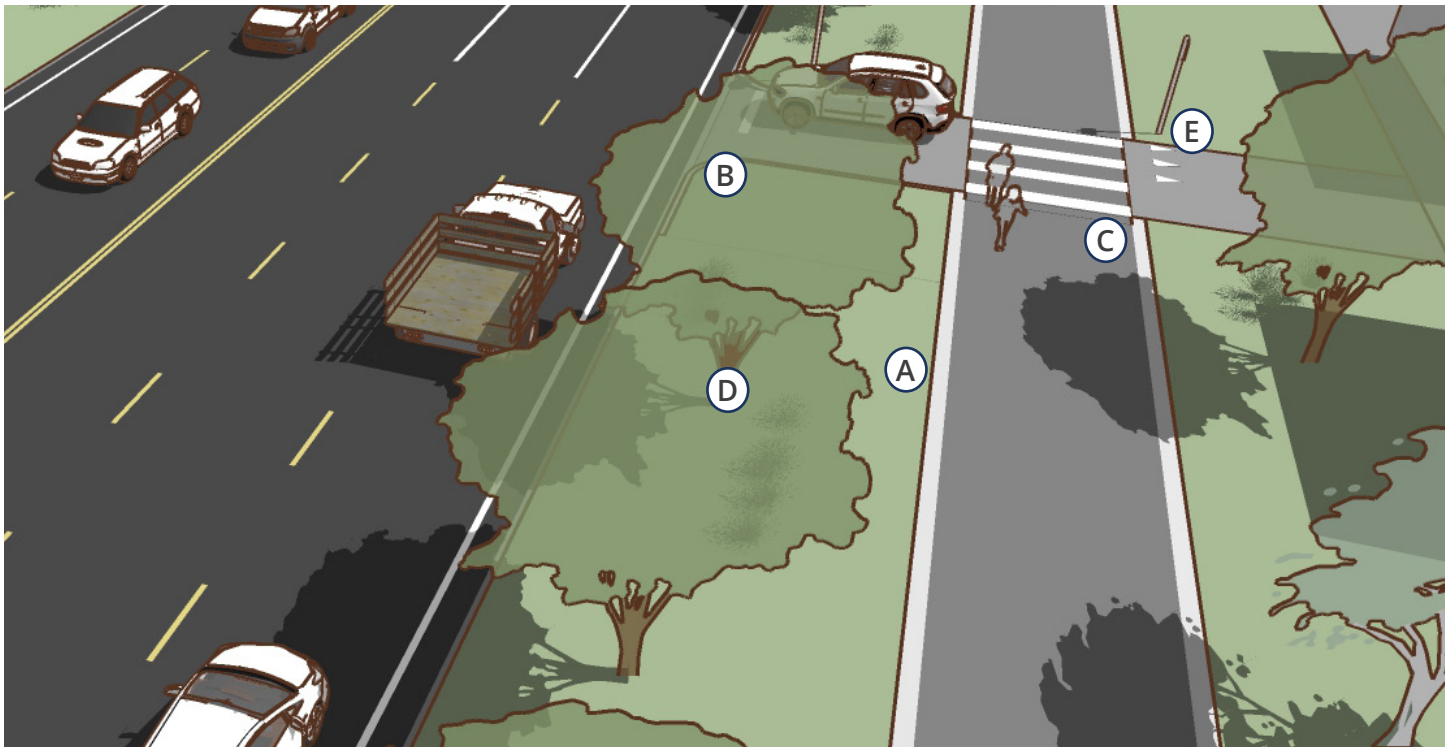
(A) Along major roads, set path back at least one car length from the stop bar (approximately 20 ft) to provide space for drivers to make yielding decisions for sidepath users independently from merging onto or off of the street.

(B) Where a setback of one car length is not possible, use driveway ramps to encourage slower vehicle speeds.

(C) Maintain a level path surface at driveways. Detectable warning devices should not be placed at driveway crossings.

(D) Provide shade trees in the landscaped buffer between the roadway and sidepath, taking care to maintain clear sight triangles at driveways.

(E) Mark crosswalk and yield lines at high-volume driveways and install "Do Not Block Crosswalk" signage.



MINOR STREET CROSSING

Where sidepaths cross minor streets, roadway crossings should be set back from the parallel roadway, and signage and markings should be used to clarify the responsibilities of path and road users. Turning vehicles and vehicles approaching the crossing on the minor street should yield to path users, who have right-of-way through the crossing.

The R1-5-Mod sign requires vehicles to yield for pedestrians and bicyclists.

Guidance

(A) Provide 25 - 50 ft sections of centerline on the path on crossing approaches.

(B) "Bend out" crossing with crosswalk setback of 20 ft preferred to allow space for one vehicle to queue between the perpendicular roadway and the crosswalk. A bend out crossing is the most ideal where a tight curb radius can be used to slow vehicles and angle them perpendicular to the path at the crossing. A truck apron can be used to minimize the curb radius for most vehicles where a wider radius is required for truck turns.

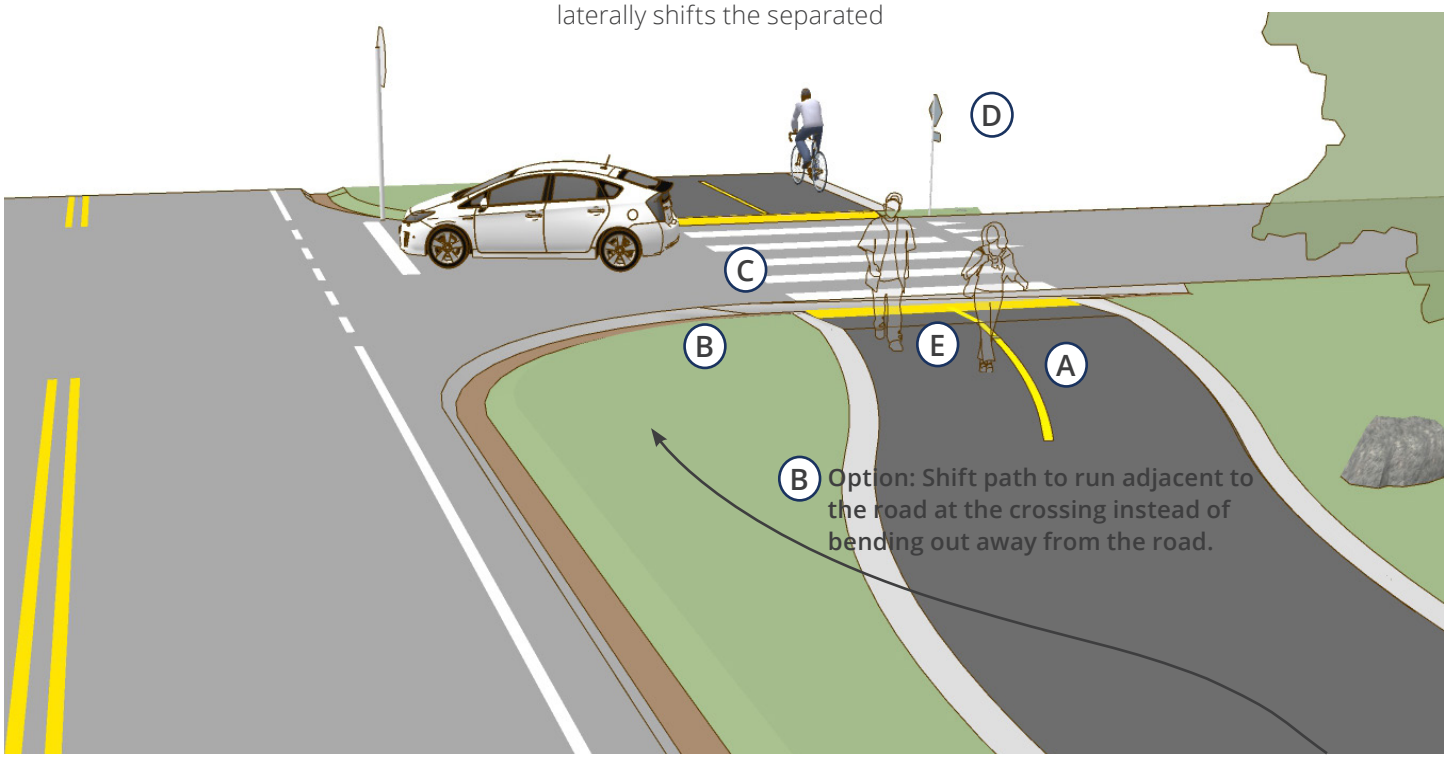
- Option: To increase visibility to turning traffic, a lateral shift in or "bend-in" intersection approach laterally shifts the separated multi-use path immediately adjacent to the turning lane.

(C) Stripe a high-visibility marked crosswalk.

- Option: A raised crosswalk may also be used to show vehicle speeds and increase visibility of path users.

(D) Provide a Yield sign (R1-2) and warning signage featuring pedestrians and bicyclists (W11-15 with W16-7P), or a Yield Here to Pedestrians and Bicyclists sign (R1-5-Mod). A "Do Not Block Crosswalk" sign may also be included.

(E) Install ADA- compliant curb ramps with detectable warning devices.



SETBACK CROSSING AT SIGNALIZED INTERSECTION

Where sidepaths approach signalized intersections, special considerations - such as signage and signal timing enhancements - apply.

Guidance

(A) Provide high-visibility crosswalk markings.

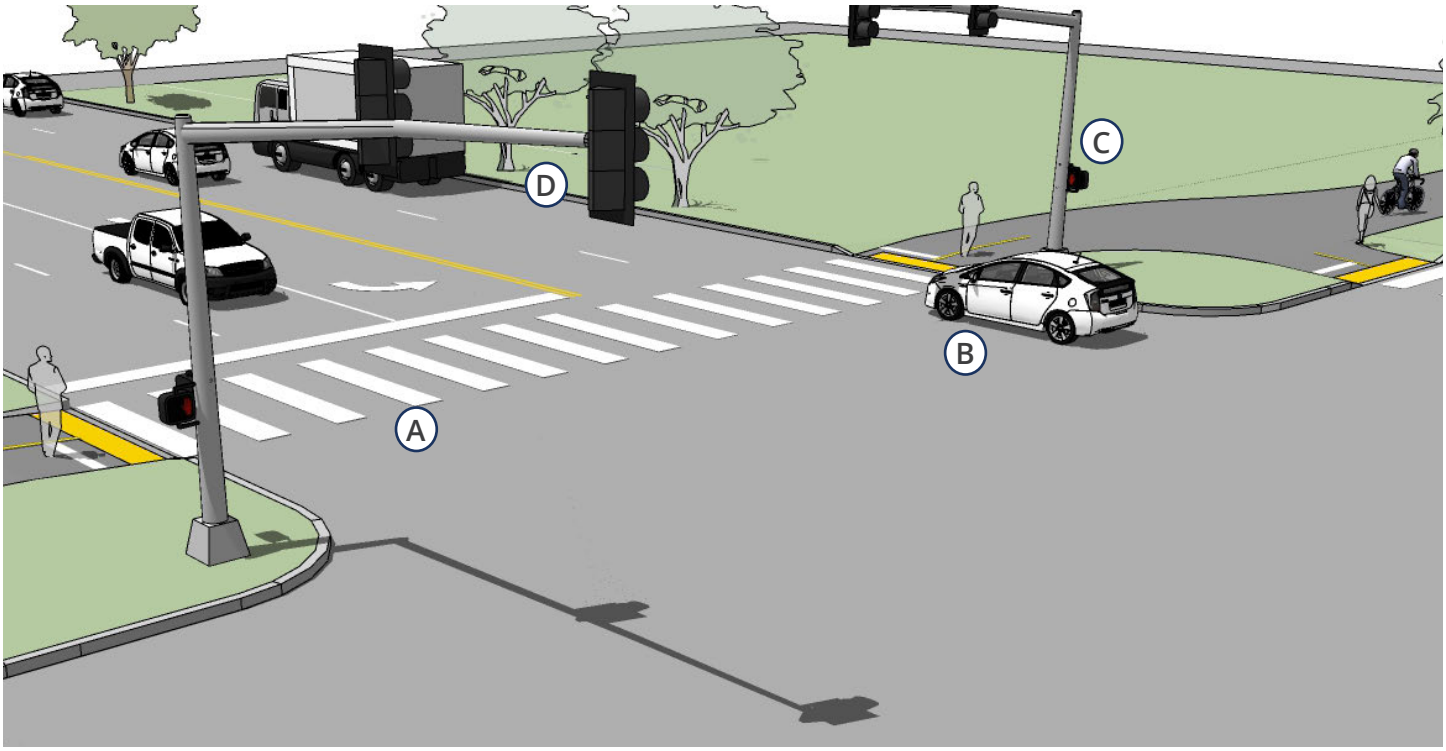
(B) Set back sidepath crossings 20 ft from the intersection to improve driver visibility of vulnerable roadway users in the crosswalk, and to allow space for right-turning vehicles to pull completely out of the through lane while waiting for path users to cross

(C) Install pedestrian signal heads at each path approach.

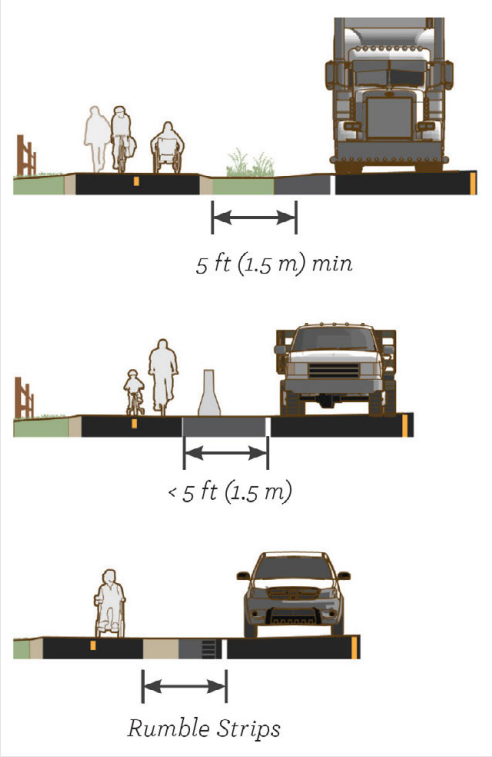
(D) Consider signal enhancements such as Leading Pedestrian Intervals (LPIs) and exclusive/protected pedestrian phases.

(E) Consider installing warning signage (R10-15 modified to include pedestrian and bicycle symbols) to increase driver awareness that pedestrians and bicyclists may be present at the intersection.

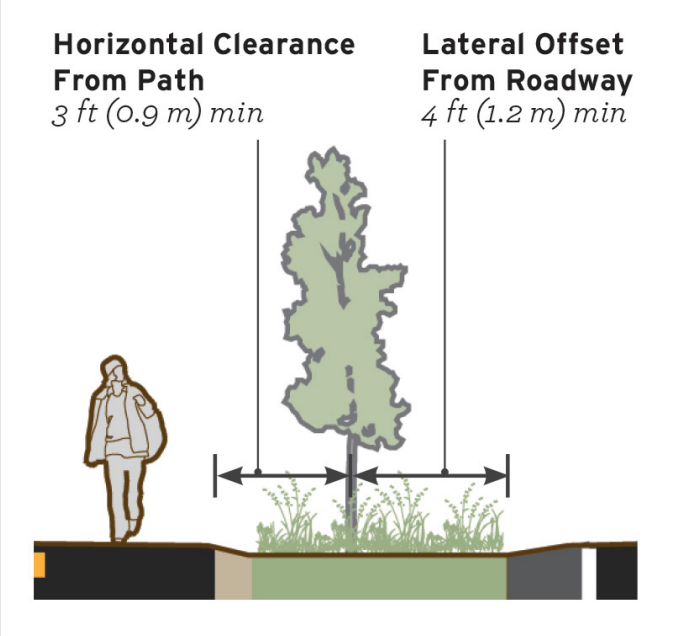
The R10-15-Mod sign warns turning vehicles to expect pedestrians and bicyclists.



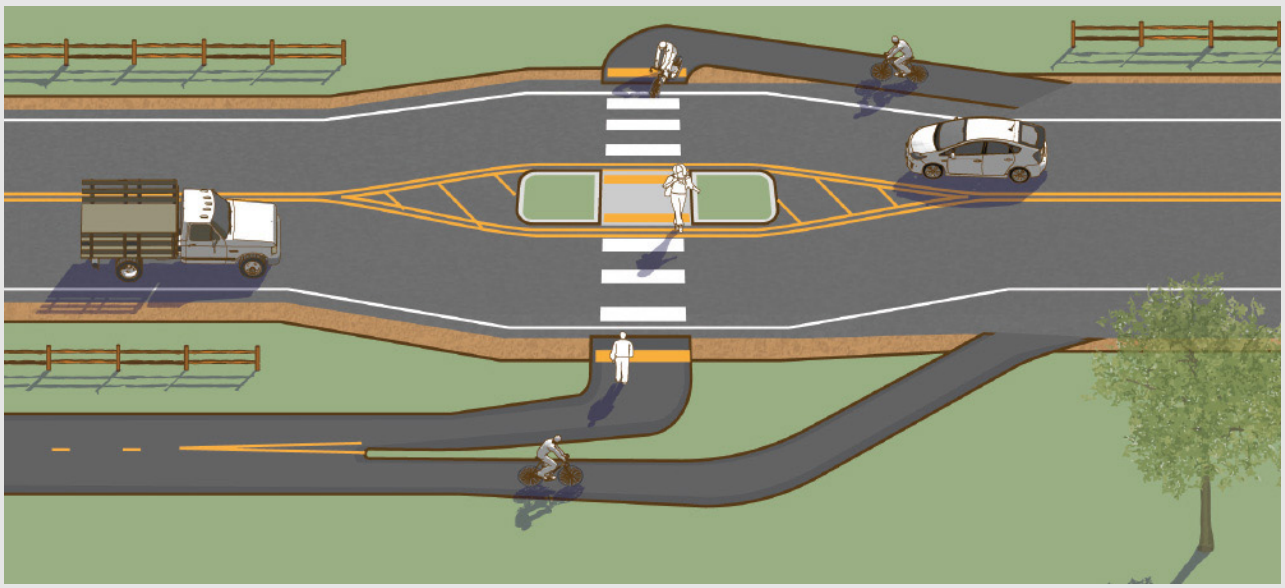
ADDITIONAL SIDEPATH GUIDANCE FROM THE FHWA SMALL TOWN AND RURAL MULTIMODAL NETWORKS GUIDE An interactive online edition of the guide is available at ruraldesignguide.com.



Recommended dimensions for sidepath width and unpaved separation distance.



Trees and landscaping can maintain community character and add value to the experience of using a sidepath. They provide shade for users during hot weather and help to absorb stormwater runoff.



Where a sidepath terminates, it may be necessary for path users to transition to a facility on the opposite side of the road. Designs should consider the desire for natural directional flows, and the potential for conflicts with adjacent traffic. Use median islands and horizontal deflection of the roadway travel lanes to slow motor vehicle traffic and offer improved crossing conditions for path users.

Bike/Ped/Path Crossings at Railroads

MODE

RECOMMENDATION:

- **Install active or passive warning devices at all shared-use path crossings, and at all ped/bike street crossings with high pedestrian or bicycle activity.**
- **Minimize the skew of crossings and include accessible elements such as detectable warning panels and audible warning devices.**

GENERAL

Where pedestrian and bicycle crossings of an active railroad cannot be grade-separated, passive or active warning devices help to alert users to the conflict area.

Consider the context of the crossing to select appropriate warning devices. Crossings in the vicinity of schools, retail areas, or hospitals require greater enhancement than crossings in rural areas.

Before implementing a new railroad crossing, conduct a diagnostic review of the design in the field with key agency representatives from the authority with jurisdiction as well as the State Department of Transportation.

Guidance

- Minimize the skew of crossings. Skewed crossings worsen sightlines and can create safety hazards for wheelchair users and bicyclists, whose wheels can catch in the rail flangeway opening. Perpendicular crossings are preferable. Avoid crossing angles less than 60 degrees.
- Minimize flangeway opening width. Use flangeway filler for crossings with light rail traffic.
- Provide a concrete surface at the crossing. Rubber, asphalt, and timber are alternatives, but are more hazardous when wet and require more ongoing maintenance.
- Provide a detectable warning surface at each crossing approach. Choose a surface that contrasts visually with the adjacent material.
- Consider lighting at crossings where a significant amount of rail traffic occurs at night or there is a history of crashes due to lack of visibility.
- Consider the use of an offset crossing. An offset crossing directs pedestrians and bicyclists to look toward the direction of oncoming trains before crossing the tracks.
- Use passive and active warning devices, as described in the *Shared-Use Path Crossings* section.
- Provide the appropriate clearing sight distance for the user type. When clearing sight distance can't be provided, consider flashing light signals with gates.

This pedestrian rail crossing at the University of Memphis uses pull gates to encourage pedestrians to look for trains before crossing the tracks. The exit gates to the left of the entrance gates prevent pedestrians from getting caught on the tracks.

SHARED-USE PATH CROSSINGS

Path crossings more than 25 feet from an adjacent street crossing require passive or active warning devices.

Guidance

- At crossings that require curves in the path before the crossing to reduce the skew, widen the path through the curves and at the crossing to allow bicyclists to select their crossing angle. Centerline striping through these areas can help to guide cyclists to cross at a minimum skew.

Passive Warning Devices

- Provide a Crossbuck Assembly (R15-1 and R15-2P) at each approach to the crossing at a minimum.
- Pavement markings and texturing can be used to supplement signage.
- Gates may be appropriate at path crossings if visual obstructions or other elements block a path user's ability to detect an approaching train. Consider nighttime visibility of gates and fencing. Swing gates should open away from tracks.
- Provide advance warning signage so that bicyclists and other users traveling faster than pedestrians are aware they are approaching the crossing.

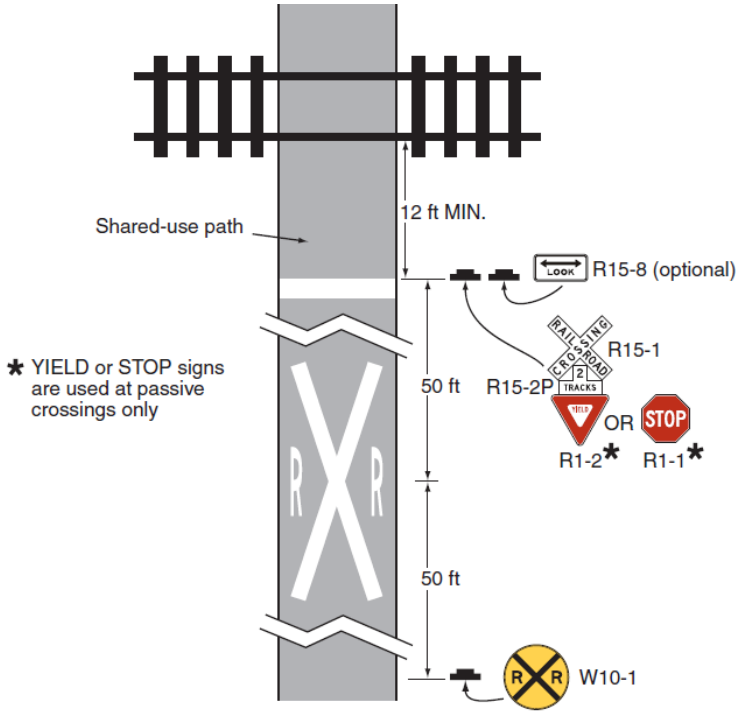
Active Warning Devices

- If used, flashing-light signals must be provided for each direction and include an audible warning device. Provide a minimum of 20 seconds of warning time.
- Automatic gates are an active alternative to swing gates. When used, they should include channelization to avoid pedestrians going around the gate, cover the full width of the crossing, and be supplemented with a means to exit the crossing area, such as a separate swing gate. Gates should be down at least 5 seconds before the train arrives.

Pedestrian Clearing Sight Distance at a Rail Crossing

Train Speed (mph)	Distance (Feet)
10	180
20	355
25	440
30	530
40	705
50	880
60	1,060
70	1,235
80	1,410
90	1,585

Source: Guidance on Traffic Control Devices at Highway-Rail Grade Crossings. Washington, DC: Federal Highway Administration, Highway/Rail Grade Crossing Technical Working Group, November 2002.



Source: Figure 8D-1, Manual on Uniform Traffic Control Devices, 2009 Edition

STREET CROSSINGS

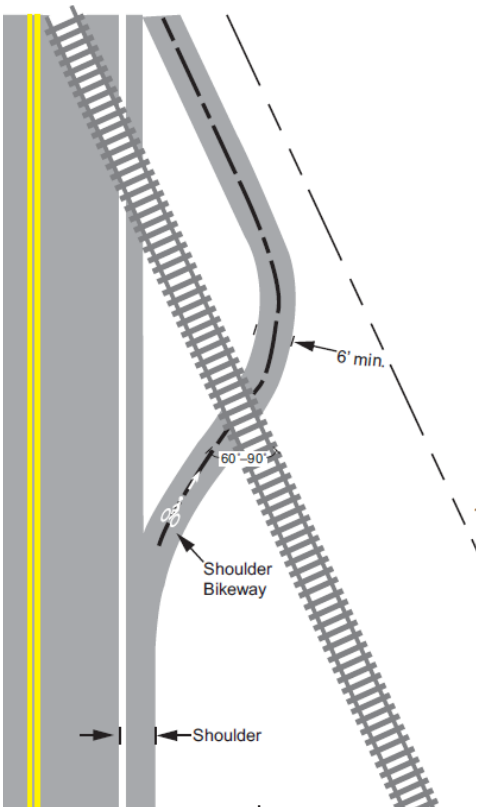
Separate warning devices are not required when bicycle and pedestrian facilities cross a railroad track within 25 feet of a street crossing. Depending on the volumes of bicyclists, pedestrians, and trains, however, additional enhancements may be appropriate. The devices described in the path crossing section are also applicable to street crossings, with some differences in application.

Guidance

- At skewed roadway crossings, bicycle and pedestrian facilities should bend away from the road where geometrically possible to improve the crossing angle.
- Where right-of-way allows, sidewalk rail crossings can be offset to direct pedestrians to look toward oncoming trains as they cross each track. Special attention should be taken to ensure pedestrians with disabilities can safely navigate offset crossings.
- Automatic gates used for roadway lanes can be placed to cover the roadway and the sidewalk. Alternatively, a second gate arm from the same assembly can be provided across the sidewalk, or an entirely separate gate can be used.

REFERENCES

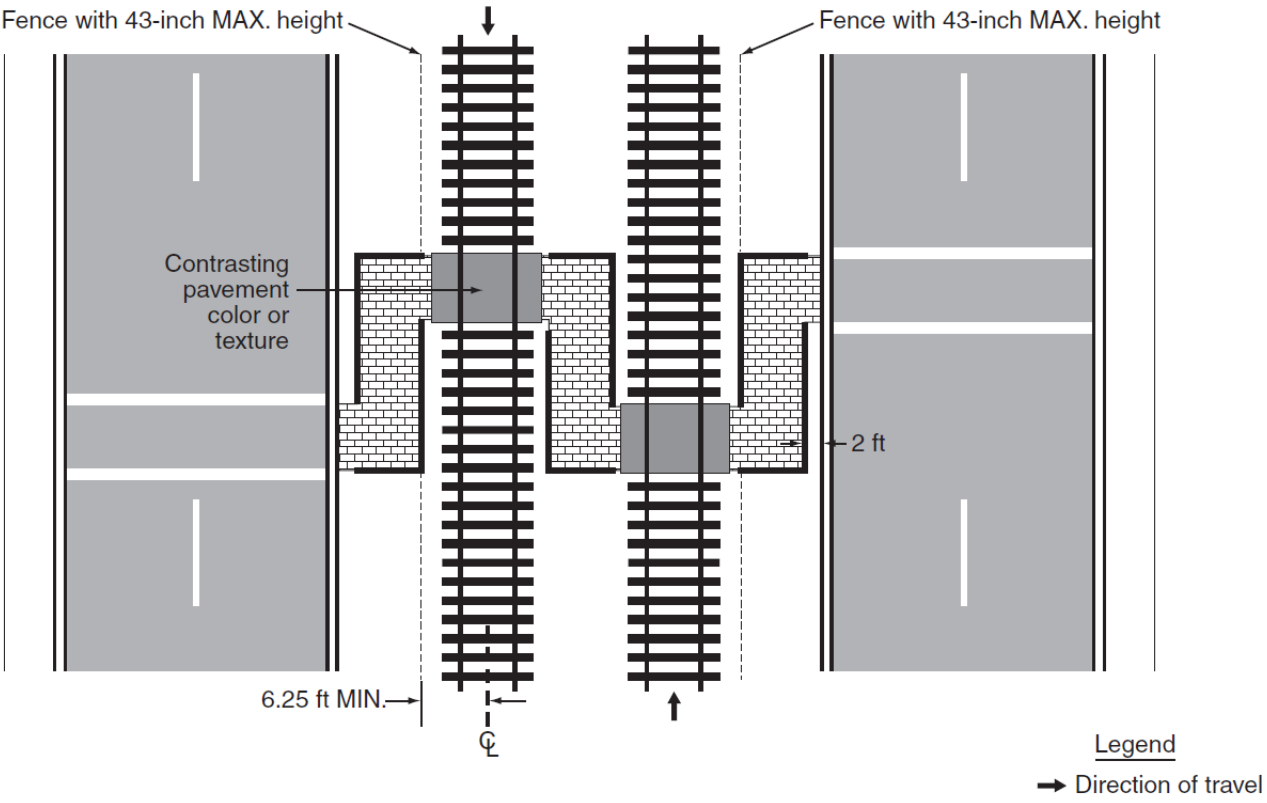
- *Manual on Uniform Traffic Control Devices, Chapter 8D*
- *AASHTO Guide for the Development of Bicycle Facilities.* American Association of State Highway and Transportation Officials, 1999.
- *Railroad-Highway Grade Crossing Handbook*, Second Edition. U.S. Department of Transportation, Federal Highway Administration, 2007.



Source: Figure 4-28, AASHTO Guide to Bicycle Facilities, 4th Edition

Signage can be used to reinforce the risk at skewed rail crossings and guide cyclists to cross tracks at 90 degrees.

A pedestrian crossing in Los Angeles on the Metro Gold Line includes automatic pedestrian gates and emergency exit swing gates. Where geometrically feasible, they are attached to the same assembly as the roadway gates for cost savings.



An offset crossing design encourages pedestrians to look toward the direction of travel as they cross each track. The designs shown above are only appropriate for pedestrian-only crossings. They do not work for bicyclists.

Source: Figure 8C-9 and 8C-10, Manual on Uniform Traffic Control Devices, 2009 Edition

Pedestrian-Scale Lighting

MODE

RECOMMENDATION:

- **Install pedestrian-scale along corridors with high pedestrian activity**
- **Evaluate opportunities to add lighting along trails and/or trail crossings at intersections**

URBAN/COMMERCIAL AREAS

Pedestrian scale lighting improves visibility for both pedestrians and motorists - particularly at intersections and in areas of high pedestrian activity.

Pedestrian scale lighting is characterized by short light poles (around 15 feet high), close spacing, low levels of illumination (except at crossings), and the use of LED lamps to produce good color rendition, long service life and high energy efficiency.

Both street and pedestrian lighting levels should be considered for the same street corridor, especially in areas with tree canopy. "Dark Sky" lighting should be considered within residential districts.

Materials

Low-cost light emitting diodes (LED) offer a wide range of light levels and can reduce long term utility costs.

Guidance

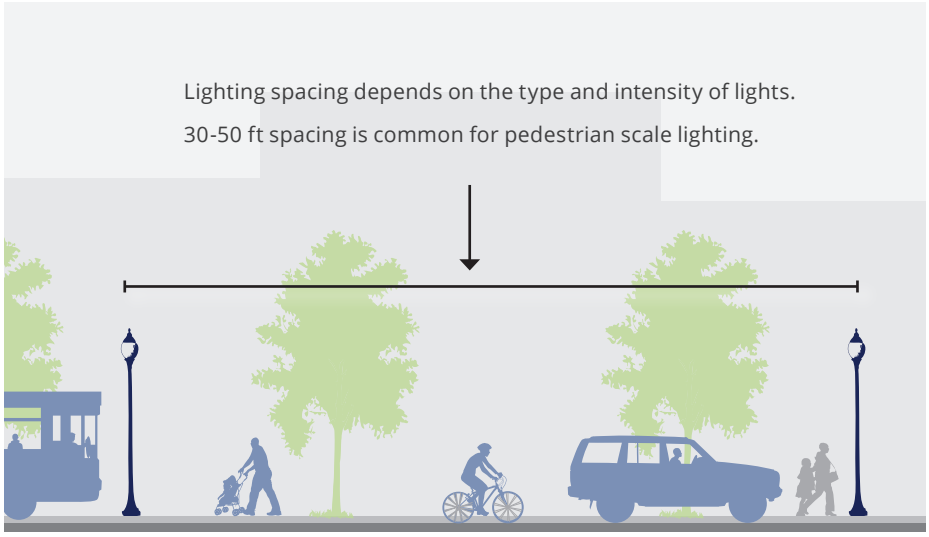
Locate lighting at the following locations:

- Pedestrian oriented areas
- Street crossings (intersection and mid block)
- Entrances and exits of bridges
- Areas near churches, schools, and community centers with nighttime pedestrian activity.

Placement details and dimensions:

- Spacing should be provided for minimum illumination levels while limiting excess light pollution
- Luminaries should direct light downward
- Lighting poles should be placed in the furniture zone of the sidewalk and not interfere with pedestrian travel.

Solar powered lights are available where utility collection is difficult



TRAILS

Lighting for trails should be analyzed on a case-by-case basis with full consideration of the maintenance commitment lighting requires. In general, lighting is not appropriate for trails in remote areas, trails with low use, or where there is little to no development.

Lighting can improve visibility along the trail and intersection crossings at night for commuters. If a trail is determined to be unlit and closes at sun down, extended hours for commuters should be considered, particularly during winter months when trips to and from work are often made before sunrise and after sunset. Lighting may also be necessary for day-time use in greenway tunnels and underpasses.

Guidance

Recommended locations for lighting include the following:

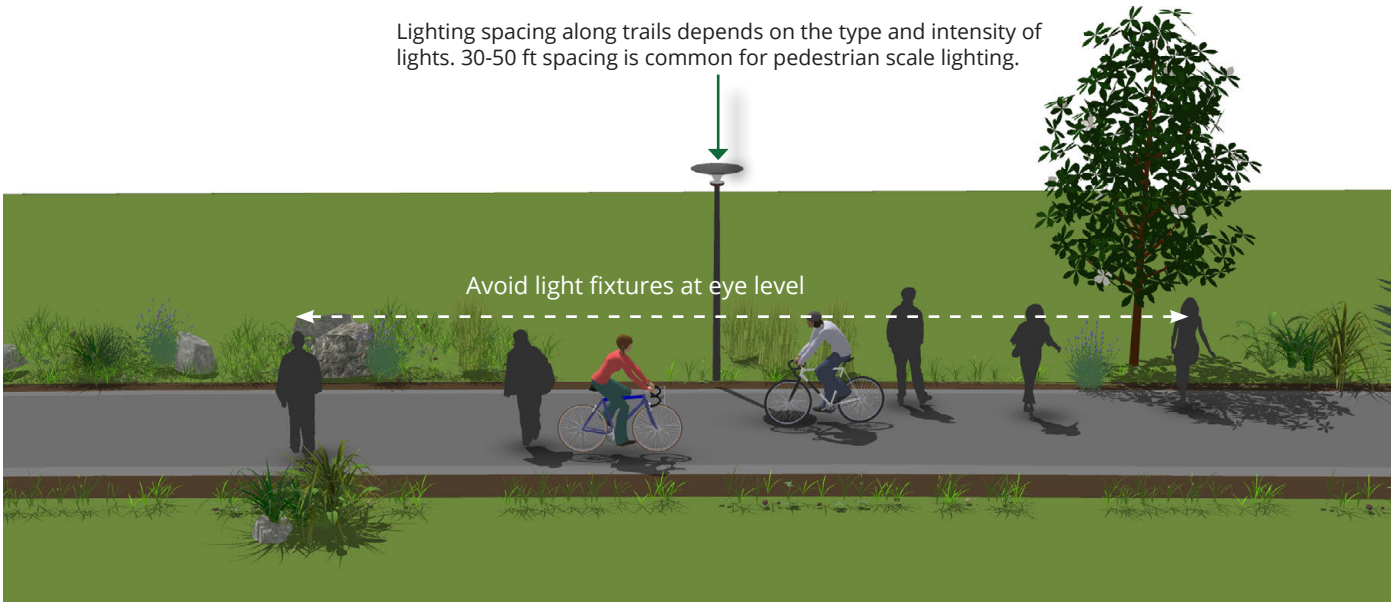
- Trailheads and parking areas
- Restroom facilities
- Major trailhead intersections to use as a navigation aid
- Entrances and exits of bridges and underpasses and in tunnels
- Street crossings

Low-cost light emitting diodes (LED) offer a wide range of light levels and can reduce long term utility costs.

Design lighting levels appropriate to each situation. Trail lighting should be at pedestrian scale. Avoid light fixtures at eye level that could impair visibility.

Solar powered lighting is available where utility collection is difficult or when alternative energy sources are desired.

Direct glare or excessive illumination on to adjacent properties, streets, or sidewalks should be avoided.



Trail lighting visualization

Batched Bikeway Projects

RECOMMENDATION:

- Identify diverse funding strategies for bikeway projects
- Group bikeway projects together when appropriate and feasible in order to save on costs and time

MODE

Part I. Background

Due to limited federal and state grant funding, cities and towns must be innovative in how they finance and expand their bicycle networks. A deliberate strategy is needed to maximize available funding. The Greater Greenville area should capitalize on existing resources and build new partnerships, especially with developers and private entities, so that it can expand and enhance its bikeway network. The Greater Greenville area should implement new bikeways during street resurfacing and major street improvements. The Greenville MPO should also seek out private partnerships, when appropriate, in order to support bike parking and development of bikeways. Many cities across the United States carry out bikeway projects as part of road resurfacing projects or through larger Complete Streets projects. Funding sources for these projects vary and may be a mix of federal, state, and local sources.

Part II. Details

Timeframe

- ☐ SHORT-TERM
- ☐ MID-TERM
- ☑ LONG-TERM

Funding Needs

- ☑ LOW
- ☐ MEDIUM
- ☐ HIGH

Responsible Party

LEAD ROLE

Greenville MPO

SUPPORT ROLE

Town and City leaders in Greater Greenville area, Planning, Public Works

A bicycle lane in Greenville

Case Study

Memphis, TN

Currently, Memphis doesn't have a dedicated funding source for bikeway projects in its capital improvement budget. Many of the bikeway projects are implemented through street resurfacing or other projects that are already happening. For some projects, such as greenways, groups that aren't part of the city are the ones who initiate the projects. For example, a cycle track was constructed on Jefferson Avenue that was initiated by the Memphis Medical District Collaborative (MMDC), a nonprofit community development entity. MMDC focuses its work heavily on streetscape improvements throughout the Medical District. Memphis's Hampline, a combined on and off-street bikeway, was initiated by the public and paid for in part by crowdfunding. The project's supporters launched a digital fundraising campaign (similar to Kickstarter) to pay for part of the project's cost.

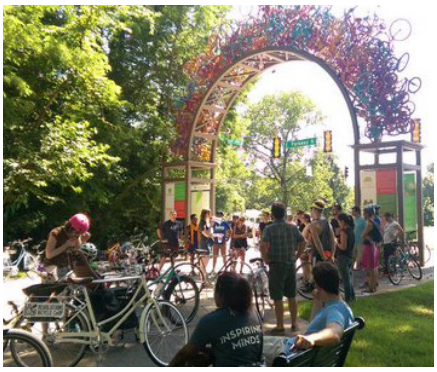
Raleigh, NC

Raleigh's Long Term Bikeway Plan and the city's Complete Streets Policy directs the city to continue to include bike facilities in street projects and in new developments (when appropriate). The city currently installs pavement markings for bicycle facilities through the street resurfacing program. In addition, the city coordinates with the greenway and pedestrian plan implementation to install shared use paths where appropriate. Building a shared use path could serve multiple purposes while also saving capital. Similar to Memphis, the City of Raleigh also undertook a crowdfunding campaign to raise money for various public projects. The crowdfunding campaign raised $9,000 to finance bike racks and greenway benches.

Sources: Raleigh Bike Plan Update 2015,
Andersen, Michael. "Memphis is About to Build the Country's First Crowdfunded Bike Lane." People for Bikes. http://www.peopleforbikes.org/blog/entry/memphis-is-about-to-build-the-countrys-first-crowdfunded-bike-lane

Part III. Action Steps

Action Steps	Person(s)/ Organization(s) Responsible	Target Completion Date
Identify funding strategies for bikeway projects	Greenville MPO, City and town leaders such as Mayors and City Council	Ongoing
Continue implementation of bikeway projects through street resurfacing	Public Works	Ongoing
Engage business community and other private partners	Greenville MPO	Ongoing
Engage neighborhood groups, advocacy groups, and other nonprofit organizations	Greenville MPO	Ongoing



Hampline in Memphis, TN

Utility and Fixed Object Coordination

MODE

RECOMMENDATION:

- Create a guidebook to address fixed obstacles within sidewalk zones
- Evaluate existing sidewalks for their accessibility, with special attention to utility and fixed object obstacles
- Enhance standards for sidewalk construction, including minimum width and furnishing zones

Part I. Background

As the Greater Greenville area improves its pedestrian network, accessibility and usability are key factors that must be considered to create a viable and safe network. Sidewalks in the public realm are typically designed to be a minimum of five feet wide. However, in many areas, the width of existing sidewalks is much narrower. Many factors contribute to narrow width of existing sidewalks, such as constrained right-of-way, old sidewalks that have not been repaired, and obstructions outside of the existing sidewalk zone. In many instances, the "sidewalk zone" starts at the back of curb and extends outward within the right-of-way. This zone is often the location of fixed objects such as utility and electric poles as well as lighting, signage, benches, and transit stops. When these items are located within the sidewalk zone, the accessible width is reduced and is often reduced to less than three feet. This creates areas that are impassible for users in a wheelchair, people pushing strollers, etc.

A guidebook should be created to address fixed obstacles within sidewalk zones. The sidewalk zone width, or minimum pedestrian travel area, should be determined based on the street type and area that it is located in (commercial vs. residential). Conduit placement for future underground power lines for new sidewalk projects should be evaluated and considered in the guidebook.

No new or replacement sidewalks should be built that result in an obstacle or barrier. All new sidewalks should contain a furnishing zone that would be in addition to the minimum required sidewalk width. Fixed objects such as utility poles, lighting, signs, benches and trash receptacles should be located in this zone. This zone is also appropriate for landscaping such as street trees and bio-swales.

Part II. Details

Timeframe

- ○ SHORT-TERM
- ☑ MID-TERM
- ○ LONG-TERM

Funding Needs

- ○ LOW
- ☑ MEDIUM
- ○ HIGH

Responsible Party

LEAD ROLE

Public Works

SUPPORT ROLE

Greenville MPO, Greenville Utilities Commission, communications companies, GREAT

Case Study

Seattle, WA

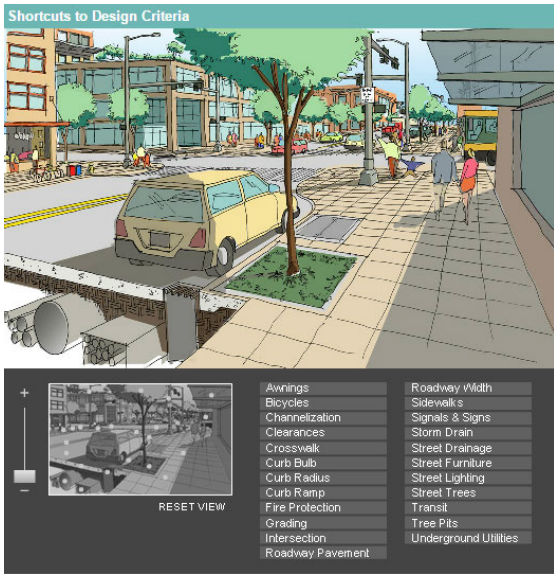
Seattle uses a similar landscape/furniture zone located between the roadway curb face and the front edge of the walkway with a minimum width of 5-6 feet. This area is used to locate street trees, utility poles, furniture, and lighting. Transit Zones are located in the landscape/furniture zone and are designated for transit riders as well as for loading and alighting. It may also include transit signage, shelters, benches, trash receptacles, and pedestrian scale lighting. Seattle has a standard that the sidewalk shall be clear of all vertical obstructions, such as poles, fire hydrants, street furniture, and other elements for a width of at least 5 feet. These obstructions should be placed in the landscape / furniture zone or behind the sidewalk. Relocation of existing utilities may be required to meet clearance requirements. These requirements and others can be found within the Seattle Right-of-Way Improvements Manual, which can be found on the city's website.

NACTO

The NACTO *Urban Street Design Guide* can be consulted for further guidance on addressing utility conflicts. Similar to the practice of other cities, NACTO suggests a "street furniture/curb zone". This refers to the section of the sidewalk between the curb and the edge of sidewalk as the appropriate location for items such as lighting, newspaper kiosks, and utility poles. It is critical that sidewalks have a desired minimum width of 6 feet and absolute minimum of 5 feet with a minimum 2 feet buffer for street furniture and utilities.

Part III. Action Steps

Action Steps	Person(s)/ Organization(s) Responsible	Target Completion Date
Inventory obstructions and constrained widths in existing sidewalks that are part of the proposed sidewalk network	Public Works, Greenville Utilities Commission	Early 2018
Create a task list that outlines the obstruction, existing degree of obstruction, party responsible for relocation, and then prioritize items on the list	Public Works	Early 2018
Work with utility and communication companies to identify a dedicated funding source to relocate utility poles from sidewalks. This should be a yearly recurring fund	City Council, Greenville MPO, Public Works, Greenville Utilities Commission	End of 2018
Work with GREAT Bus System to develop a strategy and plan to relocate bus stops and benches outside of the sidewalk zone	Public Works, GREAT	End of 2018
Create a guidebook to clearly outline the process to address obstacles in sidewalks	Public Works, Greenville MPO, Greenville Utilities Commission	Mid-year 2019



Online version of the Seattle Right-of-Way Improvements Manual. Users can select links in the illustration to access information about design criteria

Tactical Urbanism Approach to Pedestrian & Bike Infrastructure

RECOMMENDATION:

- ☑ **Implement low-cost strategies to complete the pedestrian and bicycle network**
- ☑ **Utilize tactical urbanism approaches to install both temporary and permanent pedestrian and bicycle infrastructure**

MODE

Part I. Background

Tactical urbanism has been embraced as a low-cost alternative to implementing temporary and permanent pedestrian and bicycle projects. This method of testing out longer-term infrastructure improvements sprung out of a series of citizen-led efforts to "take action when confronted with the slow pace of change." It can take shape in many forms, ranging from smaller "guerilla interventions" to demonstration projects led by community groups and cities. Tactical urbanism projects may or may not be carried out with the approval of city governments. Examples of tactical urbanism methods include pavement markings, pop-up bikeways, adding furniture and/or seating to create public space, and using planters as barriers for a protected bike lane.

The Greater Greenville area should embrace tactical urbanism as a strategy for implementing improvements. Tactical urbanism projects have low costs and have the potential to garner excitement for active transportation. Tactical urbanism projects also allow residents to envision an environment with improved pedestrian or bicycle facilities and to test out these facilities before they are made permanent.

Part II. Details

Timeframe

- ☑ **SHORT-TERM**
- ○ **MID-TERM**
- ○ **LONG-TERM**

Funding Needs

- ☑ **LOW**
- ○ **MEDIUM**
- ○ **HIGH**

Responsible Party

LEAD ROLE

Greenville MPO

SUPPORT ROLE

Public Works, Greenville Bicycle and Pedestrian Commission, local non-profit organizations such as FROGGS

Case Study

Seattle Low-Cost Sidewalk Program

In 2015, Mayor Ed Murray furthered his commitment to creating a walkable city and proposed that the city use innovative techniques to complete more sidewalk projects. The Mayor plans to deliver at least 250 blocks of new sidewalks over the next nine years at the same cost as constructing 150 blocks using the traditional concrete sidewalk model. In order to achieve that goal, sidewalks could be constructed with stamped asphalt, at-grade sidewalks separated by curb stops or planter boxes, and other quick-to-implement, low-cost pedestrian infrastructure solutions. These sidewalk improvements will be implemented on streets where no sidewalks exist and will be constructed on one side of the street rather than both sides.

The 2016 low-cost sidewalk improvements will cost $1.5 million and will be primarily funded through Move Seattle, a property tax levy. Mayor Murray is also hoping to identify private sources of funding to expand the sidewalk network by establishing new partnerships with homeowners and businesses. The City plans to improve enforcement and outreach when private entities are responsible for repairing sidewalks, leverage existing development to incentivize building better pedestrian environments, and update Seattle Department of Transportation's tools for tracking sidewalk conditions.

Quick-build projects in Memphis and New York City

Departments of Transportation (DOTs) in cities across the United States have implemented "quick-build" projects that focus on improving pedestrian and bike infrastructure. These projects typically have short timeframes and are installed within a year of planning. Materials that are easily transferable and mobile, such as traffic barriers, planters, and posts, are used so that the space can be altered. MEMFix, a community initiative in Memphis, has implemented short-term alterations to city blocks with bike lanes, community gardens, and green space. New York City has a Plaza Program, which is a city initiative that collaborates with community organizations to convert underutilized roadways into public spaces. These projects use paint, plants, and moveable seating. Some projects, such as the pedestrian plaza at Times Square, have become permanent through capital construction plans.

Top: Stamped asphalt sidewalk in Seattle (Source: Seattle Bike Blog); Bottom: Times Square Pedestrian Plaza (Source: Irving Commons)

Part III. Action Steps

Action Steps	Person(s)/ Organization(s) Responsible	Target Completion Date
Develop countywide tactical urbanism policy to implement demonstration projects and low cost pedestrian projects	Greenville MPO	Early 2018
Partner with community organizations to implement temporary demonstration projects to test pedestrian and bike infrastructure treatments	Greenville MPO, advocacy groups and nonprofit organizations	Ongoing

Sources: Fesler, Stephen. "Seattle Mayor Ed Murray Reveals Low-Cost Sidewalk Program." The Urbanist. 22 Oct 2015. https://www.theurbanist.org/2015/10/22/seattle-mayor-ed-murray-reveals-low-cost-sidewalk-program/
Kaufman, Rachel. "Seattle Just Voted to Build 250 Blocks of 'Alternative' Sidewalks." Next City. https://nextcity.org/daily/entry/seattle-vote-250-blocks-new-sidewalks-alternative-concrete

Transit First/ Last Mile

MODE

Part I. Background

One strategy to improve transit service for riders is for Greenville Area Transit (GREAT) and Eastern Carolina University (ECU) Transit to improve pedestrian access and provide better bike connections. Strategies that GREAT and ECU Transit can undertake to make pedestrian improvements along transit routes include providing amenities at bus shelters such as lighting and providing bike racks on all buses.

Greenville MPO should work with GREAT and ECU Transit to plan walksheds (half-mile radius) and bikesheds (3-mile radius) around each priority transit stop. These walksheds and bikesheds should be the focus of where pedestrian and bike connections to transit are made. Focusing on these walksheds and bikesheds would improve safety for cyclists and pedestrians and increase the likelihood of shifting vehicle trips to active transportation and transit trips.

RECOMMENDATION:

- ☑ Partner with Greenville GREAT to provide amenities at priority transit stops
- ☑ Improve pedestrian and bike connections to transit stops, regional transit centers, and park-and-ride lots
- ☑ Plan walksheds and bikesheds around each priority transit stop

Part II. Details

Timeframe

- ○ SHORT-TERM
- ☑ MID-TERM
- ○ LONG-TERM

Funding Needs

- ○ LOW
- ☑ MEDIUM
- ○ HIGH

Responsible Party

LEAD ROLE

GREAT, ECU Transit

SUPPORT ROLE

Public Works, Greenville MPO

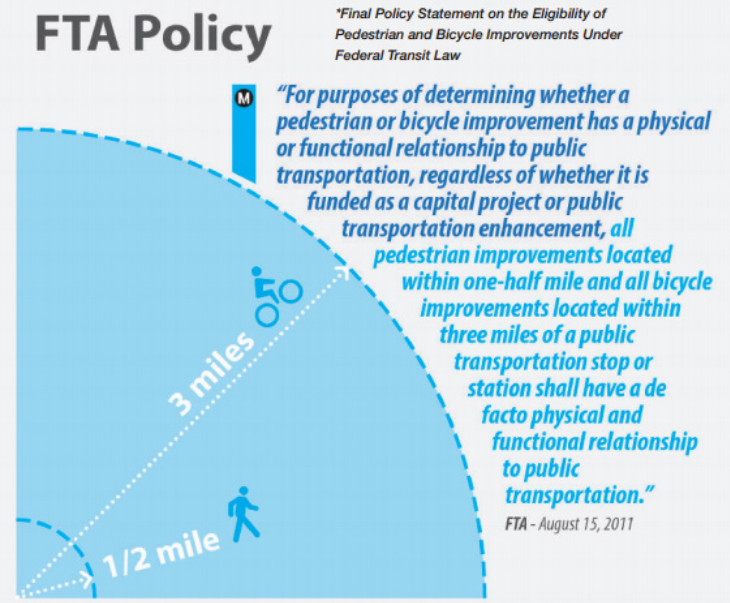
GREAT bus in Greenville

Key transit amenities to promote walking and biking at transit stops are (refer to illustration below):

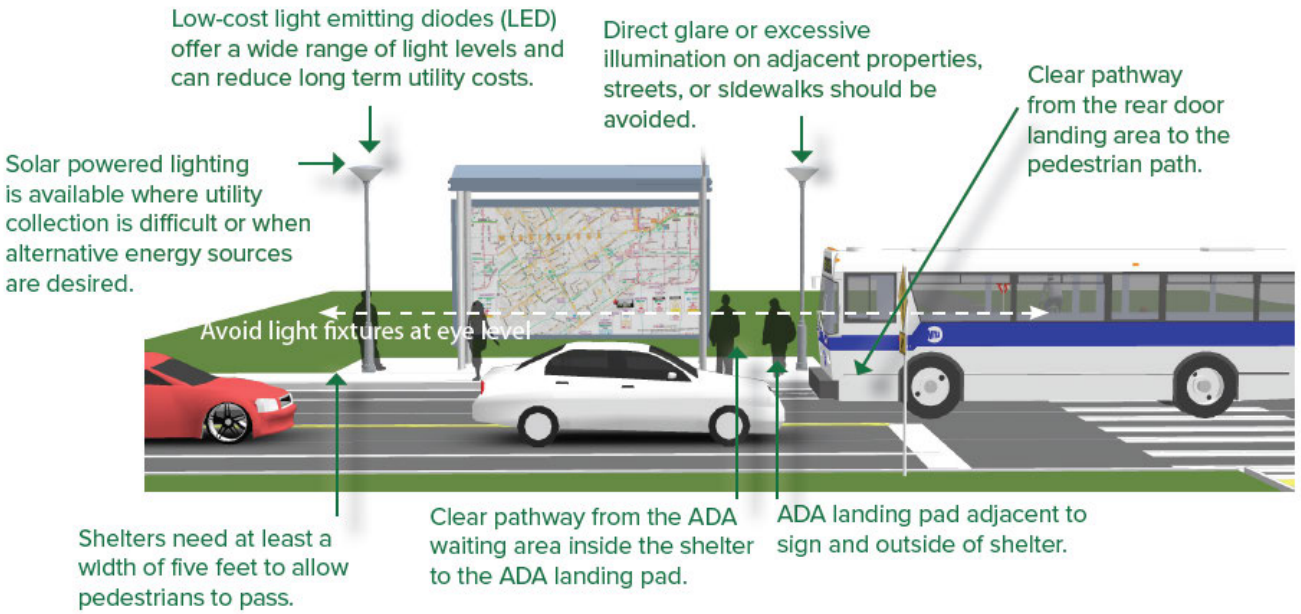
- ADA compliant curb ramps and ADA landing pad
- Bench
- Lighting
- Bus route information
- Bus shelter
- Bike parking
- Public art
- Trash receptacles

Part III. Action Steps

Action Steps	Person(s)/ Organization(s) Responsible	Target Completion Date
Plan walksheds and bikesheds around priority transit stops	GREAT, ECU Transit	End of 2017
Improve biking amenities, such as providing space for bikes on all transit vehicles, bike parking at bus stops	GREAT, ECU Transit	End of 2018
Make pedestrian improvements along transit routes, including crossings and sidewalks	GREAT, ECU Transit, Greenville MPO	Mid-year 2019



Right: FTA Policy on bike and pedestrian improvements near public transportation; Bottom: Illustration of key amenities at transit stops



NACTO Involvement

MODE

RECOMMENDATION:

- Join NACTO
- Formally adopt NACTO guidelines as defacto design standards
- Maintain NACTO membership as an annual cost

Part I. Background

NACTO's core mission is to build a strong network of peer communities as well as foster open communication and collaboration between cities. They help to fulfill this mission by providing its members valuable tools to improve their transportation infrastructure in order to provide a safe environment for all road users. The City of Greenville is not a member of NACTO and does not have access to the myriad of tools, technical assistance, training resources, and learning opportunities such as information sharing, peer city review, policy committee participation, workshops, and forums.

Each year, Greenville should dedicate funding to send a representative to the NACTO annual conference. The annual conference is a convening of transportation practitioners across the country and is a valuable opportunity to learn about emerging trends in urban street design and transportation policy. The Greenville MPO should also plan yearly study visits to aspirational cities to meet with government officials and leaders to learn about innovative practices, policies, and services as well as lessons learned.

Smaller US cities can join NACTO as Affiliate Members. Annual costs for Affiliate Membership are $4,000 for communities with less than 300,000 residents.

Part II. Details

Timeframe

- [x] **SHORT-TERM**
- [ ] **MID-TERM**
- [ ] **LONG-TERM**

Funding Needs

- [x] **LOW**
- [ ] **MEDIUM**
- [ ] **HIGH**

Responsible Party

LEAD ROLE

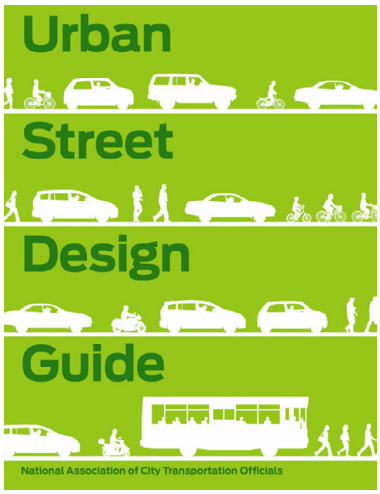
Greenville MPO

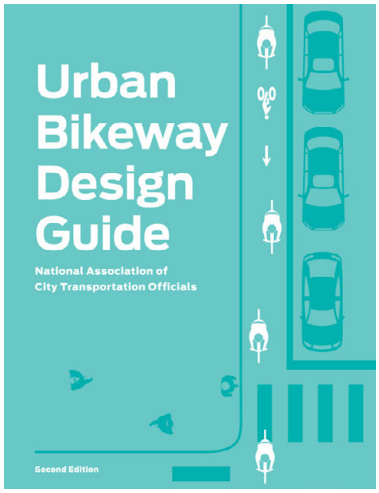
SUPPORT ROLE

Mayor, City Council

Part III. Action Steps

Action Steps	Person(s)/ Organization(s) Responsible	Target Completion Date
Become a member of NACTO	Mayor's Office, Planning, Greenville MPO	On-going
Adopt NACTO guidelines	Greenville MPO	Mid-year 2018
Attend NACTO annual conference	Greenville MPO representative	Annually
Conduct a study visit to an aspirational city in the U.S.	Greenville MPO representative	2020





Top left: NACTO 2016 Membership Guide; Top right: Urban Street Design Guide; Bottom left: Urban Bikeway Design Guide; Bottom right: Transit Street Design Guide

7 Implementation

About 75% of the 1,000+ respondents say it is VERY important to improve walking, bicycling and greenway trail conditions in their community.

- Active Transportation Plan Comment Form Results, 2017

Overview

Successful implementation will require support from elected officials, strong local advocates, close coordination with NCDOT, and the dedication of a well-organized bicycle and pedestrian coordinator.

This chapter lays the groundwork for implementation efforts through a recommended organizational framework and set of action steps for establishing funding and carrying out implementation. The organizational chart on the follow page outlines the suggested key roles for project partners and stakeholders involved in implementation. The actual roles and responsibilities of each group will be more diverse and may vary depending on how this plan is implemented over time.

Many of the key groups for implementation were represented on this plan's Steering Committee.

Above: Steering Committee Meeting in 2016

Framework for Implementation

Elected Officials

Recognize the value of walkable and bicycle-friendly communities by adopting this plan update, thereby supporting quality of life in the Greater Greenville Area.

NCDOT-DBPT

Guidance on bicycle policy & project funding; Support in coordinating with local division & district offices

Greenville Urban Area MPO

- Hire a MPO director that is experienced in bicycle and pedestrian project development
- Coordinate with NCDOT and municipal & county partners on leveraging funding opportunities through STP-DA funds and the STI process;
- Incorporate this Plan's projects into CTPs and LRTPs;
- Provide implementation progress reports during regularly scheduled MPO meetings, at least semi-annually.
- Use this plan's action steps table as a guide for progress reports and action items.

Private Sector

Potential partners in developing active transportation facilities & potential program sponsorship

NCDOT Division 2

- Become familiar with the recommendations in this plan
- Communicate with MPO on potential projects that could incorporate bicycle and pedestrian facilities, especially when on roadways with recommendations from this plan
- Coordinate with MPO on STP-DA funds and the STI process for bicycle and pedestrian projects

Municipal & County Partners

- Include funding for bicycle projects in Capital Improvement Programs (CIPs), at least to provide a 20% match to outside funding sources for top projects
- Coordinate with MPO to leverage local funding on specific projects
- Coordinate with NCDOT Division 2 for bicycle and pedestrian facilities as incidental projects during roadway reconstruction and resurfacing
- Update local development regulations to better support bicycle and pedestrian facility development
- Promote public awareness and use of local and regional bicycle, pedestrian, and greenway trail facilities through local tourism and economic development agencies

Advisory Groups

Continued support and leadership from:

- Greenville Bicycle & Pedestrian Commission
- Greenville Neighborhood Advisory Board
- Greenville Environmental Advisory Committee

Local Residents and Civic Organizations

- Help build public support for walking & bicycling in the region and for funding projects and programs
- Reach out to elected officials and other decision-makers to let them know you and your organization support active transportation

Regional Partners

Continued support, coordination, & outreach from:

- Uptown Greenville
- Friends of Greenville Greenways
- Keep Greenville Beautiful
- ECU Sustainability Program
- Boys & Girls Club
- Eastern Carolina Injury Prevention Program
- East Coast Greenway Alliance
- Vidant Health
- Private Developers
- Local Business Owners
- Safe Kids Pitt County

Consultants

Assist project partners by providing guidance on project development, and by providing bicycle & trail design services

Acronym Legend:
NCDOT: North Carolina Department of Transportation
DBPT: Division of Bicycle and Pedestrian Transportation
MPO: Metropolitan Planning Organization / RPO: Rural Planning Organization
STP-DA: Surface Transportation Program – Direct Attributable
STI: Strategic Transportation Investments
CTP: Comprehensive Transportation Plan / LRTP: Long Range Transportation Plan

Facility Development Methods

This section describes types of transportation facility construction and maintenance projects that can be used to create new bicycle and pedestrian facilities.

Note that roadway re-construction projects offer excellent opportunities to incorporate facility improvements for bicyclists and pedestrians. It is much more cost-effective to provide a bicycle facility when these road projects are implemented than to initiate the improvement as a "retrofit."

In order to take advantage of upcoming opportunities to incorporate bicycle and pedestrian facilities into routine transportation projects, Pitt County and its municipalities should continue to track repaving schedules, and other lists of projects. Additionally, the NCDOT's district office should be encouraged to use this Plan as a ready reference when maintenance projects are being programmed. As recommended in this chapter, a semiannual meeting with project partners will ensure this critical communication. As the long-range transportation plan is updated in future years, bicycle and pedestrian improvements should be included in appropriately programmed projects.

Bicycle Project Implementation

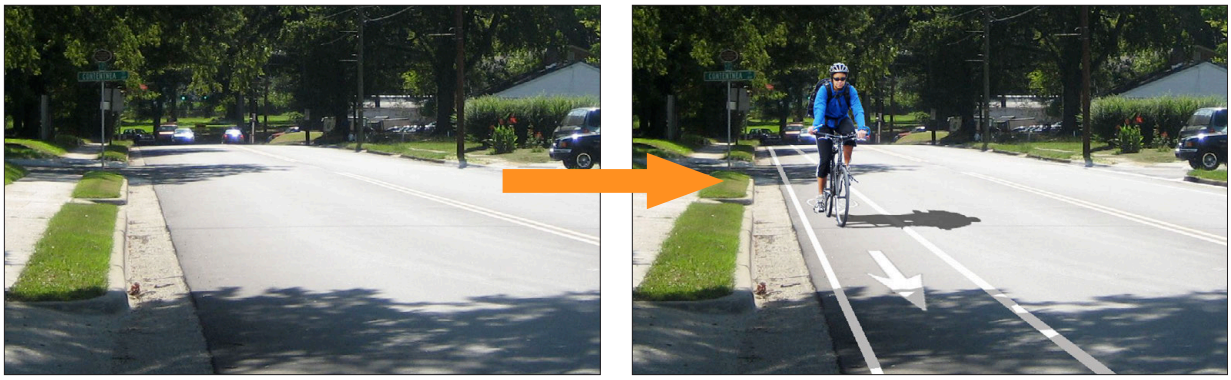
Restriping

The simplest type of restriping project is the addition of bicycle lanes, edgelines, or shoulder stripes to streets without making any other changes to the roadway (example at right).

Bicycle lanes, edgelines, and shoulder stripes can also be added by narrowing the existing travel lanes or removing one or more travel lanes. In some locations where the existing lanes are 12- or 13-feet wide, it may be possible to narrow them to 11 feet, especially where medians are present. This requires changing the configuration of the roadway during a resurfacing project. This type of downsizing represents an opportunity for adding bicycle and pedestrian facilities while working within the construct of an existing right-of-way width.

Removing Parking

Some neighborhood collector roadways are wide enough to stripe with bike lanes, but they are used by residents for on-street parking, especially in the evening. In locations like this, removing parking is likely to create considerable controversy and is not recommended unless there is no other solution



Above: A photo rendering of bicycle lanes on W. 5th Street. This is an example of a project that would only require striping the new lanes.

(unless the parking is never used). In the rare case that removing parking is being considered, the parking should not be removed unless there is a great deal of public support for the bike lanes on that particular roadway, and a full public involvement process with adjacent residents and businesses is undertaken prior to removing parking.

If it is not practical to add a bike lane, edgelines and shared lane markings may be considered. On roads where the outside lane and parking area combined are more than 17-feet-wide, 10-foot-wide travel lanes can be striped with an edgeline, leaving the rest of the space on either side for parking. The stripe would help slow motor vehicles and provide extra comfort for bicyclists, especially during the daytime when fewer cars would be parked along the curb. On roads with outside lane and parking areas that are narrower than 17-feet-wide, shared lane markings can be provided every 100 to 200 meters on the right side of the motor vehicle travel lane to increase the visibility of the bike route.

Repaving

Repaving projects provide a clean slate for revising pavement markings. When a road is repaved, the roadway should be restriped to create narrower lanes and provide space for bike lanes and shoulders, where feasible. In addition, if the spaces on the sides of non-curb and gutter streets have relatively level grades and few obstructions, the total pavement width can be widened to include paved shoulders.

Installing Shared Lane Markings

The Greenville Urban Area should continue the use of shared lane markings, or "sharrows" as one of its bicycle facility types. Shared lane markings have been newly incorporated into the MUTCD. They take the place of traditional bicycle lanes where lanes are too narrow for striping, where speeds do not exceed 35 mph, and/or where there is on-street parking. The intent of the shared lane marking is threefold: 1) they draw attention to the fact that the roadway is accommodating bicycle use and traffic; 2) they clearly define direction of travel for both bicyclists and motorists; and 3) with proper placement, they remind bicyclists to bike further from parked cars to prevent "dooring" collisions. While shared-lane markings are not typically recommended or needed on local, residential streets, they are sometimes used along such streets when part of a signed route or neighborhood bikeway.

Roadway Construction and Reconstruction

Bicyclists should be accommodated any time a new road is constructed or an existing road is reconstructed. In the long-term, all roadways should have on-road bicycle facilities. However, sidepaths can be an acceptable solution when a road has few driveways and high-speed, high-volume traffic.

Bridge Replacement

All new or replacement bridges should accommodate bicycles with on-road facilities on both sides of the bridge. If the bridge is in a developed area or an area that may experience development in the future, it should also have wide sidewalks on both sides to accommodate all types of bicyclists and pedestrians.

Federal law, as established in the Transportation Equity Act for the 21st Century (TEA-21), makes the following statement with respect to bridges:

"In any case where a highway bridge deck is being replaced or rehabilitated with Federal financial participation, and bicyclists are permitted on facilities at or near each end of such bridge, and the safe accommodation of bicyclists can be provided at reasonable cost as part of such replacement or

RESEARCH ON BICYCLE LANE DEVELOPMENT THROUGH TRAVEL LANE NARROWING (RESTRIPING)

Narrowing roadways for traffic calming purposes and bicycle facilities are common occurrences now since planners and engineers are trying to not only accommodate vehicles but bicyclists and pedestrians as well. Narrowing roadways to allow for bicycle lanes or other bicycle facilities is needed in some instances where current roadway widths and traffic volume do not allow for a simple "stripe" to paint in a bicycle lane.

One means of developing bicycle lanes is through restriping or travel lane narrowing. In laying out the bicycle network facility recommendations and methods, it was determined that 11' travel lanes were acceptable in order to fit bicycle lanes into the existing roadway environment. This methodology used in developing recommendations is supported by research in both automobile traffic safety and bicycle level of service improvements.

Current AASHTO literature, research, and precedent examples (including some found in Greenville) support the notion of reducing 12' travel lanes to as narrow as 10' lanes. The 2004 AASHTO Green Book states that travel lanes between 10 and 12 feet are adequate for urban collectors and urban arterials. (1) "On interrupted- flow operating conditions at low speeds (45 mph or less), narrow lane widths are normally adequate and have some advantages." At the 2007 TRB Annual Meeting, a research paper using advanced statistical analysis, supported the AASHTO Green Book in providing flexibility for use of lane widths narrower than 12 feet on urban and suburban arterials. The paper indicates there is no difference in safety on streets with lanes ranging from 10 to 12 feet. "The research found no general indication that the use of lanes narrower than 12 feet on urban and suburban arterials increases crash frequencies. This finding suggests that geometric design policies should provide substantial flexibility for use of lane widths narrower than 12 feet." The research paper goes on to say "There are situations in which use of narrower lanes may provide benefits in traffic operations, pedestrian safety, and/or reduced interference with surrounding development, and may provide space for geometric features that enhance safety such as medians or turn lanes. The analysis results indicate narrow lanes can generally be used to obtain these benefits without compromising safety." and "Use of narrower lanes in appropriate locations can provide other benefits to users and the surrounding community including shorter pedestrian crossing distances and space for additional through lanes, auxiliary and turning lanes, bicycle lanes, buffer areas between travel lanes and sidewalks, and placement of roadside hardware." (2)

Precedent examples also show the large number of communities around the United States that have narrowed travel lanes to enable the development of bicycle lanes. Cities such as Arlington, VA, Cincinnati, OH, Charlotte, NC, Houston, TX, and Portland, OR have regularly narrowed travel lanes to 10' or even commonly use them in new roadway development. Lane narrowing and the addition of bicycle lanes in the Greater Greenville Area will require consultation with NCDOT and further analysis beyond this planning effort. Changing the roadway design may also require a reduction in speed limit and consideration of traffic calming designs such as median islands. For roadways with higher speed limits and traffic volumes, wider vehicular and bicycle lanes may be warranted. Further analysis of bicycle lane restriping projects is warranted to determine appropriateness of lane narrowing, bicycle lane widths, and speed limits that impact both motorists and bicyclists.

Sources for Bicycle Lane Development & Travel Lane Narrowing:

1) American Association of State Highway and Transportation Officials, A Policy on Geometric Design of Highways and Streets, Washington, DC 2004.

2) Relationship of Lane Width to Safety for Urban and Suburban Arterials, Ingrid B. Potts, Harwood, D., Richard, K, TRB 2007 Annual Meeting

rehabilitation, then such bridge shall be so replaced or rehabilitated as to provide such safe accommodations." (23 U.S.C. Section 217)

Bridge replacement projects on controlled access freeways where pedestrians and bicyclists are prohibited by law should not include facilities to accommodate bicyclists and pedestrians. In cases, however, where a bridge replacement project on a controlled access freeway impacts a non-controlled access roadway (i.e., a new overpass over an arterial roadway), the project should include the necessary access for pedestrians and bicyclists on the non-limited access roadway (i.e., paved shoulders, sidewalks, and pedestrian/bicycle crossing improvements). Existing and planned greenway crossings, both at-grade and below new bridges, should be similarly accommodated during bridge replacement projects.

Retrofit Roadways with New Bicycle Facilities

There may be critical locations in the Bicycle Network that have bicycle safety issues or are essential links to destinations. In these locations, it may be justifiable to add new bicycle facilities before a roadway is scheduled to be repaved or reconstructed.

In some places, it may be relatively easy to add extra pavement for shoulders, but others may require removing trees, moving landscaping or fences, or regrading ditches or hills. Retrofitting roadways with sidepaths creates similar challenges. Improvements in these locations are typically recommended in the long-term.

Some roads may require a "road diet" solution in order to accommodate bicycle facilities. Road diets involve removing vehicle travel lanes and replacing these lanes with on-road bicycle facilities and sidewalks or sidepaths. These are generally recommended only in situations where the vehicular traffic count can be safely and efficiently accommodated with a reduced number of travel lanes. Further study may be necessary for recommended road diets to ensure that capacity and level-of-service needs are balanced against bicycle level of service needs.

Pedestrian Project Implementation

Residential and Commercial Development

As detailed in Chapter 6, the construction of sidewalks and safe crosswalks should be required during development. Construction of pedestrian facilities that corresponds with site construction is more cost-effective than retrofitting. In commercial development, emphasis should also be focused on safe pedestrian access into, within, and through large parking lots. This ensures the future growth of the pedestrian network and the development of safe communities. Developers can also provide a fee-in-lieu of sidewalk construction that is equivalent to the specific need for their development.

Retrofit Roadways with New Pedestrian Facilities

For top priority pedestrian projects, it may be necessary to add new facilities before a roadway is scheduled to be reconstructed. In some places, it may be relatively easy to add sidewalk segments to fill gaps, but other segments may require removing trees, relocating landscaping or fences, re-grading ditches or cut and fill sections, and/or relocating/reconfiguring the drainage system.

Repaving

Repaving and resurfacing projects provide a clean slate for revising pedestrian crosswalk facilities, especially high visibility marked crosswalks, advanced stop lines, and enhanced curb ramps. Depending on the project, sidewalk and refuge islands may be developed as well.

2019 Plan Updates

This plan was updated in 2019 to coordinate recommendations with the **Greenville Urban Area MPO 2045 Metropolitan Transportation Plan (MTP).** The maps and pages affected by this update included the following:

- Map 3.1 Strategic Bikeway Network
- Map 3.2 Major Corridor Improvements
- Maps 3.3-3.10 Full Bicycle & Greenway Trail Network Maps
- Map 4.1 Strategic Sidewalk Network
- Map 4.2 Major Corridor Improvements
- Maps 4.3-4.10 Full Sidewalk & Greenway Trail Network Maps
- Map 5.1 Priority Project Key Map
- Project Cut-Sheets D, E, G, I, J, O, Q

Two new Project Cut-Sheets were also developed as part of this update (projects AA and BB) to reflect recent roadway construction, development, and trail opportunities in the City of Greenville.

Additional updates were made in the recommendations section of the plan to provide more detailed information on key topic areas, specifically:

- Pages 168-169, Shared Active Transportation (bike share and scooters)
- Page 177, Watch for Me NC Safety Campaign
- Pages 188-191, Sidepath Crossings at Driveways and Intersections
- Page 192-195, Bike/Ped/Path Crossings at Railroads

Finally, as a result of these changes, the plan's table of contents and page numbers were updated accordingly.

Action Steps Table

Action Step	Lead	Support	Details	Timeframe
Presentations and Adoptions				
Present Plan to City of Greenville Council	GUAMPO	Project Consultant	Presentation to City Council for overview of plan and planning process.	Short Term (2017)
Approve and adopt this Plan - City, County, Towns	City of Greenville, Pitt County, Town of Winterville, Town of Ayden, Village of Simpson	GUAMPO/ Project Consultant	Adoption shows that each jurisdiction has been part of a successful, supported planning process and are partners in implementation. It does not commit the communities to funding the plan, but it is key to securing outside funding from NCDOT, other state and federal agencies as well as private and nonprofit sources.	Short Term (2017)
Infrastructure Improvements				
Identify and secure specific funding sources for priority projects	GUAMPO	NCDOT, City of Greenville, Pitt County, Town of Winterville, Town of Ayden, Village of Simpson	Multiple funding sources should be sought. Appendix D contains funding opportunities. Also, GUAMPO should work with NCDOT to ensure that upcoming roadway reconstruction projects, including TIP projects, incorporate bicycle and pedestrian improvements recommended in this Plan. Immediate attention to the priority projects will have a large impact on bicycling and walking conditions in Greenville. Consider a bond referendum for greenways and roadway improvements for bicycle transportation. First phase work that can be done at a low cost includes crossing improvements and neighborhood bikeway projects. The intersection recommendations are very critical because of safety concerns and because these projects are also lower cost. Finally, the priority projects (Chapter 5) should be regularly evaluated as new opportunities arise, such as roadway resurfacing and new developments.	Short Term (2017-2018)
Consider speed limit reductions throughout the Greenville Urban Area MPO	GUAMPO, NCDOT	City of Greenville, Pitt County, Town of Winterville, Town of Ayden, Village of Simpson	Speed was a common concern of the public during this planning process. Speed limit reduction should be considered, especially in areas of heavy bicycle and pedestrian use. As bicycle and pedestrian facilities are installed on major arterials and collectors, speed limit reduction should be strongly considered.	Continuous/ Ongoing
Develop a long term funding strategy	GUAMPO, City of Greenville	NCDOT, Town of Winterville, Town of Ayden, Village of Simpson, Pitt County, BPAC, Uptown Greenville, FROGGS	To allow continued development of the overall system, capital funds for selected priority bicycle and pedestrian facility construction should be set aside every year (a 20% local match is typical for leveraging outside funding sources). Funding for an ongoing maintenance program should also be included in the county and town operating budgets. Diverse funding sources should be sought from federal, state, private, and nonprofit sources. Finally, consider grouping bikeways projects together when appropriate and feasible in order to save on costs and time (see Batched Bikeway Projects in Chapter 6).	Mid Term (2019-2021)

Action Step	Lead	Support	Details	Timeframe
Maintain on-road and off-road bicycle and pedestrian facilities	NCDOT, City of Greenville, Town of Winterville, Town of Ayden, Village of Simpson, Pitt County	GUAMPO, BPAC + General Public (for reporting maintenance needs)	NCDOT, Pitt County, and all municipalities should make immediate repairs to any on-road and off-road bicycle and pedestrian facilities that are damaged or have hazardous conditions. This includes floodplain trails that are covered in sand and debris after heavy rains (especially the Green Mill Run greenway). The local governments should make commitment to regular sweeping of bicycle lanes, repair of cracking, uneven sidewalks, and repainting of faded marked crosswalks.	Continuous/ Ongoing
Update design guidelines and typical street cross sections	City of Greenville, Town of Winterville, Town of Ayden, Village of Simpson	GUAMPO, BPAC, NCDOT	Local governments in the Greenville Urban Area MPO should update design guidelines to include current, innovative treatments found in the design resources referenced in Chapter 6 and the Design Guidelines appendix. Update typical street cross sections as part of this effort using the examples detailed in Chapter 6.	Short Term (2017-2018)
Implement Tactical Urbanism to Bike/Ped Infrastructure	City of Greenville, Town of Winterville, Town of Ayden, Village of Simpson	GUAMPO, BPAC, NCDOT	Tactical urbanism has been embraced as a low-cost alternative to implementing temporary and permanent pedestrian and bicycle projects. See Chapter 6 for further detail.	Short Term (2017-2018)
Local and Regional Coordination				
Expand efforts of City of Greenville Bicycle and Pedestrian Advisory Commission (BPAC) and incorporate MPO-wide input	BPAC	City of Greenville, GUAMPO, Town of Winterville, Town of Ayden, Village of Simpson	BPAC will continue to be instrumental in promoting active transportation and championing implementation of this plan. The group plays a strong role in determining priorities and establishing programs and activities. BPAC members should be responsible for reading the Active Transportation Plan and becoming familiar with the content. Finally, the Greenville BPAC should be transformed to be an MPO BPAC (GUABPAC) with representation from each of the local jurisdictions of the MPO.	Short Term (2017-2018)
Begin semiannual project development meeting with project partners	GUAMPO, BPAC, City of Greenville, Town of Winterville, Town of Ayden, Village of Simpson	NCDOT; municipality planning/public works officials	These meetings will help establish a process of incorporating bicycle and pedestrian improvements into upcoming roadway projects. Many bicycle and pedestrian projects recommended in this Plan could be developed as part of a roadway reconstruction, widening, or resurfacing project. Coordination between all appropriate government agencies, especially NCDOT, especially regarding TIP projects, will ensure that recommendations in this Plan are implemented. It will also provide a level of accountability. Current and upcoming roadway projects such as the Evans St/Old Tar Rd, Allen Rd, Fire Tower Rd/Portertown Rd, 10th St, Dickinson Ave, Laurie Ellis Rd extension, etc are examples of critical opportunities to efficiently integrate bicycle and pedestrian facilities into roadway the transportation system.	Short Term (2017-2018)

Action Step	Lead	Support	Details	Timeframe
Continue to make regional bicycle and pedestrian connections	City of Greenville, GUAMPO, Town of Winterville, Town of Ayden, Village of Simpson	Surrounding counties and towns, NCDOT	Work with surrounding counties and towns to ensure bicycle and pedestrian connectivity. Focus on regional trail systems such as the East Coast Greenway and state bike route system.	Continuous/ Ongoing
Ensure planning efforts are integrated regionally	GUAMPO, Pitt County, NCDOT, City of Greenville, Town of Winterville, Town of Ayden, Village of Simpson	BPAC	Combining resources and efforts with surrounding municipalities, regional entities, and stakeholders is mutually beneficial. Coordinate on regional greenway corridor projects; partner for joint-funding opportunities. After adoption, this document should also be recognized in the LRTP.	Continuous/ Ongoing
Programs				
Continue and expand Safe Routes to School programs	GUAMPO, Eastern Carolina Injury Prevention Program	Local schools, BPAC, SRTS Program	Apply for Safe Routes to School funding for planning and implementation. Establish 'bike-to-school' groups, walking school buses, and regular bicycling activities for children through the Safe Routes to School programming.	Continuous/ Ongoing
Apply for "Bicycle Friendly Community" designation by League of American Bicyclists	GUAMPO, City of Greenville	BPAC, Project Consultant	Complete the application for the Bicycle Friendly Community designation.	Mid Term (2019-2021)
Apply for "Walk Friendly Community" designation administered by the UNC Highway Safety Research Center Center	GUAMPO, City of Greenville	BPAC	Complete the application for the new Walk Friendly Community designation.	Mid Term (2019-2021)

Action Step	Lead	Support	Details	Timeframe
Reapply for "Bicycle Friendly University" designation by League of American Bicyclists	ECU	GUAMPO, ECU, BPAC	ECU completed the Bicycle Friendly University application in 2014 and was awarded Silver. This designation is valid for four years. ECU should reapply in 2018 to maintain or improve its Silver Bicycle Friendly University designation.	Mid Term (2019-2021)
Begin Safety Campaign	Pitt County, City of Greenville, and other municipality Police Departments	General Public (for reporting enforcement issues/violation incidents)	As described in Chapter 6, implement a comprehensive safety campaign that includes education, encouragement, and enforcement components.	Short Term (2017-2018)
Adopt Vision Zero policy and plan	BPAC, GUAMPO	City of Greenville, Pitt County, Town of Winterville, Town of Ayden, Village of Simpson	In August 2016, Greenville City Council unanimously approved a Public Transportation and Parking Commission motion to consider adopting a Vision Zero commitment to reduce pedestrian fatalities to zero by 2026. This can serve as a model for all GUAMPO jurisdictions.	Continuous/ Ongoing
Expand Wayfinding System	GUAMPO, BPAC	City of Greenville, Town of Winterville, Town of Ayden, Village of Simpson, Pitt County	The 2013-2017 Greenville Capital Improvement Program (CIP) includes a budget line item for a wayfinding system that will include major attractions and destinations within Greenville. This wayfinding system should be expanded to include bicycle routes and greenway trails within Greenville and across jurisdictional boundaries (if possible) since they are also major destinations for residents and visitors.	Continuous/ Ongoing
Educate internal staff on bicycle and pedestrian-related issues.	GUAMPO, City of Greenville, Town of Winterville, Town of Ayden, Village of Simpson, Pitt County	BPAC	Relevant local government staff who play roles in implementation, design, construction, enforcement, and maintenance should have an understanding of the Active Transportation Plan.	Short Term (2017-2018)
Update the Greenville & Pitt County Bike Map	GUAMPO	City of Greenville, BPAC, Town of Winterville, Town of Ayden, Village of Simpson	The current hardcopy and online map was developed in 2013. These maps should be updated every 3-5 years.	Short Term (2017-2018)

Action Step	Lead	Support	Details	Timeframe
Celebrate and promote awareness days and events such as Bike to Work Day and Walk to Work Day.	BPAC, GUAMPO	City of Greenville, Town of Winterville, Town of Ayden, Village of Simpson, Eastern Carolina Injury Prevention Program, other groups	Awareness days provide an opportunity to encourage new bicyclists and walkers in a group setting with entertainment, prizes, and media attention. Continue to promote and expand Bike to Work Month and Bike to Work Day as well as existing group rides such as the First Friday Social Bike Ride.	Continuous/ Ongoing
Policies				
Incorporate this Active Transportation Plan into regional planning documents such as the LRTP and local comprehensive plans.	GUAMPO	NCDOT, municipalities	The Greenville MPO Active Transportation Plan should become a component of the LRTP and local comprehensive plans. This step will make clear the importance of these documents working together in future development and transportation decisions.	Short Term (2017-2018)
Revise local ordinances	City of Greenville, Town of Winterville, Town of Ayden, Village of Simpson, Pitt County	GUAMPO	Revisions and additions to local ordinances: The changes suggested in the policy review memorandum during this planning process should be used for updating local ordinances, reflecting the findings and recommendations of this Active Transportation Plan. It clarifies some basic policy positions regarding future development and the provision of bicycle and pedestrian facilities. Some edits are also suggested for consistency in terminology.	Short Term (2017-2018)
Adopt Complete Streets Policy	Town of Winterville, Town of Ayden	City of Greenville, GUAMPO	Ayden and Winterville should adopt a Complete Streets policy to ensure commitment to developing roadways that accommodate all users. The City of Greenville adopted a resolution in support of NCDOT's Complete Streets Policy in 2015.	Mid Term (2019-2021)
Develop and adopt an ordinance that addresses construction closures in bikeways and walkways during construction	GUAMPO, BPAC	City of Greenville, Town of Winterville, Town of Ayden, Village of Simpson, Pitt County	Develop and adopt an ordinance that addresses construction closures in bikeways and walkways during construction. Implement a monitoring and enforcement program with penalties for unpermitted closures and the identification of dedicated staff to manage the program. Establish a clear and easy to use guidebook that outlines the planning and approval process for sidewalk and bikeway closures.	Mid Term (2019-2021)

Action Step	Lead	Support	Details	Timeframe
Further Studies				
Conduct a bicycle parking study and provide bicycle parking in key locations throughout City of Greenville and municipalities throughout the MPO.	GUAMPO	City of Greenville, BPAC, Town of Winterville, Town of Ayden, Village of Simpson, Pitt County, local businesses and developers	Make specific recommendations for the location of new bicycle parking facilities. A phase priority listing should be developed for implementation. Then, provide bicycle services such as bicycle racks, covered parking, bicycle stations, showers at employment centers, and bicycle rentals. Work with downtown groups such as Uptown Greenville and BPAC to determine other key locations for future parking facilities. Ask local businesses to partner and sponsor racks that can also serve to advertise their services. ECU has adopted a uniform bike racks style for use across campus and could serve as a partner in design and implementation.	Short Term (2017-2018)
Perform bus stop access improvement study.	GUAMPO, City of Greenville	NCDOT	Assess the need for and recommend bicycle and pedestrian connections and safe crossings in the vicinity of bus stops. Additionally, comfortable facilities (e.g., shelters, benches, etc.) for people waiting for the bus should also be implemented.	Short Term (2017-2018)
Conduct a study of all roadway railroad crossings and examine for bicycle/ pedestrian safety and ADA accessibility.	GUAMPO, City of Greenville, BPAC	Town of Winterville, Town of Ayden, Village of Simpson, Pitt County	Many pedestrian crossings of railroad tracks throughout the study area are not safe or accessible. An examination of these crossings and priority improvements should be developed as part of this study.	Short Term (2017-2018)
Conduct a study on traffic calming needs and opportunities on local roads.	GUAMPO	City of Greenville, BPAC, Town of Winterville, Town of Ayden, Village of Simpson	Traffic calming is critical to create safe walking and biking environments. In many cases, where bicycle and pedestrian facilities aren't feasible, treatments such as speed humps can still improve safety by slowing traffic. Roadways should be identified and prioritized for improvements.	Mid Term (2019-2021)

Action Step	Lead	Support	Details	Timeframe
Conduct a study on existing driveway access issues such as high frequency and large sizes.	GUAMPO	City of Greenville, BPAC, Town of Winterville, Town of Ayden, Village of Simpson	Some roadways feature an excess of driveway entrances (such as the Greenville Blvd/Evans St commercial area). An examination of driveways should be conducted with the end-goal of retrofitting improvements to create safer separated spaces for bicyclists and pedestrians.	Mid Term (2019-2021)
Perform bicycle detection and traffic signal timing analyses.	GUAMPO, NCDOT	City of Greenville, BPAC, Town of Winterville, Town of Ayden, Village of Simpson, Pitt County	Work with NCDOT and local municipalities to investigate bicycle detection at intersections and traffic signal timing. Upon completion of evaluation, specific improvement recommendations should be made.	Mid Term (2019-2021)
Staffing				
Hire full time Bicycle and Pedestrian Coordinator	GUAMPO	Pitt County, City of Greenville, BPAC, Town of Winterville, Town of Ayden, Village of Simpson	Currently, the Transportation Planner handles all MPO responsibilities, including bicycle and pedestrian issues. A full time position (housed in the MPO) is needed to handle all active transportation concerns. The "keeping" of this Plan would be the Coordinator's primary responsibility, including working closely with NCDOT, Pitt County, and municipalities to ensure its implementation, review, and regular update. Grant writing and project funding coordination will be key responsibilities of the Coordinator as well. The Coordinator would serve as "staff" to the BPAC and report BPAC progress as appropriate to the Technical and Policy Committees of the MPO.	MId Term (2019-2021)
Designate staff member to be local bicycle and pedestrian coordinator; include multi-jurisdictional education opportunities/ training for bicycle and pedestrian inclusion	City of Greenville, Town of Winterville, Town of Ayden, Village of Simpson, and Pitt County	GUAMPO	Each local government within the MPO should designate a staff member to "wear the hat" of local bicycle and pedestrian coordinator. These would not be full time positions; rather, each municipality would assign an existing staff member to dedicate specified level of time (10-15%) to bicycle and pedestrian issues. These coordinators would coordinate with the full time MPO Bicycle and Pedestrian Coordinator.	Short Term (2019-2021)

Action Step	Lead	Support	Details	Timeframe
Evaluation and Databases				
Update bicycle and pedestrian database and establish central holding place for data	GUAMPO, City of Greenville	Town of Winterville, Town of Ayden, Village of Simpson	Continuous updating of bicycle and pedestrian GIS database as new facilities come online and new crash data is published. GUAMPO should lead this effort, but the City of Greenville and other municipalities must coordinate as improvements are made.	Continuous/ Ongoing
Publish Annual Performance Report	GUAMPO	City of Greenville, BPAC, Town of Winterville, Town of Ayden, Village of Simpson	Publish an annual report to provide an update on progress made during that year to advance bicycle and pedestrian modes. GUAMPO should lead this effort, but the City of Greenville and other municipalities must coordinate. This report will provide an objective measurement of progress.	Annually
Continue and expand bicycle and pedestrian count program	GUAMPO, City of Greenville	BPAC, Town of Winterville, Town of Ayden, Village of Simpson	A key method to evaluate bicycle and pedestrian use and needs is to conduct professional counts. Continue bike/ped counts, especially as new facilities (such as the Greens Mill Run Greenway) open.	Annually
Online form for bicycle/ pedestrian facility request	GUAMPO	City of Greenville, BPAC, Town of Winterville, Town of Ayden, Village of Simpson	Provide a web-based service that allows residents to request bicycle and pedestrian facilities.	Mid Term (2019-2021)
Continually support and evaluate implementation of this plan	GUAMPO	City of Greenville, BPAC, Town of Winterville, Town of Ayden, Village of Simpson	The different county and city departments and boards and BPAC representatives should meet quarterly to assess implementation and evaluate progress.	Continuous/ Ongoing