



PREPARED FOR
THE ISOTHERMAL
PLANNING &
DEVELOPMENT
COMMISSION



PREPARED
BY ALTA
PLANNING +
DESIGN





Acknowledgments

Thank you to the hundreds of local residents, community leaders, 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 committee members, listed below.

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Prepared for the Isothermal Planning & Development Commission
Prepared by Alta Planning + Design
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Resolutions in Support of the Isothermal Regional Bicycle Plan:

- *Cleveland County - April 17, 2018*
- *Rutherford County - May 7, 2018*
- *McDowell County - May 14, 2018*
- *Polk County - Pending*

Contents

1. INTRODUCTION & PROJECT BENEFITS

Project Overview.....	5
Study Area: The Isothermal Region.....	5
Plan Vision and Goals.....	8
The Value of Bikeways for the Isothermal Region.....	9
Economic Impact.....	9
Health & Quality of Life.....	12
Safety.....	15
Mobility.....	16
The Planning Process.....	16
Types of Bicyclists.....	17

2. EXISTING CONDITIONS

Overview.....	19
Existing Conditions Maps.....	19
Maps 2.1 Key Opportunities & Challenges.....	20
Map 2.2 Bicycle Level of Comfort.....	24
Maps 2.3 Bicycle Crashes.....	26
Map 2.4 Past Planning Efforts.....	28
Public Process Overview.....	32
Public Outreach at Community Events.....	33
Public Comment Form Response Highlights.....	36

3. REGIONAL NETWORK

Overview.....	39
The Regional Bicycle Network.....	39
Map 3.1 Priority Projects.....	42
Short-Term Priority Project Sheets.....	46
Map 3.2 Strategic Regional Bicycle Network.....	104
Map 3.3 Comprehensive Regional Bicycle Network.....	106

4. PROGRAM STRATEGIES

Overview.....	109
Regional Bicycling Website.....	110
Trail Coordinators Through Americorps Project Conserve.....	111
Active Routes to School.....	112

Bicycle Brochure Maps.....	114
Watch for Me NC.....	115
Bicycle Wayfinding Signage.....	116
Bicycle Rides and Races.....	118
Cycle to Farm Events.....	120

5. POLICY STRATEGIES

Overview.....	123
Priority Policy Recommendations.....	123
Example Development Regulations.....	124
Policy Considerations by Settlement Types.....	131

6. IMPLEMENTATION ACTION PLAN

Overview.....	137
Stakeholder Coordination for Implementation.....	137
Project Development Opportunities.....	138
Summary of Key Action Steps.....	139
Example Types of Project Development on Existing Roadways.....	140
Engaging Private Funding.....	142
Organizational Framework for Implementation.....	148
Implementation Action Steps Table.....	149
Performance Measures.....	152

APPENDIX A: DESIGN GUIDE RESOURCES

APPENDIX B: FUNDING RESOURCES

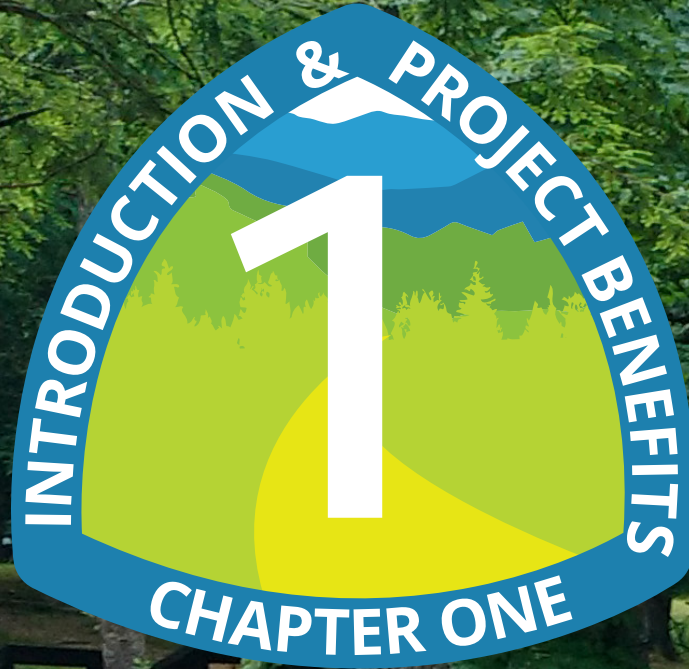
APPENDIX C: FULL BIKE PLAN NETWORK MAPS

INTENDED AUDIENCE

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 throughout the Isothermal Region of North Carolina.

ADDITIONAL INFORMATION

Please contact the Isothermal Planning & Development Commission for additional information on this plan and the planning process: 111 W. Court Street, Rutherfordton, NC 28139 | 828-287-2281 www.regionc.org



INTRODUCTION & PROJECT BENEFITS

1

CHAPTER ONE



This plan will help the region capitalize on the benefits of bicycling, ranging from health and recreation to transportation and economic development. Bikes parked at the Old Fort Picnic Area shown above.



PROJECT OVERVIEW

Cities, towns, and regions around the country are increasingly recognizing that bicycle-friendly communities offer multiple quality of life benefits to residents and visitors, in terms of public safety, health, economics, mobility, and the environment.

The North Carolina Department of Transportation (NCDOT) has recognized the importance of providing multi-modal transportation choices and has supported regional bicycle planning efforts in North Carolina. The Isothermal region, its Rural Planning Organization (RPO), and its member municipalities are primed for improving bicycle infrastructure and programs, and through this planning process, signal their commitment to improving bicycle transportation and recreation.

In early 2017, the Isothermal Rural Planning Organization (Isothermal RPO), with funding from NCDOT, began the process of developing a regional bicycle plan for the Isothermal region of North Carolina. This Plan was developed in coordination with a whole host of counties, municipalities, transportation agencies, health agencies, outdoor/trail coalitions, business groups, and community members. The purpose of this bicycle plan is to identify key bicycling routes and provide recommendations for new facilities, programs, and policies that will support safer bicycling throughout the region.

The development of this Plan included an open, participatory process, with residents providing

input through public events, the project Steering Committee, social media, online input map, and online comment forms. The plan also incorporates recommendations from previously adopted local and regional plans that had their own public outreach and involvement processes as well.

On a regional level, this plan will help to increase options for recreation-based tourism, affordable personal mobility and carbon-free transportation, while also creating more vibrant communities, tourism destinations, and healthy, active transportation choices for residents and visitors of the Isothermal region.

STUDY AREA: THE ISOTHERMAL REGION

The Isothermal Regional Bicycle Plan covers Cleveland, McDowell, Polk and Rutherford counties in North Carolina (see Study Area Map on following page). The region includes some of the most beautiful areas of North Carolina, from rural rolling hills and farms, to small towns, to stunning mountains, and to abundant recreational activities. The existing and expanding Thermal Belt Rail Trail is a centerpiece of the region and is a model for continued bicycle network development across the region.



MAP 1.1 STUDY AREA OVERVIEW & EXISTING FACILITIES

EXISTING

- Shared Use Paths
- Bike Lane
- Hiking/Mt Biking Trail
- Other Trail

REGIONAL/STATEWIDE

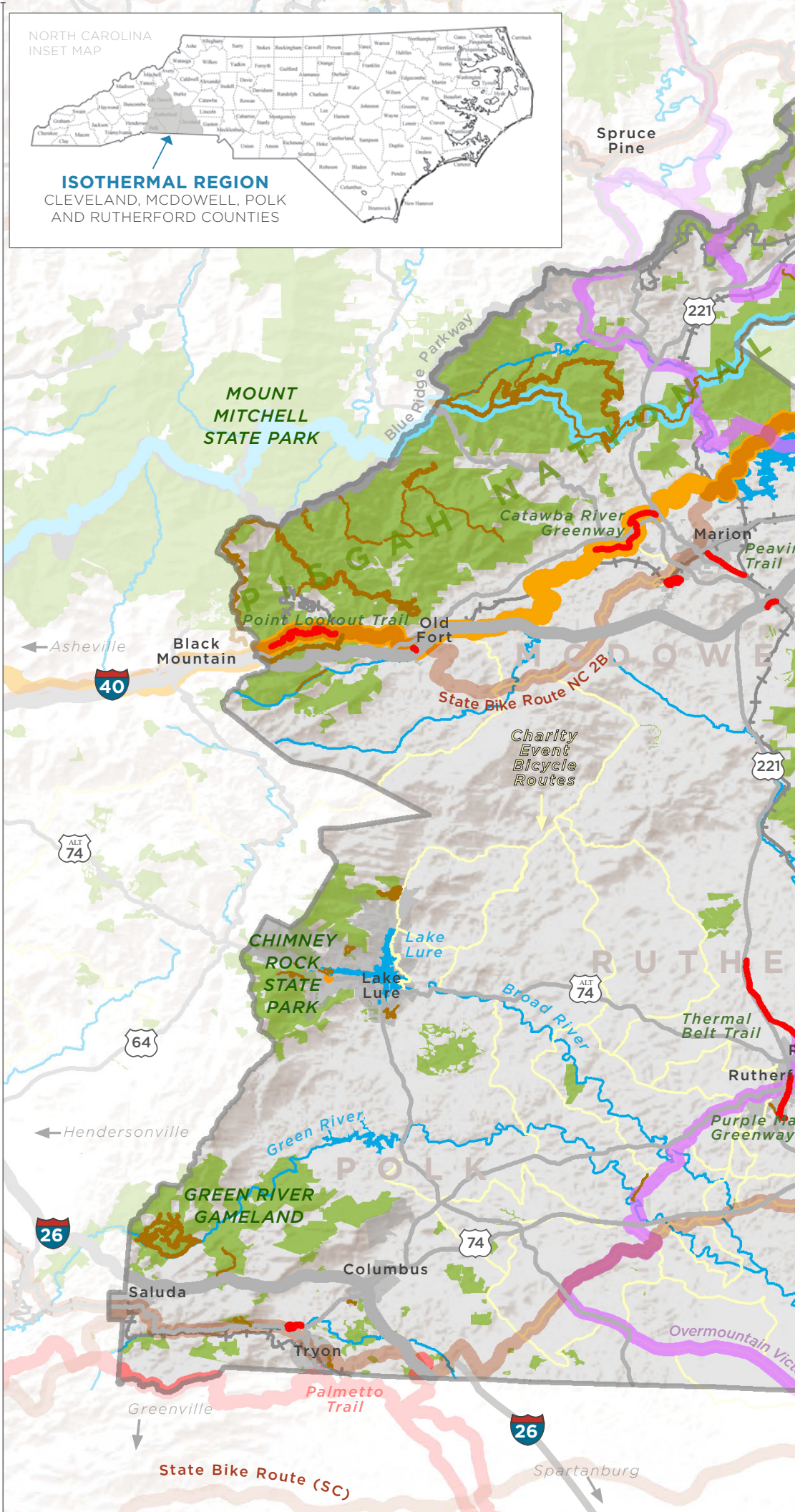
- State Bike Routes
- Carolina Thread Trail
- Overmountain Victory Trail
- Mountains to Sea Trail
- Fonta Flora State Trail
- Palmetto Trail
- Charity Event Bicycle Routes

OTHER FEATURES

- Study Area
- Municipalities
- Parks & Conservation
- Lakes & Rivers
- Topography
- Railroads

ABOUT THIS MAP:

This map shows some of the many existing trails and designated routes throughout the Isothermal Region. The Bicycle Plan study area includes Cleveland, McDowell, Polk and Rutherford Counties. For more on the existing facilities and conditions in the region, see Chapter 2.



10 miles



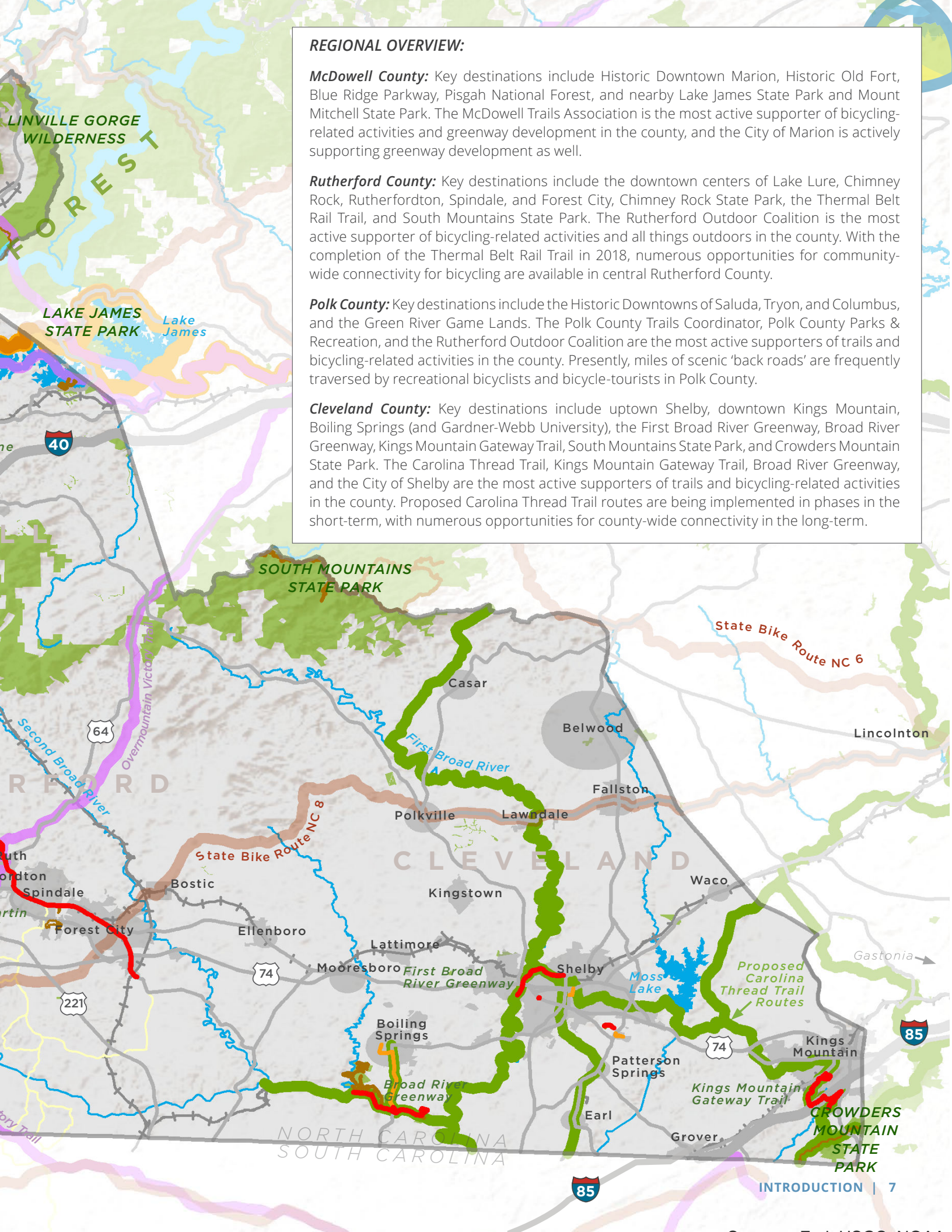
REGIONAL OVERVIEW:

McDowell County: Key destinations include Historic Downtown Marion, Historic Old Fort, Blue Ridge Parkway, Pisgah National Forest, and nearby Lake James State Park and Mount Mitchell State Park. The McDowell Trails Association is the most active supporter of bicycling-related activities and greenway development in the county, and the City of Marion is actively supporting greenway development as well.

Rutherford County: Key destinations include the downtown centers of Lake Lure, Chimney Rock, Rutherfordton, Spindale, and Forest City, Chimney Rock State Park, the Thermal Belt Rail Trail, and South Mountains State Park. The Rutherford Outdoor Coalition is the most active supporter of bicycling-related activities and all things outdoors in the county. With the completion of the Thermal Belt Rail Trail in 2018, numerous opportunities for community-wide connectivity for bicycling are available in central Rutherford County.

Polk County: Key destinations include the Historic Downtowns of Saluda, Tryon, and Columbus, and the Green River Game Lands. The Polk County Trails Coordinator, Polk County Parks & Recreation, and the Rutherford Outdoor Coalition are the most active supporters of trails and bicycling-related activities in the county. Presently, miles of scenic 'back roads' are frequently traversed by recreational bicyclists and bicycle-tourists in Polk County.

Cleveland County: Key destinations include uptown Shelby, downtown Kings Mountain, Boiling Springs (and Gardner-Webb University), the First Broad River Greenway, Broad River Greenway, Kings Mountain Gateway Trail, South Mountains State Park, and Crowders Mountain State Park. The Carolina Thread Trail, Kings Mountain Gateway Trail, Broad River Greenway, and the City of Shelby are the most active supporters of trails and bicycling-related activities in the county. Proposed Carolina Thread Trail routes are being implemented in phases in the short-term, with numerous opportunities for county-wide connectivity in the long-term.





PLAN VISION

This plan represents a 30-year vision, with completion of recommendations to be achieved in stages. The plan's recommendations and implementation strategy will build on the Isothermal Region's existing bicycling infrastructure and bicycling community efforts to achieve these goals, and ultimately to achieve the plan's vision:

Bicycling is an accepted, normal, and safe means of traveling in the Isothermal Region. Bicycling allows residents to experience the beauty of the region and to live healthy lifestyles. Bicycle networks, programs, and events attract people to the Isothermal region, boosting tourism and economic development.

PLAN GOAL & PLAN ASPIRATIONS:

The Isothermal Regional Bicycle Plan will provide a framework for NCDOT and local governments to enhance bicycling as a normalized mode of transportation and recreation for residents and visitors alike, improving access, connectivity, and safety.



MOBILITY: Bicyclists will have a connected network of bicycling infrastructure for transportation and recreation purposes.



SAFETY: Bicyclists of all ages and abilities will experience greater separation from motor vehicles and a culture of bicycling acceptance.



ECONOMY: Bicyclists will help diversify and boost the regional economy through tourism and increased business revenues.



QUALITY OF LIFE: Bicyclists will have greater opportunity to live healthy lifestyles and have access to the beauty of the Isothermal region.

THE VALUE OF BIKEWAYS FOR THE ISOTHERMAL REGION

Increased rates of bicycling will help to improve people's health and fitness, improve livability of our community, 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: Mobility, economic impact, quality of life, and safety.

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 bikeways and greenways. 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. Studies have demonstrated a range of increases in property values, from 2% up to 20%. For example, a study from Asabere and Huffman, *The Relative Impacts of Trails and Greenbelts on Home Price*, analyzed 10,000 home sales and found that trails, greenbelts/greenways, and trails with greenbelts/greenways were associated with roughly **2, 4, and 5 percent price premiums**, respectively. See box on the following page for other examples.

Bicyclists, pedestrians, and trail users can also add real value to local economies. Consider these three findings that relate to the Isothermal Region as southeastern US examples:

- From a neighboring county to the Isothermal region (Greenville County, SC), the *Greenville Health System Swamp Rabbit Trail Year 3 Findings* by Furman University (Clemson International Institute for Tourism & Research & Development), has demonstrated that the 20-mile Swamp Rabbit Trail's economic impact in the county is approximately **\$6.7 million** per year.

Bicycling means business in Rutherford County; Below, cyclists gather for the Hilltop Fall Festival. Photo from Rutherford Outdoor Coalition





- The five-mile Brevard Greenway in the City of Brevard in Transylvania County (two counties west of the Isothermal region), according to a three year study (2015-2017), *Evaluating the Economic Impact of Shared Use Paths in North Carolina*, by the NCDOT Division of Bicycle and Pedestrian Transportation, generates approximately **\$1.5 million** annually in business output.
- Just a two-hour drive north of the Isothermal Region is Damascus, VA, the self-proclaimed 'Friendliest Trail Town', featuring 34 miles of trail, where approximately **\$2.5 million** is spent annually related to recreation visits according to a US Forest Service study, *The Virginia Creeper Trail: An Assessment of User Demographics, Preferences, and Economics*.
- Going east from the Isothermal Region, in Durham, NC, a study of the American Tobacco Trail Bridge by the Institute of Transportation Research and Education, *Bridging the Gap*, found that: "The completion of the bridge linking the Northern and Southern trail segments resulted in an estimated annual impact of...**\$4.9 million** in total business gross revenues." A related study by the

East Coast Greenway Alliance, *The Impact of Trails in the Triangle*, found an estimated total health, economic, and transportation impact of over **\$90 million** per year for the nearly 70-mile trail through the Triangle Region.

- On the other side of the state, in the Outer Banks, NC, 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**, according to a study completed by NCDOT, Division of Bicycle and Pedestrian Transportation, *Pathways to Prosperity*.
- *WalkBikeNC*, developed by the NCDOT Division of Bicycle and Pedestrian Transportation, includes further economic impact analyses that can be found here - <https://www.ncdot.gov/bikeped/walkbikenc/pillars-of-plan/economy/>.

See below for more selected national examples of how bicycling and trails positively impact property values:
<https://headwaterseconomics.org/economic-development/trails-pathways/trails-research/>

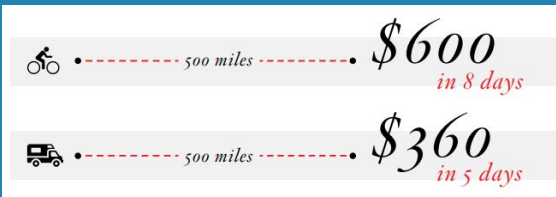
SELECTED RESEARCH HIGHLIGHTS FROM HEADWATERS ECONOMICS:

- *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.* Karadeniz, D. 2008. *The Impact of the Little Miami Scenic Trail on Single Family Residential Property Values (Unpublished Master's Thesis)*. University of Cincinnati School of Planning.
- *In suburban New Castle County, Delaware, homes within 150 feet of bike paths commanded a four percent price premium.* Racca, D. and A. Dhanju. 2006. *Property Value/Desirability Effects of Bike Paths Adjacent to Residential Areas*. University of Delaware, Delaware Center for Transportation Working Paper 188.
- *In rural Methow Valley, Washington, homes within one-quarter mile of trails benefited from a 10 percent price premium.* Resource Dimensions. 2005. *Economic Impacts of MVSTA Trails and Land Resources in the Methow Valley*. Methow Valley Sport Trails Association.
- *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.* Crompton, J., and S. Nicholls. 2006. "An Assessment of Tax Revenues Generated by Homes Proximate to a Greenway." *Journal of Park and Recreation Administration* 24(3): 103-108.
- *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.* Lindsey, G., Man, J., Payton, S., and K. Dickson. 2004. "Property values, recreation values, and urban greenways." *Journal of Park and Recreation Administration*, 22 (3): 69-90.

See below for more about the economics of bicycle travel, from **Tourists on Two Wheels: Economics of Bicycle Travel** by the Adventure Cycling Association and *The Path Less Pedaled*.

SELECTED RESEARCH HIGHLIGHTS FROM THE ADVENTURE CYCLING ASSOCIATION AND THE PATH LESS PEDALED:

- *Bicycling is the second most popular outdoor recreation activity in the US. From bike touring to destination mountain biking to cycling events, bicycle tourism generates \$71 billion annually - and is continuing to grow and attract new participants.*
- *On average, touring cyclists stay three days longer and spend \$240 more per trip than the average tourist. To the small rural communities hosting these cyclists, that 40% makes a big difference.*

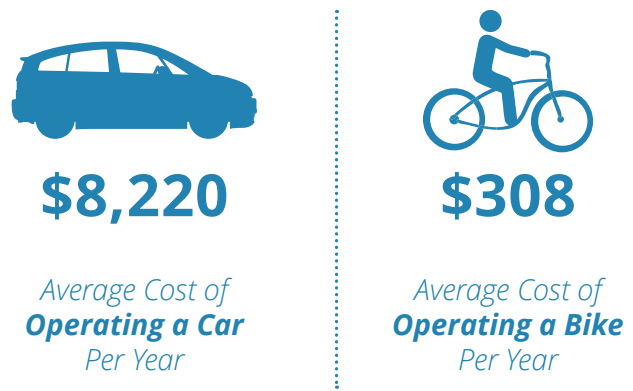


- *Spanning 150 miles between Pittsburgh, PA and Cumberland, MD, the Great Allegheny Passage (GAP) attracts nearly a million visits each year. Over 95% of visitors travel the trail by bicycle, stopping along the way to experience the trail's unique landscapes and history. It took the Allegheny Trail Alliance (ATA) nearly 30 years to complete the GAP, at a cost of \$80 million. But, today, the return on investment to the states and communities the trail serves is \$75 to \$100 million annually. Business owners report an increase in their yearly sales from trail user traffic - from 34% in 2013 to 41% in 2014. To the communities and businesses along the trail, bicycle tourism is now indispensable.*

Furthermore, many businesses, residents, and visitors consider quality of life factors like walkability and bikability when choosing locations to settle. For example, consider the following from North Carolina's most renowned business park:

"Building our network of trails is an essential investment that enables the Research Triangle Park to remain globally competitive by allowing us to attract the type of workers that companies want with amenities professional workers demand" (Liz Rooks, Former Executive Vice President of the Research Triangle Foundation).

It is also important to consider the individual costs associated with various forms of transportation. Walking is virtually free and the cost of operating a bicycle is far less than operating a car. A study cited by the Victoria Transport Policy Institute found that households in automobile dependent communities devote 50 percent more of their income to transportation (more than \$8,000 annually) than households in communities with more accessible land use and more multi-modal transportation systems (less than \$5,500 annually). Bicycling is a much more affordable form of transportation at roughly \$300 annually. With the relatively low cost and high return on investment for bikeways and greenways, it is hard to argue against developing a regional system that creates value and generates economic activity.



Source: Mohn, T. "Pedaling to Prosperity: Biking Saves U.S. Riders Billions a Year." (2012). *Forbes*. <goo.gl/YX2r1R>



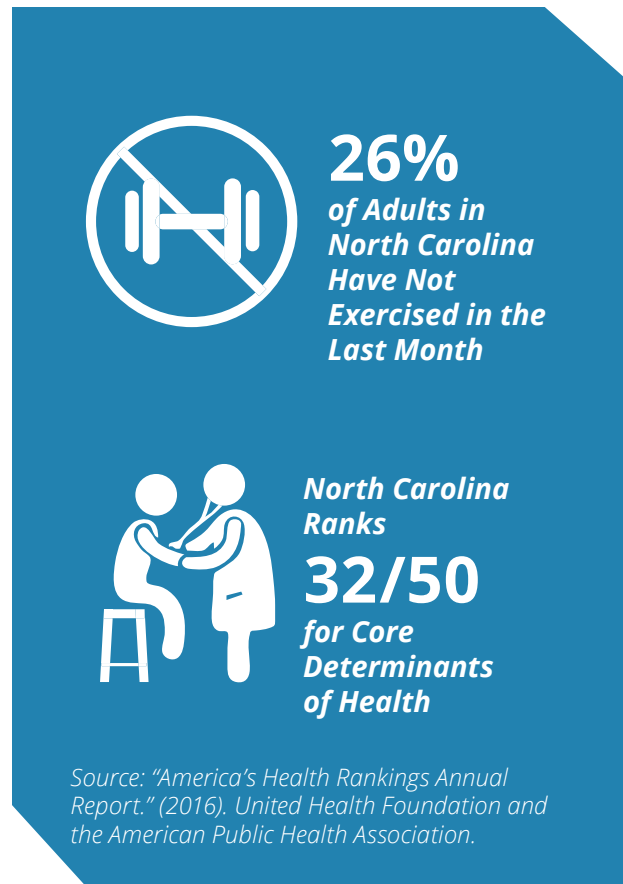
HEALTH & QUALITY OF LIFE

“This is a very worthwhile process. Many diseases in this country could be reduced substantially through diet and exercise. Somehow our mind-set has to change.” - From the Isothermal Bicycle Plan Public Comment Form, 2017

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 Centers for Disease Control and Prevention (CDC) recommended daily 30 minutes of moderately intense physical activity (60 minutes for youth). Consider that 26% of adults in North Carolina have not exercised in the last month, and that North Carolina ranks 32nd among all states for core determinants of health. Clearly there is room for improvement, and building more infrastructure that allows for safe and active transportation and recreation can only help. See the infographic on the opposite page for some current health statistics and the ways health benefits might be achieved through increased exercise through bicycling.

Many factors go into determining quality of life for the citizens of a community, beyond just public health: 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.

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.

Another aspect of quality of life is the quality of our surrounding natural environment. When bicycle infrastructure comes in the form of greenway trails in protected natural corridors, additional benefits come in the form of water filtration, carbon sequestration, carbon storage, waste treatment, wildlife protection, and protecting people and property from flood damage (Firehock, Karen. *“Evaluating and Conserving Green Infrastructure Across the Landscape, 2013*). Anecdotally, we also know that by connecting people to nature, trails in the Isothermal Region can inspire appreciation and better stewardship of the environment while also improving our mental, physical, and spiritual health.

WalkBikeNC, developed by the NCDOT Division of Bicycle and Pedestrian Transportation, includes further information on health benefits that can be found here - <https://www.ncdot.gov/bikeped/walkbikenc/pillars-of-plan/economy/>.

CURRENT U.S. HEALTH STATISTICS

HEALTH BENEFITS



CARDIOVASCULAR DISEASES are the **#1 CAUSE OF DEATH** in the United States.
(Mozaffarain, D. et al, 2014)



20 MINUTES WALKING OR BIKING each day is associated with **21% LOWER RISK OF HEART FAILURE FOR MEN** and **29% LOWER RISK FOR WOMEN.**
(Rahman, 2014 and 2015)



1,630 Americans **DIE EVERY DAY FROM CANCER**, mainly that of the lung, breast and colon.
(American Cancer Society, 2016)



MODERATE EXERCISE for 30-60 minutes a day **REDUCES THE RISK OF LUNG, BREAST AND COLON CANCER** by a minimum of **20%.**
(National Cancer Institute, 2009)



61% of American adults 65 years or older **HAVE AT LEAST ONE ACTIVITY-BASED LIMITATION.**
(CDC, 2015b)



PHYSICAL ACTIVITY HELPS PREVENT OR DELAY ARTHRITIS, OSTEOPOROSIS AND DIABETES, while helping to maintain balance, mental cognition, and independence.
(National Institute on Aging, 2015)



86% of workers in the United States **DRIVE OR RIDE IN A PRIVATE VEHICLE TO COMMUTE**, sitting on average for 26 minutes each way.
(U.S. Census Bureau, 2013)



PEOPLE WHO BIKE BURN an average of **540 CALORIES PER HOUR** and **PEOPLE WHO WALK BURN** an average of **280 CALORIES PER HOUR.**
(De Geus, 2007 and CDC, 2015c)



1 in 5 Americans report their **STRESS LEVELS AS EXTREME.**
(American Psychological Association, 2011)



BIKE COMMUTERS REPORT LOWER STRESS LEVELS compared to auto commuters.
(New Economics Foundation, 2011)



ASTHMA IS THE LEADING CHRONIC DISEASE IN CHILDREN and the number one reason for missed school days.
(CDC, 2015a)



A minimum of **20 MINUTES OF PHYSICAL ACTIVITY, 3X WEEK, STRENGTHENS THE LUNGS**, including those of individuals living with asthma.
(PubMed Health, 2014)



Exposure to **TRAFFIC EMISSIONS** is linked to exacerbation of **ASTHMA, REDUCED LUNG FUNCTION, ADVERSE BIRTH OUTCOMES** and childhood **CANCERS.**
(CDC, 2009)



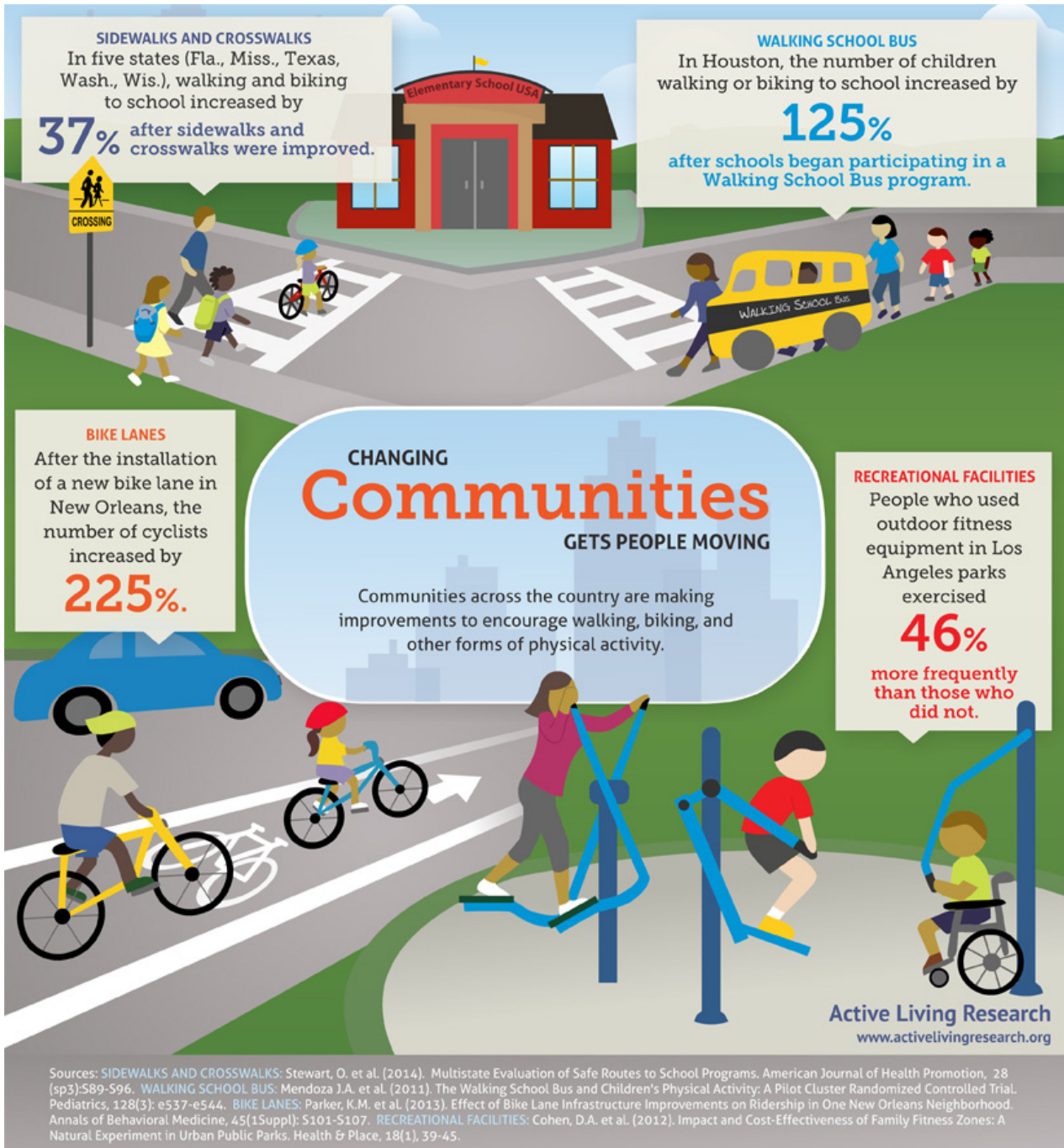
IF 8% MORE CHILDREN LIVING WITHIN 2 MILES OF A SCHOOL WERE TO WALK OR BIKE TO SCHOOL, the air pollution reduced from not taking a car would be **EQUIVALENT TO REMOVING 60,000 CARS FROM THE ROAD** for one year, nationally.
(Pedroso, 2008, SRTS)



40% OF ALL TRIPS in the U.S. are **TWO MILES OR LESS**, and two-thirds of them happen in cars.
(NHITS, 2009)



BIKING 2 MILES, rather than driving, **AVOIDS EMITTING 2 lbs OF POLLUTANTS**, which would take 1.5 months for one tree to sequester.
(EPA, 2000 and NC State, 2001)



Infographic provided by Active Living Research, a program of the University of California, San Diego. Available for download at <http://activelivingresearch.org/changingcommunitiesinfographic>.

SAFETY

“Bike lanes would have huge positive impact on safety of riding bikes and number of individuals and families riding bikes.” - From the Isothermal Bicycle Plan Public Comment Form, 2017

Bicycle facilities can have a significant influence on user safety. The Federal Highway Administration Crash Modification Factor Clearinghouse (<http://www.cmfclearinghouse.org/>) is a web-based database of Crash Modification Factors (CMF) to help transportation engineers identify the most appropriate countermeasure for their safety needs.

For example, **before and after studies of bicycle lane installations show a crash reduction of 35 percent** (CMF ID: 1719) for vehicle/bicycle collisions after bike lane installation. Shared use paths have been observed to have an even higher injury reduction rates, as shown in the graphic at right.

Even measures as straightforward as speed reduction can have huge impact on safety, with the increasing chances of survival growing dramatically for every 10 miles per hour that speed is reduced, as shown in the graphic below.



Average number of bicyclists and pedestrians KILLED each year in North Carolina (169 pedestrians & 24 bicyclists)

Source: National Highway Traffic Safety Administration: Fatality Analysis Reporting System (FARS). (American Community Survey 3-yr estimates for 2007, 2010, and 2013).

60%



Shared use paths (like the Thermal Belt Rail Trail) reduce injury rates for cyclists, pedestrians, and other nonmotorized modes by 60% compared with on street facilities.

Source: Teschke, Kay. “Route Infrastructure and the Risk of Injuries to Bicyclists”. (2012). American Public Health Association.

A PERSON HIT BY A VEHICLE TRAVELING AT 25 MPH



HAS AN **89%** CHANCE OF SURVIVAL

A PERSON HIT BY A VEHICLE TRAVELING AT 35 MPH



HAS A **68%** CHANCE OF SURVIVAL

A PERSON HIT BY A VEHICLE TRAVELING AT 45 MPH



HAS A **35%** CHANCE OF SURVIVAL

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

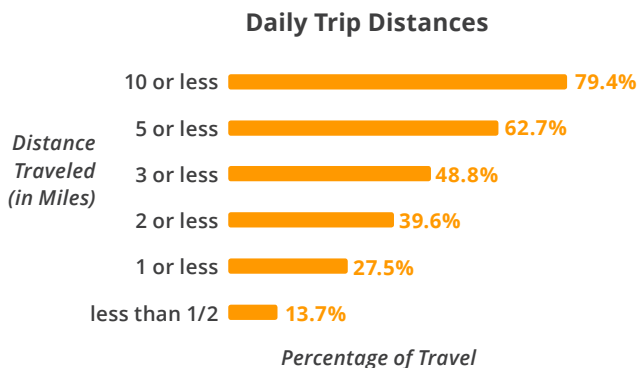


MOBILITY

“We have a wonderful area for cycling. The key is to get large numbers of new people using their bikes. That will only be possible with bike paths, rail trails, and bike lanes that are separated from traffic.” - From the Isothermal Bicycle Plan Public Comment Form, 2017

Surveys by the Federal Highway Administration show that Americans are willing to bicycle as far as five miles to a destination. More than 60% of all driving trips made in the U.S. are shorter than five miles (see chart below), indicating an opportunity to accommodate those trips by providing the right environment for people to make them 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, younger generations (those born between 1981 and 2001) are driving less and wanting more transportation choices. According to the National Household Travel Survey, from 2001 to 2009, the annual number of vehicle miles traveled by young people (16 to 34 year-olds) decreased by 23 percent. In addition, according to the Federal Highway Administration, the share of that same age group saw a rise in those without driver’s licenses, from 21 percent to 26 percent.



Most driving trips in the U.S. are for a distance of five miles or less. Chart from the Bicycle and Pedestrian Information Center, www.pedbikeinfo.org

THE PLANNING PROCESS

The planning process began in February 2017 and concluded in April of 2018. The development of this plan included a public process, featuring a steering committee and ongoing public involvement through a project website, an interactive on-line map, a user comment form, two phases of outreach at events and meetings, county presentations, regional transportation planning organization presentations, and a final presentation to the regional transportation planning organization’s Transportation Advisory Committee. These and other steps in the process are outlined in the approximate timeline below:

KEY STEPS IN THE PROCESS



Spring 2017: Project Kick-Off, Data Collection, and Public Outreach Sessions



Summer 2017: Analysis of Bike Routes & Draft Network Development



Fall 2017: Development of the Draft Plan Report & Public Outreach Sessions



Winter 2017-2018: Plan Review & Revisions



Spring 2018: Final Plan & Presentations



THE STEERING COMMITTEE INCLUDED REPRESENTATIVES FROM THE FOLLOWING AGENCIES & ORGANIZATIONS:

Active Routes to School
Town of Boiling Springs
Carolina Thread Trail
Cleveland County
Town of Columbus
Town of Forest City
Gaston-Cleveland-Lincoln Metropolitan Planning Organization
Isothermal Planning & Development Commission
Isothermal Rural Planning Organization
City of Kings Mountain
Town of Lake Lure
City of Marion
McDowell Trail Association
NCDOT Divisions 12, 13 & 14
NCDOT Division of Bicycle and Pedestrian Transportation
Polk County
Polk County - Fit, Fresh and Friendly
Polk County Trails Group
Rutherford County
Town of Rutherfordton
Rutherford Outdoor Coalition
City of Saluda
City of Shelby
Town of Spindale
Town of Tryon

TYPES OF BICYCLISTS

This Plan was developed with the understanding that there are different types of bicyclists, with differing needs. Bicyclists can be categorized into four distinct groups based on comfort level and riding skills. Bicyclists' skill levels greatly influence expected speeds and behavior, both in separated bikeways and on shared roadways. Bicycle infrastructure should accommodate as many user types as possible, with decisions for separate or parallel facilities based on providing a comfortable experience for the greatest number of people. The characteristics, attitudes, and infrastructure preferences of each type bicyclist are described below.

THIS PLAN IS DESIGNED FOR SEVERAL DIFFERENT TYPES OF BICYCLISTS:

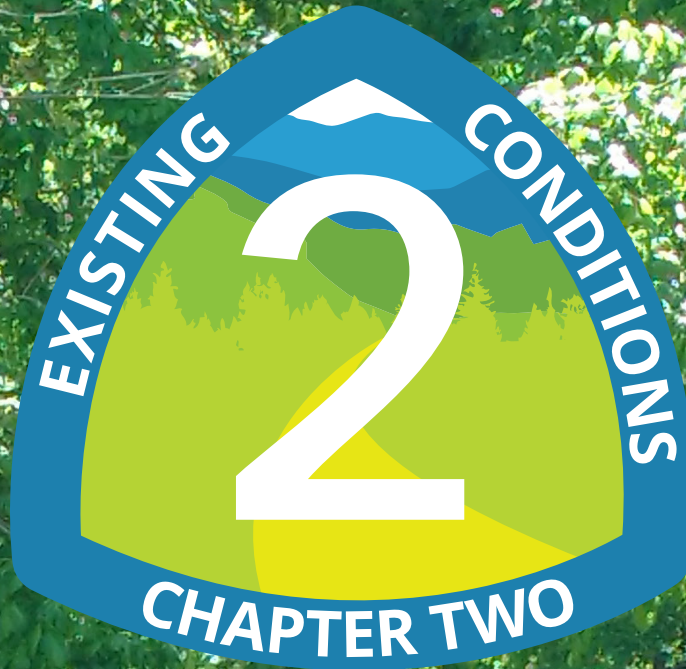
<1% STRONG AND FEARLESS: This group is willing to ride a bike on any roadway regardless of traffic conditions. Comfortable taking the lane and riding in a vehicular manner on major streets without designated bike facilities.

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.

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



EXISTING CONDITIONS
2
CHAPTER TWO



Existing facilities, like the Kings Mountain Gateway Trail (shown here), are few and far between, but growing in number.

OVERVIEW

This chapter summarizes the existing conditions for bicycling in the Isothermal Region through existing conditions maps, public comments, stakeholder feedback, and a summary of support for bicycling in local and regional existing plans.

EXISTING CONDITIONS MAPS

The maps on the following pages (and in Chapter 1), serve to communicate the existing conditions of the region for bicycling. Although it is a large study area of 1,718 square miles, there are relatively few actual miles of bicycle facilities on the ground today. In fact, the main existing mileage is made up of signed and unsigned on-road routes. The existing facilities within the study area include the following (see Map 1.1, pages 6-7, for details and locations):

- 105 miles of State Bike Routes
- 497 miles of Charity Event Bicycle Routes (Unsigned)
- 45 miles of Shared Use Paths
- 6 miles of Bike Lanes
- 96 miles of Mountain Bike Trails
- 13 miles of Carolina Thread Trail

The above facilities and routes provide a great starting point from which to build a more complete system. They are currently disconnected from one another for the most part, and much more can be done to better connect to a greater number of community centers and regional destinations. After all, the key to a successful bicycle network is connectivity; as more bicycle facilities are connected to one another, the benefits of any particular segment are greatly enhanced, with positive impacts to transportation, recreation, health, and economy.

The following maps provide more detail on a variety of topics related to existing conditions:

- **MAP 1.1: STUDY AREA OVERVIEW & EXISTING FACILITIES** Features the region's main existing facilities, designated bicycle routes, municipalities, and parks/natural areas.

See
Chapter
One,
Pages
6-7

- **MAP 2.1: KEY OPPORTUNITIES & CHALLENGES** Summarizes the key, overarching map-based comments from the public, the Steering Committee, stakeholder interviews, and consultant analysis.
- **MAP 2.2: BICYCLE LEVEL OF COMFORT** Shows estimated level of comfort for bicycling under current conditions, based on traffic volumes, traffic speeds, roadway widths, and other factors.
- **MAP 2.3: BICYCLE CRASHES** Shows locations and clusters of bicycle crashes, as reported by NCDOT (2007-2014).
- **MAP 2.4: PAST PLANNING EFFORTS** Highlights the most significant aspects of past and current planning work that is relevant to bicycle planning in the Isothermal Region.

MAP 2.1 KEY OPPORTUNITIES & CHALLENGES

Opportunities and Challenges (See Table 2.1 on following pages for corresponding notes)

EXISTING

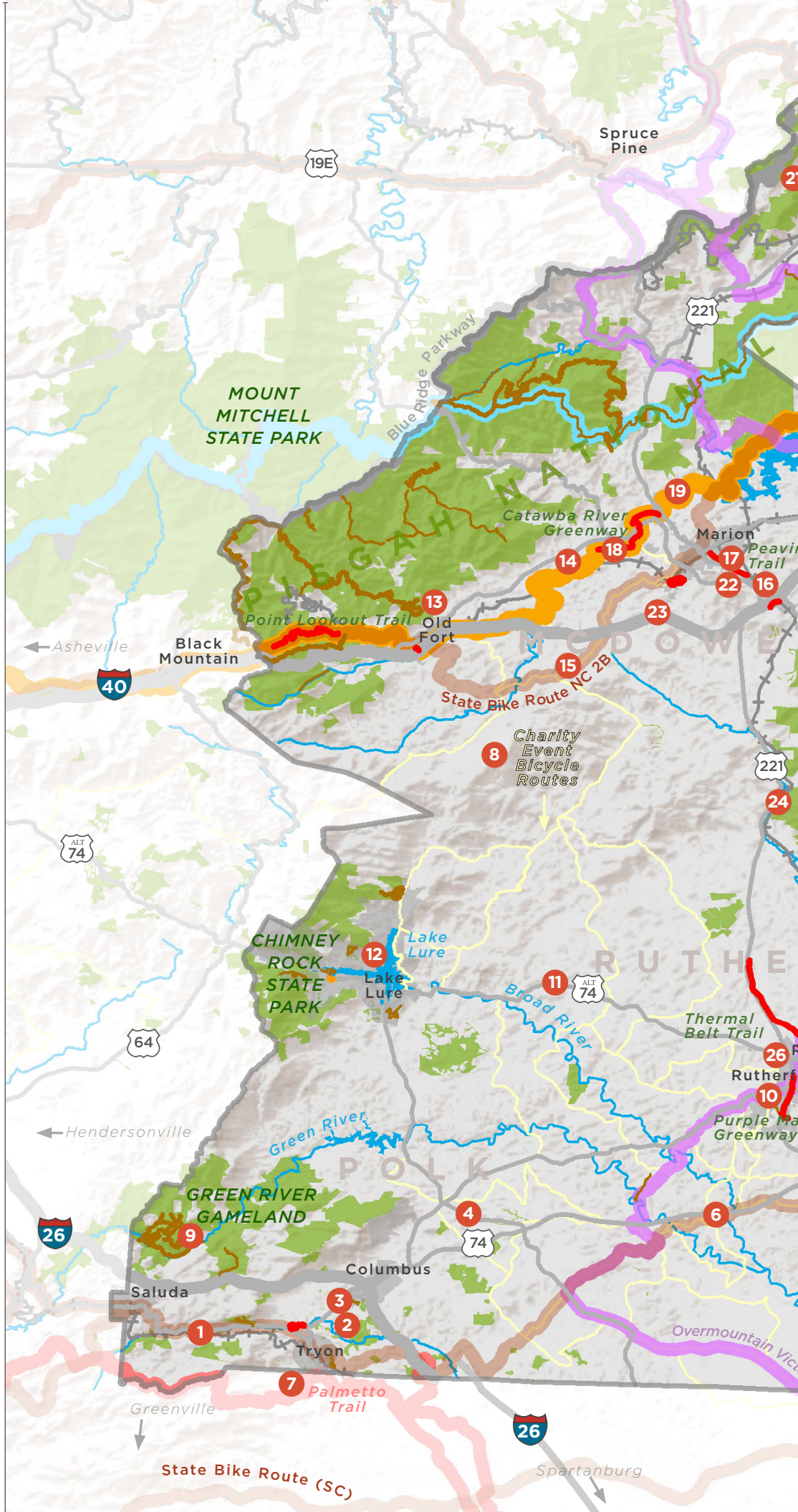
- Shared Use Paths
- Bike Lane
- Hiking/Mt Biking Trail
- Other Trail

REGIONAL/STATEWIDE

- State Bike Routes
- Carolina Thread Trail
- Overmountain Victory Trail
- Mountains to Sea Trail
- Fonta Flora State Trail
- Palmetto Trail
- Charity Event Bicycle Routes

OTHER FEATURES

- Study Area
- Municipalities
- Parks & Conservation
- Lakes & Rivers
- Topography
- Railroads



10 miles



ABOUT THIS MAP:

This map and corresponding table on the following pages summarizes the key, overarching map-based comments from the public, the Steering Committee, stakeholder interviews, and consultant analysis.

5 Bridge Replacements in the STIP - Nine bridges are scheduled for replacement in the region. These are critical opportunities to incorporate space for bicyclists (see interactive map for specific bridge locations here - <http://ncdot.maps.arcgis.com/home/webmap/viewer.html?webmap=cb02f4f828974670ad01bb83be91b18c>).

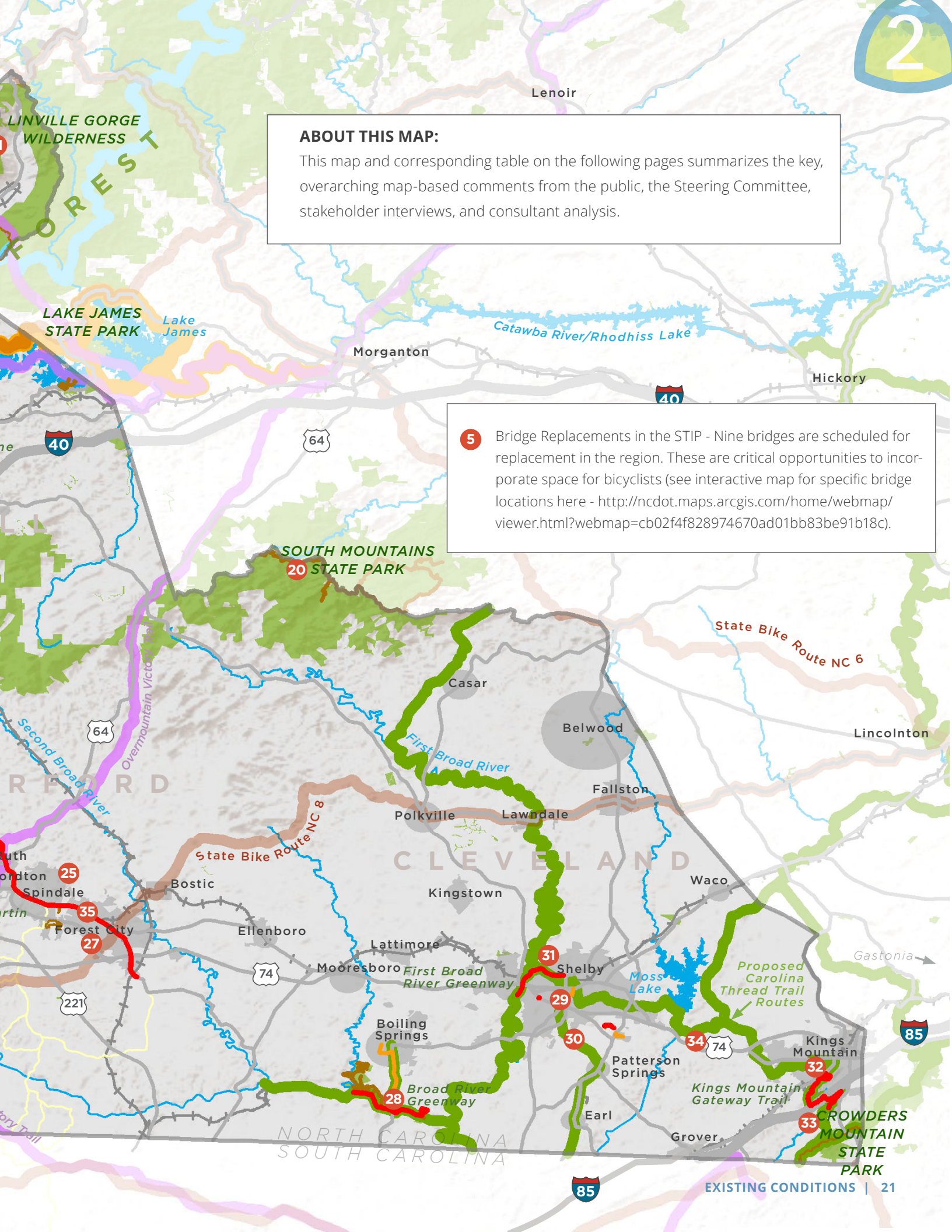




TABLE 2.1 OPPORTUNITIES & CONSTRAINTS FOR BICYCLING IN THE ISOTHERMAL REGION

<i>This table summarizes the key, over-arching map-based comments from the public, the Steering Committee, stakeholder interviews, and consultant analysis.</i>	
ID # from Map 2.1	Observation
1	Saluda Grade Rail Trail - Inactive rail line is currently owned by Norfolk Southern that connects Saluda, Tryon, and Landrum (SC) - each town has passed a resolution of support for building the Saluda Grade Rail Trail.
2	Tryon and Columbus Bicycle and Pedestrian Plan - Awarded 2017 Bicycle and Pedestrian NCDOT planning grant - upcoming local bike/ped planning processes to be coordinated with this regional planning process.
3	NC 108 Columbus to Tryon (STIP: R-5838) - Widening to four lanes no longer being considered, but improvements for bicyclists and pedestrians (as well as turn lanes) still being considered.
4	NC 9 Mill Spring to US 74 (STIP: R-5840) - Widening planned to include paved shoulders.
5	Bridge Replacements in the STIP - Nine bridges are scheduled for replacement in the region, creating critical opportunities to incorporate space for bicyclists.
6	NC Bike Route 8 Southern Highlands - generally flat, has space for paved shoulders; improve this route to make connection from Tryon to Rutherfordton, Spindale, and Forest City.
7	Palmetto Trail - South Carolina Trail (statewide) that should connect to the Isothermal Regional Bicycle System.
8	Charity Event Bicycle Routes - Multiple charity ride routes cross through this part of the region, including Tour de Pumpkin, Tour de Lure, Tour de Leaves, The Assaults, Gears & Gables, and Gran Fondo Hincapie.
9	Green River Game Lands - Existing network of rugged hiking/mountain biking trails, very scenic; provide connectivity to Green River Cove Rd and Holbert Cove Rd.
10	Purple Martin Greenway - Phase 2 recently completed, Phase 3 (north to Charlotte Rd) under construction - eventually planned to link to Kiwanis park along Cleghorn Creek. Connectivity options to the Thermal Belt include via Mountain St to the north and via Thunder Rd/Oak St to the south/east.
11	Greenline sewer from Lake Lure to Spindale - Proposed sewer following US 64 corridor (currently in easement acquisition) - potential greenway opportunity as well ('Whistle Pig Trail' potential trail name).
12	Lake Lure and Chimney Rock - Chimney Rock State Park and multiple local destinations and trails need bicycle connectivity.
13	Old Fort includes nearby trails and destinations such as Pisgah National Forest, Point Lookout Trail, Kitsuma Peak/Young's Ridge Trail, Old Fort Picnic Area, and Curtis Creek Campground. Bicycle connectivity needed.
14	Catawba River Greenway - Link Marion and Old Fort via the Catawba River Greenway - several miles currently exist/under construction northwest of Marion continuing toward Old Fort - also designate this corridor as part of the Fonta Flora State Trail.
15	NC Bike Route 2B - Scenic back roads link between Old Fort and Marion that is part of the NC state bike route system (unsigned).
16	Peavine Trail - Improvements and extension in the current STIP (EB-5917) would connect the Peavine Trail from State St to McDowell Technical Community College - two options for this connection across I-40 include a rail-with-trail connection parallel to the active railroad line crossing under I-40 or utilizing the culvert under I-40 to make the link. Eventually connect to the Thermal Belt Trail.
17	Peavine Trail Trestle Feasibility Study - Two old railroad trestles are undergoing an engineering study by NCDOT to consider the options for refurbishing/reconstructing the trestles as part of the extension of the Peavine Trail to the south. Study is expected to be completed by 2019.

TABLE 2.1 (CONTINUED)

<p><i>This table summarizes the key, over-arching map-based comments from the public, the Steering Committee, stakeholder interviews, and consultant analysis.</i></p>	
18	Catawba River Greenway extension - 2.5 miles will be constructed from the current western terminus of the trail (included in shared use path data displayed in map).
19	Fonta Flora State Trail - This statewide trail will connect through McDowell County via the Point Lookout Trail, Old Fort, Catawba River Greenway, Marion, and on to Lake James and Burke County (trail planning and implementation are underway for the Lake James section in Burke County to Marion in McDowell County).
20	South Mountains State Park - Improve connectivity to the west and south (official entrance on east side).
21	Blue Ridge Parkway, NC Mountains to Sea Trail - Acres of scenic open space and miles of trails continuing north in McDowell County - improve connectivity to Blue Ridge Parkway, Pisgah National Forest, the Mountains to Sea Trail, and Linville Gorge.
22	Rutherford Rd improvements from Georgia Ave to the 226/221 intersection in Marion (STIP: U-5835) - Bike lanes and sidewalks have been requested as part of this project - opportunity to include physically separated bicycle facilities.
23	Sugar Hill Rd/I-40 bridge improvements (STIP: U-5818) - Opportunity to include space for bicyclists (and pedestrians).
24	US 221 widening in McDowell and Rutherford Counties - This project is currently unfunded, but space for bicyclists should be incorporated into this project.
25	Spindale Bicycle and Pedestrian Plan - This planning process began in 2017 with expected completion in 2018 - project teams coordinated throughout the regional and local planning processes. Spindale is also conducting a Main Street Master Plan that is focusing on streetscape elements for their Main Street section. This process is expected to be completed in 2018 as well.
26	US 221 Bypass (STIP: R-2233B) - A sidepath is shown on the preliminary design of the US 221 bypass project for the Mountain St section (Overmountain Victory Trail).
27	Oak St (Forest City) (STIP: U-5833) - Improvements from Piney Ridge Rd to US 74 likely to include sidewalks - bicycle facilities needed as well.
28	Broad River Greenway - Connect to the Thermal Belt Trail to the west and Shelby to the east.
29	City of Shelby - Future resurfacing project along Lafayette St from Grigg St to Graham St (will include buffered bike lanes).
30	Cleveland County Rail Trail - 11 miles of inactive line from downtown Shelby to the South Carolina border (to Blacksburg, SC), likely to go through railbanking process - trail study to be completed in 2018.
31	Downtown Shelby to the First Broad River Trail connection - to be completed in 2018 - this sidepath will connect the First Broad River Trail along Grover St to Morgan St.
32	Kings Mountain Gateway Trail (top priority for Kings Mountain) - Three ft paved shoulders to be constructed and striped between downtown and the Gateway Trail trailhead at Quarry Rd as part of roadway improvement project. An off-road route would be ideal and should be pursued.
33	Kings Mountain Gateway Trail to Crowders Mountain State Park - Currently working on preliminary design to connect southern terminus of existing trail to Boulder Access at Crowders Mountain State Park.
34	US 74 improvements between Shelby and Kings Mountain (STIP: R-2707E) - Preliminary designs for this section include a service road adjacent to the highway corridor from Long Branch Rd to David Baptist Church Rd at the Oak Grove intersection - opportunity to build bicycle facilities with this project and serve as part of a direct link between Kings Mountain and Shelby.
35	Charlotte Road/Main Street Corridor Study Charrette - The Charlotte Road/Main Street corridor from Rutherfordton to Forest City is underway in 2018, and will examine bicycle and pedestrian connectivity.

MAP 2.2 BICYCLE LEVEL OF COMFORT

BICYCLE LEVEL OF COMFORT

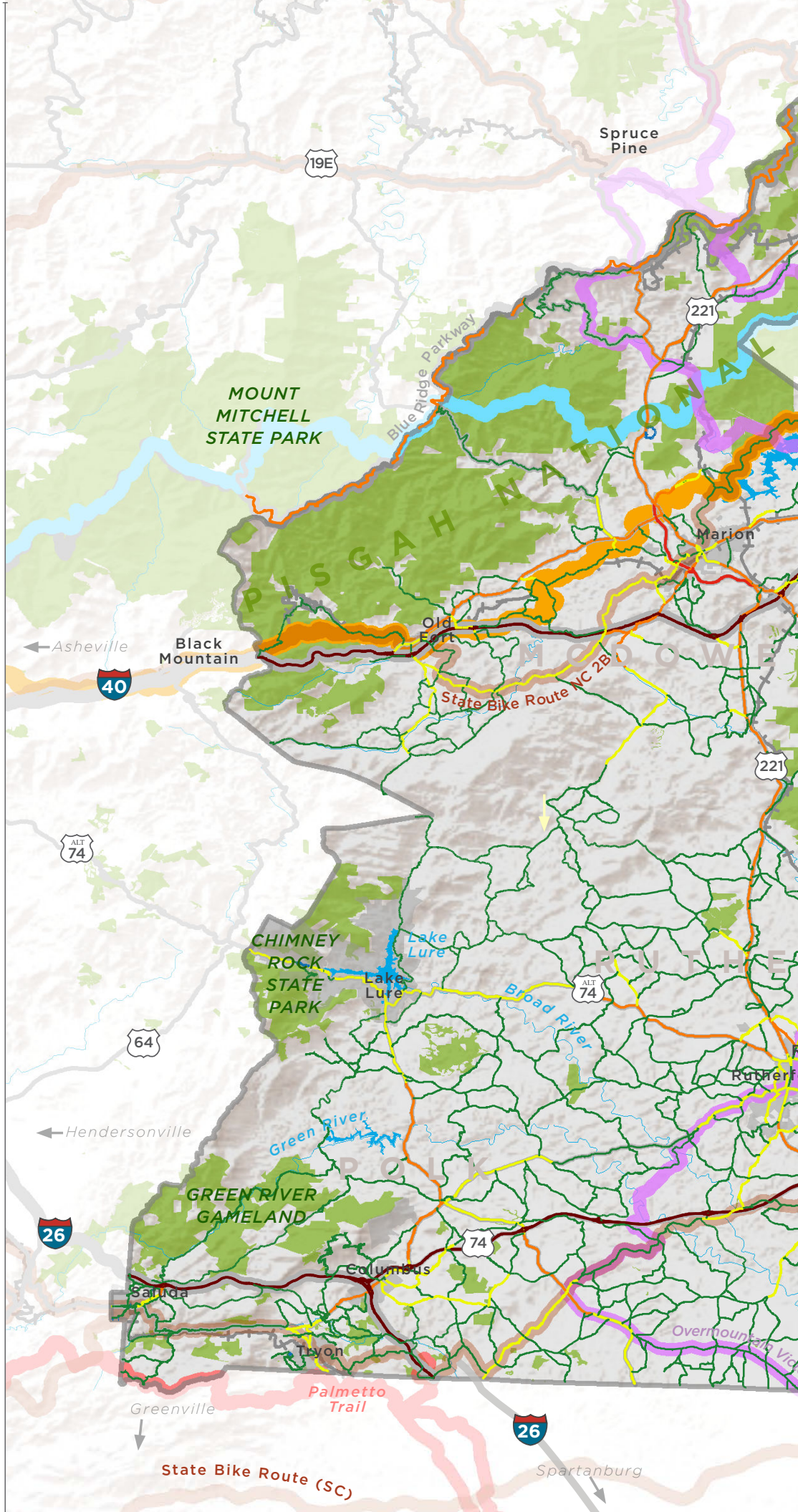
- Easy
- Moderate
- Caution
- Advanced
- Not Recommended
- Not Allowed

REGIONAL/STATEWIDE

- State Bike Routes
- Carolina Thread Trail
- Overmountain Victory Trail
- Mountains to Sea Trail
- Fonta Flora State Trail
- Palmetto Trail
- Charity Event Bicycle Routes

OTHER FEATURES

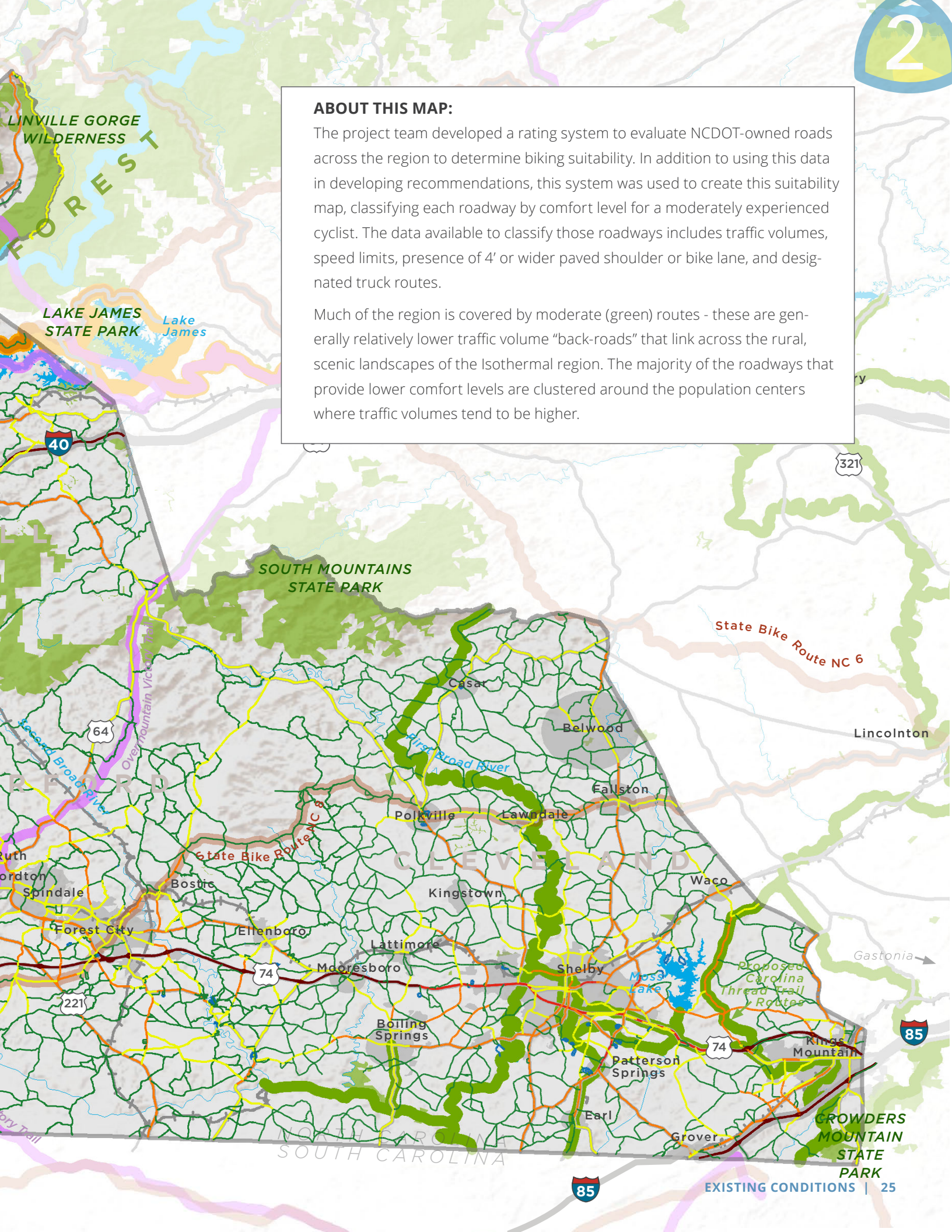
- Study Area
- Municipalities
- Parks & Conservation
- Lakes & Rivers
- Topography
- ↔ Railroads



ABOUT THIS MAP:

The project team developed a rating system to evaluate NCDOT-owned roads across the region to determine biking suitability. In addition to using this data in developing recommendations, this system was used to create this suitability map, classifying each roadway by comfort level for a moderately experienced cyclist. The data available to classify those roadways includes traffic volumes, speed limits, presence of 4' or wider paved shoulder or bike lane, and designated truck routes.

Much of the region is covered by moderate (green) routes - these are generally relatively lower traffic volume "back-roads" that link across the rural, scenic landscapes of the Isothermal region. The majority of the roadways that provide lower comfort levels are clustered around the population centers where traffic volumes tend to be higher.



MAP 2.3 BICYCLE CRASHES

BICYCLE CRASHES

● Bicycle Crashes (2007-2014)

EXISTING

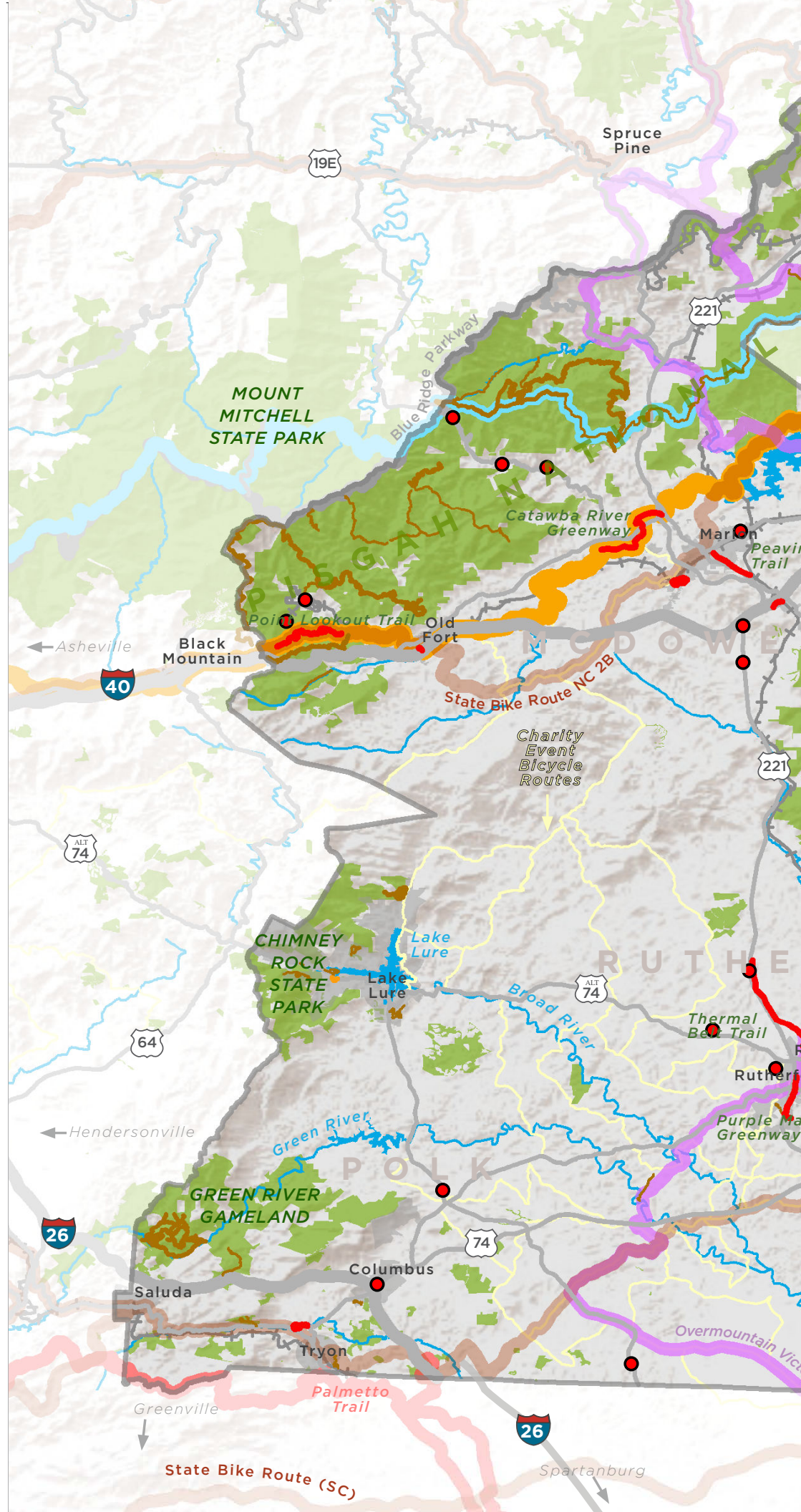
- Shared Use Paths
- Bike Lane
- Hiking/Mt Biking Trail
- Other Trail

REGIONAL/STATEWIDE

- State Bike Routes
- Carolina Thread Trail
- Overmountain Victory Trail
- Mountains to Sea Trail
- Fonta Flora State Trail
- Palmetto Trail
- Charity Event Bicycle Routes

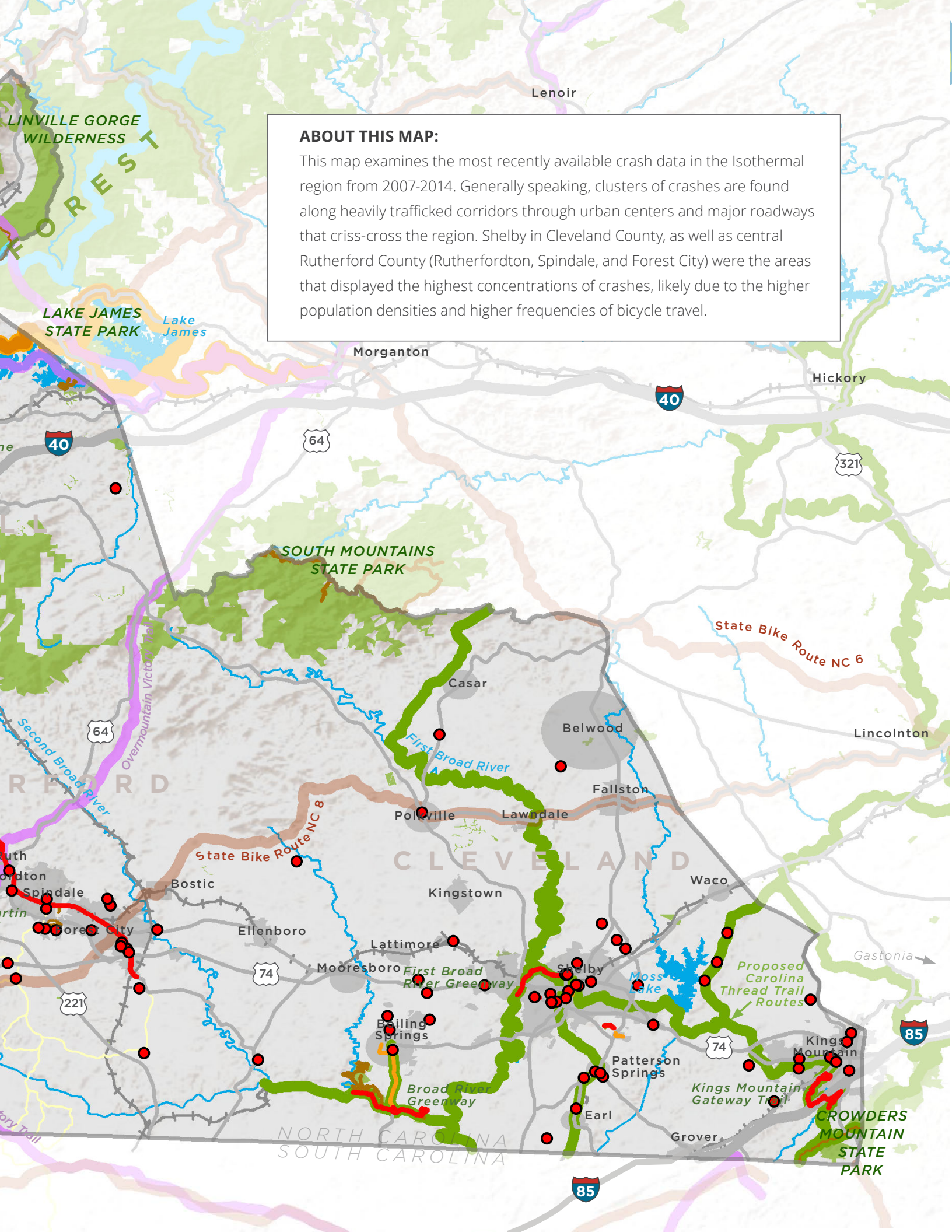
OTHER FEATURES

- Study Area
- Municipalities
- Parks & Conservation
- Lakes & Rivers
- Topography
- + Railroads



10 miles





ABOUT THIS MAP:

This map examines the most recently available crash data in the Isothermal region from 2007-2014. Generally speaking, clusters of crashes are found along heavily trafficked corridors through urban centers and major roadways that criss-cross the region. Shelby in Cleveland County, as well as central Rutherford County (Rutherfordton, Spindale, and Forest City) were the areas that displayed the highest concentrations of crashes, likely due to the higher population densities and higher frequencies of bicycle travel.

MAP 2.4 PAST PLANNING EFFORTS

Past Planning Efforts
(See Table 2.2 on following pages for corresponding notes)

EXISTING

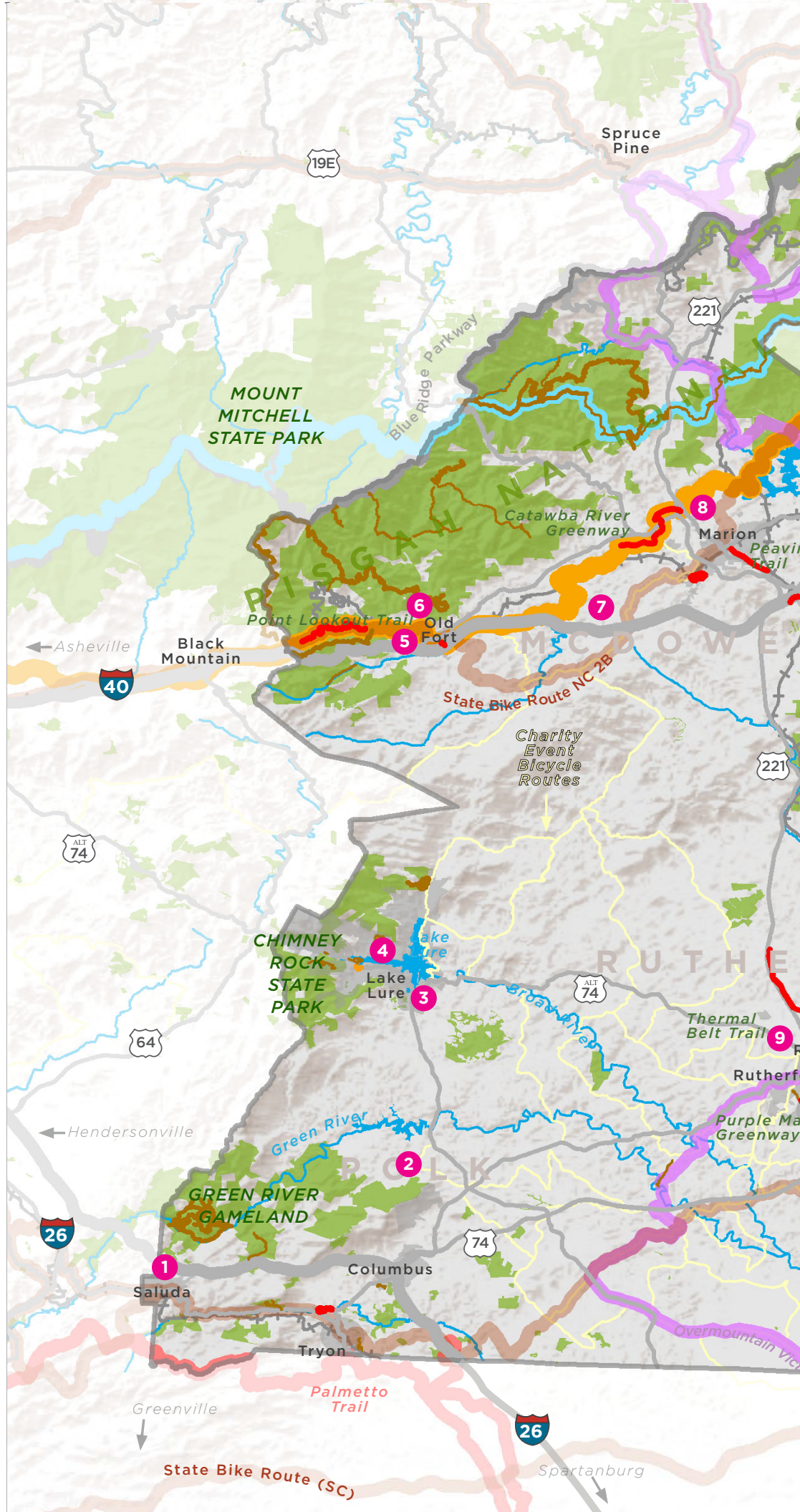
- Shared Use Paths
- Bike Lane
- Hiking/Mt Biking Trail
- Other Trail

REGIONAL/STATEWIDE

- State Bike Routes
- Carolina Thread Trail
- Overmountain Victory Trail
- Mountains to Sea Trail
- Fonta Flora State Trail
- Palmetto Trail
- Charity Event Bicycle Routes

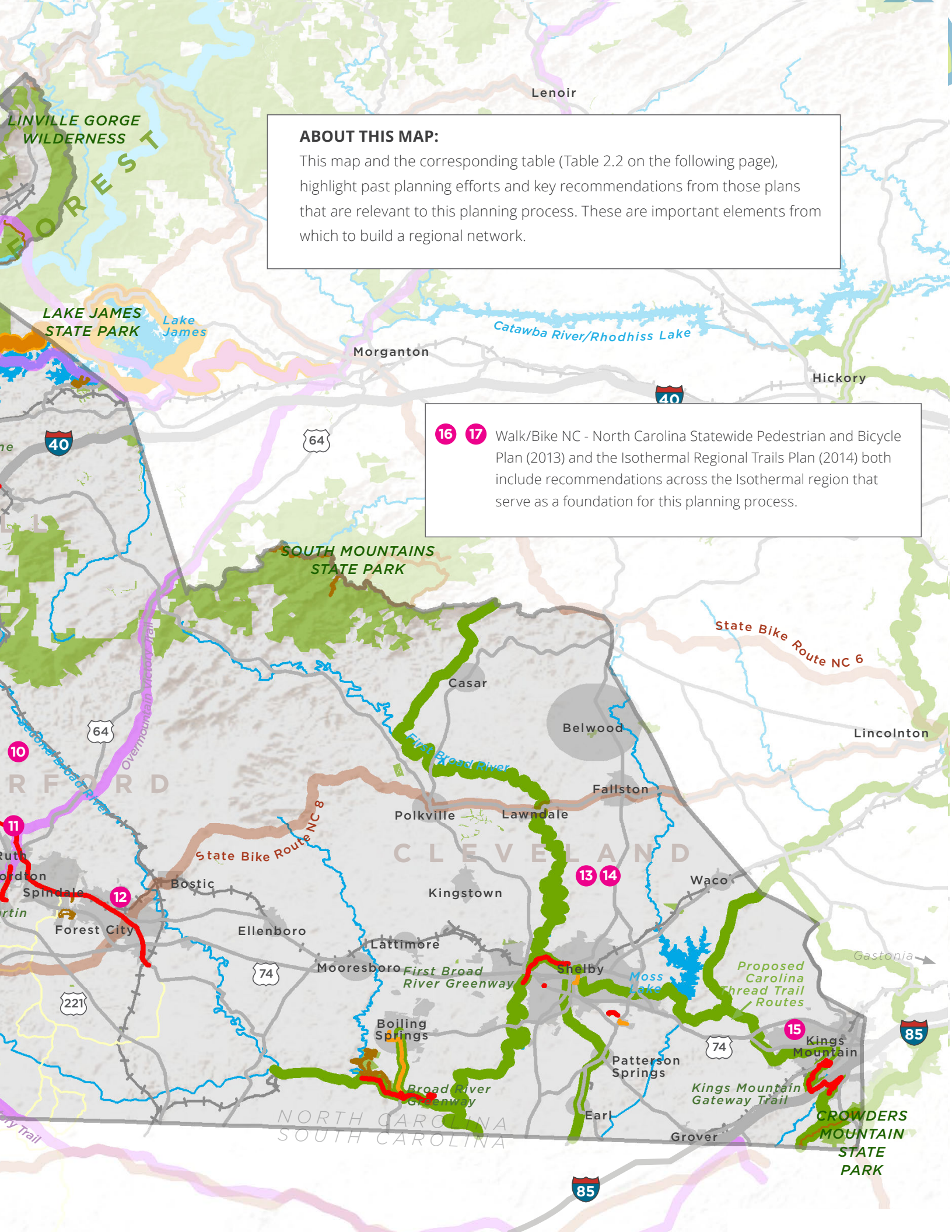
OTHER FEATURES

- Study Area
- Municipalities
- Parks & Conservation
- Lakes & Rivers
- Topography
- + Railroads



10 miles





ABOUT THIS MAP:

This map and the corresponding table (Table 2.2 on the following page), highlight past planning efforts and key recommendations from those plans that are relevant to this planning process. These are important elements from which to build a regional network.

16 17 Walk/Bike NC - North Carolina Statewide Pedestrian and Bicycle Plan (2013) and the Isothermal Regional Trails Plan (2014) both include recommendations across the Isothermal region that serve as a foundation for this planning process.

NORTH CAROLINA
SOUTH CAROLINA



TABLE 2.2 PAST PLANNING EFFORTS

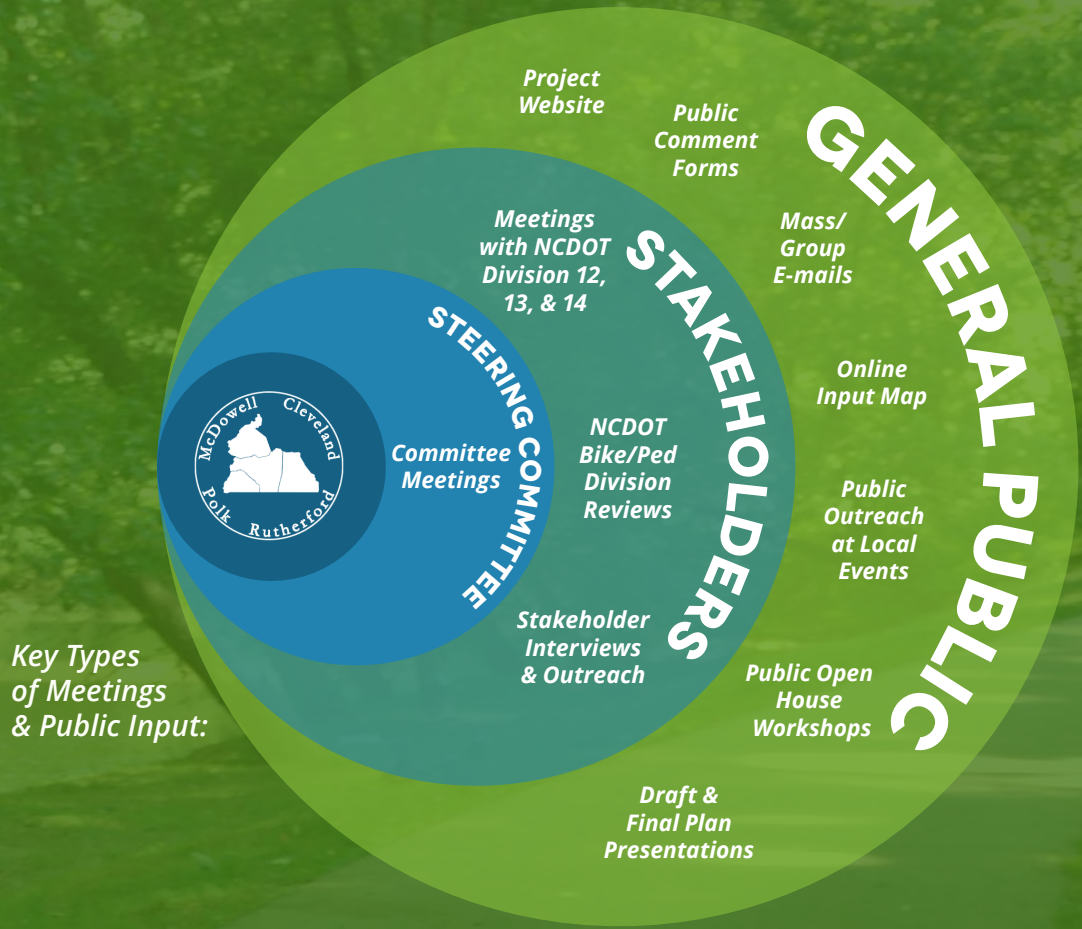
<i>This table highlights the most significant aspects of past and current planning work that is relevant to bicycle planning in the Isothermal Region.</i>	
ID # from Map 2.4	Past Planning Efforts
1	<p>Saluda Bicycle and Pedestrian Plan (2016) - priority considerations from the plan with regional significance include:</p> <ul style="list-style-type: none"> • Ozone Dr from downtown toward Howard Gap Rd (and Green River Cover Rd, Holbert Cove Rd) has varying amounts of paved shoulder; priority recommendation includes adding paved shoulder where it is currently lacking; Main St through downtown - shared lane markings (sharrows), signage and bicycle parking; NC 176 through Saluda - sharrows and signage; Greenville St - sharrows and signage.
2	<p>Polk County Comprehensive Transportation Plan (2007) - to be updated in 2018 - The CTP includes several routes along back roads throughout the county as well as NC bike route 8.</p>
3	<p>Lake Lure NC 9 Corridor Plan (2015) - NC 9 section from US 64 south to the Rutherford County border includes land use recommendations as well as general thoroughfare types including pedestrian and bicycle facilities.</p>
4	<p>Lake Lure Chimney Rock CTP (2013) - Recommendations include a combination of multi-use paths and on-road facilities that form a loop.</p>
5	<p>Old Fort Pedestrian Plan (2011) - Key recommendations include greenway connectivity from downtown to Point Lookout Trail/Old Fort Picnic Area as well as to the southeast to the Catawba River via Mill Creek, Catawba River tributary.</p>
6	<p>Old Fort Mill Creek Greenway Plan (2010) - The Mill Creek Greenway Master Plan Map details opportunities and challenges for a greenway along Mill Creek from I-40 through downtown Old Fort - several alternatives are also identified.</p>
7	<p>McDowell County CTP (2012) - The CTP shows recommended improvements along US 70 as well as a multi-use path along the Catawba River from Old Fort to Marion - the map also includes greenway recommendations from the Old Fort Pedestrian Plan.</p>
8	<p>Marion Bicycle Plan (2016) - priority considerations from the plan with regional significance include:</p> <ul style="list-style-type: none"> • Peavine Trail improvements and extension (trail paving currently on STIP) • Main St from the Catawba River Greenway to downtown - sidepath/separated bikeway and/or other corridor improvements needed • Henderson Street from the YMCA to downtown - corridor study needed • Main St - shared lane markings from Viewpoint Dr to Morgan St • Court St - bike lanes and shared lane markings from Snipes St to Church St • Rutherford Rd - Uphill bike lane (downhill sharrow) from Main St to Georgia Ave • Wayfinding signage for cross-town route
9	<p>Rutherfordton Bicycle and Pedestrian Plan (2017) - priority considerations from the plan with regional significance include:</p> <ul style="list-style-type: none"> • Charlotte Rd Corridor Improvements - dedicated bicycle facilities from Main St to Thermal Belt - would also connect to future Purple Martin Greenway extension • Green St - Proposed pedestrian improvements but nothing specific proposed for bicycle facilities - connects Kiwanis Park to Thermal Belt across US 221 bypass • Mountain St - Bike lanes recommended - also note that sidepath shown on the preliminary US 221 bypass project • S Main St - bike lanes recommended from Charlotte Rd to Cottage Ln/Skyline Dr

TABLE 2.2 (CONTINUED)

<i>This table highlights the most significant aspects of past and current planning work that is relevant to bicycle planning in the Isothermal Region.</i>	
10	Rutherford County CTP (2018) - Draft coordinated with the Isothermal Regional Bicycle Plan process. Completion expected in 2018.
11	Thermal Belt Rail Trail Master Plan (2017) - The Thermal Belt Rail Trail Master Plan details the 13+ miles of 12' paved trail from Gilkey to Forest City along with trail amenities, to be constructed in 2018.
12	<p>Forest City: Heart & Sole (Pedestrian Plan) (2015) - priority considerations from the plan with regional significance include:</p> <ul style="list-style-type: none"> • Thermal Belt - highest priority - to be completed 2018 • Bracketts Creek Greenway - Isothermal Community College to S Church St paralleling US 74 • Oak St - sidewalk improvements highlighted (Oak St also on 2018-2027 Draft STIP), roadway improvements likely to include wide shoulder • Longer-term greenway connections also to Bostic as well as along the Second Broad River • Potential rail trail connection to Ellenboro
13	Cleveland County CTP (2010) - Carolina Thread Trail largely coincides with CTP.
14	Carolina Thread Trail - Cleveland County Master Plan (2013) - County-wide connectivity with trunk corridors are highlighted such as Cleveland County Rail Trail, 1st Broad River Greenway, Broad River Greenway, and Shelby to Kings Mountain via Moss Lake.
15	<p>Kings Mountain Bicycle Plan (2011) - priority considerations from the plan with regional significance include:</p> <ul style="list-style-type: none"> • Downtown to Kings Mountain Gateway Trail trailhead at Quarry Rd - challenging project due to limited right of way and spacing with parallel railroad tracks - further study needed (roadway widening/resurfacing project to include 3 ft paved shoulders) • Beason Creek Greenway • Potts Creek Greenway • Other Considerations - Mountain Street - very wide
16	<p>Walk/Bike NC - North Carolina Statewide Pedestrian and Bicycle Plan (2013) -</p> <ul style="list-style-type: none"> • Statewide bike routes update includes paved shoulder recommendations for NC bike route 8 through Polk County, connectivity to new NC 11 Mountain route also highlighted from Saluda (Greenville St) • Statewide bike routes update includes a new route (NC 2B) recommendation for NC bike route 2 through McDowell County - this route follows the Point Lookout Trail from Black Mountain into McDowell County through Old Fort and follows scenic back roads (such as Lackey Town Rd out of Old Fort and Nix Creek Rd into Marion)
17	Isothermal Regional Trails Plan (2014) - This plan includes proposed statewide, regional, and local trails including the NC Mountains to Sea Trail, Overmountain Victory Trail, Carolina Thread Trail, McDowell County Greenway, Mt Mitchell Axis Trail, Isothermal Rail Trail, Cliffside Heritage Trail, Broad & Green River Blueway, the Palmetto Trail (SC), and the Saluda Grade Rail Trail.

Note: Multiple planning process were underway during the Isothermal Regional Bicycle planning process including the Spindale Bicycle and Pedestrian Plan, Spindale Main Street Master Plan, Fonta Flora State Trail Study (Burke County to Marion), Peavine Trail Trestle Feasibility Study, Charlotte Road/Main Street Corridor study (Rutherfordton, Spindale, Forest City), the Cleveland County Rail-Trail study, and Tryon and Columbus Bicycle and Pedestrian Plan - these are noted in Map 2.1 and Table 2.1.

PUBLIC PROCESS OVERVIEW



Key Types of Meetings & Public Input:

39	STEERING COMMITTEE MEMBERS, WITH 4 OFFICIAL MEETINGS
741	VISITORS TO THE PROJECT WEBSITE
4	OUTREACH SESSIONS AT LOCAL EVENTS
9	STAKEHOLDER INTERVIEWS
500+	PUBLIC COMMENT FORMS
200+	MAPPING COMMENTS
4	DRAFT PLAN PUBLIC OPEN HOUSE WORKSHOPS (1 PER COUNTY)
5+	FINAL PLAN PRESENTATIONS

PUBLIC OUTREACH AT COMMUNITY EVENTS

The first round of public outreach included tabling with project information at four events and festivals, one for each county of the study area. Each table included a project banner, project information cards, project surveys, and a public input map where people were encouraged to provide site-specific comments.



Images from outreach sessions at local events in the Isothermal Region.

The input received is summarized in the survey results on the following pages, and in Map 2.1 that show site-specific input from the public. The second round of outreach used a public open house format and focused on the main recommendations of the draft plan, also with one workshop in each county.



Bike Plan Outreach at Public Events:

- April 22, 2017: Earth Day Celebration (Cleveland County)
- May 6, 2017: MayFest (Rutherford County)
- June 3, 2017: Historic Marion Tailgate Market (McDowell County)
- June 21, 2017: Tryon Tailgate Market (Polk County)

WHAT WE HEARD *Below are quotes from the public, collected for this plan in 2017.*

I'm afraid of biking outside my neighborhood and Uptown Shelby because I don't know how to behave in major intersections AND because I know most of the drivers don't know how to drive near cyclists.

I would commute to work using my bicycle if there was a safer route from my home to downtown.

I ride regularly. There are no designations for cyclists in the Isothermal region. I also believe that most motorists are uninformed when it comes to the law and cyclists on the road.

I enjoy road cycling, but I think more off-road bike trails would encourage more people to cycle as they would feel much safer.

I am hopeful that more people will become bikers and that road conditions will become more favorable so that more people will choose biking as a major source of transportation.

I would bike far more often if the biking conditions were better!

Designated areas for cyclists to ride on the road as well as informational trainings for motorists would be of great benefit.



I grew up riding with traffic. Drivers seem more distracted than ever before. I don't feel as immortal as I did when I was younger. I would love to feel safer riding around town and countryside than I do now.

We have a wonderful area for cycling. The key is to get large numbers of new people using their bikes. That will only be possible with bike paths, rail trails, and bike lanes that are separated from traffic.

Would love to bike for transportation if roads were safer for cyclists.

Bicycling is important for the overall health and civic participation of all members of our community. While revitalization is key to economic concerns as well, please do not neglect access to the poorer segments of the community.

Bike safety seems as much about cyclist responsibility as about driver awareness. When one or the other isn't familiar with the standard expectations, it can be fatal.

Do everything possible to create connected, multi-use greenway system.





PUBLIC COMMENT FORM RESPONSE HIGHLIGHTS

The public comment form was active between March and December 2017. It was available online through the project website and in hardcopy form at outreach events and meetings. People throughout the Isothermal Region were encouraged to complete these forms through the mass-email lists of project committee members and stakeholders, through social media (Facebook), and through municipal, county, and stakeholder website announcements.

There were more than **500 respondents** to the public comment form. Although not statistically valid, the results that follow still reflect the voices of residents across the region who have an interest in the region's bicycle network. Summary responses are displayed below.


500+
Total survey respondents

87% Live
in the Isothermal Region

52% Work
in the Isothermal Region

69% Enjoy
outdoor activities in the Isothermal Region

 **17%** rate overall bicycling conditions in the region as **good or very good.**

 **40%** rate overall bicycling conditions in the region as **fair.**

 **43%** rate overall bicycling conditions in the region as **poor or very poor.**



56% Have ridden a bike in the last 30 days, and **14%** have ridden more than 10 times in the last 30 days.



44% Have not ridden a bike in the last 30 days

78% BIKE FOR EXERCISE

12% BIKE FOR TRANSPORTATION

10% Other

What is the likelihood that the following types of bicycling facilities would influence you to bike more often? (% responding "VERY LIKELY" shown below)



83%
Separated bike lanes (physically separated from traffic)



79%
Greenways



76%
Buffered bike lanes



64%
Shared-use paths



55%
Intersection improvements for bicyclists



55%
Striped bike lanes



51%
Paved shoulders



43%
Bike parking



36%
Directional and wayfinding signage for bicyclists



TOP CORRIDORS IN NEED OF BICYCLING IMPROVEMENTS, ACCORDING TO THE SURVEY:

- 1 Hwy 221
- 2 Hwy 74
- 3 Hwy 108
- 4 Hwy 70
- 5 Hwy 176
- 6 Hwy 9
- 7 Hwy 64
- 8 Main St (in Spindale & Forest City)
- 9 Hwy 226
- 10 Coxe Rd

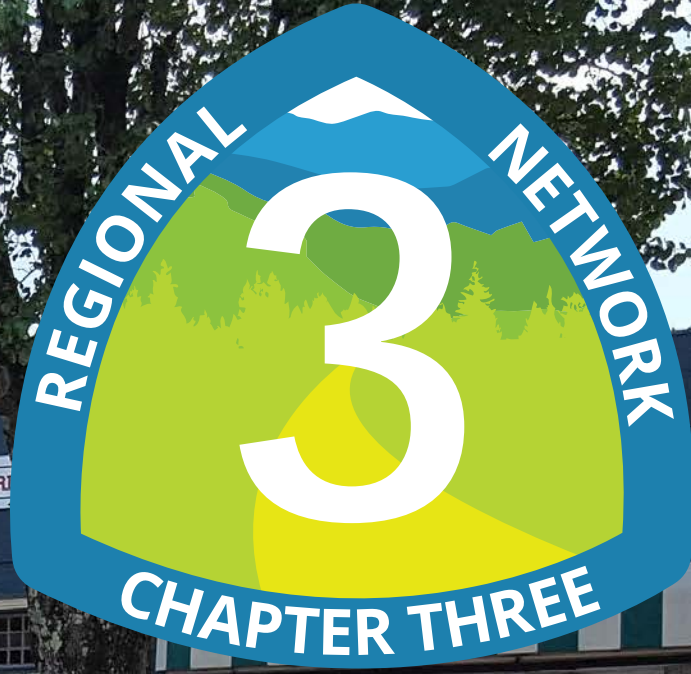
ACCORDING TO RESPONDENTS,



THE TOP THREE DESTINATIONS

THAT ARE MOST IMPORTANT TO CONNECT WITH BIKEWAYS ARE:

1. Trails or greenways
2. Parks within cities and towns
3. State parks and natural areas



The Regional Network will connect bicycle facilities and downtowns for economic development, like the Thermal Belt Rail Trail in Spindale, shown above.

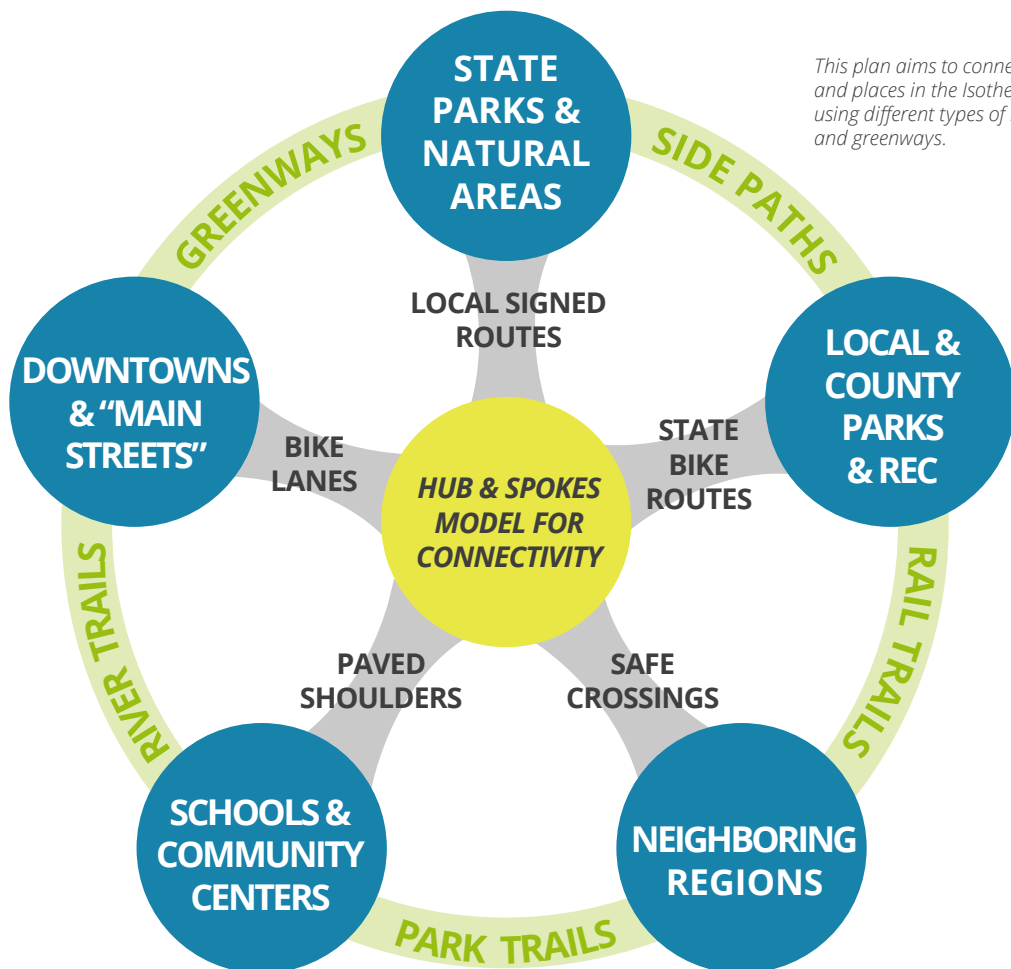
OVERVIEW

This chapter details the recommended Isothermal Regional Bicycle Network, featuring short-term (5 to 10-year) priorities to begin linking communities and local destinations, along with a long-term (30-year) plan for regional connectivity.

THE REGIONAL BICYCLE NETWORK

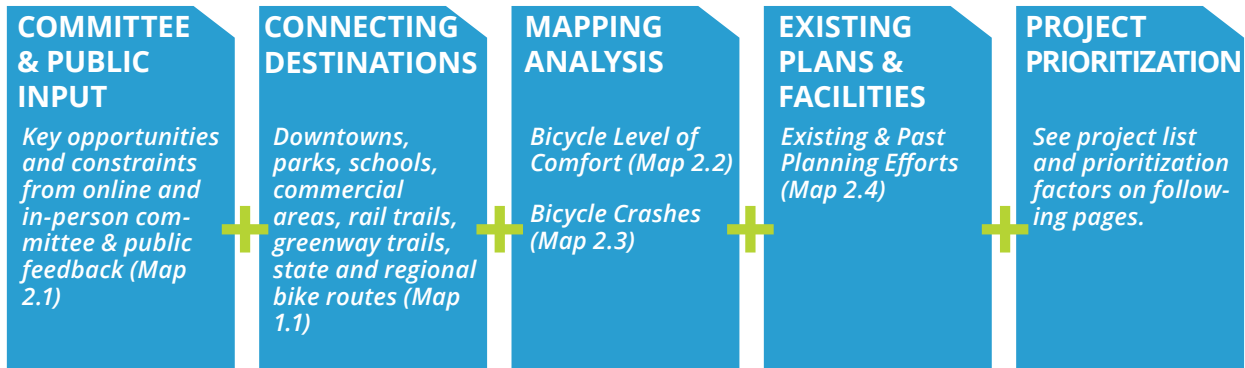
THE HUBS & SPOKES MODEL FOR CONNECTIVITY

Conceptually, the recommended bikeways and the destinations they connect can be seen as a network of 'hubs' and 'spokes'. Small towns, parks, and other places people like to bike are the 'hubs' of the network, whereas the various bicycle facilities that connect them are the 'spokes' (see graphic below).



BASIS OF RECOMMENDATIONS

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



CHAPTER 3 MAPS & CUTSHEETS

Recommendations are organized into the following maps and cutsheets. **The priority projects and recommended facilities in the comprehensive network should be approached by the IPDC and its partners with flexibility, taking into account opportunities that may arise after this planning process is complete.**

1

MAP 3.1 PRIORITY PROJECTS (5-10 YEAR): These projects were the most consistently mentioned in committee meetings, stakeholder discussions, and public outreach. They fulfill a variety of critical prioritization criteria that will help them score high in future funding applications, and they provide for a range of project types and users while being geographically distributed across the study area.

2

PROJECT CUTSHEETS: This series of 26 two-page project summaries can be used when applying for future funding, or when communicating the priority project details to potential partners during implementation. These short term project sheets are followed by brief descriptions of this plan's long-term vision projects. Note that where longer-term off-road facilities are recommended, on-road facilities are still desired in the short term on adjacent or nearby roads, as part of the Comprehensive Network.

3

MAP 3.2 STRATEGIC REGIONAL BICYCLE NETWORK: As the top priority projects are completed, this plan should be updated to include new priorities, drawing upon this strategic regional network of recommendations. These routes and recommendations strategically connect and build upon the project cutsheets referred to above.

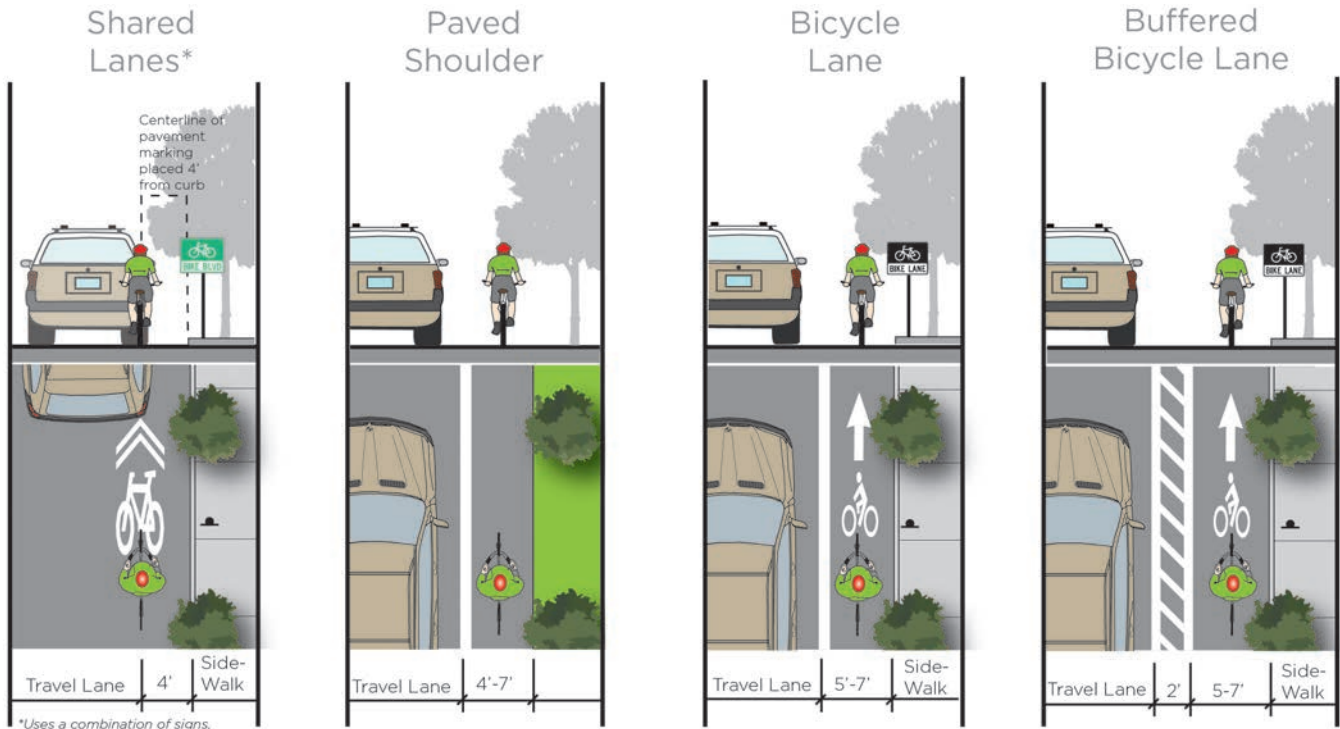
4

MAP 3.3 COMPREHENSIVE REGIONAL BICYCLE NETWORK (30 YEAR): This map shows a comprehensive network of potential bikeway and greenway opportunities throughout the region. It is not expected that all of these projects will be built. They are still an important part of this plan though, as they show what the potential is for any given future roadway resurfacing or construction that may provide an opportunity for incorporating a recommended greenway or bikeway facility.

TYPES OF FACILITIES

See the maps (and legends) in Chapter 3 to see where these different types of facilities are recommended in the Isothermal Region.

least separated



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

most separated



MAP 3.1 PRIORITY PROJECTS

Priority Projects (See project cutsheets on the following pages for further detail)

EXISTING

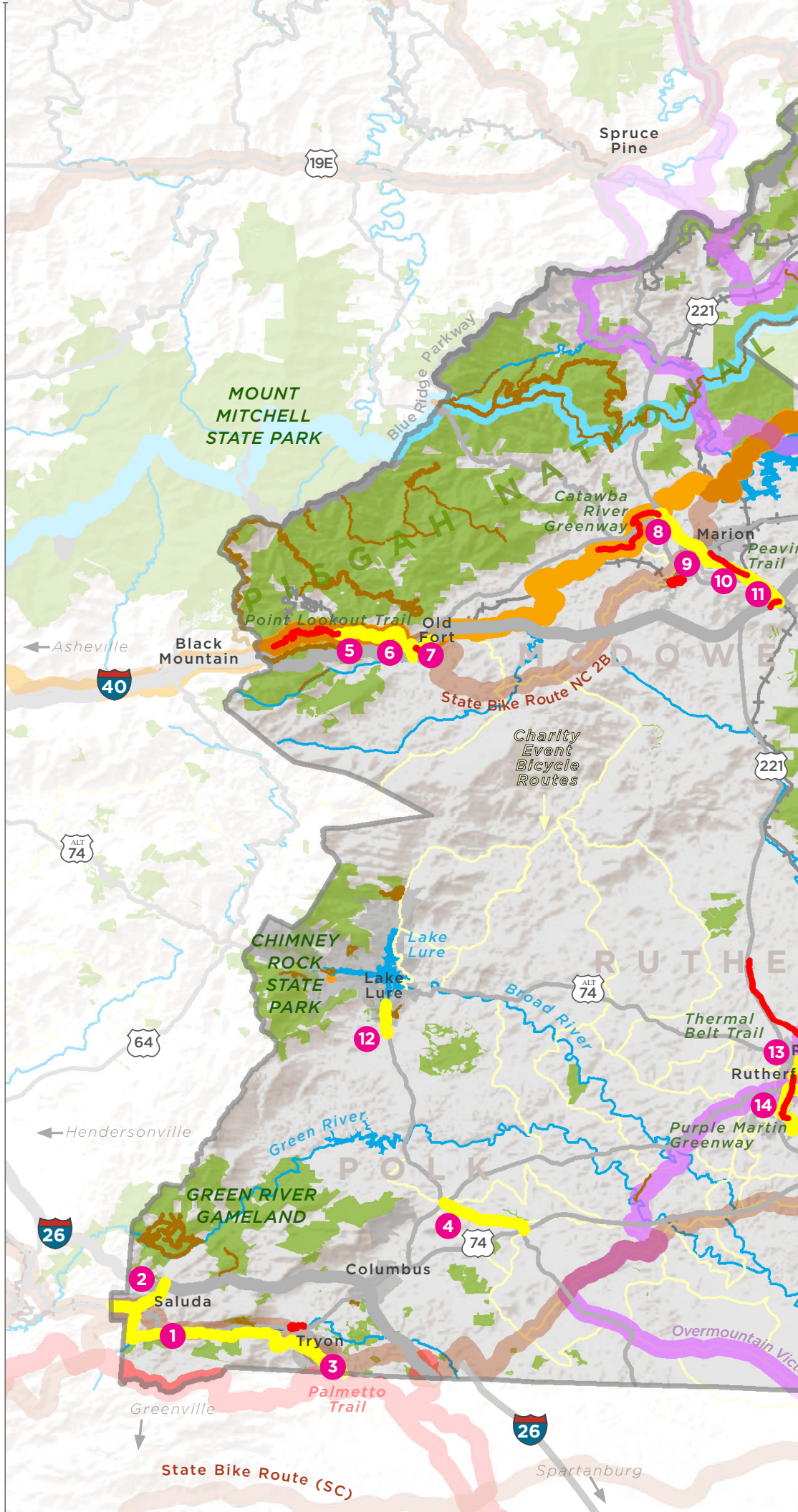
- Shared Use Paths
- Bike Lane
- Hiking/Mt Biking Trail
- Other Trail

REGIONAL/STATEWIDE

- State Bike Routes
- Carolina Thread Trail
- Overmountain Victory Trail
- Mountains to Sea Trail
- Fonta Flora State Trail
- Palmetto Trail
- Charity Event Bicycle Routes

OTHER FEATURES

- Study Area
- Municipalities
- Parks & Conservation
- Lakes & Rivers
- Topography
- Railroads

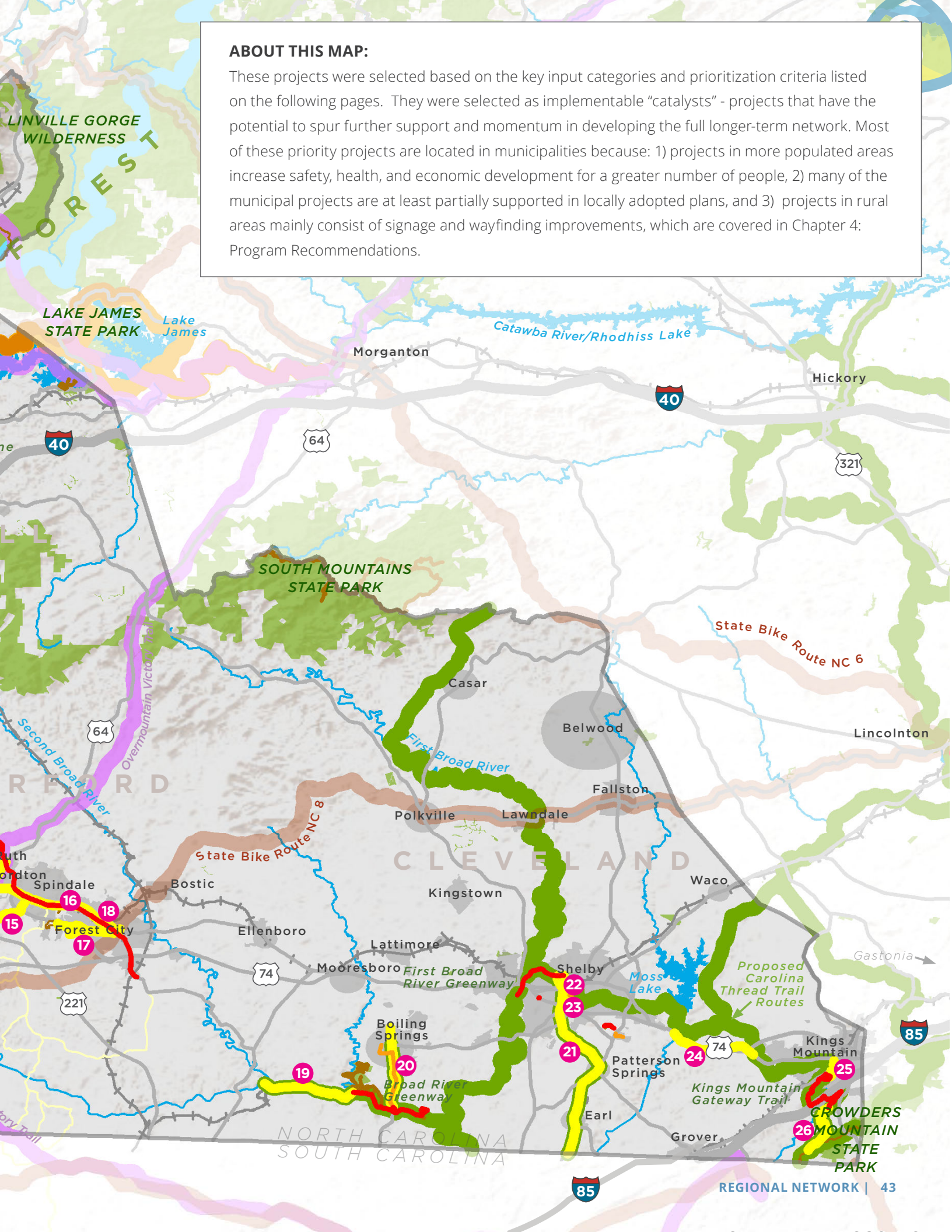


10 miles



ABOUT THIS MAP:

These projects were selected based on the key input categories and prioritization criteria listed on the following pages. They were selected as implementable “catalysts” - projects that have the potential to spur further support and momentum in developing the full longer-term network. Most of these priority projects are located in municipalities because: 1) projects in more populated areas increase safety, health, and economic development for a greater number of people, 2) many of the municipal projects are at least partially supported in locally adopted plans, and 3) projects in rural areas mainly consist of signage and wayfinding improvements, which are covered in Chapter 4: Program Recommendations.





PRIORITIZATION TABLE This table shows the top projects and how they fulfill various prioritization criteria. These rankings are for general planning purposes only, and *are not listed in priority order*. The actual order in which projects are constructed depends on many factors, such as the availability of funding and the opportunity to build facilities in conjunction with other roadway projects. Some of the most cost-effective opportunities to build new bicycle facilities are during scheduled roadway resurfacing and reconstruction, regardless of priority ranking (see Maps 3.2 and 3.3, at the end of this chapter, for all recommended bicycle facilities in addition to this list of top projects).

	Name	From	To	Facility Types*	
1	Saluda Grade Rail Trail	Saluda (Henderson County border)	Tryon (South Carolina border)	SUP	
2	Downtown Saluda to Green River Game Lands Separated Bicycle Lanes	Downtown Saluda	Green River Cove Road	SL, SBL	
3	Through Downtown Tryon To NC 8 Southern Highlands Bike Route	NC 108/US 176	New Market Street	SL, SBL	
4	NC 9 - Mill Spring To US 74 Separated Bicycle Lanes	Mill Spring	US 74	SBL	
5	NC Bike Route 2B - Old Fort to Point Lookout Trail	Old Fort	Point Lookout Trail	SL	
6	Old Fort - Catawba Ave Separated Bicycle Lanes	Downtown Old Fort	Catawba River Road	SBL	
7	Old Fort - Mill Creek/Davidson's Fort Greenway	Downtown Old Fort	Davidson's Fort	SUP	
8	Downtown Marion to Catawba River Greenway - Separated Bicycle Lanes	Downtown Marion	Catawba River Greenway	SBL	
9	Downtown Marion - Main St Bike Lane and Shared Lane	Downtown Marion	Georgia Avenue	SL, BL	
10	Marion - Rutherford Rd Separated Bicycle Lanes	Georgia Avenue	Jacktown Road	SBL	
11	Peavine Trail Extension	Southern terminus of existing Peavine Trail	McDowell Technical Community College	SUP	
12	NC 9 - Lake Lure Separated Bicycle Lanes	US 64	Owl Hollow Road	SBL	
13	Purple Martin Greenway/Overmountain Victory Trail to Thermal Belt Trail (North)	Kiwanis Park	Thermal Belt Trail	SUP	
14	Rutherfordton South Main Street Separated Bicycle Lanes	Charlotte Road	Cottage Lane	SBL, BL	
15	Purple Martin Greenway to Thermal Belt Trail Connector	Southern terminus of the Purple Martin Greenway	Thermal Belt Trail	SUP, SBL	
16	Main Street - Rutherfordton to Forest City Separated Bicycle Lanes	Rutherfordton	Forest City	SBL	
17	Isothermal Community College to Downtown Forest City Connector	Isothermal Community College	Downtown Forest City	SUP, SBL	
18	NC 8 Southern Highlands Bike Route - Forest City	Oak Street	Trade Street	SBL	
19	Broad River Greenway Extension	Western terminus of Broad River Greenway	Rutherford County border	SUP	
20	Boiling Springs to the Broad River Greenway - Separated Bicycle Lanes	End of curb and gutter just north of Homestead Avenue	Broad River Greenway	SBL	
21	Cleveland County Rail Trail	Uptown Shelby	South Carolina border	SUP	
22	1st Broad River Greenway to Cleveland County Rail Trail	1st Broad River Greenway	Cleveland County Rail-Trail	BL	
23	Uptown Shelby - Lafayette Street	Graham Street	Cleveland County Rail Trail/Morgan Street	SBL	
24	Shelby to Kings Mountain - US 74 Service Road	Hoey Church Road	Countryside Road	SBL, SUP	
25	Downtown Kings Mountain to the Gateway Trail	Downtown Kings Mountain	Gateway Trail	SBL, SL, SUP	
26	Gateway Trail to Crowders Mountain State Park	Southern terminus of the Gateway Trail/Carolina Thread Trail	Crowders Mountain State Park Boulder Access	SUP	

*Facility Types: Bicycle Lane (BL); Separated Bicycle Lane (SBL); and Shared Use Path (SUP).

Note: Connections are generally within 1.5 miles of the project corridor for a bicycle project, according to NCDOT funding criteria.

	Connects to a Park or Rec Center	Connects to a School or Univ.	Connects to a Municipal, Employment, or Mixed-Use Commercial Center	Connects to a Designated State Bike Route or Regional Trail	Connects to an Existing Trail or Bicycle Facility	In An Adopted Plan	Reported Bicycle Crash Along Route (within 500 feet of corridor)	Uses Existing Public Land or ROW	High Speed Corridor (above 40 MPH)	Supported in Stakeholder & Public Feedback
	✓	✓	✓	✓		✓		✓	✓	✓
	✓	✓	✓	✓	✓	✓			✓	✓
	✓	✓	✓	✓		✓		✓		✓
	✓	✓	✓					✓	✓	✓
	✓	✓	✓	✓	✓	✓		✓	✓	✓
	✓	✓	✓	✓	✓	✓		✓		✓
	✓	✓	✓	✓	✓	✓			✓	✓
	✓	✓	✓	✓	✓	✓		✓	✓	✓
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	✓	✓	✓	✓	✓	✓	✓	✓		✓
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓	✓		✓		✓
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	✓	✓	✓	✓	✓	✓		✓		✓
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	✓	✓	✓	✓	✓	✓	✓	✓		✓
	✓	✓	✓	✓	✓	✓	✓	✓		✓
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	✓	✓		✓		✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓	✓	✓			✓
	✓			✓	✓	✓				✓

1 SALUDA GRADE RAIL TRAIL

Length: 9.3 miles (Saluda to Tryon)

Jurisdictions: City of Saluda, Town of Tryon, Polk County

Trip Generators:

- Downtown Saluda
- Pearson’s Falls
- Melrose Mountain Plant Conservation Preserve - Melrose Falls
- Rogers Park
- Downtown Tryon
- Vaughn Creek Greenway

Support in Other Plans:

- Isothermal Planning & Development Commission Trails Map (2014)
- Resolutions of Support passed by the City of Saluda, Town of Tryon, and City of Landrum
- Landrum, SC Pedestrian Master Plan (2017)

Potential ROW Needs:

- ROW owned by Norfolk Southern

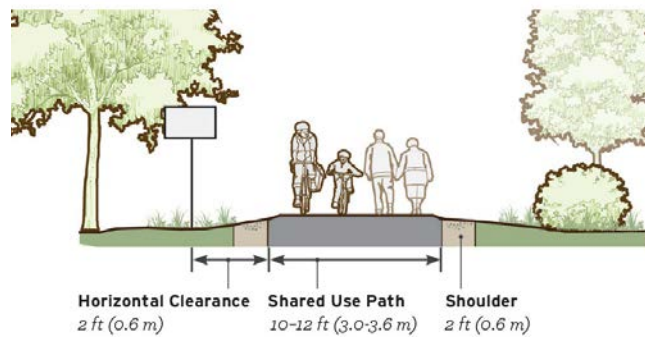
Potential Partnerships:

- City of Saluda
- Saluda Community Land Trust
- Saluda Historic Depot
- Town of Tryon
- Tryon Downtown Development Association
- City of Landrum
- Polk County
- NCDOT

Estimated Construction Costs:

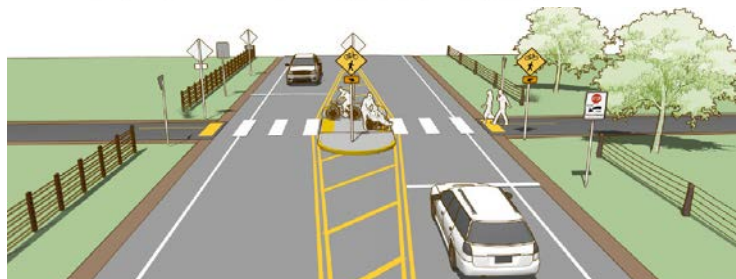
- \$ 11,500,000

DESIGN OPTIONS & CONSIDERATIONS



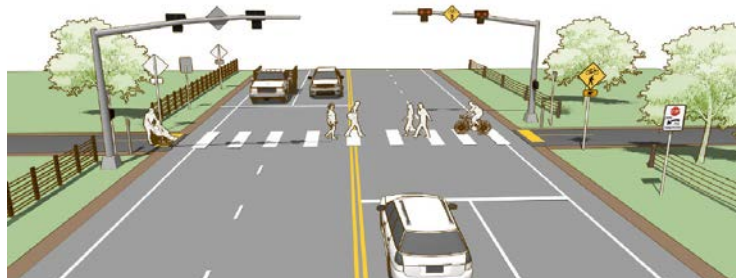
Shared Use Path Example

For design options and further detail, please see the Small Town and Rural Multimodal Network Design Guide at - <http://ruralsdesignguide.com/physically-separated/shared-use-path>.



Intersection Crossing Examples

For design options and further detail, please see the Small Town and Rural Multimodal Network Design Guide at - <http://ruralsdesignguide.com/physically-separated/shared-use-path>.



1 SALUDA GRADE RAIL TRAIL

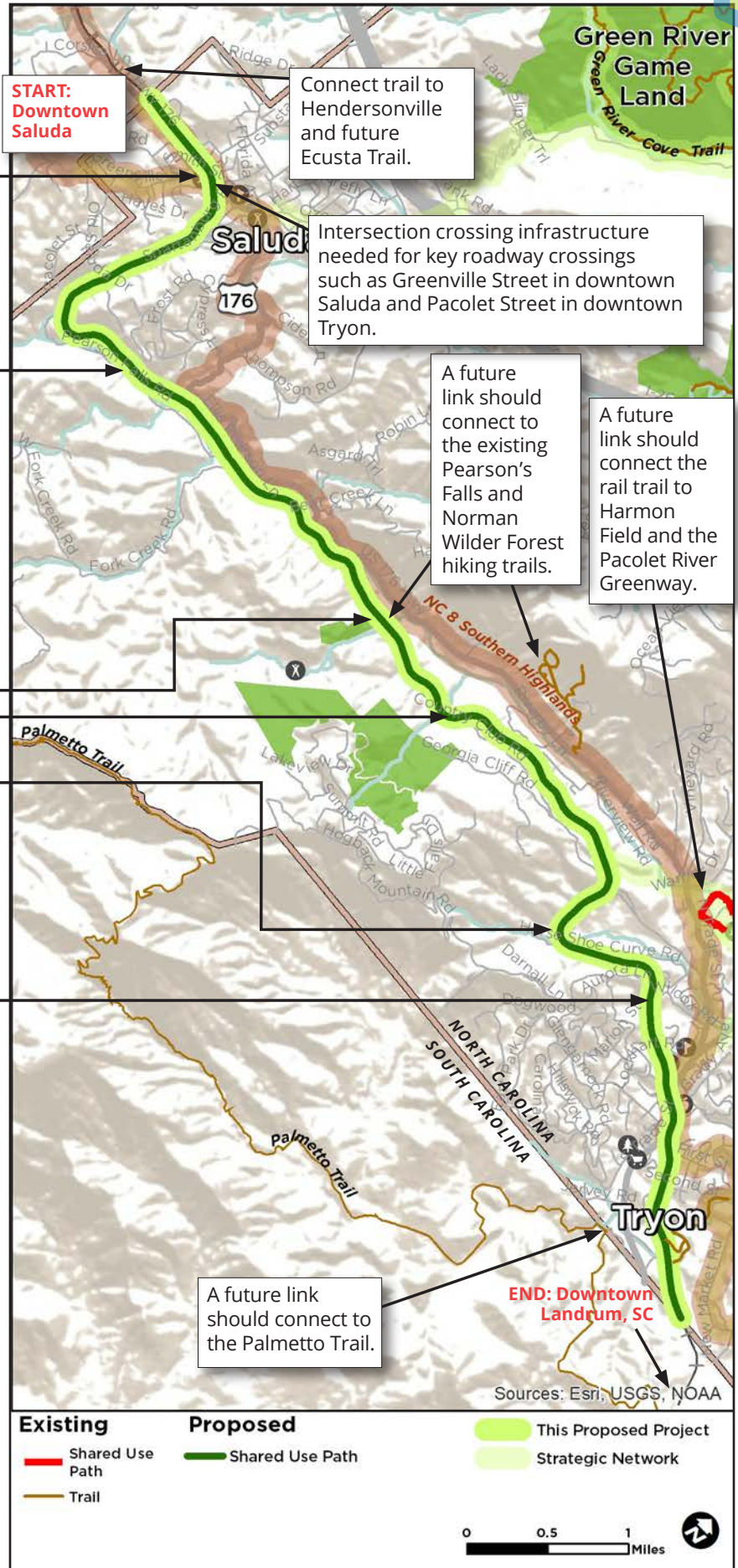
Incorporate rail trail connections into downtown Saluda.

Construct shared use path (rail trail) through downtown Saluda and downtown Tryon (and on to Landrum, SC), following the old Saluda Grade railroad line.

Multiple creek crossings occur along the old rail line, including Joels Creek, North Pacolet River, Big Falls Creek, Little Falls Creek, and Little Creek - existing bridge structures will need engineering assessment.

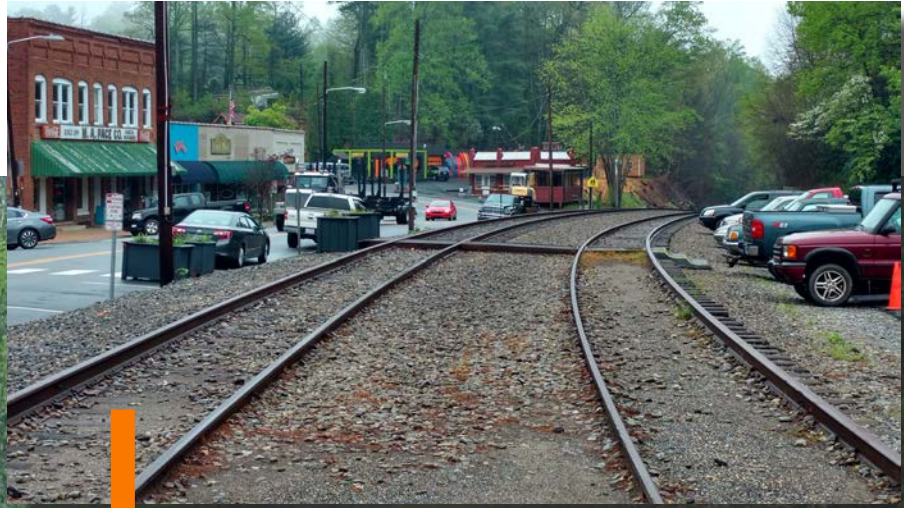
Incorporate rail trail connections into downtown Saluda.

Note: Consider designating the rail trail as NC 8 Southern Highlands Bike Route, shifting NC 8 from US 176 to the rail trail once completed.



SALUDA GRADE RAIL TRAIL (photo simulation, downtown Saluda)





2 DOWNTOWN SALUDA TO GREEN RIVER GAME LANDS SEPARATED BICYCLE LANES

Length: 1.9 miles

Jurisdictions: City of Saluda, Polk County

Trip Generators:

- Downtown Saluda
- Green River Game Lands
- Saluda Elementary School
- NC 8 Southern Highlands Bike Route

Support in Other Plans:

- Polk County CTP (2005)
- Saluda Bicycle and Pedestrian Plan (2016)

Potential ROW Needs:

- None

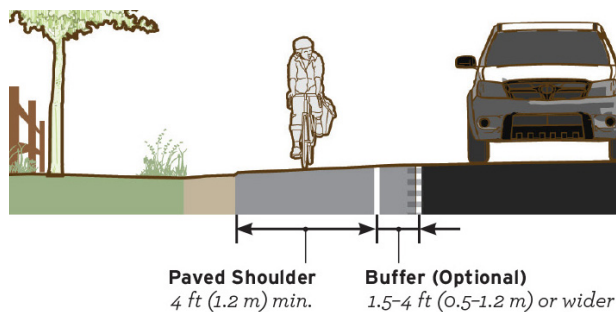
Potential Partnerships:

- City of Saluda
- Downtown businesses
- NCDOT

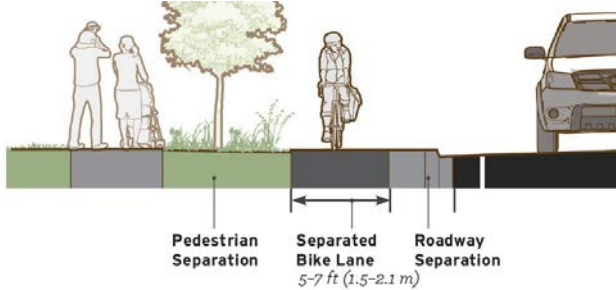
Estimated Construction Costs:

- \$ 2,000,000

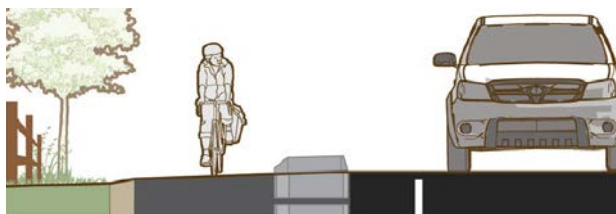
DESIGN OPTIONS & CONSIDERATIONS



While less ideal, construction of paved shoulder can be a significant improvement for bicycle and motorist safety and comfort. Sometimes geographical and/or financial constraints can limit design options. Further detail regarding options for paved shoulder enhancements such as buffer space can be found in the Small Town and Rural Multimodal Network Design Guide at <http://ruralsdesignguide.com/visually-separated/paved-shoulder>.



Several configurations are possible to create physical separation from automobile traffic. These options should be explored during the design phase. See example graphics to the left from the Small Town and Rural Multimodal Network Design Guide. Further detail can be found at - <http://ruralsdesignguide.com/physically-separated/separated-bike-lane>.



Mixed Traffic Example (Shared Lane) - Applicable to the Main St section of this project

For design options and further detail, please see the Small Town and Rural Multimodal Network Design Guide at - <http://ruralsdesignguide.com/mixed-traffic>.

2 DOWNTOWN SALUDA TO GREEN RIVER GAME LANDS SEPARATED BICYCLE LANES

This section of Ozone Drive north of the American Truck Repair driveway (1298 Ozone Dr)/Rug Outlet side street narrows to 28' pavement width in some locations. This section is recommended to be widened to at least 34' to accommodate I-26 entering/exiting truck traffic and include physically separated bicycle facilities, to complete the link to Green River Cove Road and Holbert Cove Road.

Main Street, from Cullipher Street to Ozone Drive, is a two-lane road with 20'-22' pavement width, sidewalk along the north side (with no buffer to street), traffic volumes of 3,000 AADT, and a speed limit that transitions from 20 mph to 35 mph. Ideal bicycle facilities for all ages and abilities would have physical separation from automobile traffic.¹ However, this would require constructing extra roadway width. Without undergoing a significant streetscaping effort linking to downtown Saluda, an effective option for the interim includes shared lane markings along Main Street from Cullipher Street to Ozone Drive, lowering the speed limit to 20 mph for the length of this stretch of roadway, and considering implementing traffic calming measures such as a speed table/raised crossing at the existing Saluda Elementary marked crosswalk.

Main Street, from Carolina Street to Cullipher Street, is a two-lane road with 24'-25' pavement width (not including parallel and angled parking), traffic volumes of 3,000 AADT, and a 20 mph speed limit. Ideal bicycle facilities for all ages and abilities would have physical separation from automobile traffic.¹ However, this would require constructing extra roadway width (railroad may serve as a constraint). Without undergoing a significant streetscaping effort, an effective option for the interim includes shared lane markings through downtown Saluda.

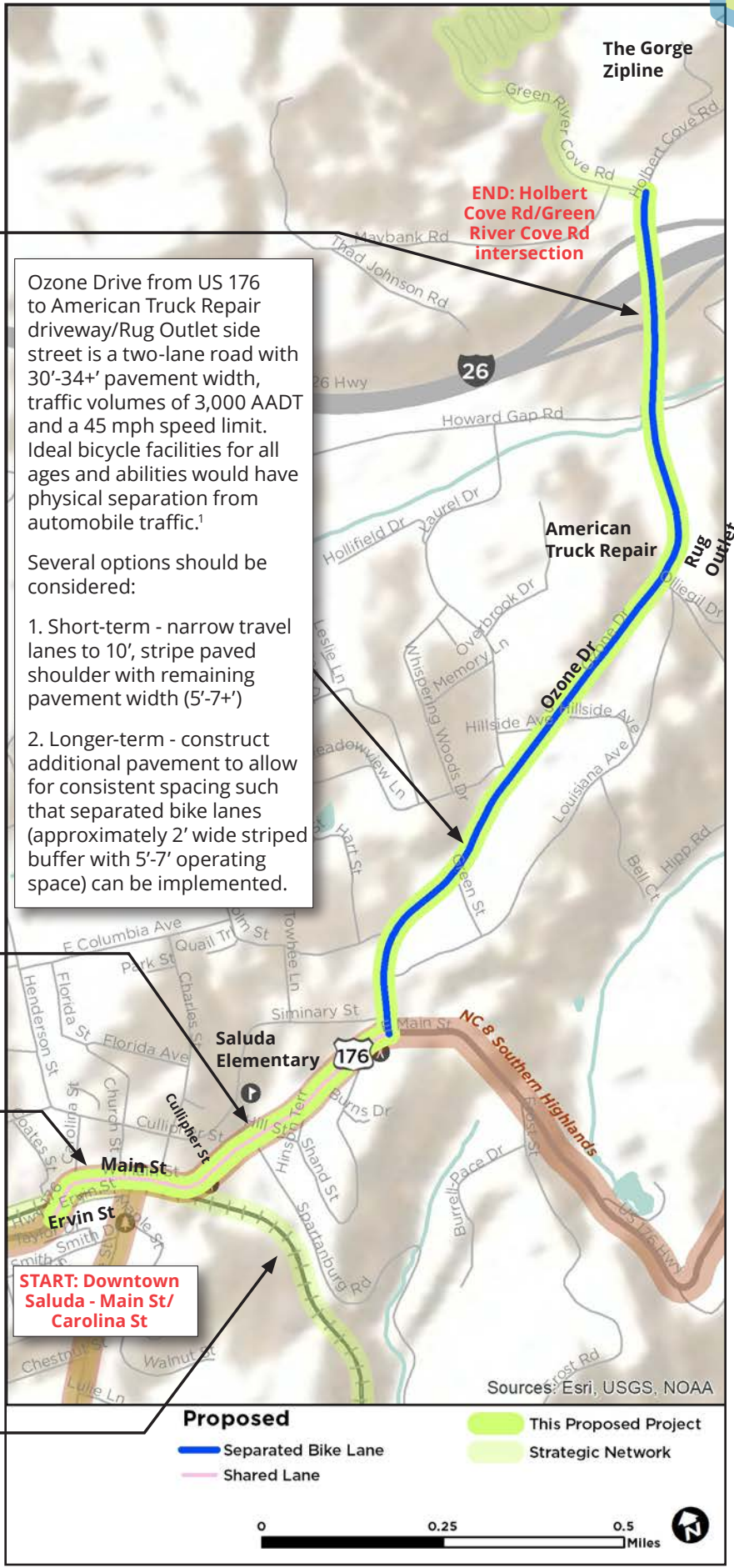
Implementation of the Saluda Grade Rail Trail through downtown Saluda would present numerous connectivity opportunities along Main Street.

Note: Consider designating the rail trail as NC 8 Southern Highlands Bike Route, shifting NC 8 from US 176/Main Street to the rail trail once completed.

Ozone Drive from US 176 to American Truck Repair driveway/Rug Outlet side street is a two-lane road with 30'-34+' pavement width, traffic volumes of 3,000 AADT and a 45 mph speed limit. Ideal bicycle facilities for all ages and abilities would have physical separation from automobile traffic.¹

Several options should be considered:

1. Short-term - narrow travel lanes to 10', stripe paved shoulder with remaining pavement width (5'-7')
2. Longer-term - construct additional pavement to allow for consistent spacing such that separated bike lanes (approximately 2' wide striped buffer with 5'-7' operating space) can be implemented.



1. See Small Town and Rural Multimodal Network Design Guide. ruraldesignguide.com



3 THROUGH DOWNTOWN TRYON TO NC 8 SOUTHERN HIGHLANDS BIKE ROUTE

Length: 0.5 miles

Jurisdictions: Town of Tryon

Trip Generators:

- Downtown Tryon
- Harmon Field
- NC 8 Southern Highlands Bike Route
- Ziglar Field
- Vaughn Creek Greenway

Support in Other Plans:

- Polk County CTP (2005)
- Isothermal Planning & Development Commission Trails Map (2014)

Potential ROW Needs:

- None

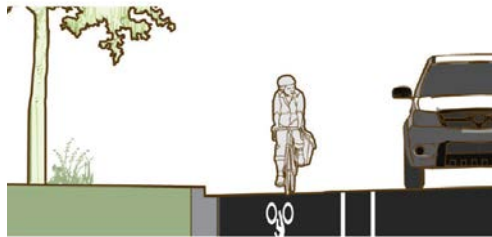
Potential Partnerships:

- Town of Tryon
- Tryon Downtown Development Association
- NCDOT

Estimated Construction Costs:

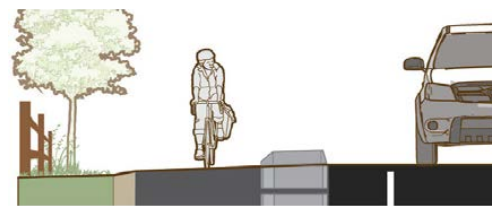
- \$ 75,000

DESIGN OPTIONS & CONSIDERATIONS



Visually Separated Example (used for N. Trade St cost estimate)

While less ideal, construction of a bicycle lane with a painted buffer rather than a physical buffer can be a significant improvement for bicycle and motorist safety and comfort, while still reserving space for constructing a physical buffer in the future. Further detail regarding visually separated bike lanes can be found in the Small Town and Rural Multimodal Network Design Guide at <http://ruraldesignguide.com/visually-separated/bike-lane>.



Physically Separated Example

Several configurations are possible to create physical separation from automobile traffic. These options should be explored during the design phase. See example graphic to the left from the Small Town and Rural Multimodal Network Design Guide. Further detail can be found at - <http://ruraldesignguide.com/physically-separated/separated-bike-lane>.



Mixed Traffic Example (Shared Lane) - Applicable to the downtown Trade St (south of Howard St) section of this project

For design options and further detail, please see the Small Town and Rural Multimodal Network Design Guide at - <http://ruraldesignguide.com/mixed-traffic>.

3 DOWNTOWN TRYON - NC 8 SOUTHERN HIGHLANDS BIKE ROUTE (MULTIPLE FACILITY TYPES)

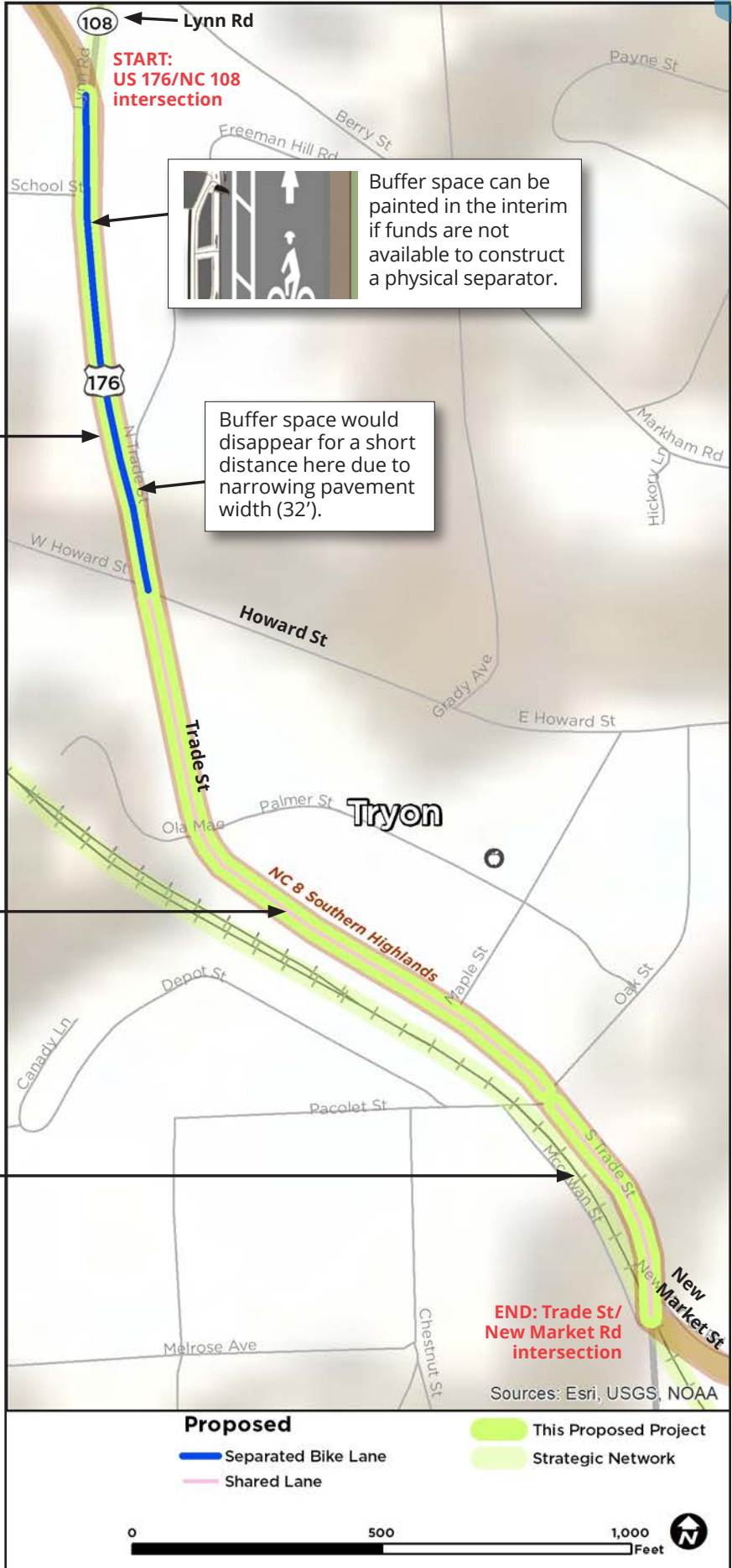
Trade Street, from the Lynn Road intersection to Howard Street has 32'-40' pavement width, traffic volumes of 7,000 AADT and has a 35 mph speed limit. Ideal bicycle facilities for all ages and abilities would have physical separation from automobile traffic.¹

On this section of Trade Street, separated bicycle lanes are recommended in each direction that include a 2'-3' buffer and 5'-7' bike lane.

Trade Street, from Howard St to New Market Street, is a two-lane road with 27-30+' pavement width (not including parallel and angled parking), traffic volumes of 6,000-7,000 AADT and a 20 mph speed limit. Ideal bicycle facilities for all ages and abilities would have physical separation from automobile traffic.¹ However, this would require constructing extra road width. Without widening the road, an effective option for the interim includes shared lane markings.

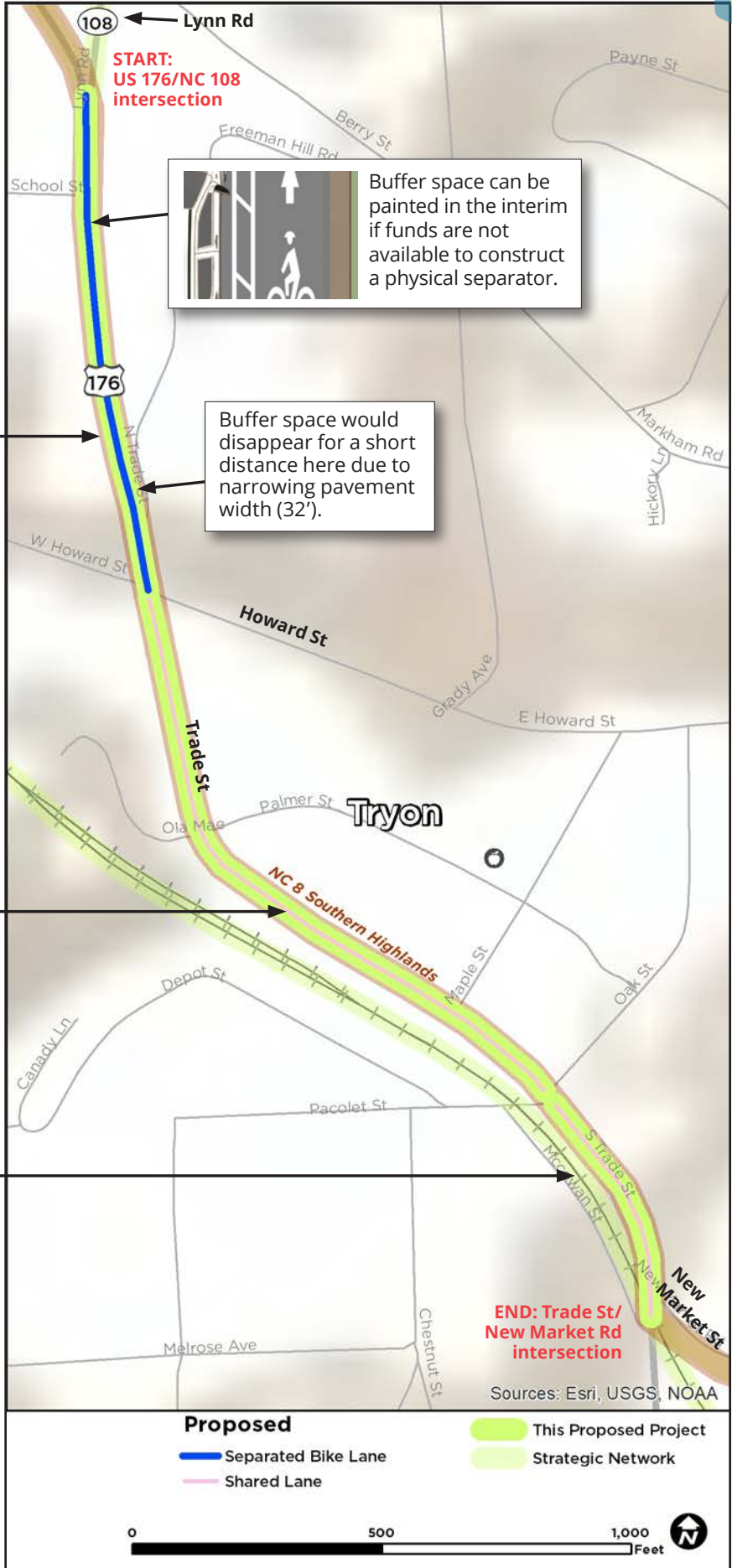
Implementation of the Saluda Grade Rail Trail through downtown Tryon would present numerous connectivity opportunities along Trade Street.

Note: Consider designating the rail trail as NC 8 Southern Highlands Bike Route, shifting NC 8 from US 176/Trade Street to the rail trail once completed.



Buffer space can be painted in the interim if funds are not available to construct a physical separator.

Buffer space would disappear for a short distance here due to narrowing pavement width (32').



1. See Small Town and Rural Multimodal Network Design Guide. ruraldesignguide.com

4 NC 9 - MILL SPRING TO US 74 SEPARATED BICYCLE LANES

Length: 3.1 miles

Jurisdictions: Polk County

Trip Generators:

- Mill Spring community and commercial area
- Polk County Recreation Complex
- Searcy Park
- Polk Central Elementary School
- Polk County Middle School
- Tryon International Equestrian Center

Support in Other Plans:

- STIP (R-5840)

Potential ROW Needs:

- Likely little to no ROW needs - most of this section currently has 22' pavement width and 60' existing ROW

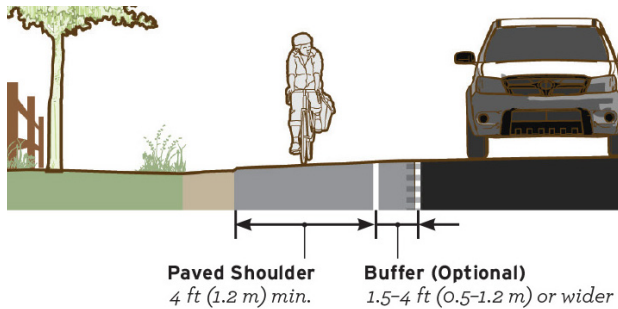
Potential Partnerships:

- Tryon International Equestrian Center
- Polk County
- NCDOT

Estimated Construction Costs:

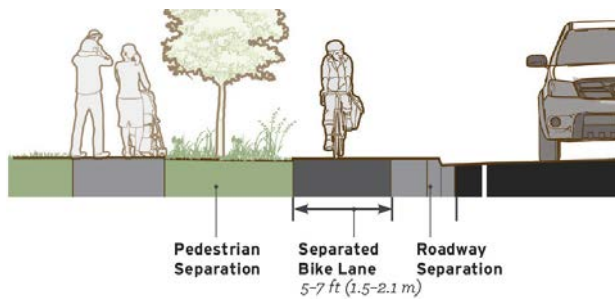
- \$ 7,700,000

DESIGN OPTIONS & CONSIDERATIONS



Visually Separated Example (used for cost estimate)

While less ideal, construction of paved shoulder can be a significant improvement for bicycle and motorist safety and comfort. Sometimes geographical and/or financial constraints can limit design options. Further detail regarding options for paved shoulder enhancements such as buffer space can be found in the Small Town and Rural Multimodal Network Design Guide at <http://ruralsdesignguide.com/visually-separated/paved-shoulder>.



Physically Separated Examples

Several configurations are possible to create physical separation from automobile traffic. These options should be explored during the design phase. See example graphics to the left from the Small Town and Rural Multimodal Network Design Guide. Further detail can be found at - <http://ruralsdesignguide.com/physically-separated/separated-bike-lane>.

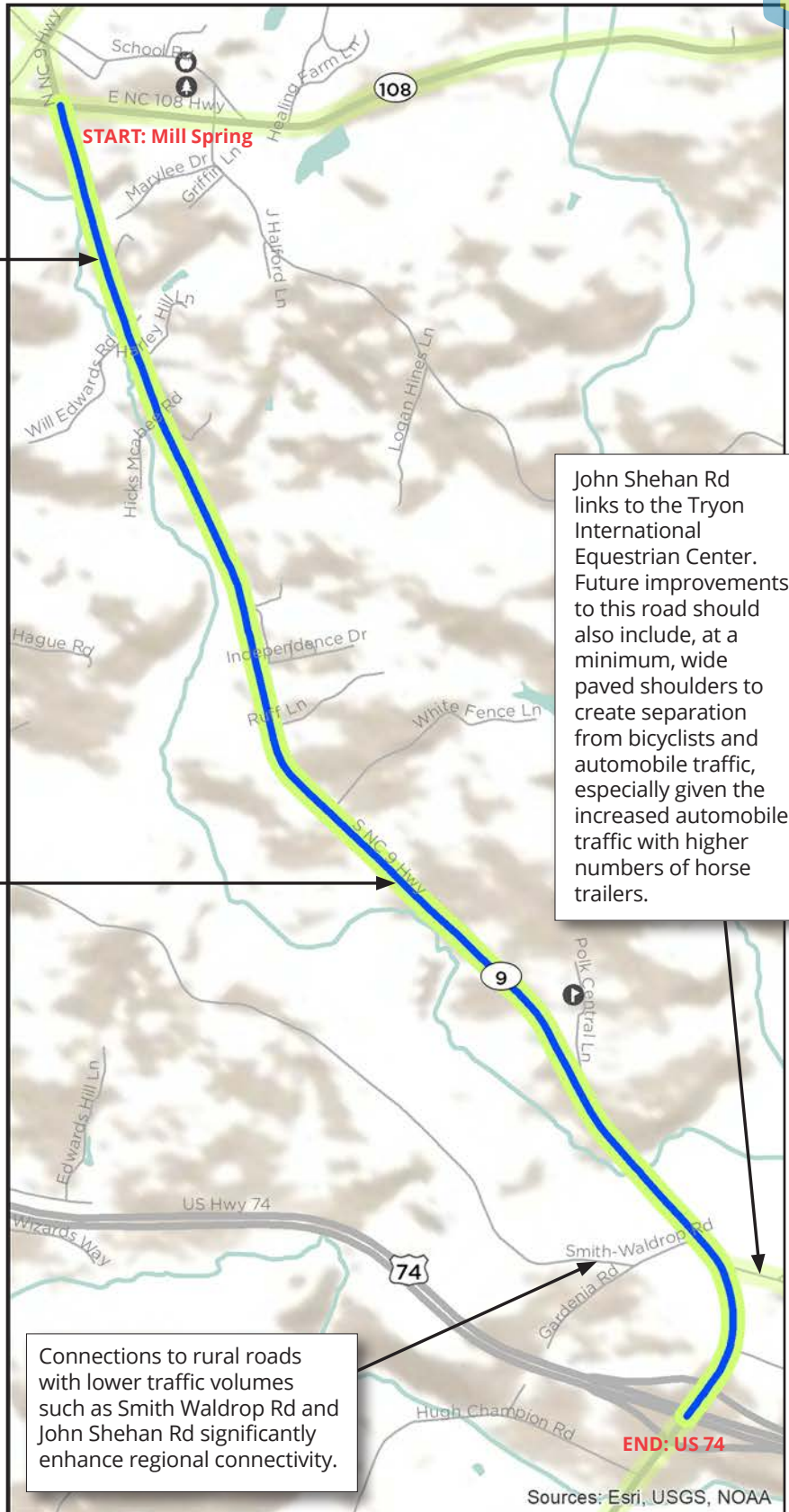
4 NC 9 - MILL SPRING TO US 74 SEPARATED BICYCLE LANES

Significant grading would be needed for approximately 600 feet along this section.

NC 9, from NC 108 in Mill Spring to US 74, has traffic volumes between 2,400 and 3,000 AADT and a 45-55 mph speed limit. Ideal bicycle facilities for all ages and abilities would have physical separation from automobile traffic.¹

In the 2018-2027 STIP, this project is programmed to include paved shoulders, with construction scheduled for 2021 - if paved shoulders are to be implemented, the minimum recommended paved shoulder width is 4-7 ft. It is also recommended to use enhanced longitudinal markings (wide solid white lines or buffer areas) to enhance visual separation.

If edge line rumble strips are to be implemented, bicycle tolerable designs can minimize impacts to bicyclists.



John Shehan Rd links to the Tryon International Equestrian Center. Future improvements to this road should also include, at a minimum, wide paved shoulders to create separation from bicyclists and automobile traffic, especially given the increased automobile traffic with higher numbers of horse trailers.

Connections to rural roads with lower traffic volumes such as Smith Waldrop Rd and John Shehan Rd significantly enhance regional connectivity.

Sources: Esri, USGS, NOAA

Proposed

- Separated Bike Lane
- This Proposed Project
- Strategic Network



1. See Small Town and Rural Multimodal Network Design Guide. ruralsdesignguide.com

5 NC BIKE ROUTE 2B - OLD FORT TO POINT LOOKOUT TRAIL

Length: 3.1 miles

Jurisdictions: Town of Old Fort, McDowell County

Trip Generators:

- Downtown Old Fort
- NC Bike Route 2B
- Fonta Flora State Trail
- Point Lookout Trail
- Kitsuma Peak/Youngs Ridge Trail
- Old Fort Picnic Area
- Pisgah National Forest
- Town of Black Mountain
- Fonta Flora State Trail

Support in Other Plans:

- Walk/Bike NC (2013)
- Old Fort Pedestrian Plan (2011)
- Mill Creek Greenway Master Plan (2010)
- McDowell County CTP (2010)
- Isothermal Planning & Development Commission Trails Map (2014)
- Fonta Flora State Trail Master Plan (Ongoing)

Potential ROW Needs:

- None

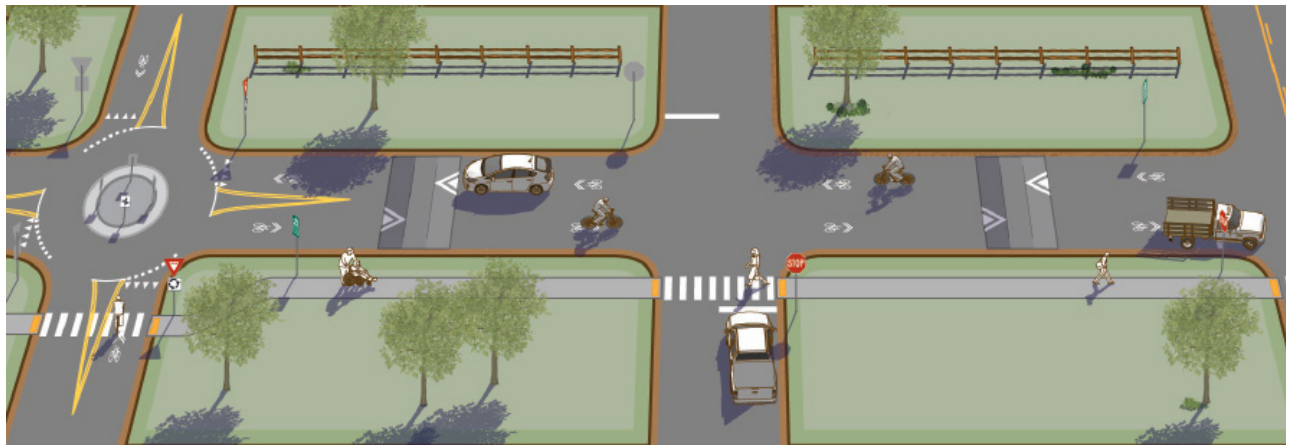
Potential Partnerships:

- Town of Old Fort
- McDowell County
- NCDOT
- Downtown businesses
- McDowell Trails Association
- Pisgah National Forest - Grandfather Ranger District
- North Carolina State Parks
- Duke Energy

Estimated Construction Costs:

- \$ 63,000

DESIGN OPTIONS & CONSIDERATIONS



Mixed Traffic Example (Shared Lane)

For design options and further detail, please see the Small Town and Rural Multimodal Network Design Guide at - <http://ruraldesignguide.com/mixed-traffic>.

5 NC BIKE ROUTE 2B - OLD FORT TO POINT LOOKOUT TRAIL

Connect to the Old Fort Picnic Area and the Kitsuma Peak/Youngs Ridge Trail.

Long-term, construct mountain bike trail along Mill Creek between Old Fort and the Point Lookout Trail.

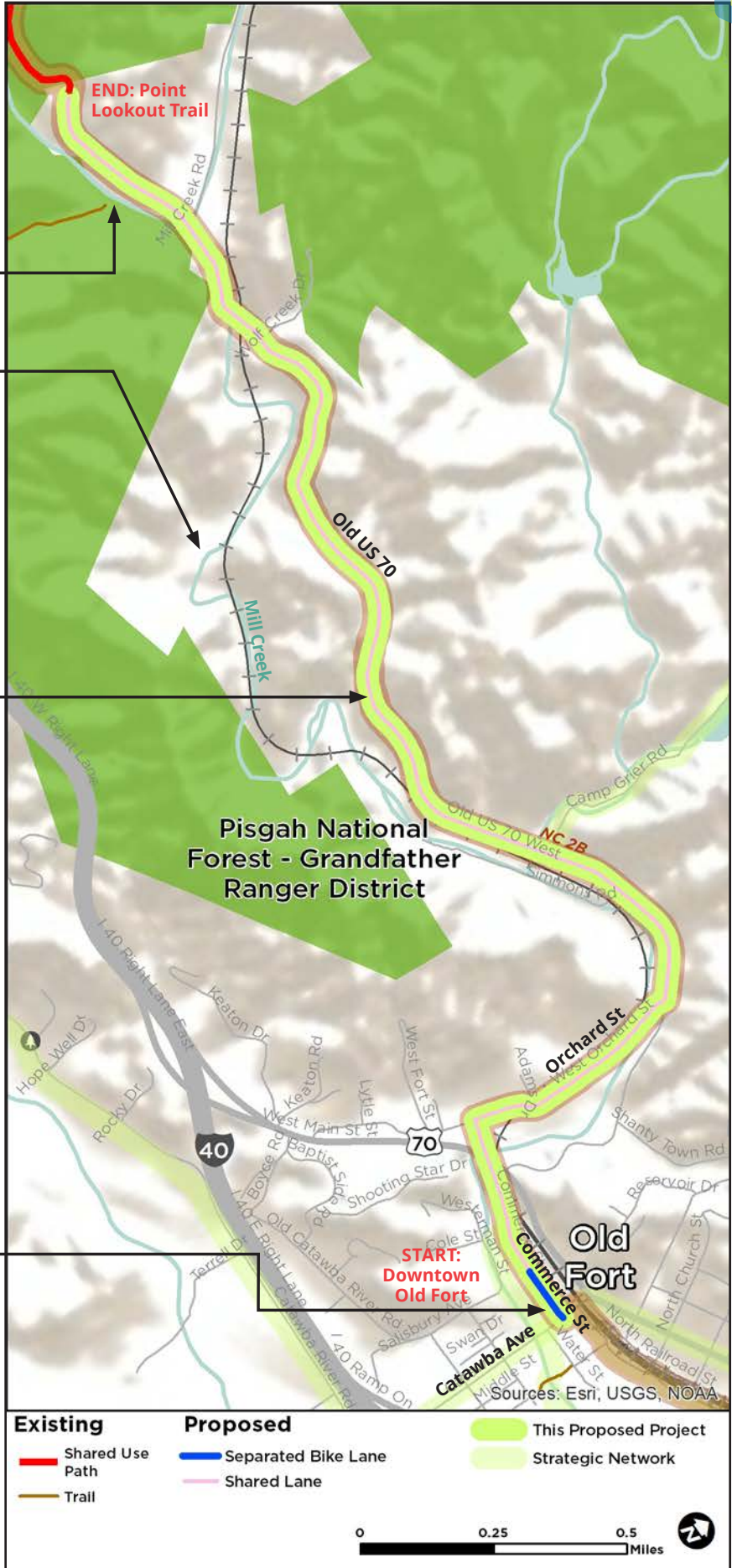
Commerce Street, Orchard Street, and Old US 70, from 500 feet west of Catawba Avenue to the Point Lookout Trail, is currently a two-lane road with 17'-18' pavement width and traffic volumes of 300-600 AADT. Between downtown Old Fort and the Point Lookout Trail, implement shared lane markings (sharrows) and signage that highlights the downtown Old Fort-Point Lookout Trail link, NC Bike Route 2B signage, and signage stating 4' between automobiles and bicyclists when passing as required by NC law. The posted speed limit is recommended to be lowered to 25 mph.

In the long-term, when this stretch of roadway is improved and if constraints allow, widen the roadway to include advisory shoulders.

Commerce Street, from Catawba Avenue to 500 feet west of Catawba Avenue, is a two-lane road with 30'-34' pavement width, and traffic volumes of 300-600 AADT.

Stripe 5'-7' bike lanes along this section with 10' travel lanes for automobile traffic. Lower the posted speed limit to 20 mph.

Note: This section is recommended to be designated as NC 2B as part of the state bike route system and should be considered as part of the Fonta Flora State Trail as well.



**6 OLD FORT - CATAWBA AVE
SEPARATED BICYCLE LANES**

Length: 0.5 miles

Jurisdictions: Town of Old Fort

Trip Generators:

- Downtown Old Fort
- NC Bike Route 2B
- Fonta Flora State Trail
- Mill Creek
- Catawba Falls
- Point Lookout Trail
- Kitsuma Peak/Youngs Ridge Trail
- Old Fort Picnic Area
- Pisgah National Forest
- Fonta Flora State Trail

Support in Other Plans:

- Old Fort Pedestrian Plan (2011)
- McDowell County CTP (2010)
- Isothermal Planning & Development Commission Trails Map (2014)

Potential ROW Needs:

- None

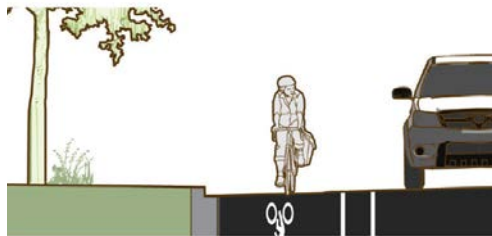
Potential Partnerships:

- Town of Old Fort
- McDowell County
- NCDOT
- Downtown businesses
- McDowell Trails Association

Estimated Construction Costs:

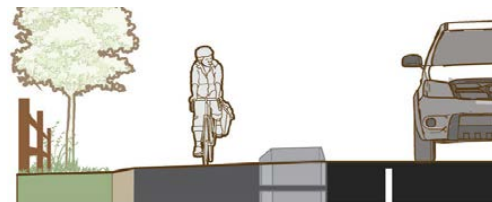
- \$ 500,000

DESIGN OPTIONS & CONSIDERATIONS



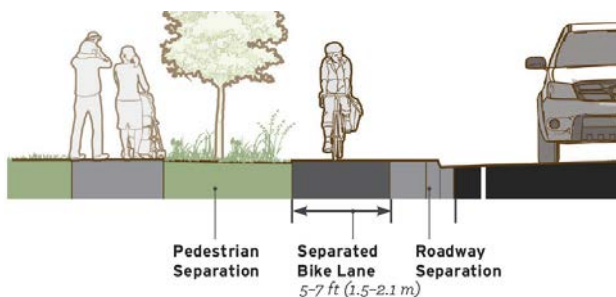
Visually Separated Example (used for section from Main St and Water St for cost estimate)

While less ideal, construction of a bicycle lane with a painted buffer rather than a physical buffer can be a significant improvement for bicycle and motorist safety and comfort, while still reserving space for constructing a physical buffer in the future. Further detail regarding visually separated bike lanes can be found in the Small Town and Rural Multimodal Network Design Guide at <http://ruraldesignguide.com/visually-separated/bike-lane>.



Physically Separated Examples (top example used for section between Water St and I-40 cost estimate; bottom example use for I-40 to Catawba River Rd cost estimate)

Several configurations are possible to create physical separation from automobile traffic. These options should be explored during the design phase. See example graphics to the left from the Small Town and Rural Multimodal Network Design Guide. Further detail can be found at - <http://ruraldesignguide.com/physically-separated/separated-bike-lane>.



6 OLD FORT - CATAWBA AVE SEPARATED BICYCLE LANES

Commerce Street/NC Bike Route 2B links to the Point Lookout Trail and Black Mountain.

Catawba Avenue, from Main Street to the I-40 ramps, is a four-lane road with 50'-52' pavement width, traffic volumes of 5,000-6,000 AADT and a 30 mph speed limit. Ideal bicycle facilities for all ages and abilities would have physical separation from automobile traffic.¹

Catawba Ave is recommended to be converted from four travel lanes to three (two travel lanes with a center turn lane), with separated bicycle lanes in each direction. Catawba Avenue's width, relative lower traffic volumes, connectivity through downtown Old Fort, and regional connectivity potential make this road a great candidate for lane narrowing. Bike lanes are recommended to include a 2'-3' buffer and 6'-7' for the operating space for bicyclists.

Catawba Avenue, between the I-40 ramps (and under I-40), is a two-lane road with a narrow pavement width of 25'-27' (widens briefly under the actual I-40 bridge), traffic volumes of 7,000 AADT and a 35 mph speed limit. Ideal bicycle facilities for all ages and abilities would have physical separation from automobile traffic.¹

Ideally, physically separated bike lanes (with parallel sidewalks) would include constructing a 2'-3' physical buffer and 6'-7' of operating space for bicyclists on each side of the roadway. This would require pavement widening. If a physical buffer cannot be constructed at this time, an enhanced shoulder/bike lane with potential for constructing a vertical separator is an option.

The bike lanes should connect to Catawba River Road, which connects to a local park (1 mile) and Catawba Falls (3 miles).



1. See Small Town and Rural Multimodal Network Design Guide. ruralsdesignguide.com

7 OLD FORT - MILL CREEK/DAVIDSON'S FORT GREENWAY

Length: 1 mile

Jurisdictions: Town of Old Fort, McDowell County

Trip Generators:

- Downtown Old Fort
- NC Bike Route 2B
- Mill Creek
- Old Fort Elementary School
- Davidson's Fort Historic Park
- Point Lookout Trail
- Kitsuma Peak/Youngs Ridge Trail
- Old Fort Picnic Area
- Pisgah National Forest
- Fonta Flora State Trail

Support in Other Plans:

- Old Fort Pedestrian Plan (2011)
- Mill Creek Greenway Master Plan (2010)
- McDowell County CTP (2010)
- Isothermal Planning & Development Commission Trails Map (2014)
- Fonta Flora State Trail Master Plan (Ongoing)

Potential ROW Needs:

- Most of the ROW needs would be for the section of greenway west of Catawba Avenue.

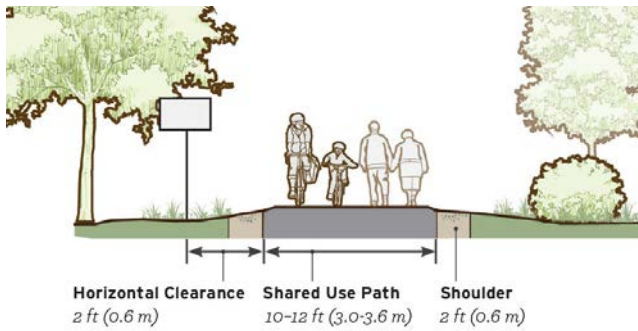
Potential Partnerships:

- Town of Old Fort
- McDowell County
- NCDOT
- Downtown businesses
- McDowell Trails Association
- McDowell County Public Schools
- Davidson's Fort Historic Park
- North Carolina State Parks
- Duke Energy

Estimated Construction Costs:

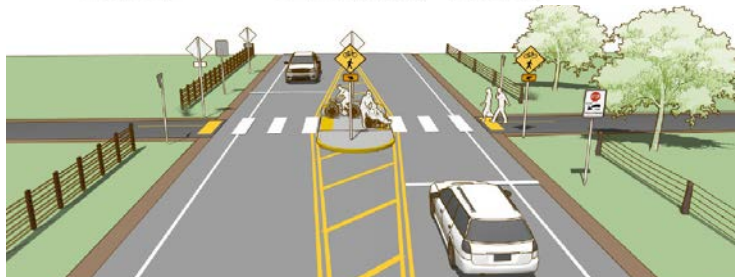
- \$ 2,300,000

DESIGN OPTIONS & CONSIDERATIONS



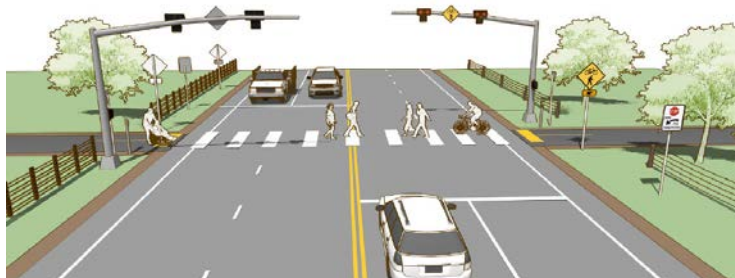
Shared Use Path Example

For design options and further detail, please see the Small Town and Rural Multimodal Network Design Guide at - <http://ruraldesignguide.com/physically-separated/shared-use-path>.



Intersection Crossing Examples

For design options and further detail, please see the Small Town and Rural Multimodal Network Design Guide at - <http://ruraldesignguide.com/physically-separated/shared-use-path>.

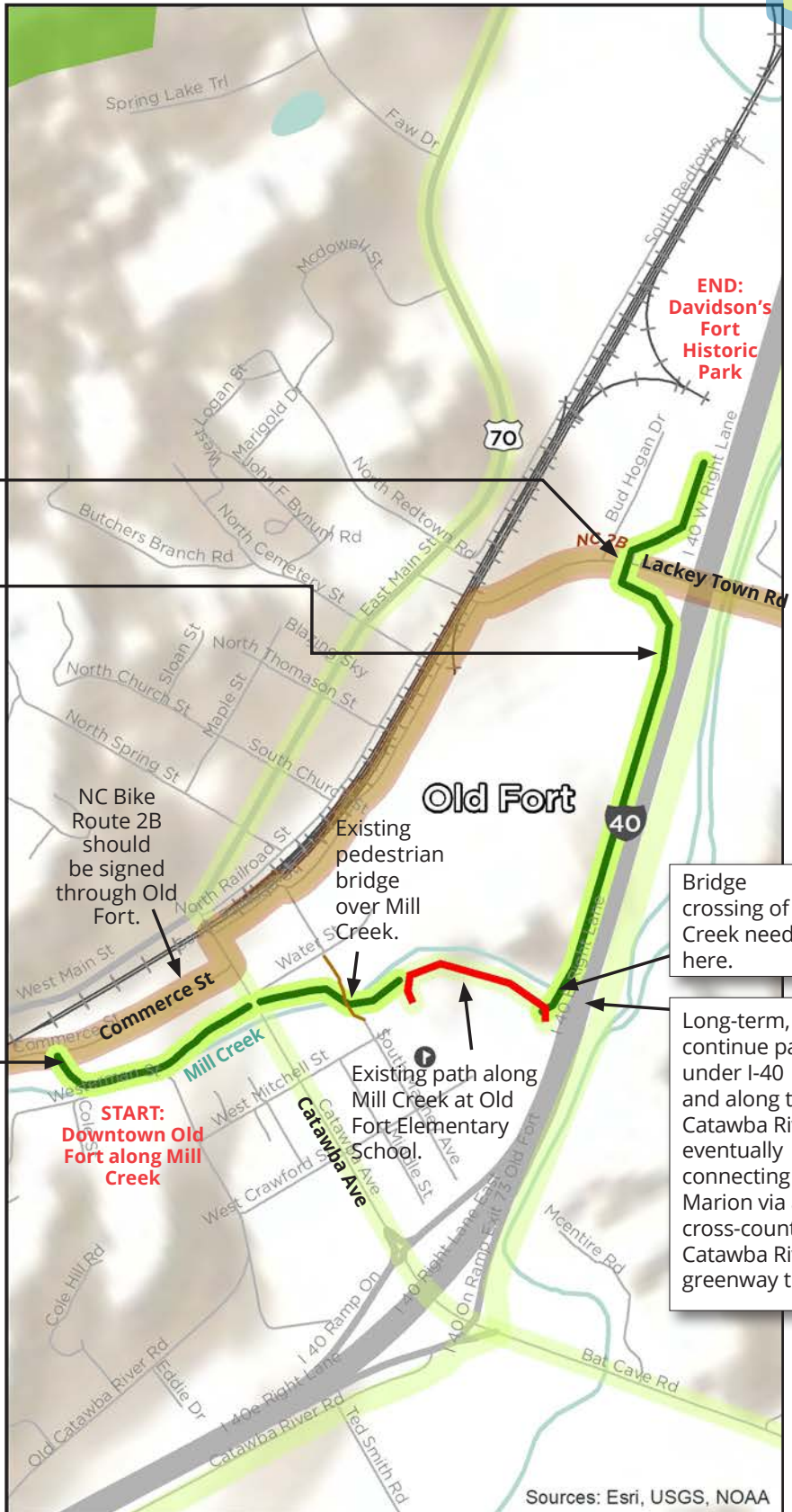


**7 OLD FORT - MILL CREEK/
DAVIDSON'S FORT
GREENWAY**

An at-grade greenway crossing of Lackey Town Road would likely need to be constructed here at the Davidson's Fort Historic Park entrance.

Construct shared use path (greenway) from Davidson's Fort Historic Park to the existing path at Old Fort Elementary School.

Construct shared use path (greenway) from the existing path at Old Fort Elementary School to Commerce Street west of downtown. This segment could be constructed as part of future development along the north side of Mill Creek. The space between the existing buildings and creek is limited. An on-road alternative to this greenway connection could include Commerce Street, Catawba Avenue, Water Street, and the existing sidewalk bridge over Mill Creek.



**END:
Davidson's
Fort
Historic
Park**

Old Fort

NC Bike Route 2B should be signed through Old Fort.

Existing pedestrian bridge over Mill Creek.

Bridge crossing of Mill Creek needed here.

Long-term, continue path under I-40 and along the Catawba River, eventually connecting to Marion via a cross-county Catawba River greenway trail.

**START:
Downtown Old
Fort along Mill
Creek**

Existing path along Mill Creek at Old Fort Elementary School.

Sources: Esri, USGS, NOAA

Existing		Proposed	
	Shared Use Path		Shared Use Path
	Trail		Strategic Network

0 0.25 0.5 Miles

Note: This section is recommended to be designated as part of the Fonta Flora State Trail.

8 DOWNTOWN MARION TO CATAWBA RIVER GREENWAY - SEPARATED BICYCLE LANES

Length: 2 miles

Jurisdictions: City of Marion, McDowell County

Trip Generators:

- Downtown Marion
- Peavine Trail
- Catawba River Greenway
- McDowell High School
- Businesses in north Marion
- Fonta Flora State Trail

Support in Other Plans:

- Marion Bicycle Plan (2016)
- Isothermal Planning & Development Commission Trails Map (2014)
- Fonta Flora State Trail Master Plan (Ongoing)

Potential ROW Needs:

- None

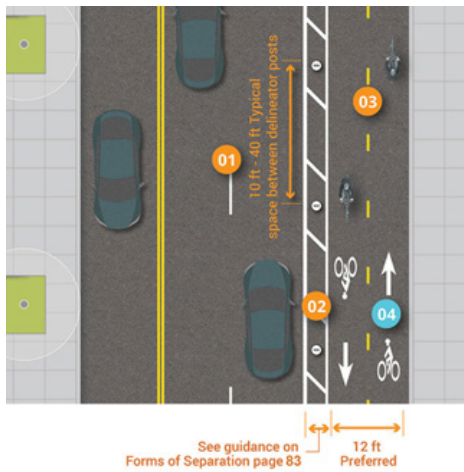
Potential Partnerships:

- City of Marion
- McDowell County
- NCDOT
- Downtown businesses
- McDowell Trails Association
- Businesses in north Marion
- North Carolina State Parks
- Duke Energy

Estimated Construction Costs:

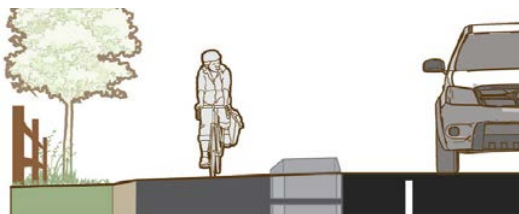
- \$ 560,000

DESIGN OPTIONS & CONSIDERATIONS



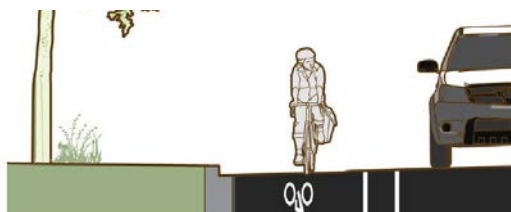
Physically Separated (Two-Way Cycle Track) Example (used for cost estimate)

For design options and further detail, please see the Separated Bike Lane Planning and Design Guide at - https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/page07.cfm#chapter5_dir.



Physically Separated Example

Several configurations are possible to create physical separation from automobile traffic. These options should be explored during the design phase. See example graphics to the left from the Small Town and Rural Multimodal Network Design Guide. Further detail can be found at - <http://ruraldesignguide.com/physically-separated/separated-bike-lane>.



Visually Separated Example

While less ideal, construction of a bicycle lane with a painted buffer rather than a physical buffer can be a significant improvement for bicycle and motorist safety and comfort, while still reserving space for constructing a physical buffer in the future. Further detail regarding visually separated bike lanes can be found in the Small Town and Rural Multimodal Network Design Guide at <http://ruraldesignguide.com/visually-separated/bike-lane>.

8 DOWNTOWN MARION TO CATAWBA RIVER GREENWAY - SEPARATED BICYCLE LANES

Finish the critical link to the Catawba River Greenway trailhead with a short shared use path.

North Main Street, from Viewpoint Drive to US 70 is a five-lane road with 64'-66' pavement width. Physical separation for bicyclists from automobile traffic is recommended¹, due to traffic volumes that are between 14,000 and 16,000 AADT with a 35-45 mph speed limit.

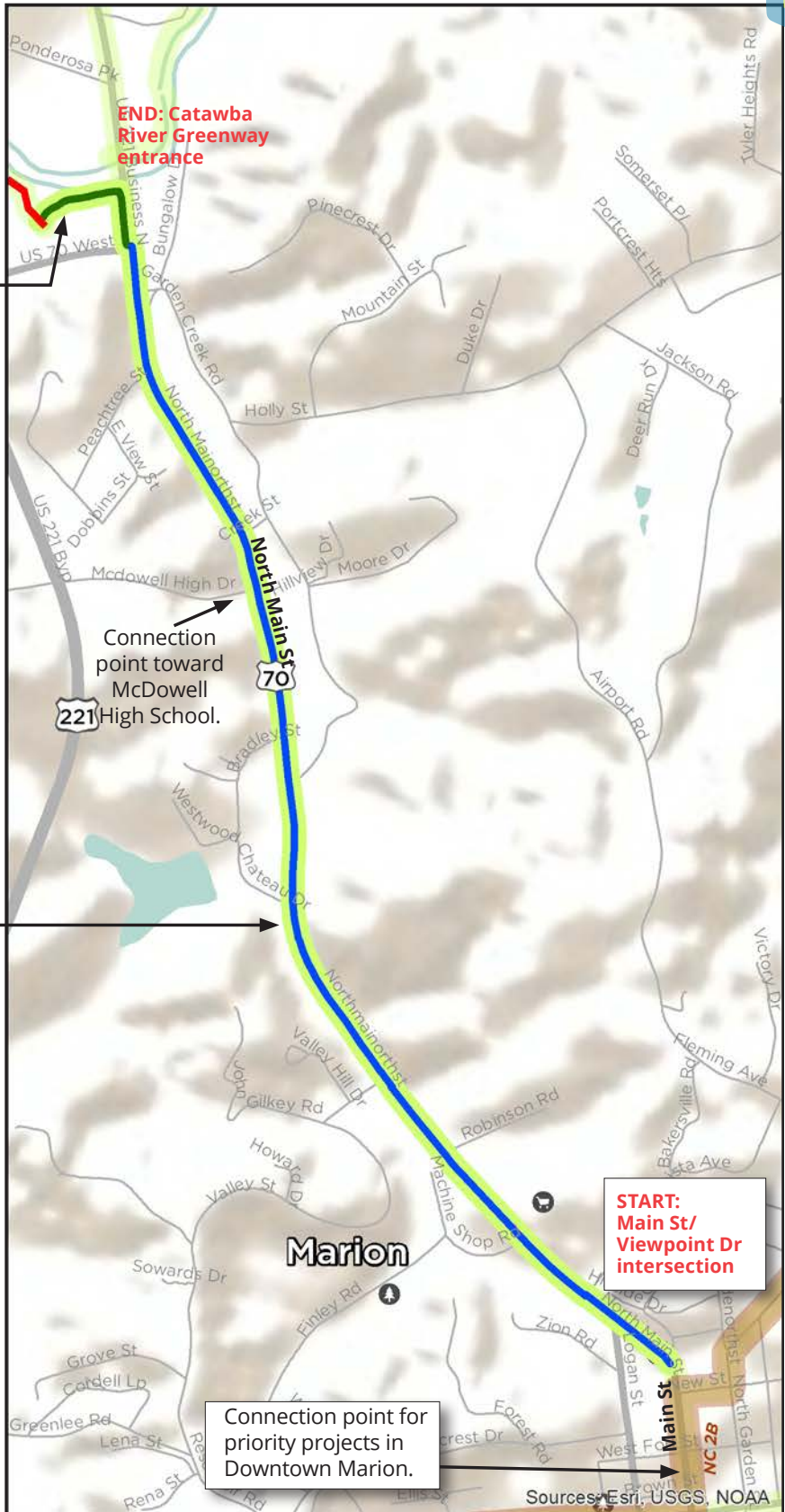
Improvements to this section should be further analyzed as part of a detailed corridor study, because of the pattern of development, number of businesses, driveway frequencies, and lack of shade trees along this roadway section.

One alternative is to utilize the extra pavement width by constructing a two-way cycle track on the west side of the road, allowing 12'-14' for the cycle track operating space and buffer space, and 52'-54' feet for the five lanes of automobile travel. Additional buffer space is recommended and could be created by reconfiguring the roadway space from 5-lanes to 4.

Another option could include reconfiguring roadway space from 5-lanes to 4 or 3 lanes - this would allow for physically separated bike lanes on both sides of the street.

For either option, access management of driveways is recommended, due to the driveway frequency on the west side of the road.

Due to the speed and volume of traffic, a wide physical buffer space (3'-6') is recommended along with a vertical barrier to make this corridor significantly more comfortable for all users.



Connection point toward McDowell High School.

Connection point for priority projects in Downtown Marion.

START: Main St/ Viewpoint Dr intersection

Existing	Proposed	
Shared Use Path	Shared Use Path	This Proposed Project
	Separated Bike Lane	Strategic Network

Note: This section should be considered as part of the Fonta Flora State Trail (Fonta Flora State Trail corridor study from Burke County to Marion underway at the time of this writing).

¹ See Small Town and Rural Multimodal Network Design Guide. ruraldesignguide.com

9 DOWNTOWN MARION - MAIN ST BIKE LANE AND SHARED LANE

Length: 1.1 miles

Jurisdictions: City of Marion

Trip Generators:

- Downtown Marion
- NC Bike Route 2B
- Peavine Trail
- Catawba River Greenway
- Businesses in south Marion
- Fonta Flora State Trail

Support in Other Plans:

- Marion Bicycle Plan (2016)
- Isothermal Planning & Development Commission Trails Map (2014)

Potential ROW Needs:

- None

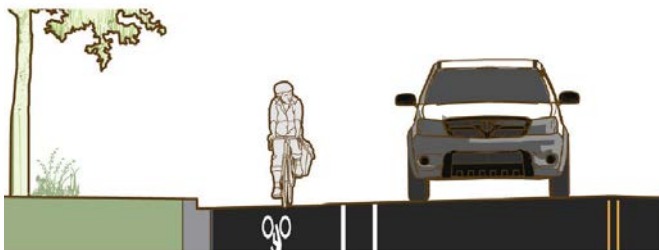
Potential Partnerships:

- City of Marion
- NCDOT
- Downtown businesses
- McDowell Trails Association
- Businesses in south Marion

Estimated Construction Costs:

- \$ 56,000

DESIGN OPTIONS & CONSIDERATIONS



Visually Separated Example

For the uphill portion with a painted bike lane - While less ideal, construction of a bicycle lane with a painted buffer rather than a physical buffer can be a significant improvement for bicycle and motorist safety and comfort, while still reserving space for constructing a physical buffer in the future. Further detail regarding visually separated bike lanes can be found in the Small Town and Rural Multimodal Network Design Guide at <http://ruraldesignguide.com/visually-separated/bike-lane>.



Mixed Traffic Example (Shared Lane)

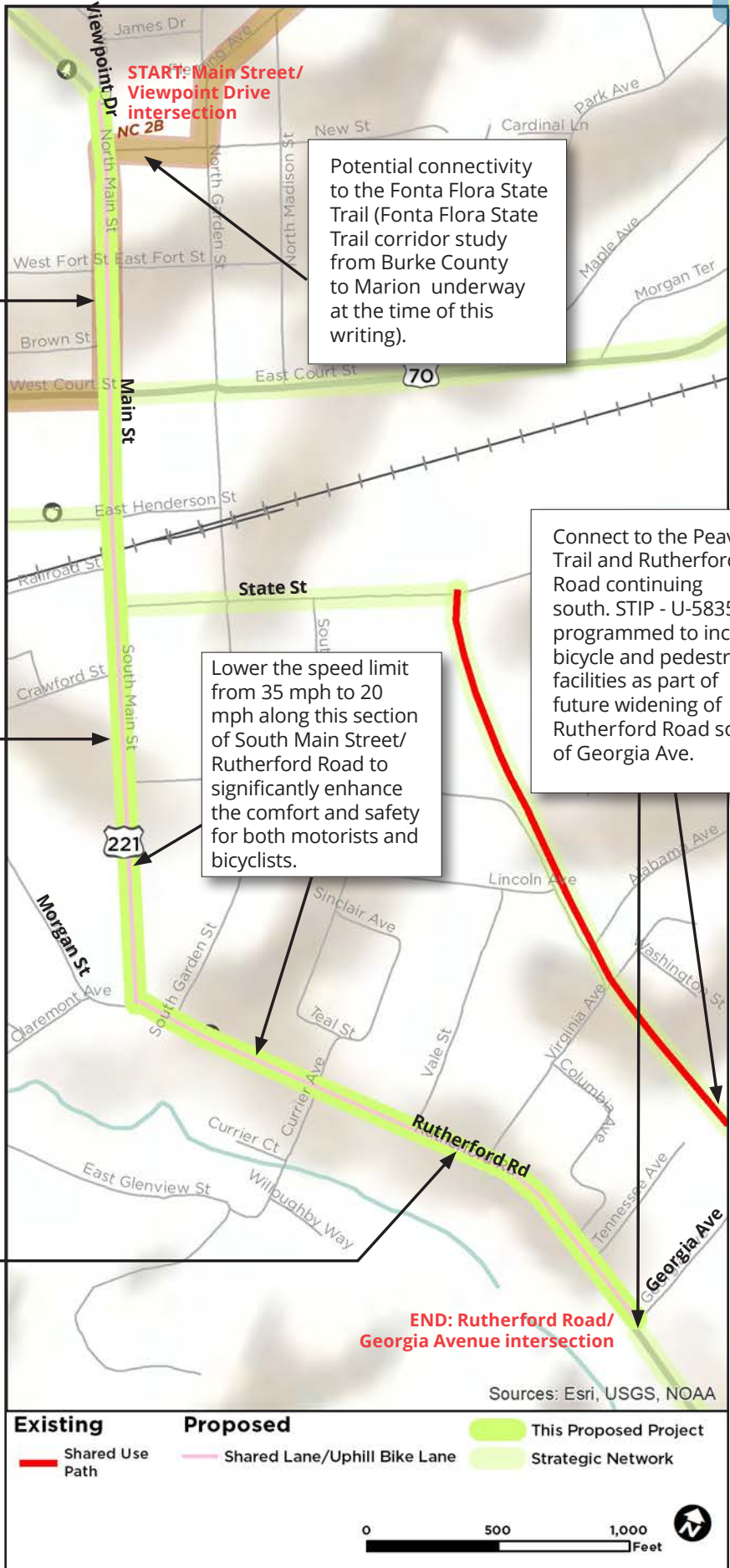
For design options and further detail, please see the Small Town and Rural Multimodal Network Design Guide at - <http://ruraldesignguide.com/mixed-traffic>.

9 DOWNTOWN MARION - MAIN ST BIKE LANE AND SHARED LANE

Main Street, from Viewpoint Drive to State Street, is a three-lane road with 33'-34' pavement width (curb to curb), and traffic volumes of 8,000-10,000 AADT. Ideal bicycle facilities for all ages and abilities would have physical separation from automobile traffic.¹ A streetscaping project was completed in the last five years along this section, with a reduction to a 20 mph speed limit. Implementing shared lane markings (sharrows) in the short-term would provide immediate benefits.

Main Street, from State Street to Morgan Street is a three-lane road with 37'-39' pavement width, traffic volumes of 7,500-9,000 and a speed limit that transitions from 20 mph to 35 mph. Because this section of roadway is downhill going south, provide an uphill bike lane by narrowing the existing travel lanes to 10'. This will allow space to mark an uphill bicycle lane (ideally with a physical buffer) in the north-bound direction. Shared lane markings (sharrows) are recommended to be striped in the south-bound travel lane as bicyclists will have a better opportunity to flow with automobile traffic downhill.

Rutherford Road, from Morgan Street to Georgia Avenue, is a 2-lane road with 30' pavement width, traffic volumes of 8,600, and a speed limit of 35 mph. Because this section of roadway is downhill going south, implement an uphill bike lane by narrowing the existing travel lanes to 10'. This will allow space to stripe an uphill bicycle lane (ideally with a physical buffer, but can be striped in the short-term) in the north-bound direction. Shared lane markings (sharrows) are recommended to be striped in the south-bound travel lane as bicyclists will be able to flow with automobile traffic downhill.



1. See Small Town and Rural Multimodal Network Design Guide. ruraldesignguide.com

10

**MARION - RUTHERFORD RD
SEPARATED BICYCLE LANES**

Length: 1.7 miles

Jurisdictions: City of Marion, McDowell County

Trip Generators:

- Downtown Marion
- Peavine Trail
- Mt Ida Wilderness Area
- Businesses in south Marion
- McDowell Technical Community College
- Fonta Flora State Trail

Support in Other Plans:

- Marion Bicycle Plan (2016)
- STIP (U-5835)

Potential ROW Needs:

- Depending on design of the project, ROW may be needed, especially along the part of the corridor where the ROW is only 50'

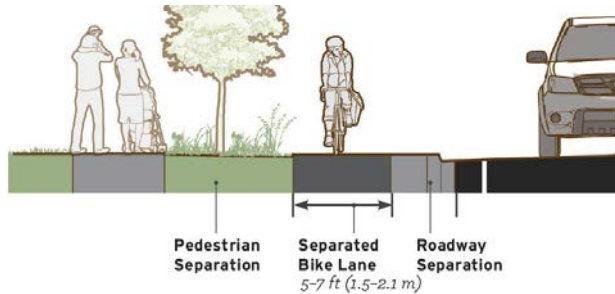
Potential Partnerships:

- City of Marion
- NCDOT
- Downtown businesses
- McDowell Trails Association
- Businesses in south Marion

Estimated Construction Costs:

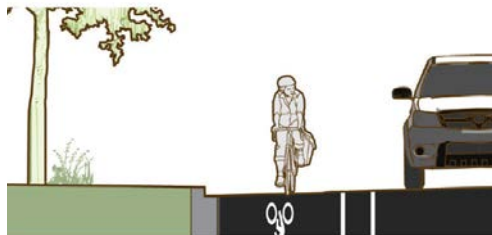
- \$ 7,400,000

DESIGN OPTIONS & CONSIDERATIONS



Physically Separated Example (use in cost estimate)

Several configurations are possible to create physical separation from automobile traffic. These options should be explored during the design phase. See example graphics to the left from the Small Town and Rural Multimodal Network Design Guide. Further detail can be found at - <http://ruraldesignguide.com/physically-separated/separated-bike-lane>.



Visually Separated Example

While less ideal, construction of a bicycle lane with a painted buffer rather than a physical buffer can be a significant improvement for bicycle and motorist safety and comfort, while still reserving space for constructing a physical buffer in the future. Further detail regarding visually separated bike lanes can be found in the Small Town and Rural Multimodal Network Design Guide at <http://ruraldesignguide.com/visually-separated/bike-lane>.

10 MARION - RUTHERFORD RD SEPARATED BICYCLE LANES

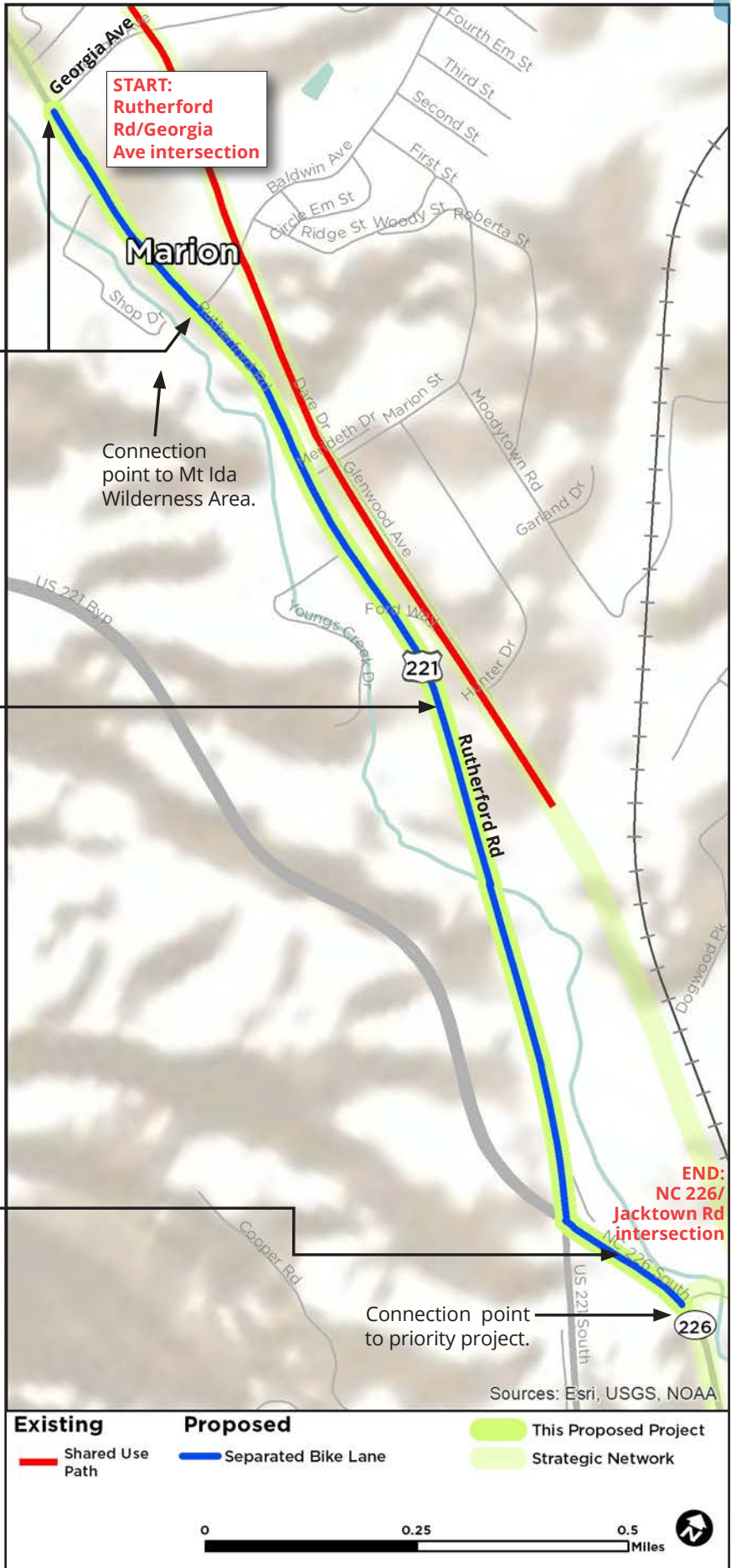
Create connection points to the Peavine Trail at Georgia Ave, Baldwin Ave, Marion St, Ford Way, and at commercial business locations along the east side of this corridor.

Rutherford Road, from Georgia Avenue to NC 226, is mostly a two-lane road with 22'-25' pavement width (and 50'-60' ROW). Physical separation for bicyclists from automobile traffic is recommended¹ due to traffic volumes that are between 9,000 and 11,000 AADT with a 35 mph speed limit.

While the northern part of this section has relatively frequent driveways, the southern part of this section has a lower frequency. Design considerations for this section should not rule out a sidepath, as some of the issues with driveways could be mitigated with proper design.

The ideal design configuration would feature a sidewalk and physically separated bicycle lanes. An interim option is to provide enhanced shoulders with potential for future vertical separators if resources are limited.

Construct a sidepath along the north side of NC 226, from the Rutherford Road intersection to Jacktown Road. The high traffic volumes and speeds, limited pavement width, and the short connection to Jacktown Road, make this a good candidate for a sidepath. A high visibility crossing with ped/bike actuated signals is recommended to be constructed across the north/northeast side of the intersection to accommodate south-bound cyclists wishing to make a left turn.



1. See Small Town and Rural Multimodal Network Design Guide. ruraldesignguide.com

11 PEAVINE TRAIL EXTENSION

Length: 1.6 miles

Jurisdictions: City of Marion, McDowell County

Trip Generators:

- Downtown Marion
- Peavine Trail
- Businesses along corridor
- McDowell Technical Community College
- Fonta Flora State Trail

Support in Other Plans:

- Isothermal Planning & Development Commission Trails Map (2014)
- City of Marion Bicycle Plan (2016)
- STIP (EB-5917)

Potential ROW Needs:

- ROW would need to be acquired for trail sections south of Jacktown Rd

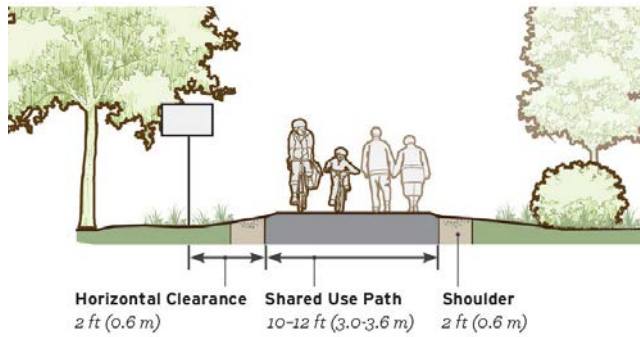
Potential Partnerships:

- City of Marion
- McDowell County
- NCDOT
- McDowell Technical Community College
- Businesses along corridor
- McDowell Trails Association
- CSX

Estimated Construction Costs:

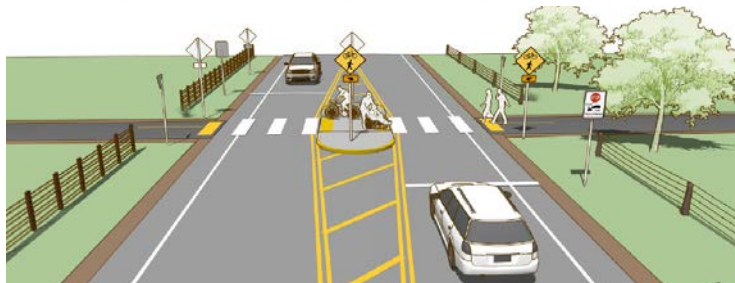
- Option 1: \$1,200,000
- Option 2: \$2,150,000

DESIGN OPTIONS & CONSIDERATIONS



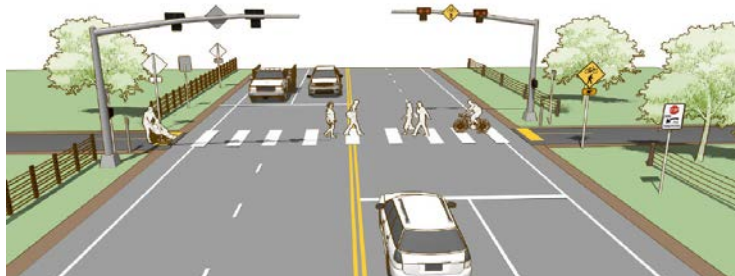
Shared Use Path Example

For design options and further detail, please see the Small Town and Rural Multimodal Network Design Guide at - <http://ruralsdesignguide.com/physically-separated/shared-use-path>.



Intersection Crossing Examples

For design options and further detail, please see the Small Town and Rural Multimodal Network Design Guide at - <http://ruralsdesignguide.com/physically-separated/shared-use-path>.



11 PEAVINE TRAIL EXTENSION

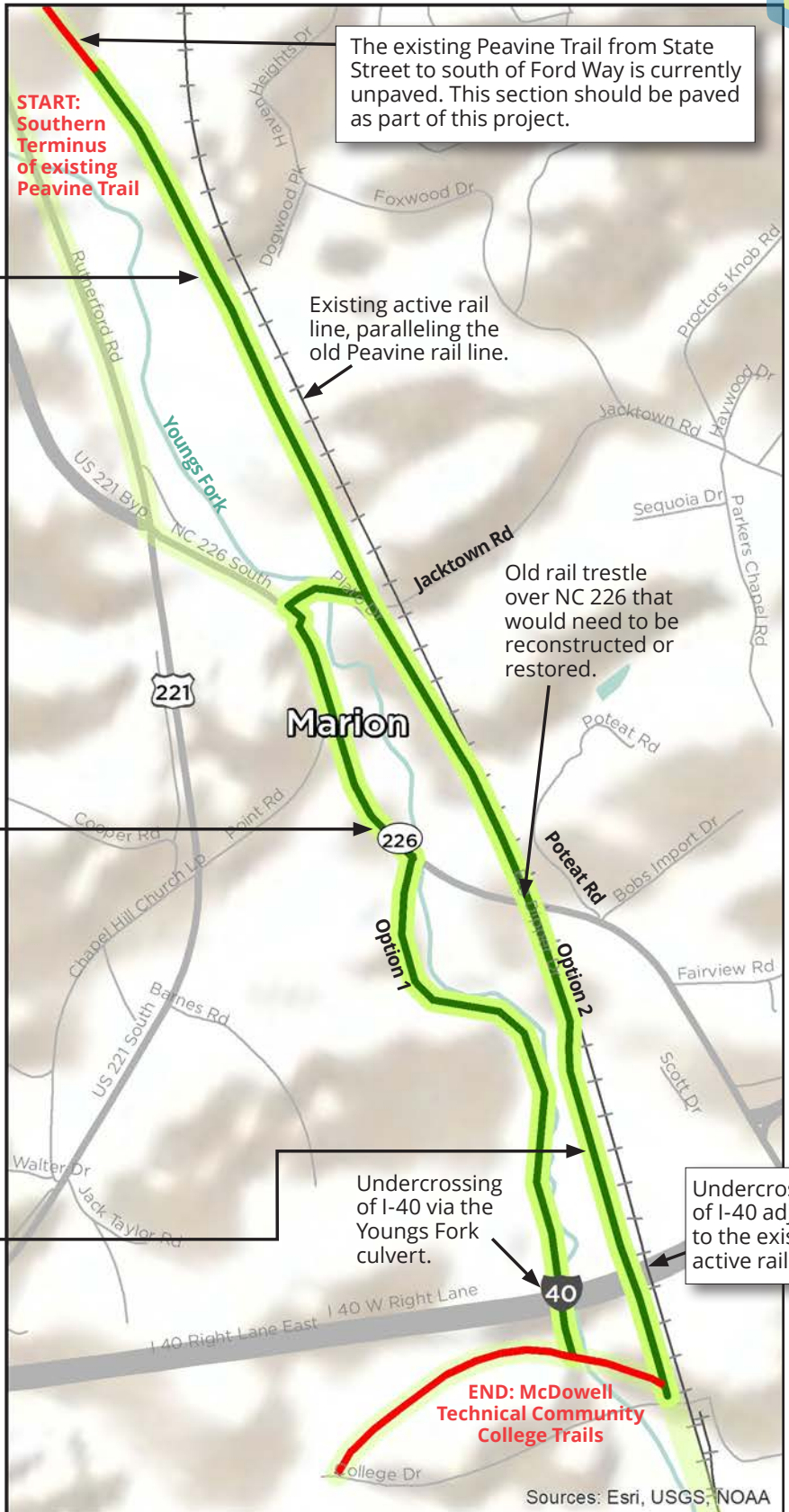
Continue shared use path along the old rail bed to Jacktown Road. An feasibility study is underway (expected completion 2019) to evaluate two old railroad trestles that will need to be replaced or reinforced as part of construction of this section of the trail.

The length of the Peavine Trail from State Street to McDowell Technical Community College is programmed in the current STIP (EB-5917), and is scheduled for construction in 2023.

There are two options for the connection from Jacktown Rd to McDowell Technical Community College:

Option 1: From Jacktown Rd, construct a sidepath along the north side of Jacktown Rd to US 226. Continue sidepath down the east side of US 226, approximately to the beginning of the existing curb. Due to the high traffic volumes and posted speed limit of NC 226 (15,000 AADT and 45 mph), install a pedestrian hybrid beacon at this location. The center turn lane is not used at this location - construct median refuge island in this space. Continue sidepath along the west side of NC 226 to Youngs Fork.

Option 2: Construct shared use path along the old rail line - the challenge with this option is restoring/rebuilding the bridge crossing over NC 226 (just west of Poteat Rd); and constructing an undercrossing of I-40 along the active railroad line. Most of this section would be a rail-with-trail project, running along the active, CSX-owned, rail line.



Sources: Esri, USGS, NOAA

Existing	Proposed	
Shared Use Path	Shared Use Path	This Proposed Project
		Strategic Network

0 0.25 0.5 Miles

12

NC 9 - LAKE LURE SEPARATED BICYCLE LANES

Length: 1.3 miles

Jurisdictions: Town of Lake Lure, Rutherford County

Trip Generators:

- Lake Lure
- Chimney Rock State Park
- Dittmer-Watts Nature Trail Park

Support in Other Plans:

- Lake Lure NC 9 Corridor Plan (2015)
- Lake Lure & Chimney Rock Village CTP (2013)
- Isothermal Planning & Development Commission Trails Map (2014)

Potential ROW Needs:

- Unlikely but depends on design - currently 20' pavement width with 60' ROW

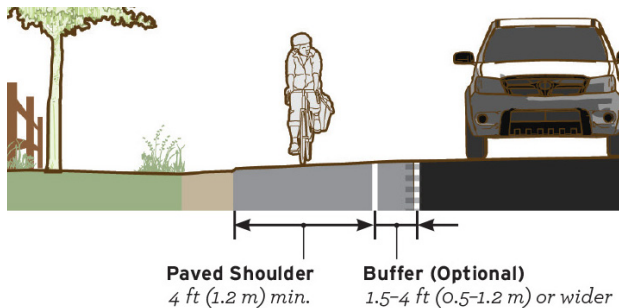
Potential Partnerships:

- Town of Lake Lure
- Developers and businesses along corridor
- NCDOT

Estimated Construction Costs:

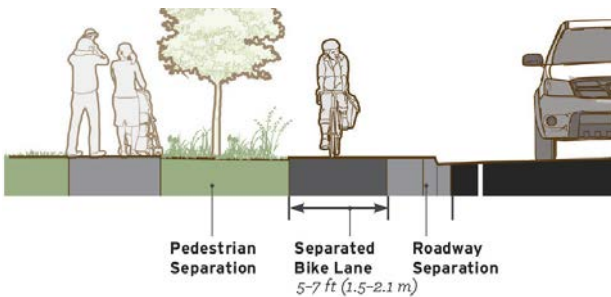
- \$ 1,800,000

DESIGN OPTIONS & CONSIDERATIONS



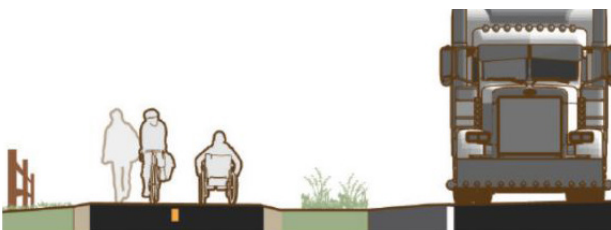
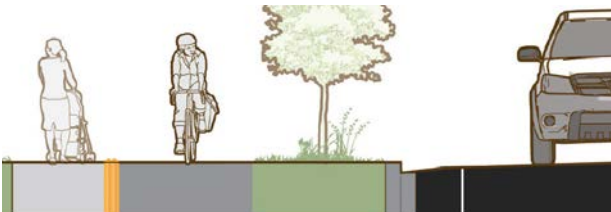
Visually Separated Example (used in cost estimate)

While less ideal, construction of paved shoulder can be a significant improvement for bicycle and motorist safety and comfort. Sometimes geographical and/or financial constraints can limit design options. Further detail regarding options for paved shoulder enhancements such as buffer space can be found in the Small Town and Rural Multimodal Network Design Guide at <http://ruraldesignguide.com/visually-separated/paved-shoulder>.



Physically Separated Examples

Several configurations are possible to create physical separation from automobile traffic. These options should be explored during the design phase. See example graphics to the left from the Small Town and Rural Multimodal Network Design Guide. Further detail can be found at - <http://ruraldesignguide.com/physically-separated/separated-bike-lane>.



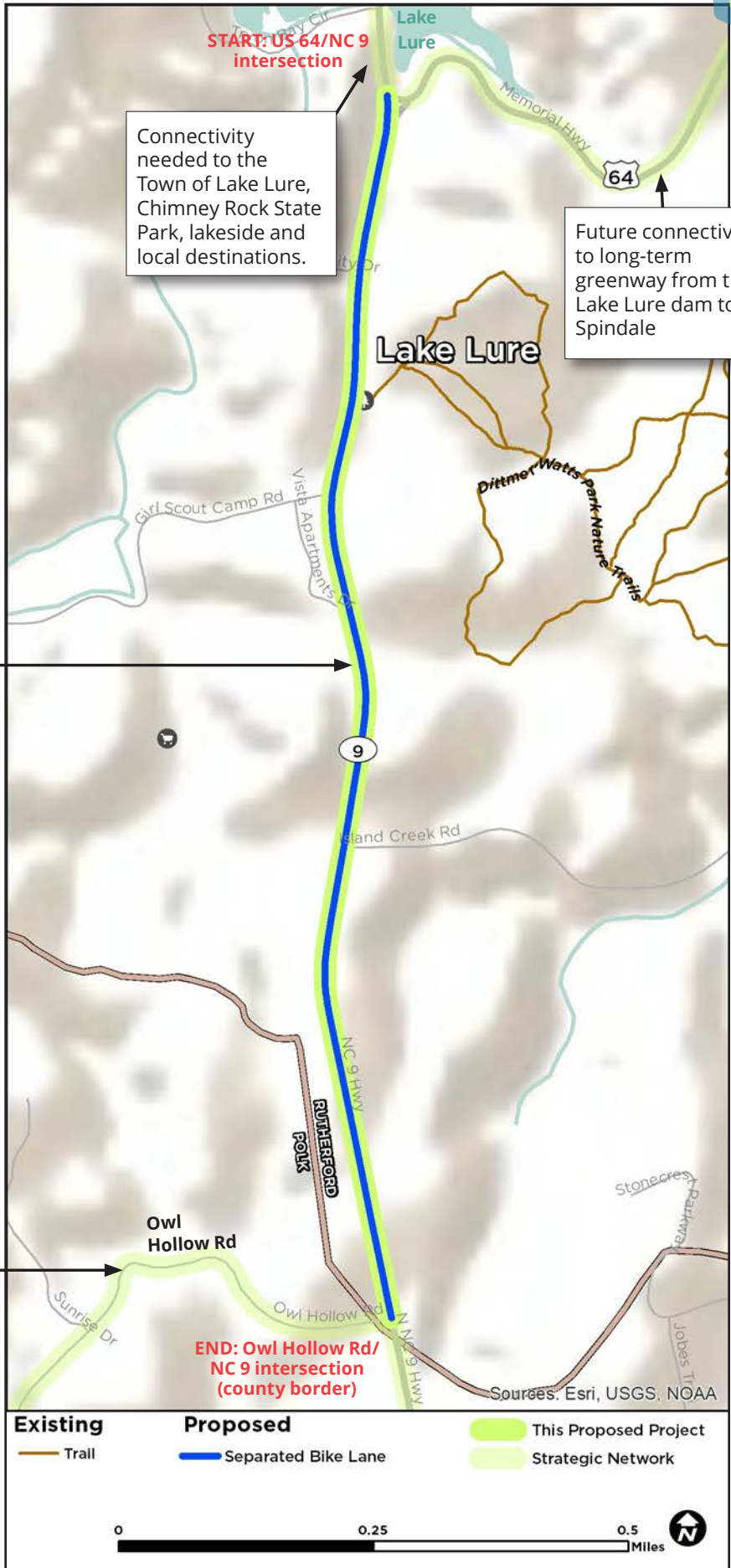
**12 NC 9 - LAKE LURE
SEPARATED BICYCLE LANES**

NC 9, from US 64 to Owl Hollow Road, is a two-lane road with 20'-22' pavement width, traffic volumes of 2,000 AADT, and a speed limit that transitions from 35 mph to 55 mph. Ideal bicycle facilities for all ages and abilities would have physical separation from automobile traffic.¹

Because of the lower driveway density, design considerations for this section should include a sidepath, a sidewalk with a physically separated bicycle lane, or an enhanced shoulder with potential for future vertical separator is an option (if resources are currently limited) - see example graphics to the left from the Small Town and Rural Multimodal Network Design Guide.

Implementation could be part of future development or roadway improvements to NC 9.

Owl Hollow Road is an excellent back roads link around Lake Adger, connecting to the Green River Game Lands and Polk County destinations.



1. See Small Town and Rural Multimodal Network Design Guide. ruraldesignguide.com

13

**PURPLE MARTIN GREENWAY/
OVERMOUNTAIN VICTORY TRAIL TO
THERMAL BELT TRAIL (NORTH)**

Length: 0.9 miles

Jurisdictions: Town of Rutherfordton, Town of Ruth

Trip Generators:

- Downtown Rutherfordton
- Purple Martin Greenway
- Town of Ruth
- Thermal Belt Rail Trail
- Railroad Avenue businesses

Support in Other Plans:

- Town of Rutherfordton Bicycle and Pedestrian Plan (2017)
- Rutherford County Draft CTP
- Isothermal Planning & Development Commission Trails Map (2014)

Potential ROW Needs:

- ROW will need to be acquired along the majority of the proposed alignment

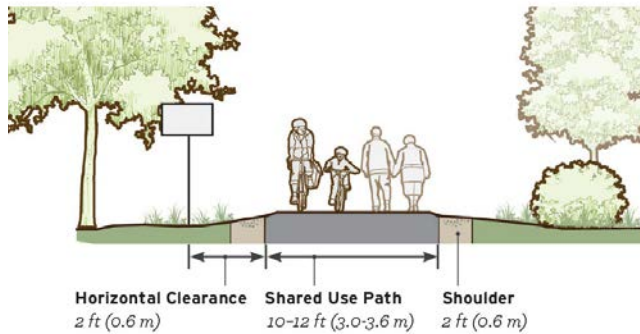
Potential Partnerships:

- Town of Rutherfordton
- Town of Ruth
- NCDOT
- Downtown businesses
- Railroad Avenue businesses
- Rutherford Outdoor Coalition

Estimated Construction Costs:

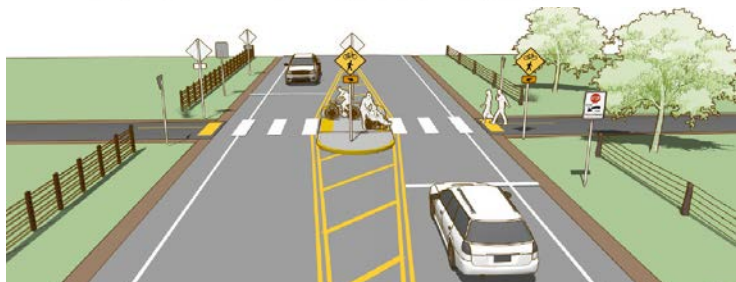
- \$ 560,000

DESIGN OPTIONS & CONSIDERATIONS



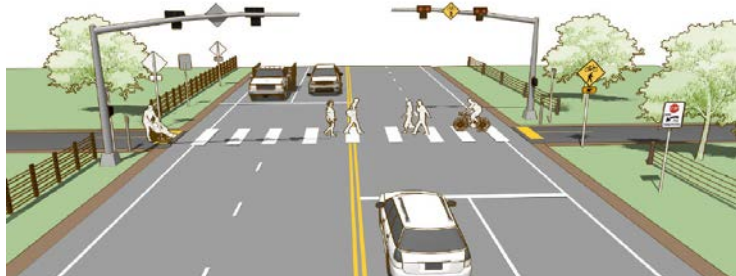
Shared Use Path Example

For design options and further detail, please see the Small Town and Rural Multimodal Network Design Guide at - <http://ruralsdesignguide.com/physically-separated/shared-use-path>.



Intersection Crossing Examples

For design options and further detail, please see the Small Town and Rural Multimodal Network Design Guide at - <http://ruralsdesignguide.com/physically-separated/shared-use-path>.



13 PURPLE MARTIN GREENWAY/ OVERMOUNTAIN VICTORY TRAIL TO THERMAL BELT TRAIL (NORTH)

This section of Mountain Street will include a shared use path as part of the future US 221 Bypass project, linking to the Thermal Belt Trail. This link should be incorporated into this project.

Construct shared use path along Cleghorn Creek from Kiwanis Park to Mountain Street. Shared use path design will need to incorporate constraints related to Cleghorn Creek crossings and stream bank stability.

Construct marked crosswalk at the Green Street crossing. Several crossing options are possible - further analysis and discussion with adjacent property owners is needed.

This section of the Purple Martin Greenway is funded and will be constructed 2018-2019.



END: Thermal Belt Trail at US 64 crossing

Ruth

Rutherfordton

START: Purple Martin Greenway At Kiwanis Park

Green Street is another connection opportunity to the Thermal Belt Trail.

Sources: Esri, USGS, NOAA

Existing		Proposed	
	Shared Use Path		Shared Use Path
			This Proposed Project
			Strategic Network

0 0.25 0.5 Miles

14

RUTHERFORDTON SOUTH MAIN STREET SEPARATED BICYCLE LANES

Length: 1.1 miles

Jurisdictions: Town of Rutherfordton

Trip Generators:

- Downtown Rutherfordton
- Crestview Park
- Purple Martin Greenway
- Businesses along corridor
- McDowell Technical Community College

Support in Other Plans:

- Town of Rutherfordton Bicycle and Pedestrian Plan (2017)

Potential ROW Needs:

- None

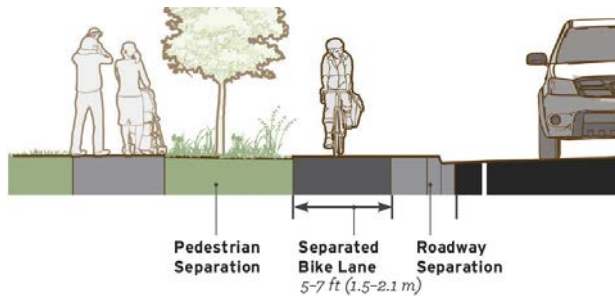
Potential Partnerships:

- Town of Rutherfordton
- NCDOT
- Businesses along corridor
- Rutherford Outdoor Coalition

Estimated Construction Costs:

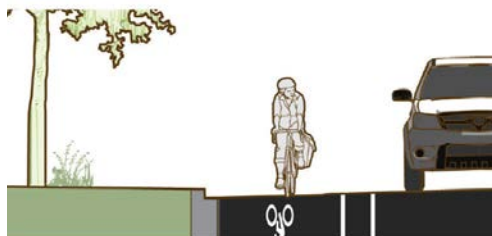
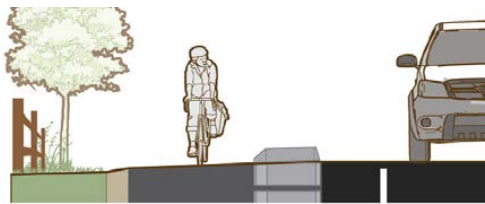
- \$ 1,100,000

DESIGN OPTIONS & CONSIDERATIONS



Physically Separated Examples

Several configurations are possible to create physical separation from automobile traffic. These options should be explored during the design phase. See example graphics to the left from the Small Town and Rural Multimodal Network Design Guide. Further detail can be found at - <http://ruraldesignguide.com/physically-separated/separated-bike-lane>.



Visually Separated Example

While less ideal, construction of a bicycle lane with a painted buffer rather than a physical buffer can be a significant improvement for bicycle and motorist safety and comfort, while still reserving space for constructing a physical buffer in the future. Further detail regarding visually separated bike lanes can be found in the Small Town and Rural Multimodal Network Design Guide at <http://ruraldesignguide.com/visually-separated/bike-lane>.

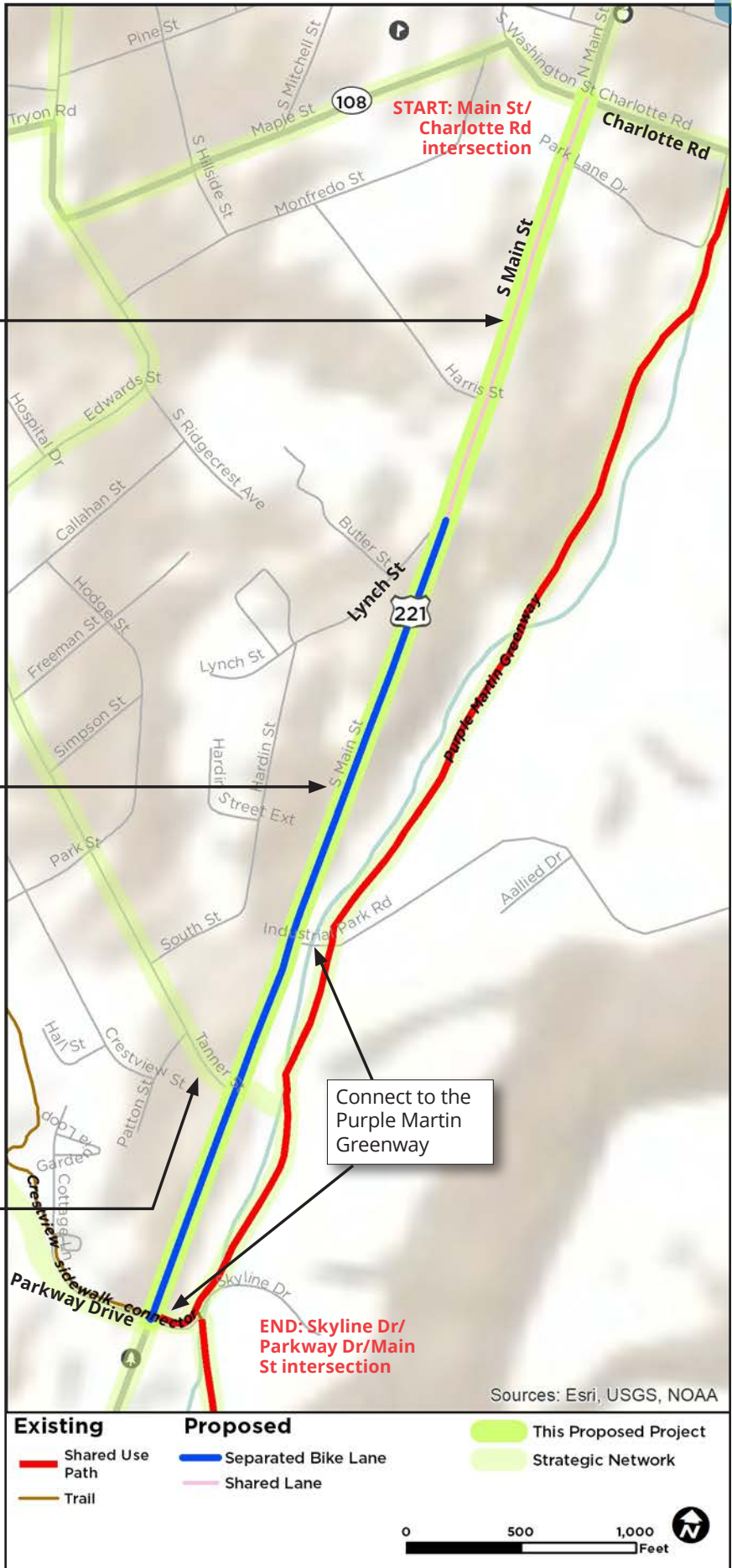
**14 RUTHERFORDTON SOUTH
MAIN STREET BICYCLE LANES**

South Main Street, from Charlotte Road to north of Lynch Street is a two-lane road with 29-30' pavement width, traffic volumes of 8,000-9,000 AADT and a 35 mph speed limit. Ideal bicycle facilities for all ages and abilities would have physical separation from automobile traffic.¹ However, this would require constructing extra road width. Without widening the road, an effective option includes implementing shared lane markings (sharrows) in the short-term to provide immediate benefits. The speed limit is recommended to be lowered from 35 mph to 20 mph.

South Main Street, from north of Lynch Street to Skyline Drive/Parkway Drive is currently a two-lane road with a narrow pavement width of 22', traffic volumes of 8,000-9,000 AADT and a 35 mph speed limit. Ideal bicycle facilities for all ages and abilities would have physical separation from automobile traffic.¹

Construct physically separated bike lanes by widening the roadway surface. Ideally, physically separated bike lanes would include constructing a 2'-3' physical buffer and 6'-7' of operating space for bicyclists on each side of the road. If a physical buffer cannot be constructed at this time, an enhanced shoulder/bike lane with a vertical separator is an option.

Connect to multiple residential streets, providing access to the Rutherford Regional Medical Center.



1. See Small Town and Rural Multimodal Network Design Guide. ruraldesignguide.com

15 PURPLE MARTIN GREENWAY TO THERMAL BELT TRAIL CONNECTOR

Length: 2.6 miles

Jurisdictions: Town of Rutherfordton, Town of Spindale, Rutherford County

Trip Generators:

- Downtown Rutherfordton
- Purple Martin Greenway
- Crestview Park
- Downtown Spindale
- Thermal Belt Rail Trail

Support in Other Plans:

- Spindale Bicycle and Pedestrian Plan Draft

Potential ROW Needs:

- The length of this project may not have any ROW needs. Property along the recommended shared use path segment from Thunder Road to the Purple Martin Greenway is owned by the Town of Rutherfordton and Rutherford County.

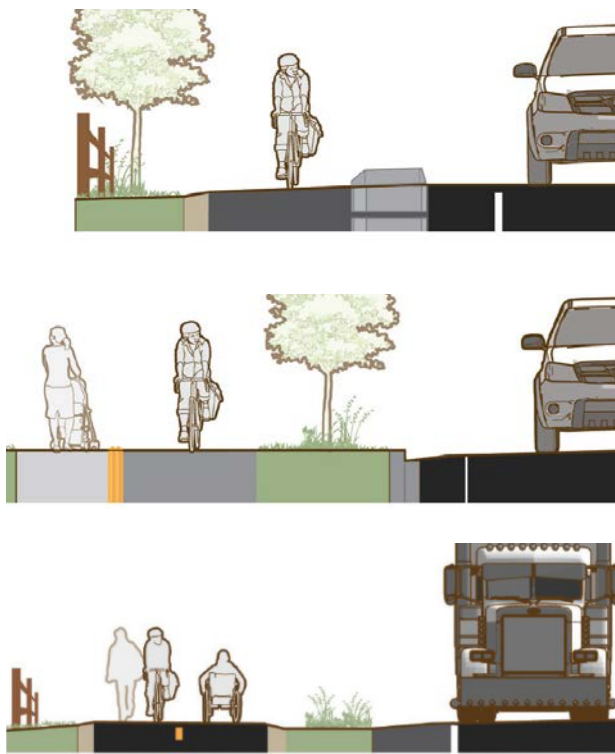
Potential Partnerships:

- Town of Rutherfordton
- Town of Spindale
- Rutherford County
- NCDOT
- Rutherford Outdoor Coalition

Estimated Construction Costs:

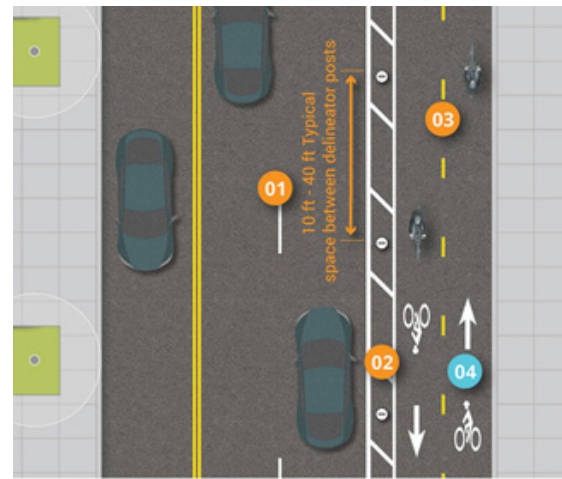
- \$ 2,150,000

DESIGN OPTIONS & CONSIDERATIONS



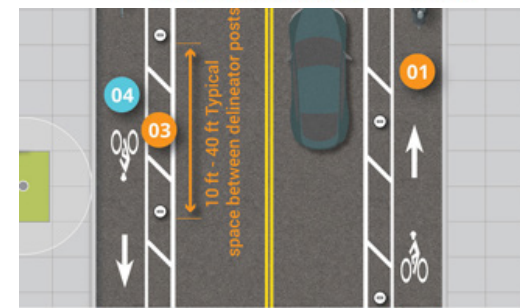
Physically Separated Examples for Thunder Road (bottom example, sidepath, is used for the cost estimate)

Several configurations are possible to create physical separation from automobile traffic. These options should be explored during the design phase. See example graphics from the Small Town and Rural Multimodal Network Design Guide. Further detail can be found at - <http://ruraldesignguide.com/physically-separated/separated-bike-lane>.



See guidance on Forms of Separation page 83

12 ft Preferred



02

7 ft Preferred
See guidance on Forms of Separation page 83.

Physically Separated Examples for Oak Street (top example, two-way cycle track is used for the costs estimate)

For design options and further detail, please see the Separated Bike Lane Planning and Design Guide at - https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/page07.cfm#chapter5_dir.

15 PURPLE MARTIN GREENWAY TO THERMAL BELT TRAIL CONNECTOR

Oak St, from the Thermal Belt Trail to US 74 roadway is a four-lane road with 48' pavement width, traffic volumes of 4,000 AADT and has a 45 mph speed limit. Ideal bicycle facilities for all ages and abilities would have physical separation from automobile traffic.¹

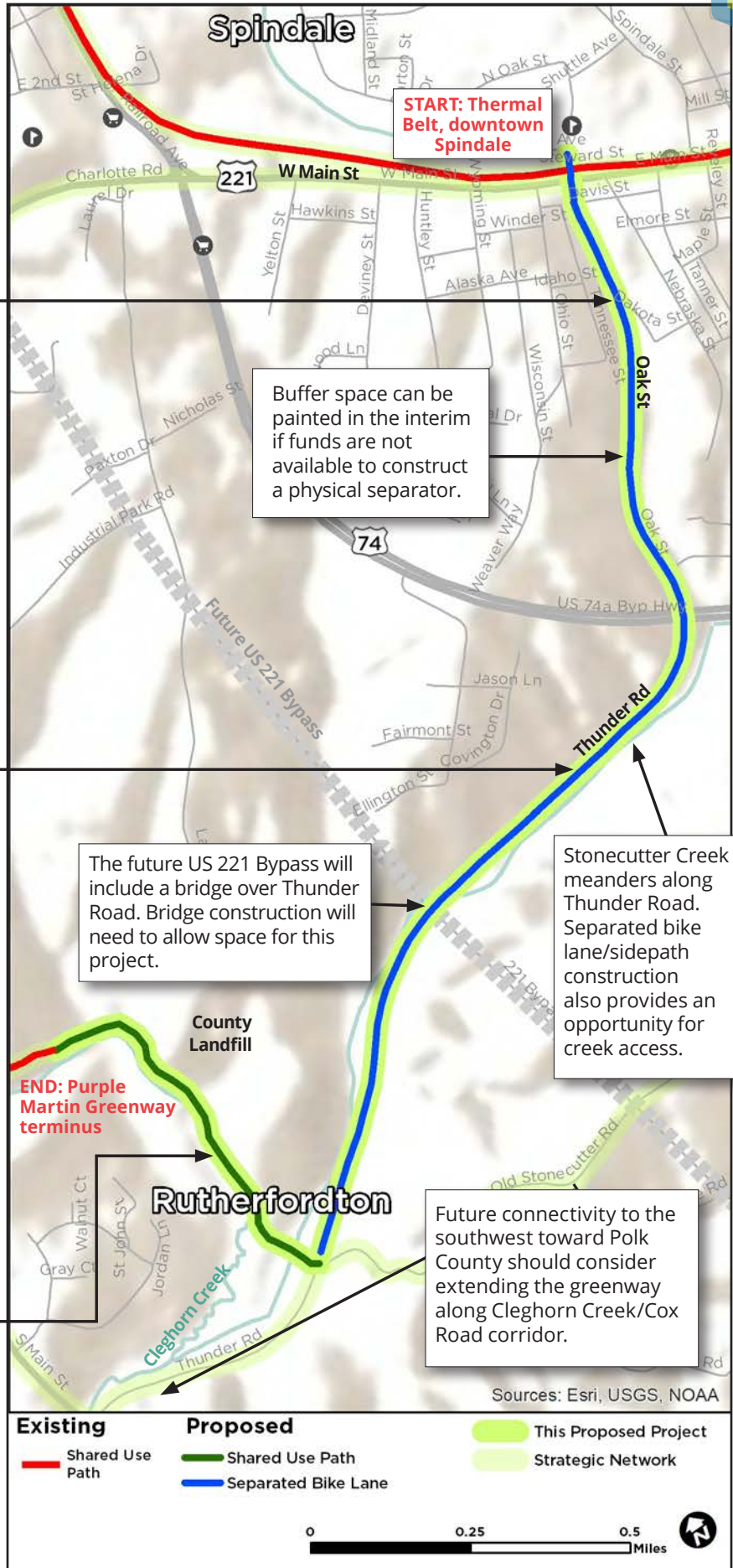
Oak Street is recommended to be converted from four travel lanes to three with a two-way cycle track (could include pedestrians as well) on the west side of the street, especially if coupled with sidepath construction along the west/north side of Thunder Rd from the US 74 intersection to Old Stonecutter Rd. Another option would include converting Oak Street from four travel lanes to three (two travel lanes with a center turn lane), and separated bicycle lanes in each direction that include a 2'-3' buffer and 6'-7' bike lane.

Thunder Rd from the Oak St/US 74 intersection to Old Stonecutter Rd is a two-lane road with 20' pavement width, traffic volumes of 4,600 AADT, and a 35 to 55 mph speed limit. Ideal bicycle facilities for all ages and abilities would have physical separation from automobile traffic.¹

Because the existing roadway corridor is 20', constructing separated bicycle facilities will require new construction.

This section of corridor is currently sparsely developed with a 60' ROW. Options for construction of separated bicycle facilities include constructing a sidepath along the west side of Thunder Road (coupled with a two-way cycle track on the west side of Oak Street). Another option could include expanding the roadway for separated bike lanes on each side of Thunder Road.

Construct a shared use path from Thunder Road (at the Old Stonecutter Road intersection) to the current southeastern terminus of the Purple Martin Greenway, utilizing space around the county landfill along Cleghorn Creek.



Buffer space can be painted in the interim if funds are not available to construct a physical separator.

The future US 221 Bypass will include a bridge over Thunder Road. Bridge construction will need to allow space for this project.

Stonecutter Creek meanders along Thunder Road. Separated bike lane/sidepath construction also provides an opportunity for creek access.

Future connectivity to the southwest toward Polk County should consider extending the greenway along Cleghorn Creek/Cox Road corridor.

Sources: Esri, USGS, NOAA

1. See Small Town and Rural Multimodal Network Design Guide. ruraldesignguide.com

OAK STREET (existing, south downtown Spindale)



OAK STREET (Proposed Two-Way Cycle Track - Striping/Bollards Only)



OAK STREET (Proposed Two-Way Cycle Track - Physical Buffer Construction)



OAK STREET (existing, south downtown Spindale)



OAK STREET (One-way Bike Lanes option - Striping Only)



OAK STREET (One-way Bike Lanes option - Physical Buffer Construction)



16 MAIN STREET - RUTHERFORDTON TO FOREST CITY SEPARATED BICYCLE LANES

Length: 5.5 miles

Jurisdictions: Town of Rutherfordton, Town of Spindale, Town of Forest City, Rutherford County

Trip Generators:

- Downtown Rutherfordton
- Downtown Spindale
- Downtown Forest City
- Businesses along corridor
- Thermal Belt Trail
- Purple Martin Greenway

Support in Other Plans:

- Rutherford County CTP Draft
- Charlotte Street/Main Street Complete Streets Enhancements Design Charrette (2018)
- Rutherfordton Bicycle & Pedestrian Plan (2017)

Potential ROW Needs:

- Depending on design, ROW may be needed for locations where pavement widening would be needed (see following page).

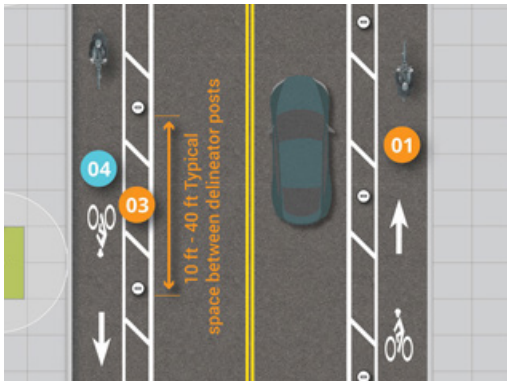
Potential Partnerships:

- Town of Rutherfordton
- Town of Spindale
- Town of Forest City
- Rutherford County
- Developers and businesses along corridor
- NCDOT

Estimated Construction Costs:

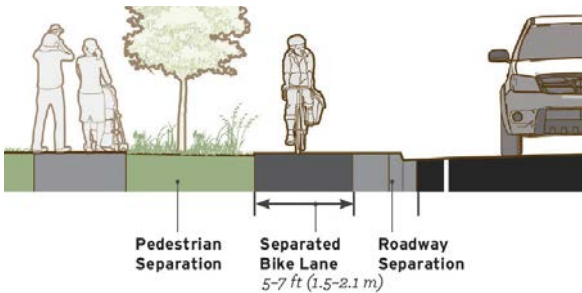
- TBD - Charlotte Street/Main Street Complete Streets Enhancements Design Charrette currently underway and will provide further detail regarding design options and costs.

DESIGN OPTIONS & CONSIDERATIONS



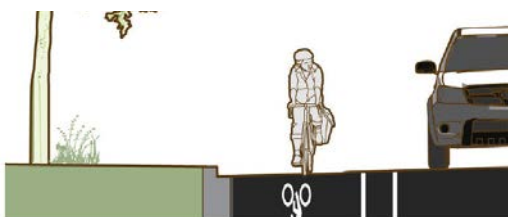
Physically Separated Example

For design options and further detail, please see the Separated Bike Lane Planning and Design Guide at - https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/page07.cfm#chapter5_dir.



Physically Separated Example

Several configurations are possible to create physical separation from automobile traffic. These options should be explored during the design phase. See example graphic to the left from the Small Town and Rural Multimodal Network Design Guide. Further detail can be found at - <http://ruraldesignguide.com/physically-separated/separated-bike-lane>.



Visually Separated Example

While less ideal, construction of a bicycle lane with a painted buffer rather than a physical buffer can be a significant improvement for bicycle and motorist safety and comfort, while still reserving space for constructing a physical buffer in the future. Further detail regarding visually separated bike lanes can be found in the Small Town and Rural Multimodal Network Design Guide at <http://ruraldesignguide.com/visually-separated/bike-lane>.

16 MAIN STREET - RUTHERFORDTON TO FOREST CITY SEPARATED BICYCLE LANES

This project would connect to the newest segment of the Purple Martin Greenway.

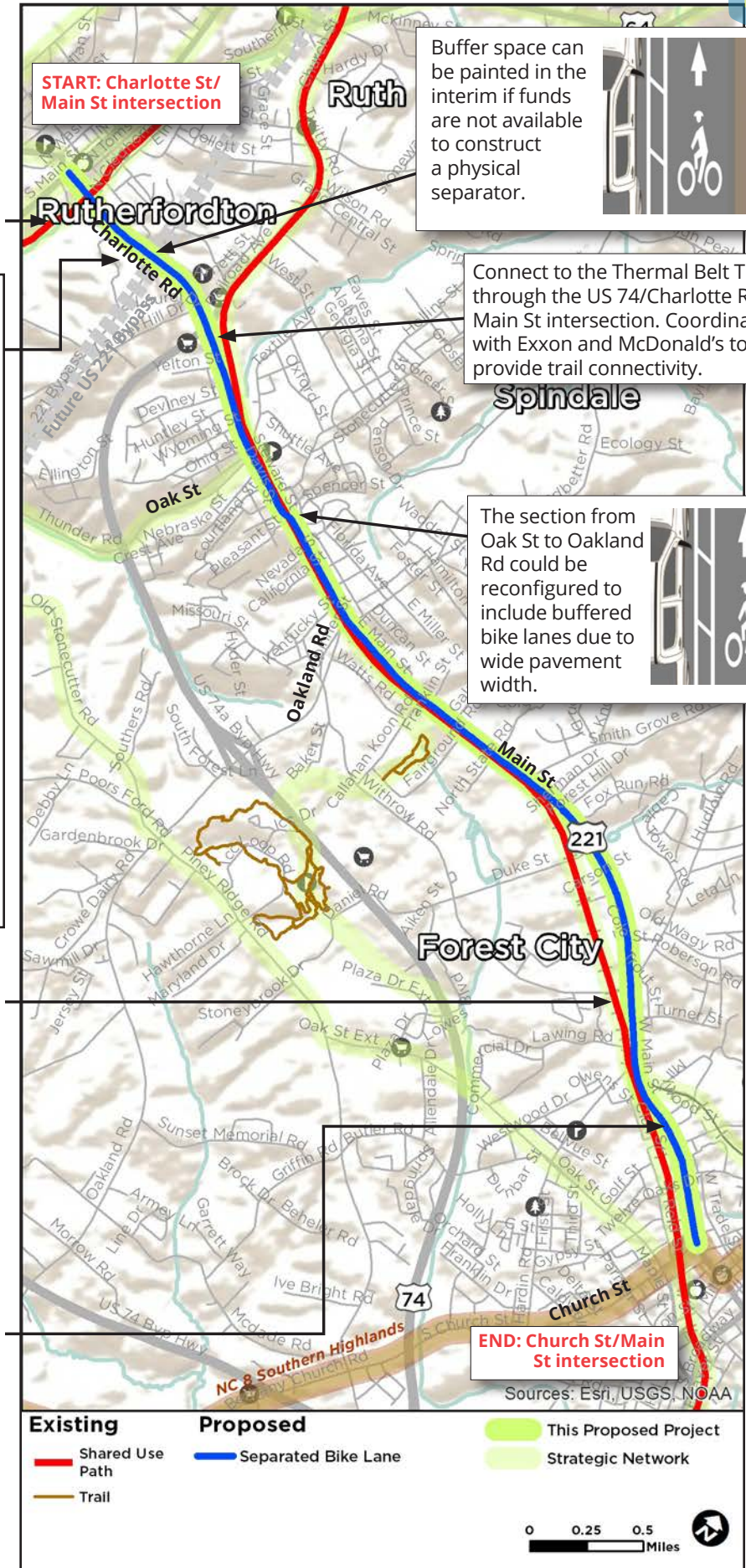
Charlotte Road, from Main Street to US 74 is a five-lane road with 52' pavement width, traffic volumes of 12,000 AADT (likely to drop significantly due to bypass construction) and a 35 mph speed limit. Ideal bicycle facilities for all ages and abilities would have physical separation from automobile traffic.¹

Charlotte Road is recommended to be converted from five travel lanes to three (two travel lanes with a center turn lane), and separated bicycle lanes in each direction. Bike lanes should include a 2'-3' buffer and 6'-7' operating space for the bicyclist. Charlotte Road's width, lower traffic volumes, connectivity to downtown Rutherfordton and connection to the Purple Martin Greenway makes this section a candidate for lane narrowing.

The future US 221 (construction expected 2022-2026) Bypass will have an interchange at Charlotte Rd with exit/entrance ramps - this design should incorporate separated bicycle facilities through the project footprint.

For much of the section of Main Street east of the US 74/Charlotte Rd intersection, the Thermal Belt runs parallel to the corridor, staying within 10'-800'. Numerous connectivity opportunities should be explored - the Steward St/Marland St/Main St intersection with the Thermal Belt will need further study.

Main Street between the US 74/Charlotte Road intersection and Oak St as well as the section east of Oakland Road to Church Street will need to be expanded to include separated bike lanes. This is due to the traffic volumes that range between 7,000-17,000 AADT, a 35 speed limit, and pavement width that is too narrow at approximately 37'. If roadway expansion cannot be accomplished in the short-term, ensure frequent connectivity options to the Thermal Belt Trail at a minimum.



Buffer space can be painted in the interim if funds are not available to construct a physical separator.

Connect to the Thermal Belt Trail through the US 74/Charlotte Rd/ Main St intersection. Coordinate with Exxon and McDonald's to provide trail connectivity.

The section from Oak St to Oakland Rd could be reconfigured to include buffered bike lanes due to wide pavement width.

1. See Small Town and Rural Multimodal Network Design Guide. ruraldesignguide.com

17

ISOTHERMAL COMMUNITY COLLEGE TO DOWNTOWN FOREST CITY CONNECTOR

Length: 3.2 miles

Jurisdictions: Town of Forest City, Rutherford County

Trip Generators:

- Isothermal Community College
- Thermal Belt Trail
- NC Bike Route 8 Southern Highlands
- Downtown Forest City
- Businesses along corridor

Support in Other Plans:

- Forest City Pedestrian Plan (2015)
- Rutherford County CTP Draft
- STIP (U-5833)

Potential ROW Needs:

- ROW will likely only be needed for the shared use path portion of this project

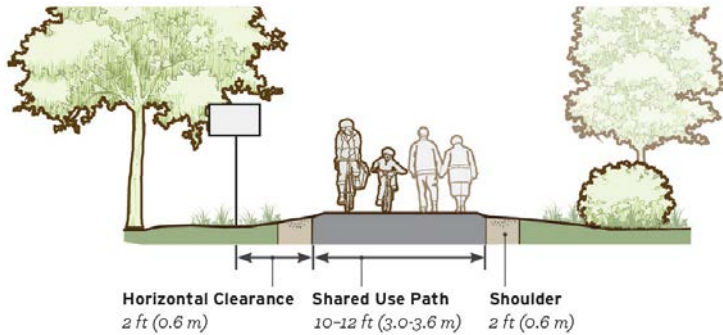
Potential Partnerships:

- Town of Forest City
- Rutherford County
- NCDOT
- Businesses along corridor
- Rutherford Outdoor Coalition

Estimated Construction Costs:

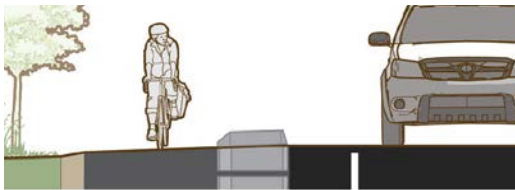
- \$ 2,800,000

DESIGN OPTIONS & CONSIDERATIONS



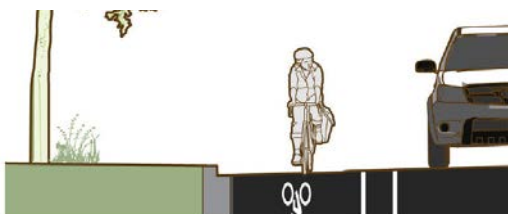
Shared Use Path Example

For design options and further detail, please see the Small Town and Rural Multimodal Network Design Guide at - <http://ruraldesignguide.com/physically-separated/shared-use-path>.



Physically Separated Example

Several configurations are possible to create physical separation from automobile traffic. These options should be explored during the design phase. See example graphics to the left from the Small Town and Rural Multimodal Network Design Guide. Further detail can be found at - <http://ruraldesignguide.com/physically-separated/separated-bike-lane>.



Visually Separated Example

While less ideal, construction of a bicycle lane with a painted buffer rather than a physical buffer can be a significant improvement for bicycle and motorist safety and comfort, while still reserving space for constructing a physical buffer in the future. Further detail regarding visually separated bike lanes can be found in the Small Town and Rural Multimodal Network Design Guide at <http://ruraldesignguide.com/visually-separated/bike-lane>.

17 ISOTHERMAL COMMUNITY COLLEGE TO DOWNTOWN FOREST CITY CONNECTOR

Construct a shared use path, tying into the existing ICC Trails and connecting to Oak Street, utilizing existing sewer easement corridors. This will require working with multiple private landowners to complete this section.

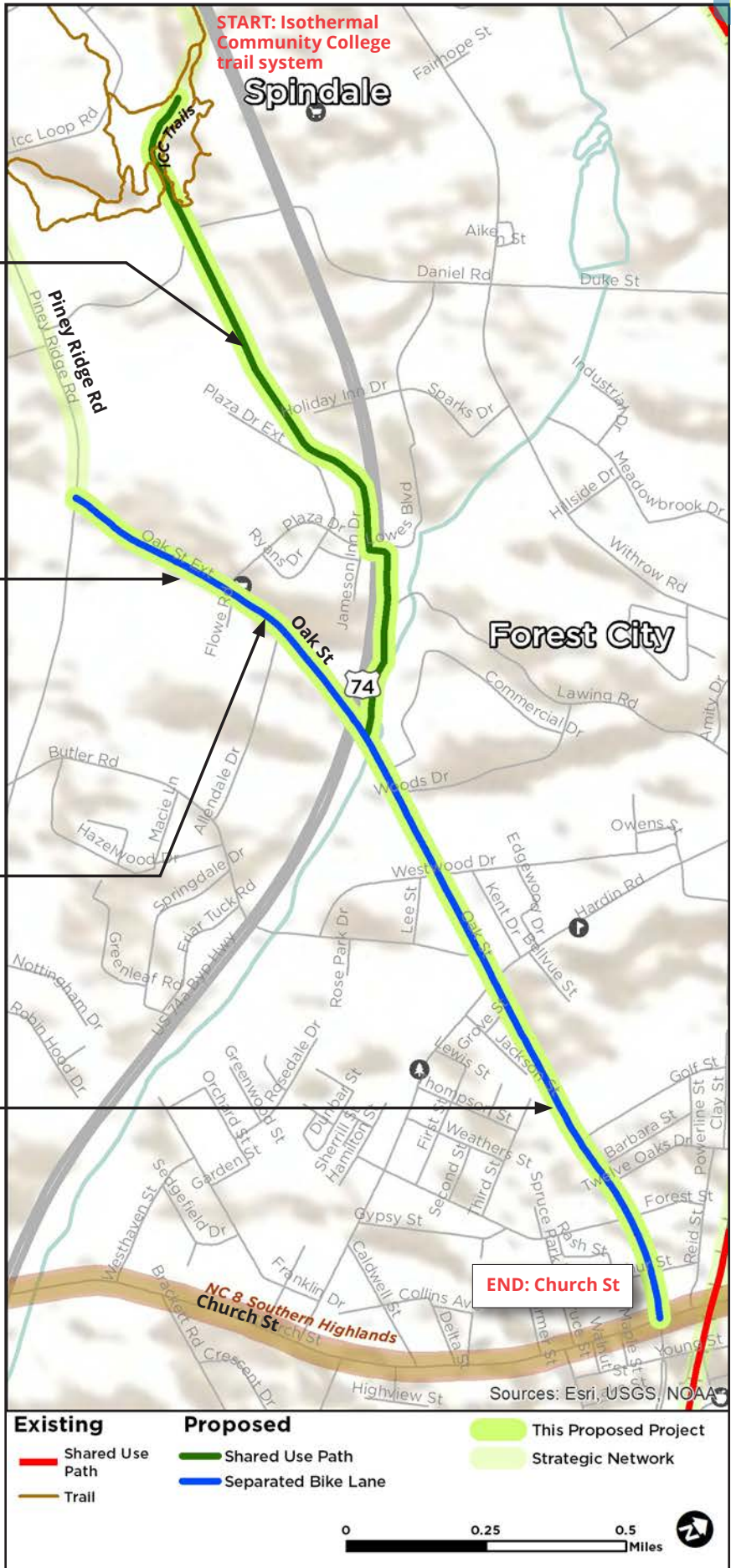
Oak Street, from Piney Ridge Road to US 74, is mostly a two-lane road with 22' pavement width that widens significantly at intersections (and 100' ROW). Physical separation for bicyclists from automobile traffic is recommended¹, due to traffic volumes that are 11,000 AADT with a 35 mph speed limit.

The ideal design configuration would feature a sidewalk and physically separated bicycle lanes. An interim option is to provide enhanced shoulders with potential for future vertical separators if resources are limited.

This section is part of TIP U-5833 and these recommendations should be incorporated into the design.

Oak Street, from US 74 to Church St, is a five-lane road with 62'-64' pavement width, traffic volumes of 11,000 - 12,000 AADT and a 35 mph speed limit. Ideal bicycle facilities for all ages and abilities would have physical separation from automobile traffic.¹

Oak Street is recommended to be further studied for a conversion from five travel lanes to three (two travel lanes with a center turn lane), with separated bicycle lanes in each direction. Oak Street's width, relatively lower traffic volumes, connectivity to ICC, multiple businesses, the Thermal Belt Trail, and downtown Forest City, make it a good candidate for lane reductions.



1. See Small Town and Rural Multimodal Network Design Guide. ruraldesignguide.com



18 NC 8 SOUTHERN HIGHLANDS BIKE ROUTE - FOREST CITY

Length: 0.5 miles

Jurisdictions: Town of Forest City

Trip Generators:

- Downtown Forest City
- Thermal Belt Trail
- NC Bike Route 8

Support in Other Plans:

- Walk/Bike NC (2013)
- Rutherford County Draft CTP

Potential ROW Needs:

- None

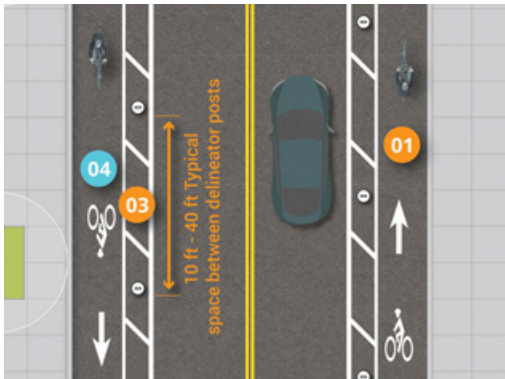
Potential Partnerships:

- Town of Forest City
- NCDOT
- Downtown businesses
- Rutherford Outdoor Coalition

Estimated Construction Costs:

- \$ 65,000

DESIGN OPTIONS & CONSIDERATIONS



Physically Separated Example (Downtown Center Context)

For design options and further detail, please see the Separated Bike Lane Planning and Design Guide at - https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/page07.cfm#chapter5_dir.



Visually Separated Example

While less ideal, construction of a bicycle lane with a painted buffer rather than a physical buffer can be a significant improvement for bicycle and motorist safety and comfort, while still reserving space for constructing a physical buffer in the future. Further detail regarding visually separated bike lanes can be found in the Small Town and Rural Multimodal Network Design Guide at <http://ruraldesignguide.com/visually-separated/bike-lane>.

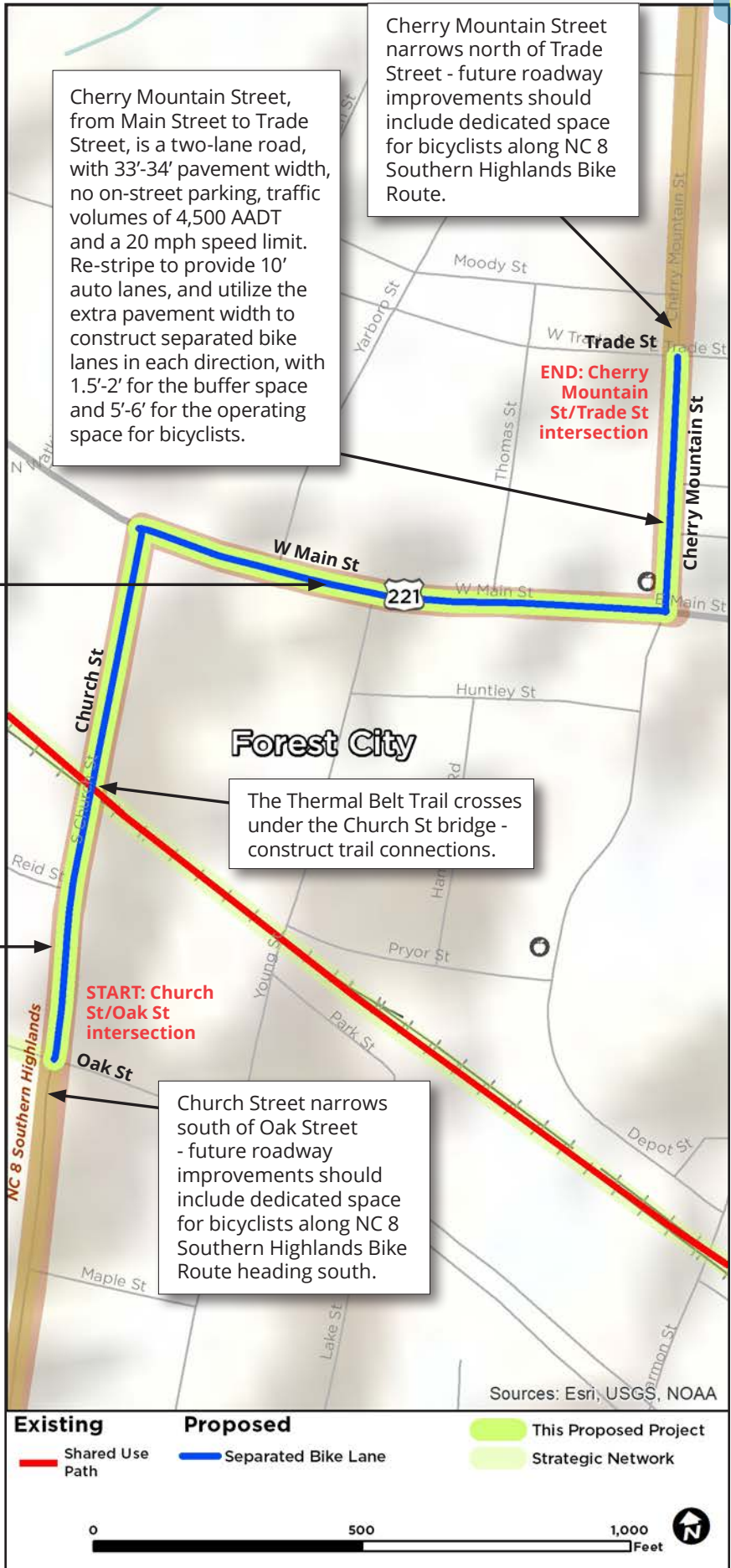
18 NC 8 SOUTHERN HIGHLANDS BIKE ROUTE - FOREST CITY

Main Street, from Church Street to Cherry Mountain Street, varies from one to two lanes in each direction, with ample pavement width, parallel and angled on-street parking, traffic volumes of 10,000 AADT, and a 20 mph speed limit. Ideal bicycle facilities for all ages and abilities would have physical separation from automobile traffic.¹

Incorporate separated bike lanes within the existing pavement width. Consider eliminating the extra travel lane in each direction (where it appears) and shift the angle parking along the north side of Main Street to parallel parking. Ideally, the bicycle lanes should include a 2'-3' buffer space and 6'-7' operating space for bicyclists. Shift the existing parallel parking between the automobile travel lanes and the recommended separated bike lanes.

Church Street, from Main Street to Oak Street, is a four-lane road with 48'-52' pavement width, traffic volumes of 8,000-9,000 AADT and a 35 mph speed limit. Ideal bicycle facilities for all ages and abilities would have physical separation from automobile traffic.¹

Church Street is recommended to be further studied for a conversion from four travel lanes to three (two travel lanes with a center turn lane), with separated bicycle lanes in each direction. Church Street's width, relative lower traffic volumes, connectivity to downtown Forest City, the Thermal Belt Trail (construction 2018), and the NC 8 Southern Highlands Bike Route designation make this road a great candidate for lane narrowing. Bike lanes should include a 2'-3' buffer and 6'-7' for the operating space for bicyclists.



1. See Small Town and Rural Multimodal Network Design Guide. ruralsdesignguide.com



19

BROAD RIVER GREENWAY EXTENSION

Length: 4 miles

Jurisdictions: Cleveland County

Trip Generators:

- Boiling Springs
- Gardner-Webb University
- Broad River Greenway/Carolina Thread Trail
- Duke Energy Power Plant
- Cliffside

Support in Other Plans:

- Cleveland County Carolina Thread Trail Master Plan (2010)
- Cleveland County CTP (2010)
- Isothermal Planning & Development Commission Trails Map (2014)

Potential ROW Needs:

- ROW needed for the length of the project

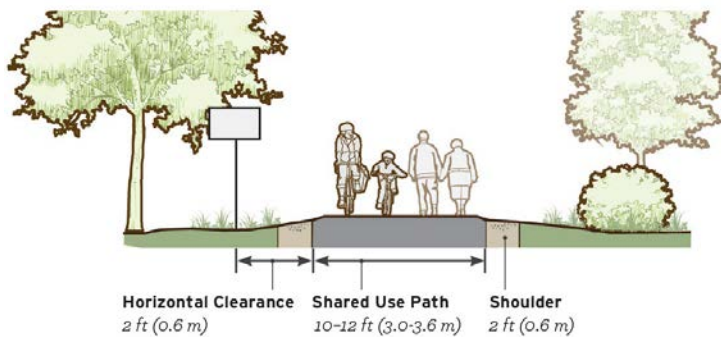
Potential Partnerships:

- Cleveland County
- Private landowners along corridor
- Carolina Thread Trail
- Broad River Greenway
- Lake Houser Adventures
- Duke Energy

Estimated Construction Costs:

- \$ 1,100,000 (unpaved trail)

DESIGN CONSIDERATIONS



Shared Use Path Example

For design options and further detail, please see the Small Town and Rural Multimodal Network Design Guide at - <http://ruralsdesignguide.com/physically-separated/shared-use-path>.

Note: The Broad River Greenway is currently unpaved. This recommended extension should continue the same user experience as an unpaved shared use trail.

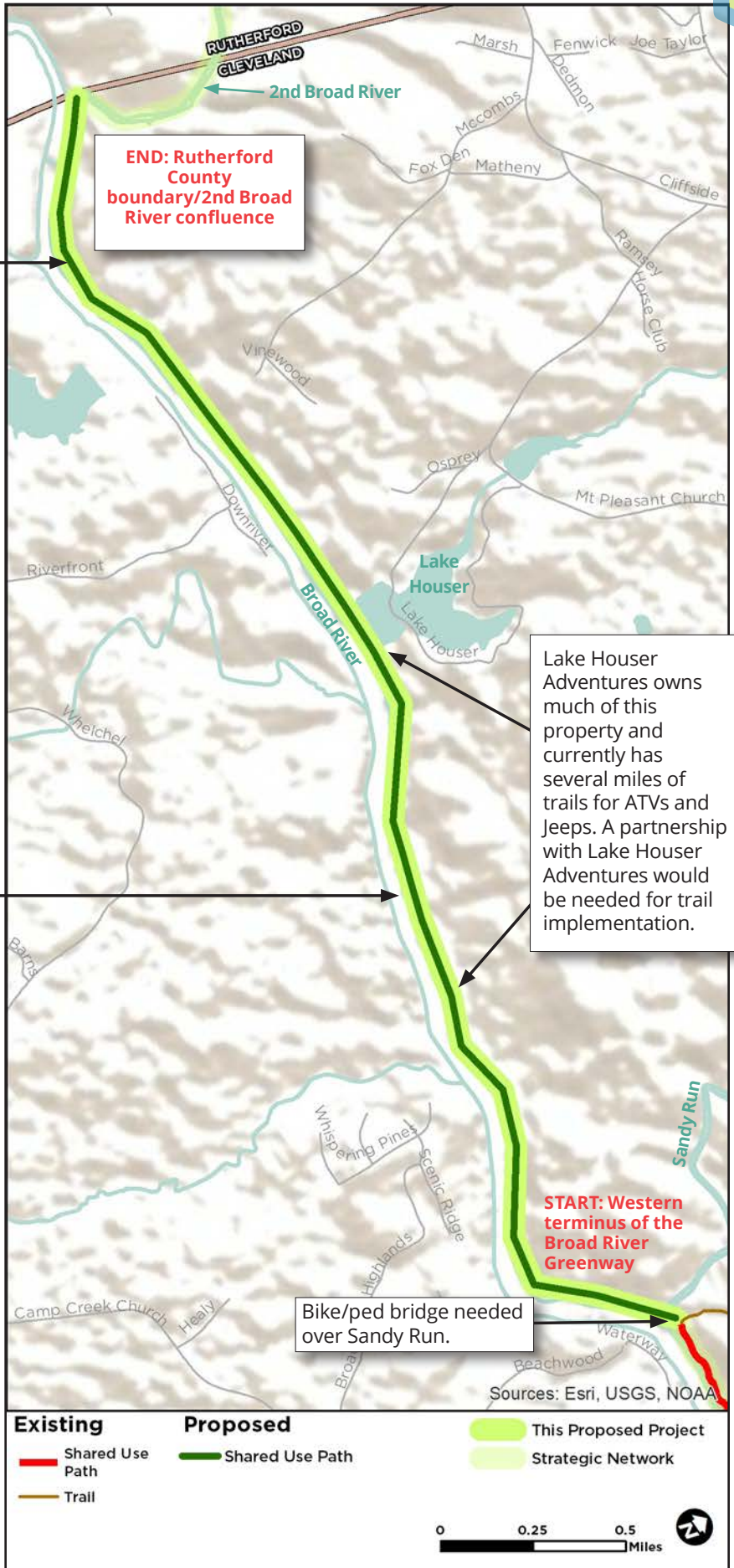
19 BROAD RIVER GREENWAY EXTENSION

Duke Energy owns much of this property and operates a large energy plant on the south side of the river. A partnership with Duke energy would be needed for implementation. A bridge crossing of the Broad River here would allow employees easy access to the trail as well.

Construct shared use path along the north side of the Broad River from the Broad River Greenway to the Second Broad River confluence at the Rutherford County border.

The path surface should remain consistent with the existing section of the Broad River Greenway, accommodating bicyclists, pedestrians, and equestrians.

Note: This extension is recommended to be designated as part of the Carolina Thread Trail and Broad River Greenway, same as the existing section.



20

BOILING SPRINGS TO THE BROAD RIVER GREENWAY - SEPARATED BICYCLE LANES

Length: 4.1 miles

Jurisdictions: Town of Boiling Springs, Cleveland County

Trip Generators:

- Downtown Boiling Springs
- Gardner-Webb University
- Broad River Greenway/Carolina Thread Trail

Support in Other Plans:

- Cleveland County Carolina Thread Trail Master Plan (2010)
- Cleveland County CTP (2010)
- Isothermal Planning & Development Commission Trails Map (2014)

Potential ROW Needs:

- None

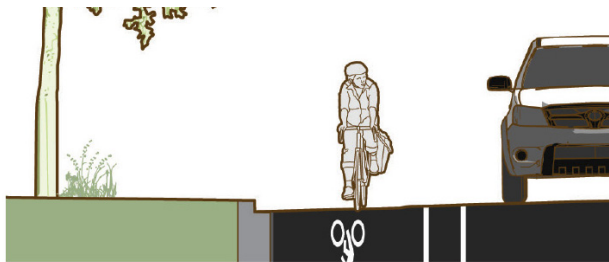
Potential Partnerships:

- Town of Boiling Springs
- Cleveland County
- NCDOT
- Businesses along corridor
- Carolina Thread Trail
- Broad River Greenway

Estimated Construction Costs:

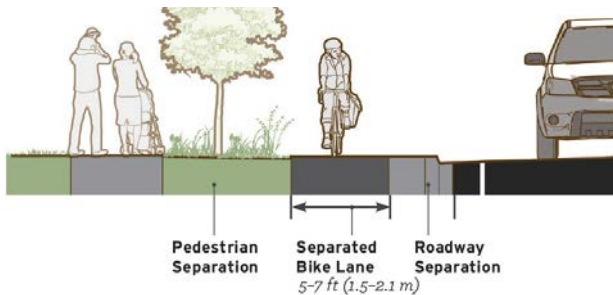
- \$ 1,300,000

DESIGN CONSIDERATIONS



Visually Separated Example (used in cost estimate)

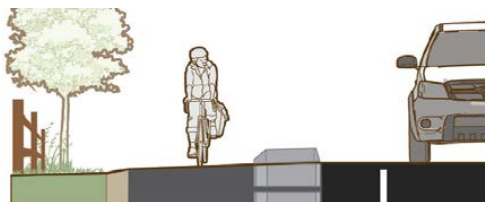
While less ideal, construction of a bicycle lane with a painted buffer rather than a physical buffer can be a significant improvement for bicycle and motorist safety and comfort, while still reserving space for constructing a physical buffer in the future. Further detail regarding visually separated bike lanes can be found in the Small Town and Rural Multimodal Network Design Guide at <http://ruraldesignguide.com/visually-separated/bike-lane>.



Pedestrian Separation Separated Bike Lane 5-7 ft (1.5-2.1 m) Roadway Separation

Physically Separated Examples

Several configurations are possible to create physical separation from automobile traffic. These options should be explored during the design phase. See example graphics to the left from the Small Town and Rural Multimodal Network Design Guide. Further detail can be found at - <http://ruraldesignguide.com/physically-separated/separated-bike-lane>.



20

BOILING SPRINGS TO THE BROAD RIVER GREENWAY - SEPARATED BICYCLE LANES

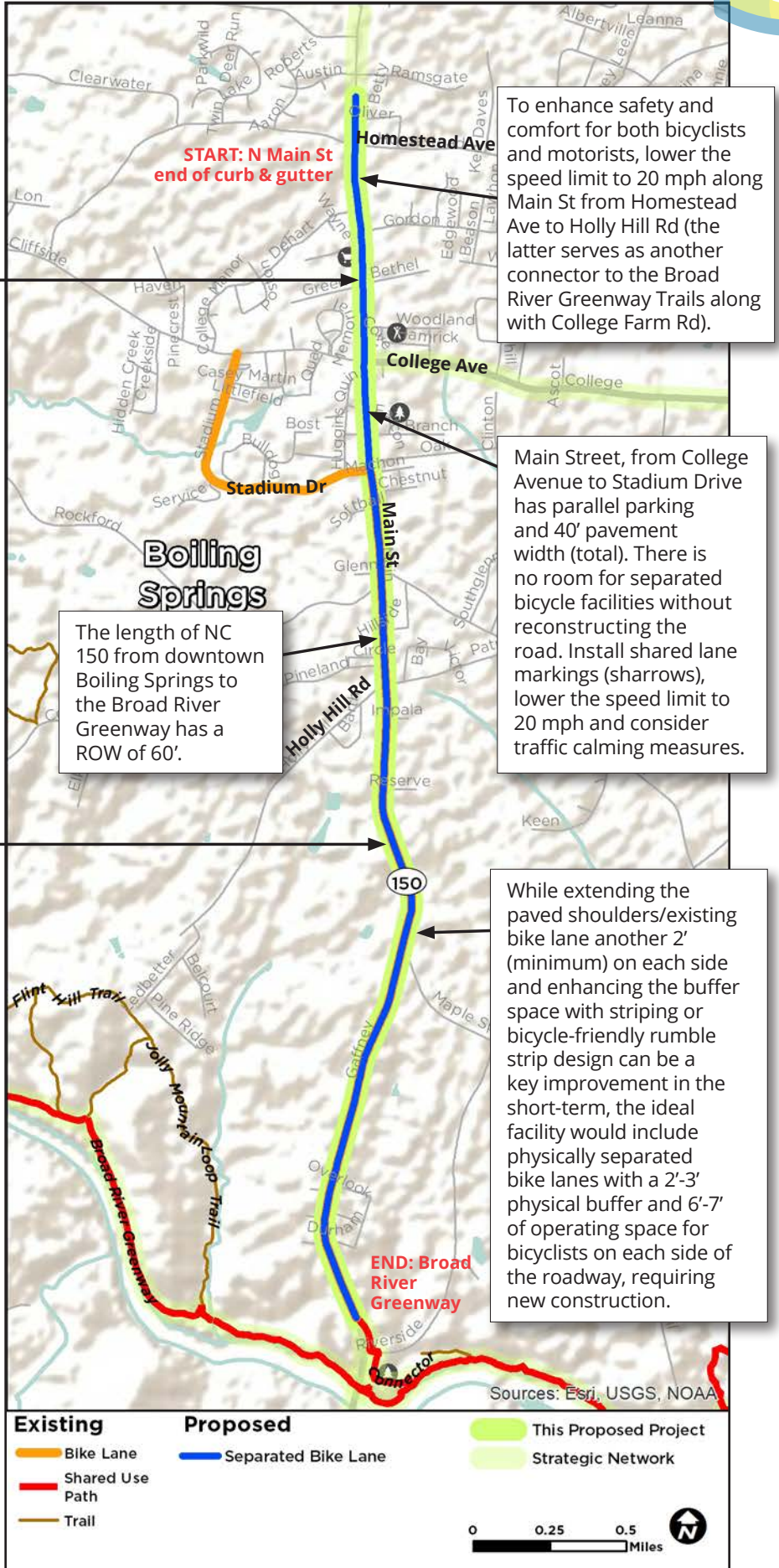
Main St, from north of Homestead Avenue to College Avenue is a two-lane road with 36'-38' pavement width, traffic volumes of 5,000-10,000 AADT, and a speed limit that transitions from 25 mph to 35 mph. Ideal bicycle facilities for all ages and abilities would have physical separation from automobile traffic.¹

Separated bike lanes is recommended to be constructed along this section of roadway within the existing pavement width. Bike lanes should include a 1'-3' buffer and 5'-7' for the operating space for bicyclists. If a physical buffer cannot be constructed at this time, a striped buffer with the potential for constructing a vertical separator is an option if resources are limited.

Main Street/NC 150, from Stadium Drive to the Broad River Greenway is a two-lane road with 32'-37' pavement width (including 5'-7' bike lanes and 11' travel lanes), traffic volumes of 3,000-6,000 AADT and a speed limit that transitions from 35 mph to 55 mph. The curb and gutter section closer to downtown has pavement width that is generally 36'-37'. Ideal bicycle facilities for all ages and abilities would have physical separation from automobile traffic.¹

For the wider sections with curb and gutter near downtown, creating a smoother transition between the gutter pan and asphalt would increase comfort in the existing bike lane space.

Where curb and gutter does not exist, the shoulder pavement surface could be widened to at least 7', matching the curb and gutter sections closer to downtown. Ideally, physically separated bike lanes would include constructing a 2'-3' physical buffer and 6'-7' of operating space for bicyclists on each side of the road. If a physical buffer cannot be constructed at this time, an enhanced shoulder/bike lane with a vertical separator is an option.



To enhance safety and comfort for both bicyclists and motorists, lower the speed limit to 20 mph along Main St from Homestead Ave to Holly Hill Rd (the latter serves as another connector to the Broad River Greenway Trails along with College Farm Rd).

Main Street, from College Avenue to Stadium Drive has parallel parking and 40' pavement width (total). There is no room for separated bicycle facilities without reconstructing the road. Install shared lane markings (sharrows), lower the speed limit to 20 mph and consider traffic calming measures.

While extending the paved shoulders/existing bike lane another 2' (minimum) on each side and enhancing the buffer space with striping or bicycle-friendly rumble strip design can be a key improvement in the short-term, the ideal facility would include physically separated bike lanes with a 2'-3' physical buffer and 6'-7' of operating space for bicyclists on each side of the roadway, requiring new construction.

1. See Small Town and Rural Multimodal Network Design Guide. ruralsdesignguide.com

21

CLEVELAND COUNTY RAIL TRAIL

Length: 10 miles

Jurisdictions: City of Shelby, Town of Patterson Springs, Town of Earl, Cleveland County

Trip Generators:

- Downtown Shelby
- First Broad River Trail/Carolina Thread Trail
- Downtown Patterson Springs
- Downtown Earl
- Blacksburg, SC

Support in Other Plans:

- Cleveland County Carolina Thread Trail Master Plan (2010)
- Cleveland County Rail Trail Master Plan (currently underway (2017-2018))

Potential ROW Needs:

- Owned by Norfolk Southern

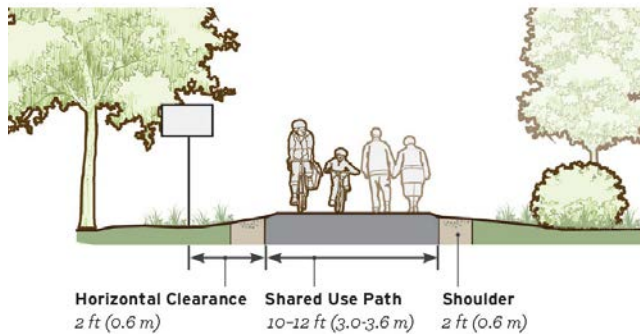
Potential Partnerships:

- City of Shelby
- Town of Patterson Springs
- Town of Earl
- Cleveland County
- NCDOT
- Businesses along corridor
- Carolina Thread Trail
- Norfolk Southern

Estimated Construction Costs:

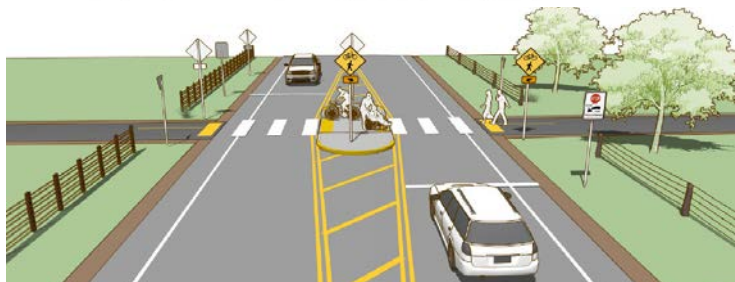
- \$ 8,100,000

DESIGN OPTIONS & CONSIDERATIONS



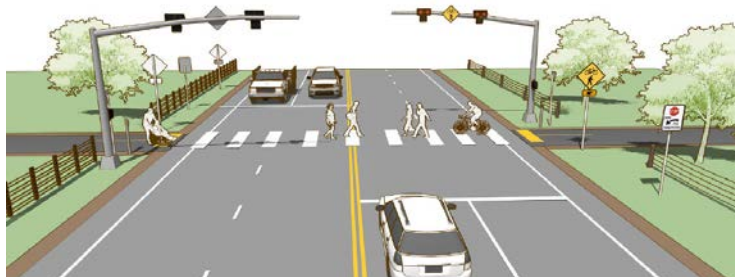
Shared Use Path Example

For design options and further detail, please see the Small Town and Rural Multimodal Network Design Guide at - <http://ruralsdesignguide.com/physically-separated/shared-use-path>.



Intersection Crossing Examples

For design options and further detail, please see the Small Town and Rural Multimodal Network Design Guide at - <http://ruralsdesignguide.com/physically-separated/shared-use-path>.



21 CLEVELAND COUNTY RAIL TRAIL

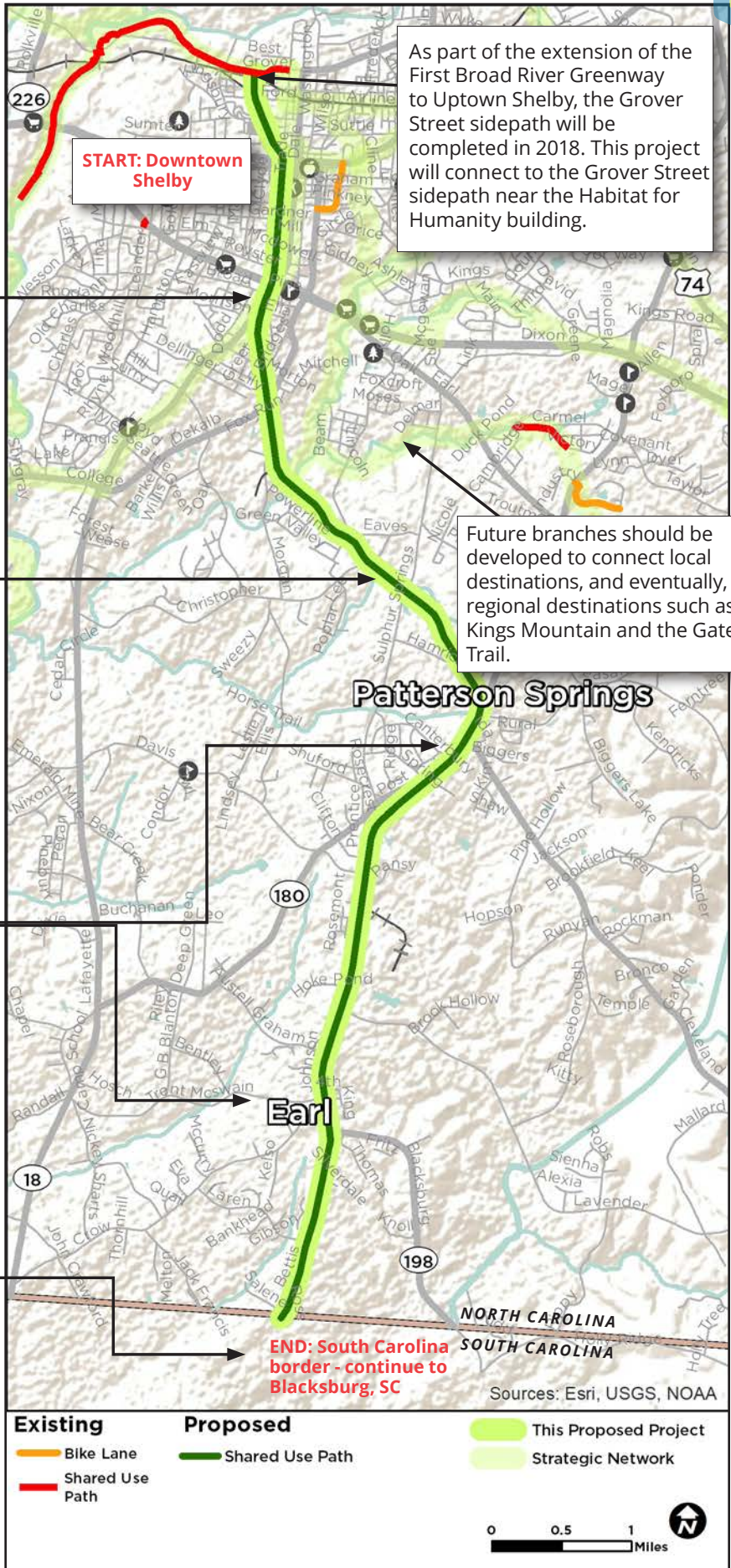
Construct shared use path (rail trail) from uptown Shelby to the South Carolina border, following the old railroad line.

Bridge structures for roadway crossings (such as US 74 in Shelby) and creek crossings (such as Hickory Creek and Logan Branch) occur along the old railroad line. Existing bridge structures will need engineering assessment.

Incorporate rail trail into downtown street-scape of Patterson Springs and Earl.

Continue shared use path (rail trail) to Blacksburg, SC

Note: This rail trail is recommended to be designated as part of the Carolina Thread Trail. Further details regarding this project will be explored during the Cleveland County Rail Trail Master Plan process that is currently underway.



UPTOWN SHELBY WAREHOUSE (existing, south of Uptown Shelby)



UPTOWN SHELBY (potential trail-oriented development)



BRIDGE OVER US 74 (existing, south of Uptown Shelby)



BRIDGE OVER US 74 (Potential low-stress crossing over US 74)



22

1ST BROAD RIVER GREENWAY TO CLEVELAND COUNTY RAIL TRAIL

Length: 0.6 miles

Jurisdictions: City of Shelby

Trip Generators:

- First Broad River Greenway
- Uptown Shelby
- Future Cleveland County Rail Trail

Support in Other Plans:

- Cleveland County Carolina Thread Trail Master Plan (2010)
- Cleveland County Rail Trail Master Plan (currently underway (2017-2018))

Potential ROW Needs:

- None

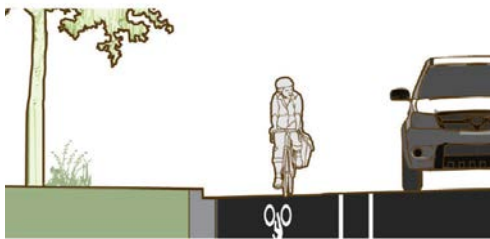
Potential Partnerships:

- City of Shelby
- Uptown businesses
- Carolina Thread Trail

Estimated Construction Costs:

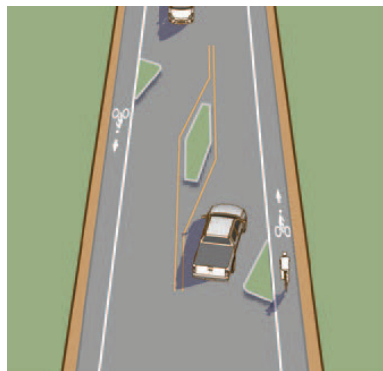
- \$ 120,000

DESIGN OPTIONS & CONSIDERATIONS



Visually Separated Example

While less ideal, a striped bicycle lane can be implemented when no space/resources for a physical buffer exists, and can serve as a significant improvement for bicycle and motorist safety and comfort. Further detail regarding visually separated bike lanes can be found in the Small Town and Rural Multimodal Network Design Guide at <http://ruraldesignguide.com/visually-separated/bike-lane>.



Lateral Shift (Chicane): Traffic Calming Example

Lateral shifts are realignments of an otherwise straight travel path. When multiple lateral shifts are applied to form an S-shaped curve it is called a chicane. For traffic calming, the taper lengths may be as much as half of what is suggested in traditional highway engineering.

Further detail regarding traffic calming options can be found on pages 5-3 - 5-6 of the Small Town and Rural Multimodal Network Design Guide. The guide can be downloaded at https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/small_towns/.

22 1ST BROAD RIVER GREENWAY TO CLEVELAND COUNTY RAIL TRAIL

Morgan Street, from Marion Street to Grover Street, is a two-lane road with 30'-34' pavement width, and a speed limit that transitions from 20 mph to 35 mph (traffic volumes are not documented). No on-street parking is present.

5'-7' bicycle lanes are recommended to be striped (narrowing the travel lanes to 10'), with 2' buffer striping where feasible, and the speed limit is recommended to be lowered to 20 mph the length of the corridor. Traffic calming features such as lateral shifts (chicanes) are recommended to be installed strategically.

Care must be taken to smooth the asphalt-gutter transition (pave asphalt all the way to curb), and install bicycle-friendly drainage grates to ensure safe and comfortable bicycle operating space.

Future implementation of the Cleveland County Rail Trail through Uptown Shelby in addition to the Grover Street sidepath that is currently under development are key connections for this project.



23 UPTOWN SHELBY - LAFAYETTE STREET

Length: 0.8 miles

Jurisdictions: City of Shelby

Trip Generators:

- Uptown Shelby
- Future Cleveland County Rail Trail

Support in Other Plans:

- None

Potential ROW Needs:

- None

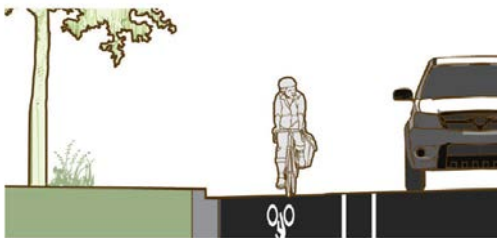
Potential Partnerships:

- City of Shelby
- Businesses along corridor
- NCDOT

Estimated Construction Costs:

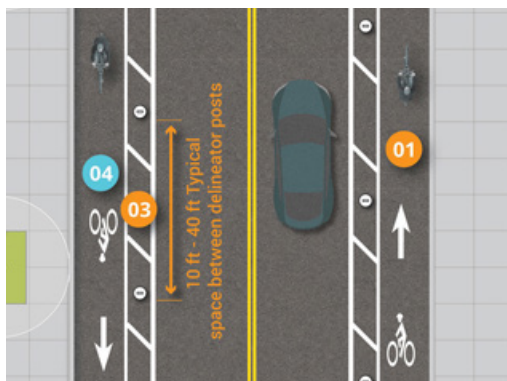
- \$ 110,000

DESIGN OPTIONS & CONSIDERATIONS



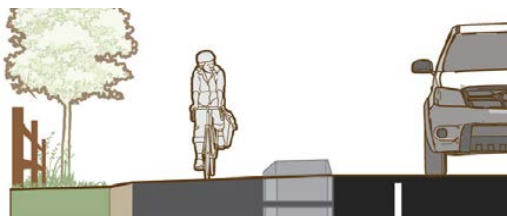
Visually Separated Example (used for cost estimate)

While less ideal, construction of a bicycle lane with a painted buffer rather than a physical buffer can be a significant improvement for bicycle and motorist safety and comfort, while still reserving space for constructing a physical buffer in the future. Further detail regarding visually separated bike lanes can be found in the Small Town and Rural Multimodal Network Design Guide at <http://ruraldesignguide.com/visually-separated/bike-lane>.



Physically Separated Examples

Several configurations are possible to create physical separation from automobile traffic. These options should be explored during the design phase. See example graphic to the left from the Small Town and Rural Multimodal Network Design Guide. Further detail can be found at - <http://ruraldesignguide.com/physically-separated/separated-bike-lane> and the Separated Bike Lane Planning and Design Guide for more urban contexts at - https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/page07.cfm#chapter5_dir.



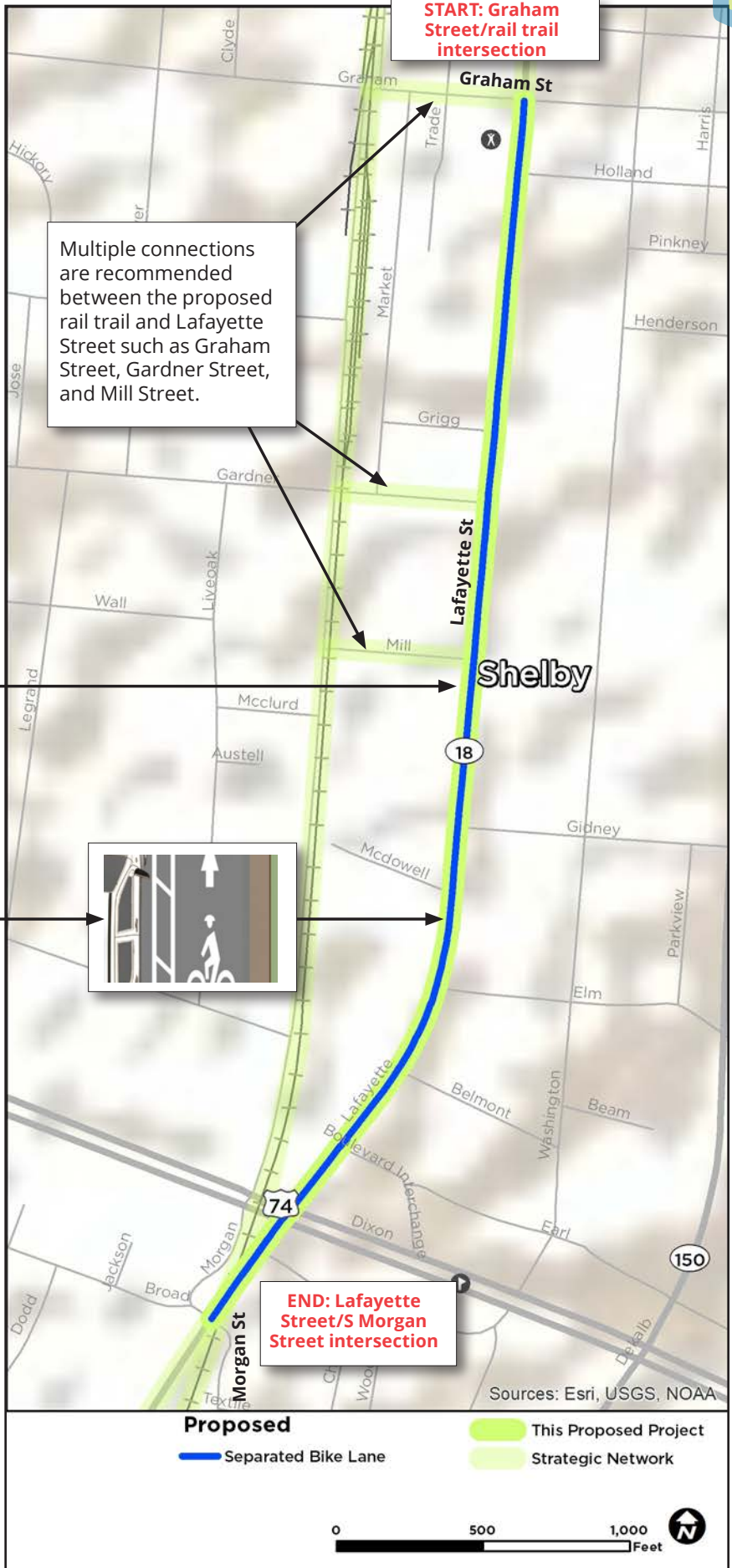
23 UPTOWN SHELBY - LAFAYETTE STREET

Lafayette Street, from Graham Street to S Morgan Street, is a five-lane road with 60'-64' pavement width, traffic volumes of 12,000-13,000 AADT, and a speed limit that transitions from 20 mph to 35 mph heading south. Ideal bicycle facilities for all ages and abilities would have physical separation from automobile traffic.¹

Lafayette Street is recommended to be further studied for conversion from five travel lanes to three (two travel lanes with a center turn lane), and separated bicycle lanes in each direction that include a 2'-3' buffer and 6'-7' bike lane.

Buffer space can be painted in the interim if funds are not available to construct physically separated bike lanes and other corridor improvements such as driveway consolidation.

Multiple connections are recommended between the proposed rail trail and Lafayette Street such as Graham Street, Gardner Street, and Mill Street.



1. See Small Town and Rural Multimodal Network Design Guide. ruralsdesignguide.com

24 **SHELBY TO KINGS MOUNTAIN - US 74 SERVICE ROAD**

Length: 3.2 miles

Jurisdictions: Cleveland County

Trip Generators:

- City of Shelby
- City of Kings Mountain
- Businesses along corridor

Support in Other Plans:

- Cleveland County Carolina Thread Trail Master Plan (2010)
- Cleveland County Rail Trail Master Plan (currently underway (2017-2018))
- Kings Mountain Bicycle Plan (2011)
- STIP (R-2707E)

Potential ROW Needs:

- TBD

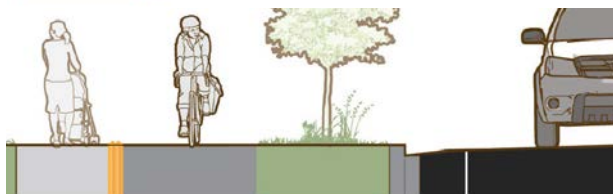
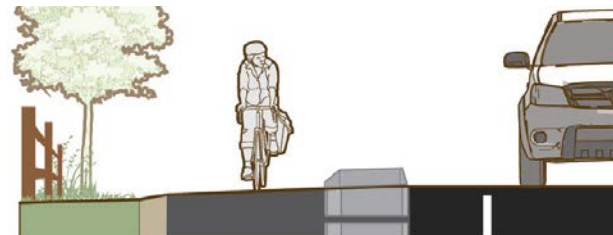
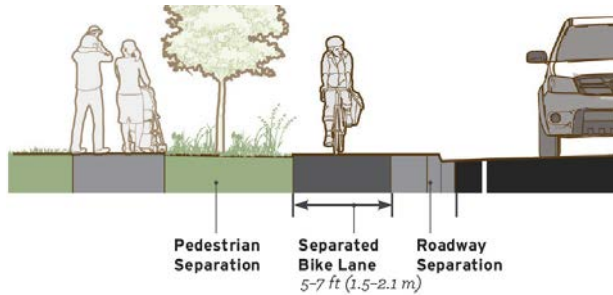
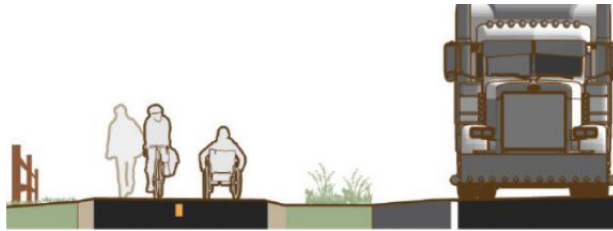
Potential Partnerships:

- City of Shelby
- City of Kings Mountain
- Cleveland County
- Carolina Thread Trail
- Businesses along corridor
- NCDOT

Estimated Construction Costs:

- \$ 4,800,000

DESIGN OPTIONS & CONSIDERATIONS



Physically Separated Examples (top example, side-path, is used for the cost estimate)

Several configurations are possible to create physical separation from automobile traffic. These options should be explored during the design phase. See example graphics to the left from the Small Town and Rural Multimodal Network Design Guide. Further detail can be found at - <http://ruralsdesignguide.com/physically-separated/separated-bike-lane>.

24 SHELBY TO KINGS MOUNTAIN - US 74 SERVICE ROAD

Construct a shared use path to Buffalo Creek, crossing under US 74 and connecting to Hoey Church Road. Several options to the north and south of US 74 could complete the link to Uptown Shelby from this area.

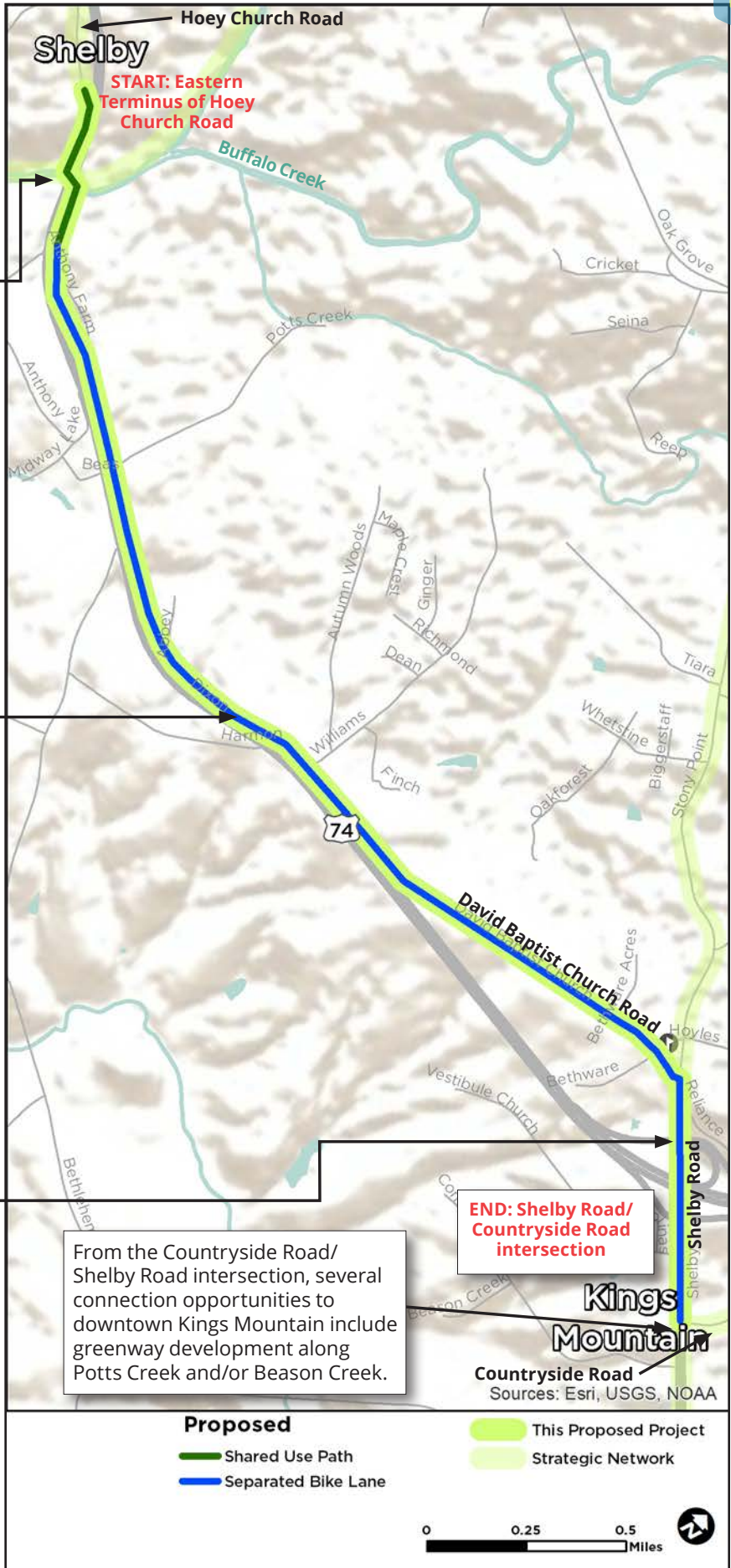
As part of the future US 74-Shelby Bypass in Cleveland County (STIP - R-2707E), improvements to US 74 from approximately Buffalo Creek to David Baptist Church Road will include a service road along the north side of US 74.

The design of this project should include separated bike lanes. Roadway construction is a critical time in which separated bicycle facilities can be incorporated efficiently - it is typically much more expensive to retrofit projects with separated bike lanes after a roadway has already been constructed.

A sidepath along the north side of this potential service road is likely the best option, although key variables such as project footprint and associated driveways and roadway crossings, and right-of-way needs are unknown at the time of this writing. There are multiple separated bike lane options that are displayed on the page to the left.

Construct a sidepath along the southwest side of Shelby Road from David Baptist Church Road to Countryside Road. The Shelby Road bridge over US 74 carries 11,000 AADT and has 88' pavement width - a two-way cycle track, on the west side of the bridge, (in keeping with sidepath consistency on both sides of the bridge) could be implemented on the southwest side as part of this section by removing the outside lane that appears on the bridge approach from the west.

Note: This project is recommended to be designated as part of the Carolina Thread Trail.



25

DOWNTOWN KINGS MOUNTAIN TO THE GATEWAY TRAIL

Length: 1 mile

Jurisdictions: City of Kings Mountain

Trip Generators:

- Downtown Kings Mountain
- Kings Mountain Gateway Trail/Carolina Thread Trail

Support in Other Plans:

- Isothermal Planning & Development Commission Trails Map (2014)
- Kings Mountain Bicycle Plan (2011)
- Carolina Thread Trail Master Plan - Cleveland County (2013)
- Cleveland County CTP (2010)

Potential ROW Needs:

- ROW is needed for the shared use path section from the southern terminus of Wilson Street to the existing Gateway Trail/Quarry Road.

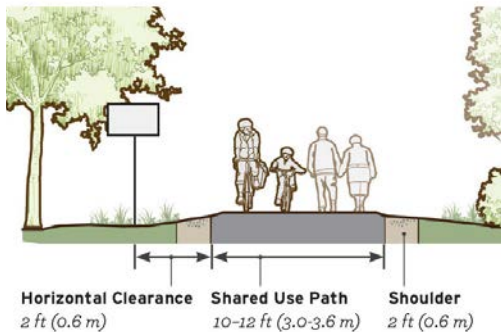
Potential Partnerships:

- City of Kings Mountain
- Carolina Thread Trail
- Kings Mountain Gateway Trail
- Kings Mountain Main Street program
- Downtown Kings Mountain businesses
- NCDOT

Estimated Construction Costs:

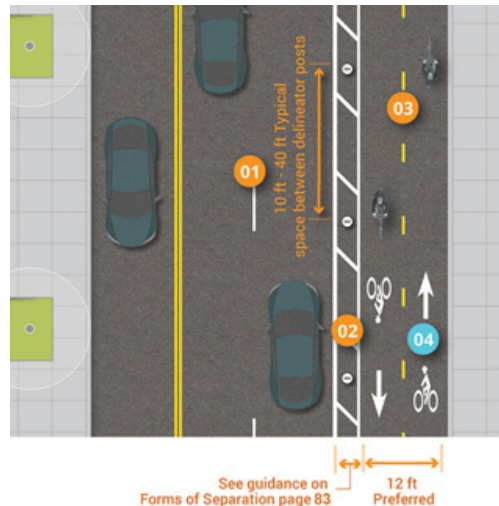
- Option 1: \$ 1,000,000
- Option 2: \$ 950,000

DESIGN OPTIONS & CONSIDERATIONS



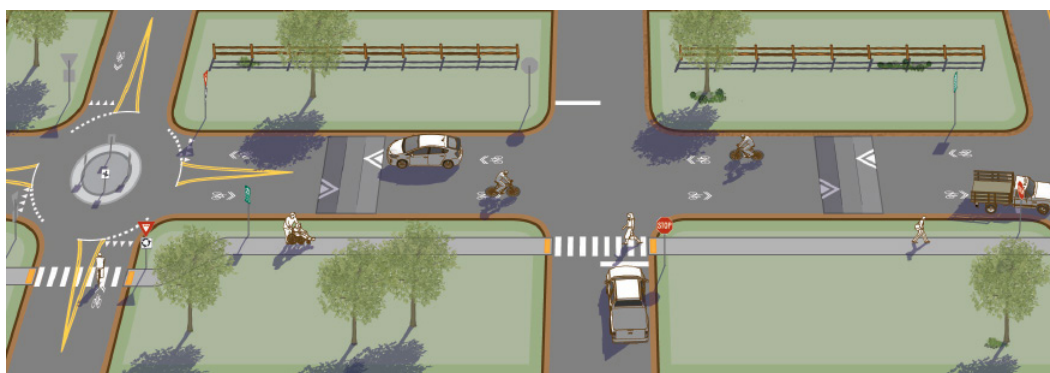
Shared Use Path Example

For design options and further detail, please see the Small Town and Rural Multimodal Network Design Guide at - <http://ruralsdesignguide.com/physically-separated/shared-use-path>.



Physically Separated (Two-Way Cycle Track) Example

For design options and further detail, please see the Separated Bike Lane Planning and Design Guide at - https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/page07.cfm#chapter5_dir.



Mixed Traffic Example (Shared Lane)

For design options and further detail, please see the Small Town and Rural Multimodal Network Design Guide at - <http://ruralsdesignguide.com/mixed-traffic>.

25 DOWNTOWN KINGS MOUNTAIN TO THE GATEWAY TRAIL

Option 1: Battleground Ave in downtown Kings Mountain from Mountain Street to Gold Street is 2-lane with 40' pavement width from curb to curb (on the west side of the street, the curb refers to the curb extensions that align with the edge of the angled parking). There is parallel parking on the east side of the street. Traffic volumes are approximately 6,500 AADT and the speed limit is 20 mph.

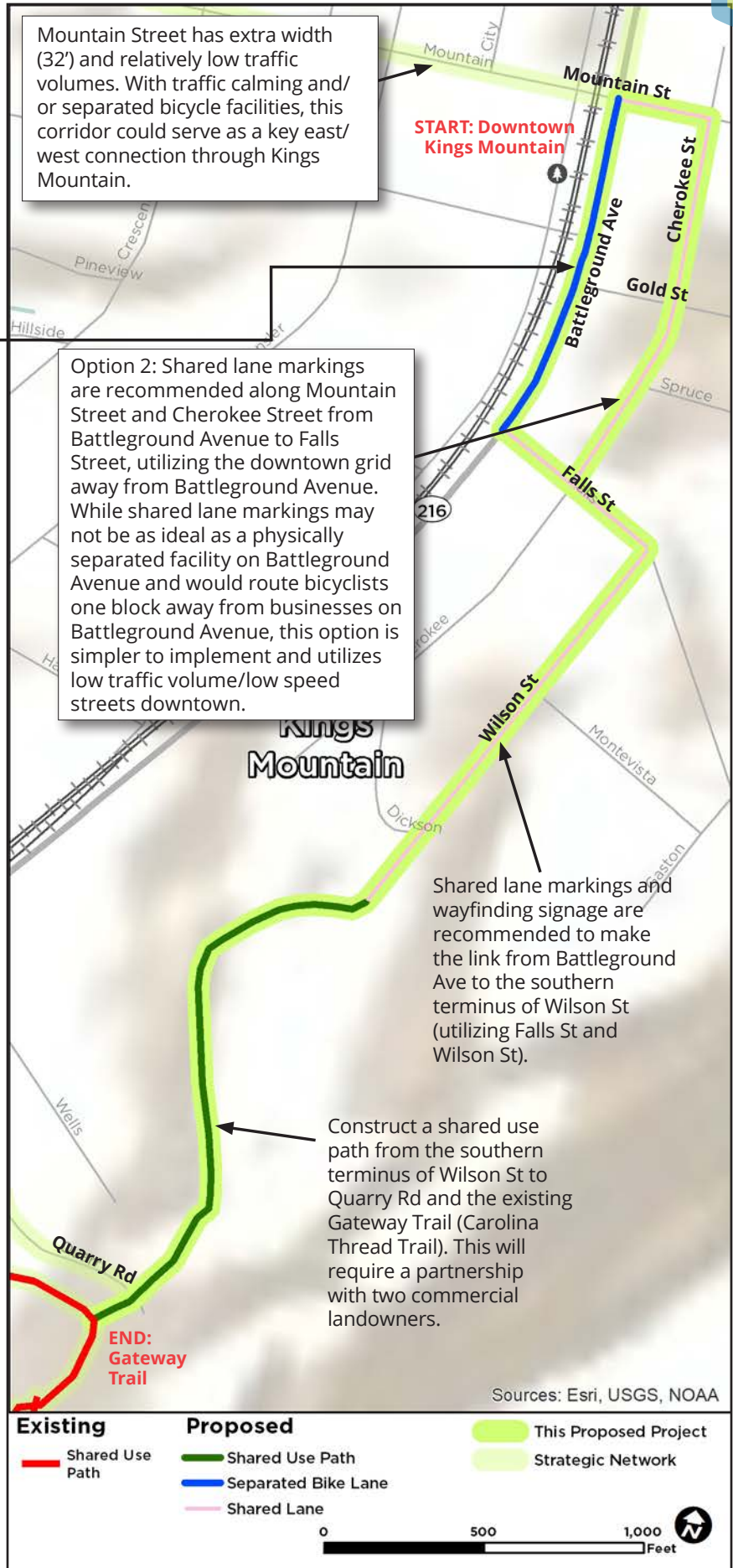
Ideal bicycle facilities for all ages and abilities would have physical separation from automobile traffic.¹ Given the existing space, a 10', two-way cycle track on the east side of the street with a 2' buffer is recommended, shifting the parallel parking between the automobile travel lanes and the recommended two-way cycle track.

This configuration utilizes the extra pavement width to add separated bicycle facilities without removing any parking. The angled parking on the west side of the street remains the same with 10.5' allotted to the two automobile travel lanes, 7' for the parallel parking, 2' for the buffer space, and 10' for the two-way cycle track.

Between the Battleground Avenue/Gold Street intersection heading west and the Battleground Avenue/Gold Street intersection heading east, the existing pavement width is 50.5' accommodating a center turn lane (which also allows space for the above recommendation).

From Gold Street to Falls Street, no parallel parking is currently permitted, leaving space for the recommended two-way cycle track to continue to Falls Street within the existing curb.

Note: This section is recommended to become an official section of the Carolina Thread Trail in addition to the Kings Mountain Gateway Trail.



1. See Small Town and Rural Multimodal Network Design Guide. ruraldesignguide.com

26

GATEWAY TRAIL TO CROWDERS MOUNTAIN STATE PARK

Length: 2.8 miles

Jurisdictions: City of Kings Mountain, Cleveland County, Crowders Mountain State Park

Trip Generators:

- Downtown Kings Mountain
- Gateway Trail/Carolina Thread Trail
- Crowders Mountain State Park
- Kings Mountain City Lakes Number One and Number Two

Support in Other Plans:

- Isothermal Planning & Development Commission Trails Map (2014)
- Kings Mountain Bicycle Plan (2011)
- Carolina Thread Trail Master Plan - Cleveland County (2013)
- Cleveland County CTP (2010)
- Kings Mountain Gateway Trail Study - Phase 5 (2017)

Potential ROW Needs:

- This section will require partnerships with multiple local private and public landowners depending on the route chosen. Further study needed.

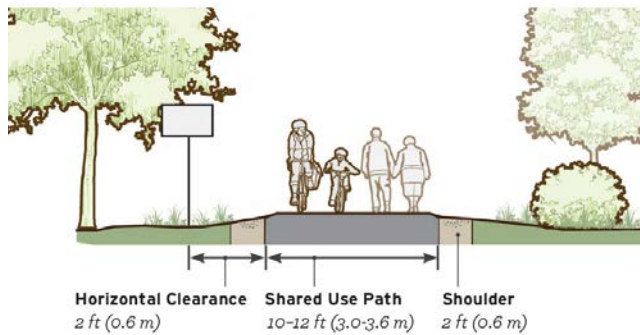
Potential Partnerships:

- City of Kings Mountain
- Cleveland County
- Private and commercial property owners
- Crowders Mountain State Park
- Kings Mountain Gateway Trail
- Carolina Thread Trail
- NCDOT

Estimated Construction Costs:

- \$ 975,000 (unpaved)

DESIGN OPTIONS & CONSIDERATIONS



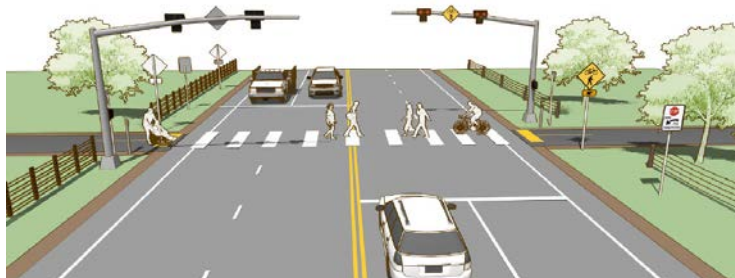
Shared Use Path Example

For design options and further detail, please see the Small Town and Rural Multimodal Network Design Guide at - <http://ruralsdesignguide.com/physically-separated/shared-use-path>.



Intersection Crossing Examples

For design options and further detail, please see the Small Town and Rural Multimodal Network Design Guide at - <http://ruralsdesignguide.com/physically-separated/shared-use-path>.

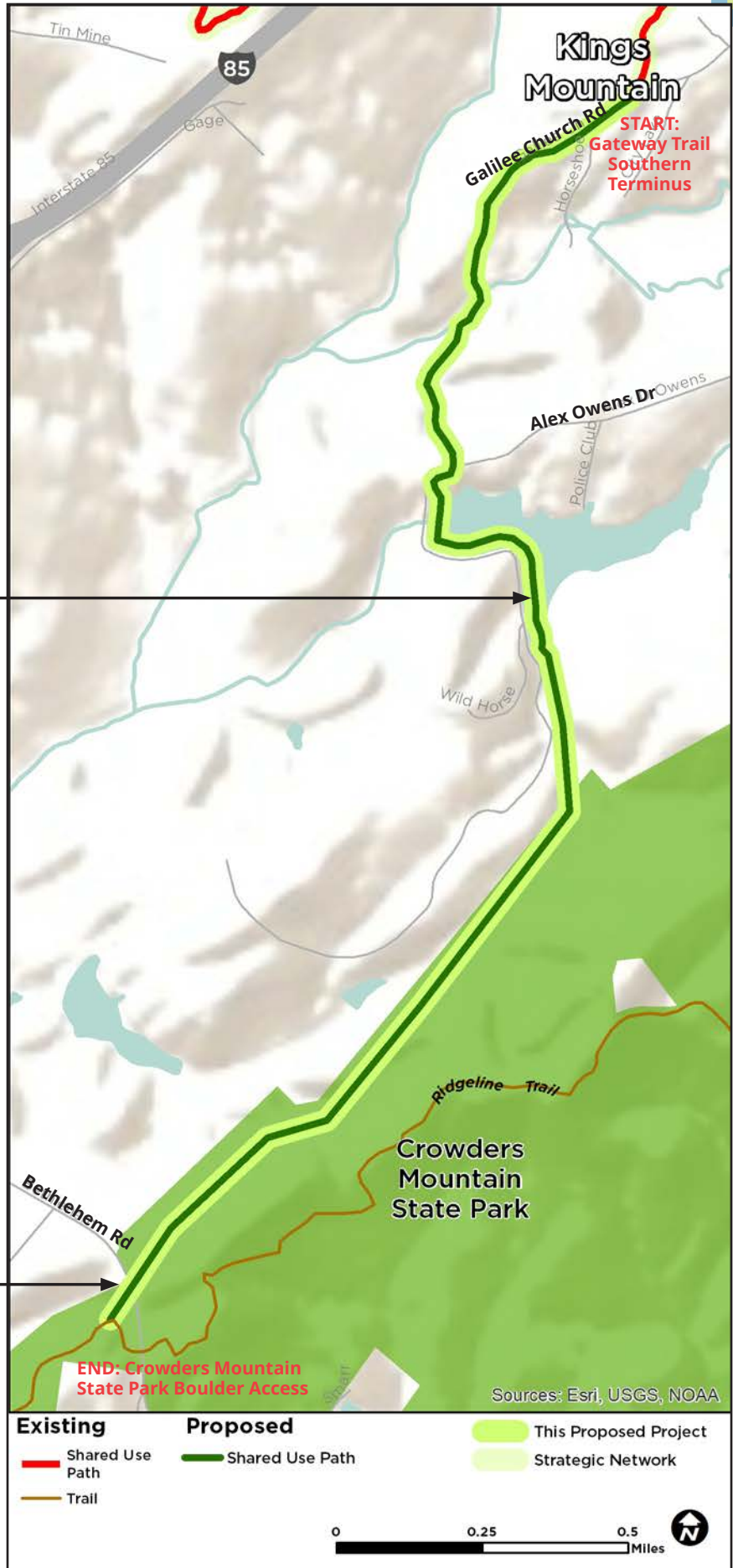


26 GATEWAY TRAIL TO CROWDERS MOUNTAIN STATE PARK

Construct shared use path from the southern terminus of the existing Gateway Trail/Carolina Thread Trail at Galilee Church Road to the Crowders Mountain State Park Boulder Access at Bethlehem Road. The alignment shown from this map is a representation of the route proposed in the Carolina Thread Trail Cleveland County Master Plan. Multiple trail alignment alternatives as well are currently under consideration for the entirety of this section.

Connect to the Crowders Mountain State Park Boulder Access trailhead and Ridgeline Trail (hiking).

Note: This section is recommended to become an official section of the Carolina Thread Trail in addition to the Kings Mountain Gateway Trail.



MAP 3.2 STRATEGIC REGIONAL BICYCLE NETWORK

EXISTING

- Shared Use Paths
- Bike Lane
- Hiking/Mt Biking Trail
- Other Trail

PROPOSED

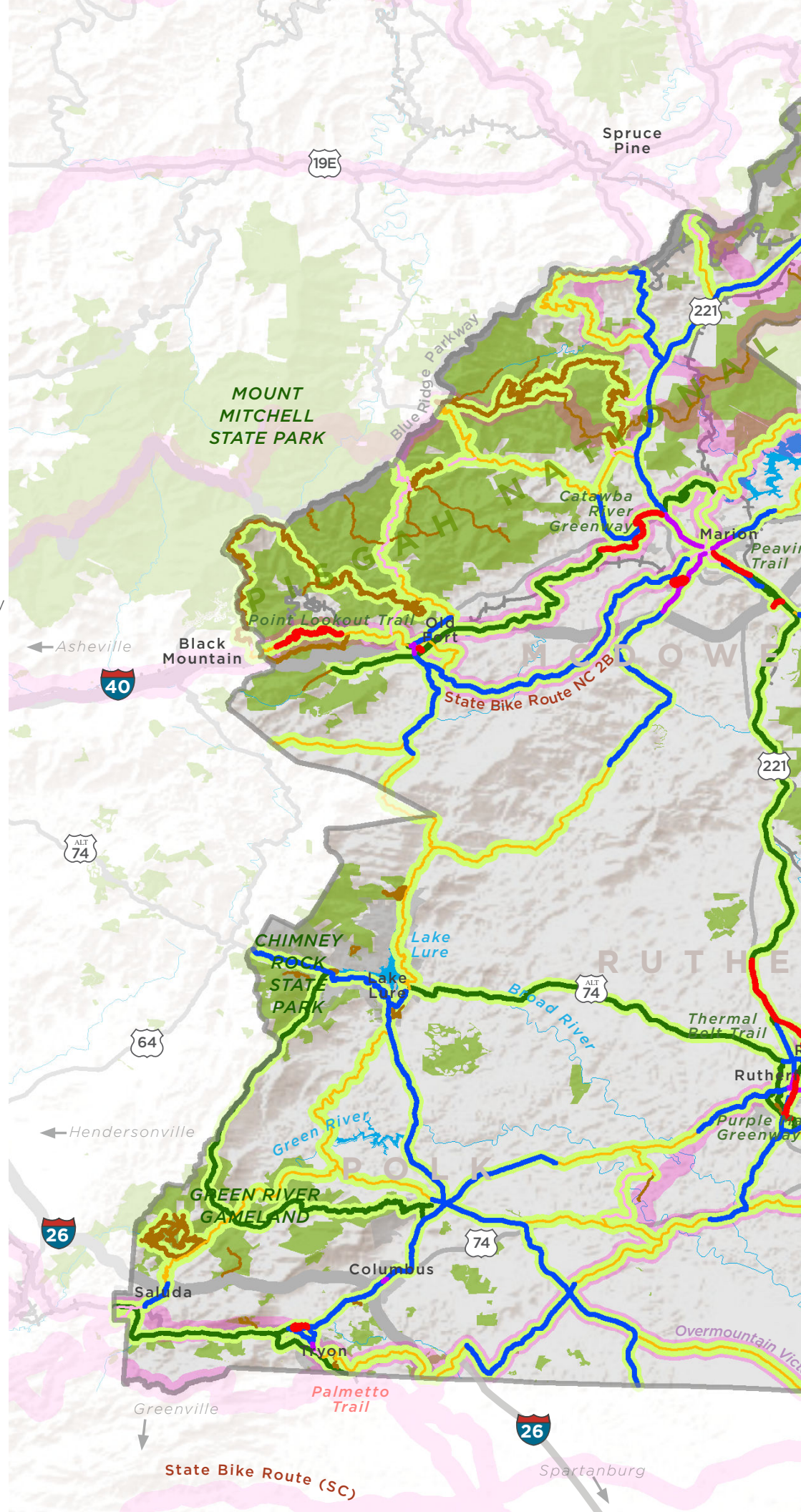
- Shared Use Path (Greenways)
- Separated Bike Lane
- Separated Bike Lane (Potentially Within Existing Curb)
- Paved Shoulder
- Shared Lane
- Strategic Network

REGIONAL/STATEWIDE

- State/Regional Trail System

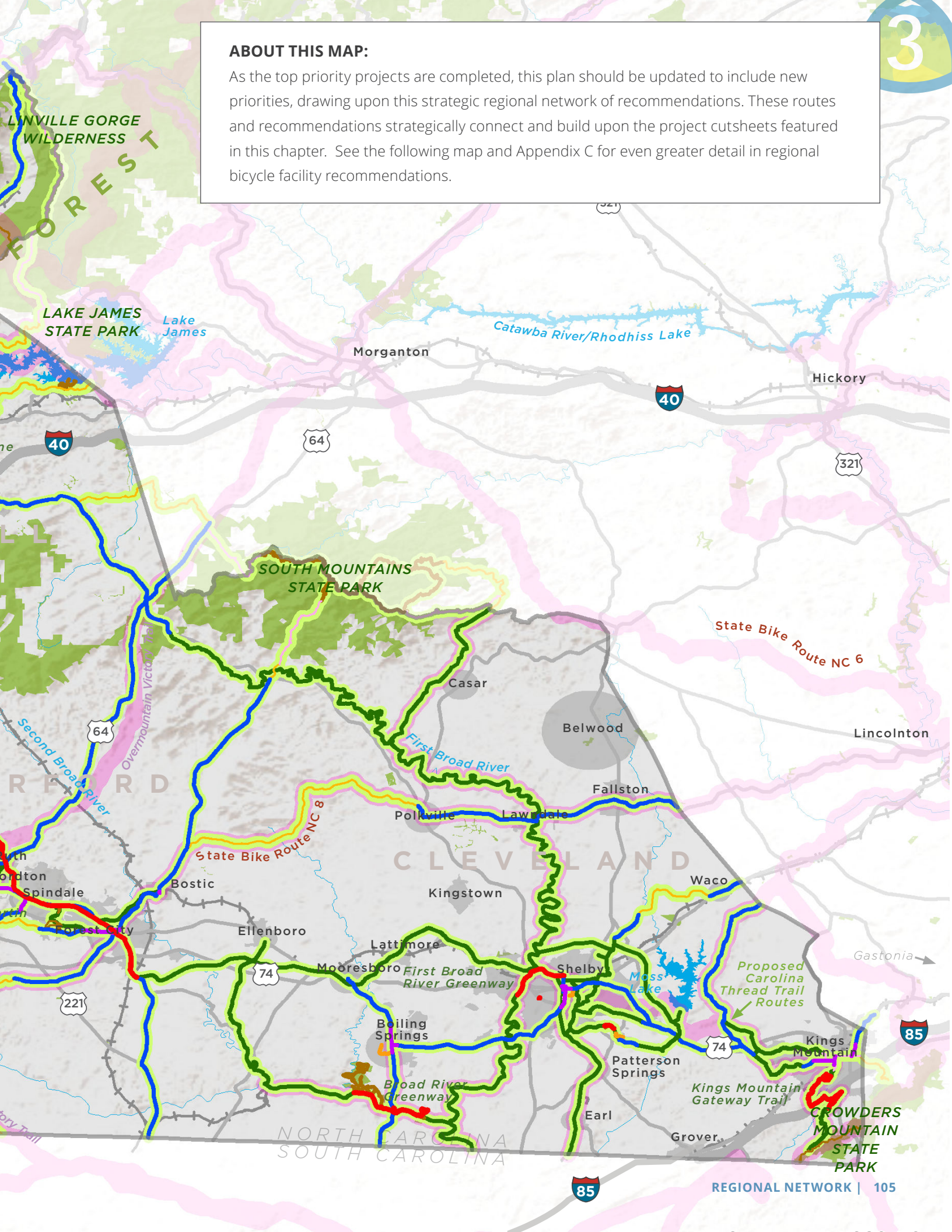
OTHER FEATURES

- Study Area
- Municipalities
- Parks & Conservation
- Lakes & Rivers
- Topography
- + Railroads



ABOUT THIS MAP:

As the top priority projects are completed, this plan should be updated to include new priorities, drawing upon this strategic regional network of recommendations. These routes and recommendations strategically connect and build upon the project cutsheets featured in this chapter. See the following map and Appendix C for even greater detail in regional bicycle facility recommendations.



MAP 3.3 COMPREHENSIVE REGIONAL BICYCLE NETWORK

EXISTING

- Shared Use Paths
- Bike Lane
- Hiking/Mt Biking Trail
- Other Trail

PROPOSED

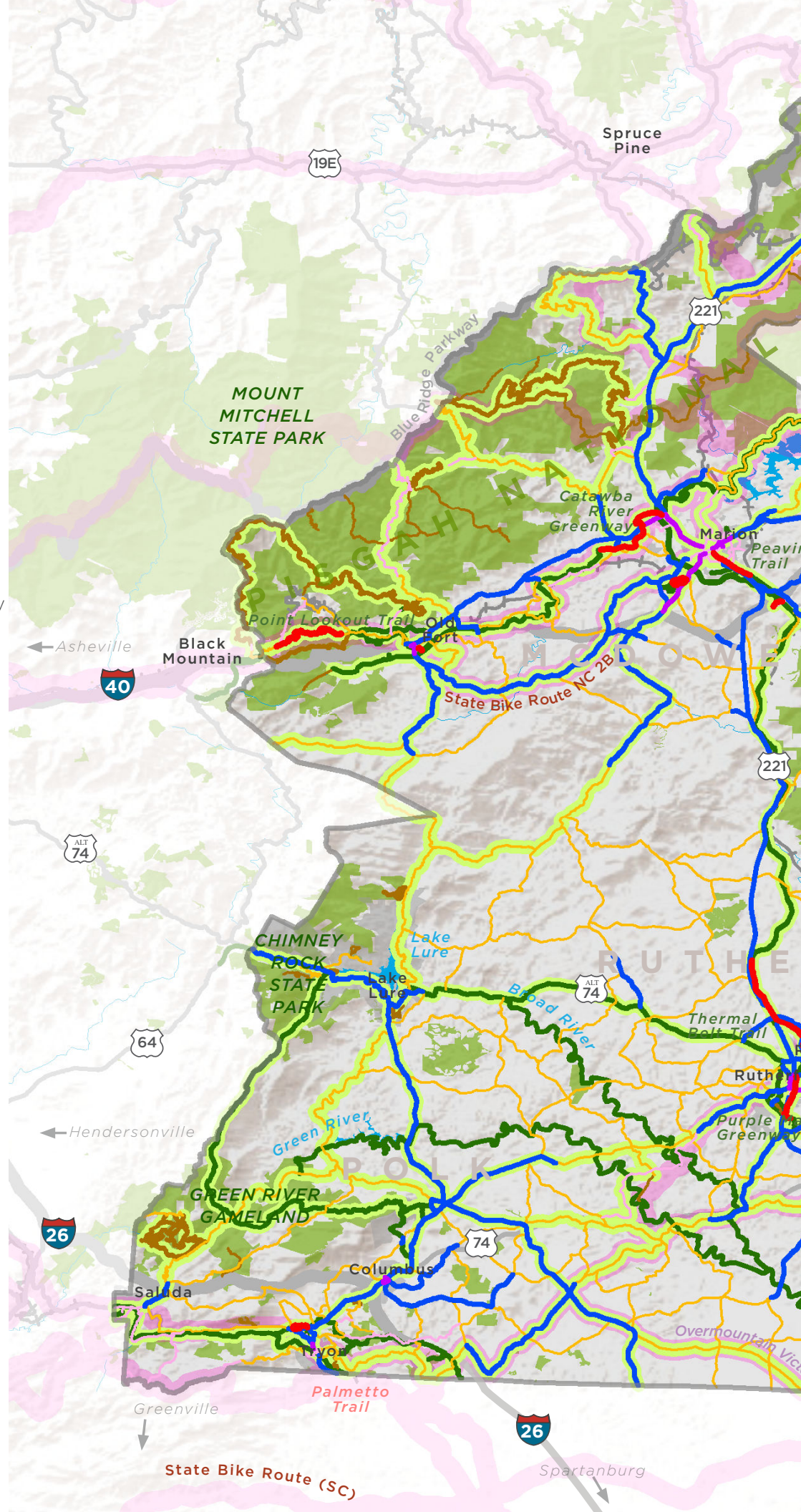
- Shared Use Path (Greenways)
- Separated Bike Lane
- Separated Bike Lane (Potentially Within Existing Curb)
- Paved Shoulder
- Shared Lane
- Strategic Network

REGIONAL/STATEWIDE

- State/Regional Trail System

OTHER FEATURES

- Study Area
- Municipalities
- Parks & Conservation
- Lakes & Rivers
- Topography
- + Railroads

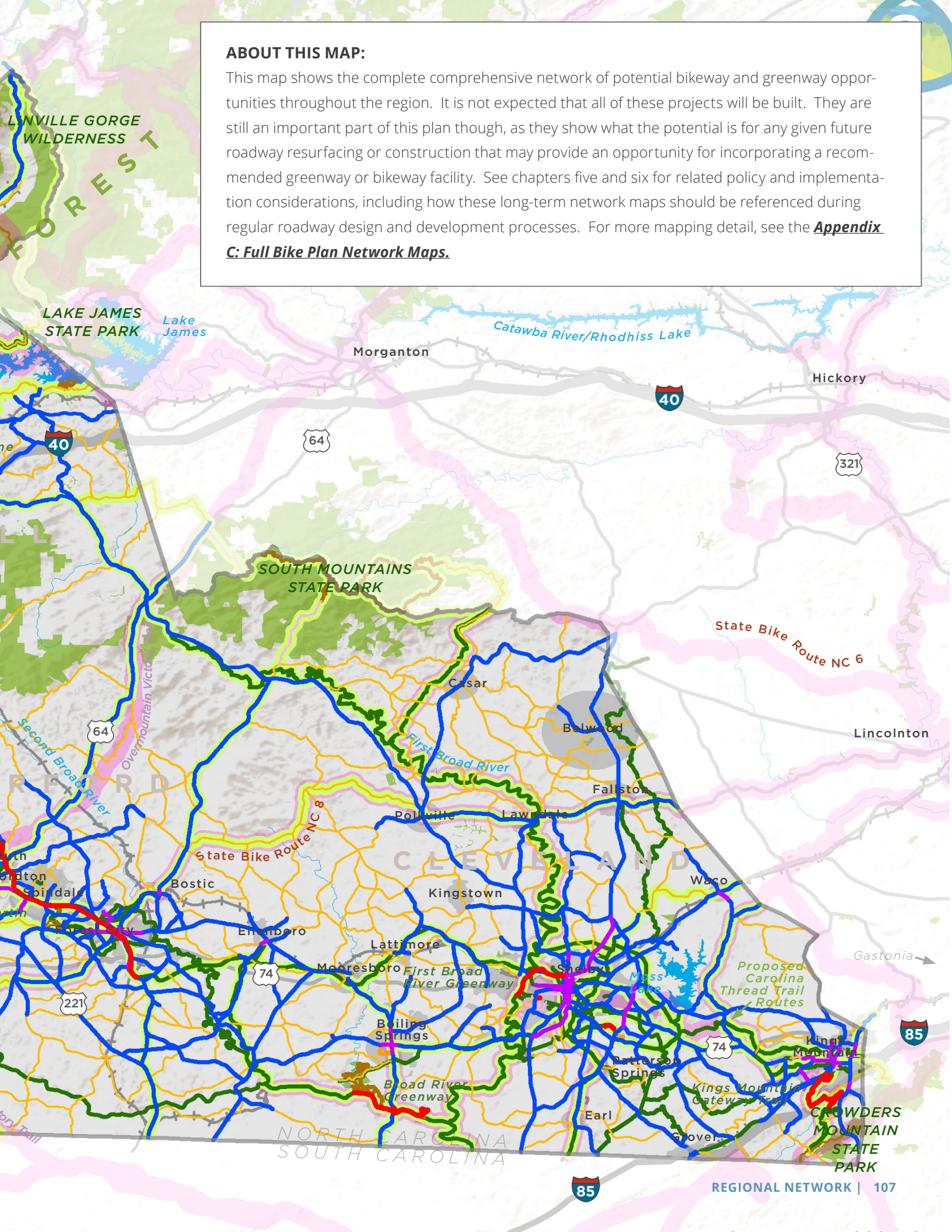


10 miles



ABOUT THIS MAP:

This map shows the complete comprehensive network of potential bikeway and greenway opportunities throughout the region. It is not expected that all of these projects will be built. They are still an important part of this plan though, as they show what the potential is for any given future roadway resurfacing or construction that may provide an opportunity for incorporating a recommended greenway or bikeway facility. See chapters five and six for related policy and implementation considerations, including how these long-term network maps should be referenced during regular roadway design and development processes. For more mapping detail, see the **Appendix C: Full Bike Plan Network Maps.**





PROGRAM STRATEGIES
4
CHAPTER FOUR

OVERVIEW

Education, encouragement, and enforcement programs can be just as important as infrastructure, especially in the promotion of bicycling safety and for promoting awareness of bicycling resources throughout the region.

The program recommendations in this chapter are critical to making bicycling more attractive and accessible to new bicyclists within the region, and for drawing new bicycle tourism from outside of the region.

Programs may be implemented as one-time events, temporary campaigns, or as on-going initiatives, depending on their purposes. In essence, these different efforts use varying degrees of education, encouragement, and enforcement to market bicycling to the general public and ensure the maximum return on investment in bicycling facilities.

These initiatives can be undertaken by local agencies, regional organizations, community organizations, or by any combination of partnerships between such agencies and organizations. The recommendations were developed based on input from the public and the Steering Committee.



Materials that support bicycle-related programs and initiatives could be distributed at local public events, such as the Hilltop Fall Festival (photo by Rutherford Outdoor Coalition).

REGIONAL BICYCLING WEBSITE: PARTNER WITH THE RUTHERFORD OUTDOOR COALITION (ROC)

Purpose: Make bicycling information easier to find by providing resources, maps, safety information, events, group listings, and more, in one central place.

Audience: General public

Partners: Rutherford Outdoor Coalition, Isothermal Regional Bicycle Plan Committee, McDowell Trails Association, Carolina Thread Trail, municipalities and counties, local advisory committees, and local advocates.

Description: Many current and potential bicyclists do not know where to turn to find out about bicycling routes, destinations, events, maps, tips, and groups. However, the Rutherford Outdoor Coalition recently launched a website including an interactive map that will feature bicycling facilities across the region.

This website should continue to serve as a regional walking and bicycling “one-stop” website. The ROC website currently includes:

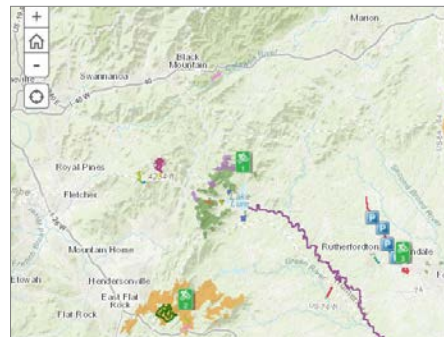
- An interactive map of trails for walking-hiking, running, mountain biking, equestrians, and rock climbing areas (an interactive map for cycling is under development);
- Information about monthly general meetings and newsletters detailing current projects;
- Information about bicycling events (and running events) and an events calendar;
- Ways to get involved as a member, sponsor, and volunteer as well as specific opportunities;
- Specific opportunities such as a Trails Coordinator position, the Trail Boss program and River Steward Program

Additional information that should be added to the website includes:

- A list of links and descriptions to all walking and bicycling groups in the region, including clubs, racing teams, and advocacy groups such as the McDowell Trails Association, Broad River Council, Kings Mountain Gateway Trail, and the Carolina Thread Trail;
- Complete the Cycling Viewer interactive map that is currently under development including information produced as part of this planning process;
- A list of local bike shops and bicycle rentals, including phone numbers and addresses;
- Links to laws and statutes relating to bicycling

The ROC site will continue to be successful if it is updated regularly. All website content should be reviewed regularly for accuracy.

ROC Website: www.rutherfordoutdoor.org



ROC is currently gathering information for bicycling to add to their interactive map.



The ROC website includes information on local events.

TRAIL COORDINATORS THROUGH AMERICORPS PROJECT CONSERVE

Purpose: Improve trail systems and community connectivity.

Audience: Counties and municipalities, AmeriCorps Vista Volunteers

Partners: Rutherford Outdoor Coalition, Isothermal Regional Bicycle Plan Committee, McDowell Trails Association, Carolina Thread Trail, Kings Mountain Gateway Trail, Broad River Greenway, municipalities and counties, local advisory committees, and local advocates

Description: Currently, Polk County and Rutherford County each host an AmeriCorps Trails Coordinator position through the AmeriCorps' Project Conserve. This is a National Service program in which members come from across the nation to dedicate themselves to serving western North Carolina for an 11 month service term. The program focuses on collaboration with nonprofit organizations, community groups and local governments to provide service throughout the region.

In Polk County, the Trails Coordinator position works for the County Parks & Recreation Department through a grant from the Polk County Community Foundation. The Polk County Trails Coordinator manages trail work days, various partnerships and other trail related initiatives in the county.

In Rutherford County, the Trails Coordinator position is supported by a partnership between ROC, the Town of Lake Lure and Rutherford County. Similarly, the Rutherford County Trails Coordinator works to expand and improve Rutherford County's growing trail system and community connections to public lands, helping to administer current ROC Trail Boss, River Steward, and other programs and activities.

The Polk County and Rutherford County Trail Coordinators should review the recommendations from this plan and integrate implementation of this plan's recommendations into their daily responsibilities.



Dana Bradley, the AmeriCorps employee who works with trails in Rutherford County. Bradley uses a bicycle donated by ROC to patrol the Thermal Belt Rail Trail, checking for obstacles in the trail, litter, unauthorized users and rule violators.

Furthermore, McDowell County and Cleveland County should create Trail Coordinator positions through this program as well. The McDowell Trails Association, Town of Old Fort, and City of Marion could serve as partners in this effort. In Cleveland County, the Carolina Thread Trail, Kings Mountain Gateway Trail Foundation, Broad River Greenway, City of Shelby, Town of Boiling Springs, City of Kings Mountain, and Cleveland County could serve as partners.

More on existing programs in Rutherford County and Cleveland County:

- Rutherford County Trails Coordinator:
www.rutherfordoutdoor.org/volunteer
- Polk County Trails Coordinator:
www.polktrails.org/
- AmeriCorps Project Conserve:
www.americorpsprojectconserve.org/about/program-overview



Local partnerships in Rutherford County and Polk County have enabled the community to utilize resources available through AmeriCorps' Project Conserve program and create Trail Coordinator positions in each county.

ACTIVE ROUTES TO SCHOOL

Purpose: Increase the number of North Carolinians that meet physical activity recommendations by the Centers for Disease Control and Prevention (CDC) by increasing the number of elementary and middle school students who safely walk and bike to or at school.

Audience: Schools, general public

Partners: City and County school districts, Fire and Police Departments, and partner organizations such as Catalyst for Healthy Eating and Active Living, Safe Kids Cleveland County, and local advocacy groups. Statewide agencies include the Community and Clinical Connections for Prevention and Health (CCCPH), which is a branch of the Chronic Disease and Injury Section in the North Carolina Division of Public Health.

Description: Active Routes to School is an NC Safe Routes to School Project supported by a partnership between the NC Department of Transportation and the NC Division of Public Health. Through this project, there are ten Active Routes to School project coordinators working across North Carolina to make it easier for elementary and middle school students to safely walk and bike to school. McDowell, Polk, and Rutherford Counties are covered by the Region 2 Coordinator and Cleveland County is covered by the Region 4 Coordinator. The project coordinators work with partners in their communities to increase:

- One-time awareness events about the importance of Active Routes to School.



- The number of ongoing programs that encourage walking and biking to or at school.
- The number of trainings on how to implement Active Routes to School-related activities.
- The number of policies that support walking and biking to or at school.
- The number of safety features near schools.

These resources are available to all schools/communities across the region. While many have already successfully engaged this program, it is recommended that all schools/communities utilize the Active Routes to School program resources as an opportunity to efficiently increase the number of elementary and middle school students who safely walk and bike to or at school.

On the following page are current examples of the Active Routes to School program in action across the region (by County). These existing programs and partnerships can function as catalysts, not only for the localities in which they serve, but for neighboring communities that have yet to engage these opportunities.



A Bike to School event in North Carolina.



Examples of existing programs and partnerships with Active Routes to School in Spindale, NC.

Cleveland County:

- Bike to School Day 2017 - James Love Elementary (Shelby)
- Boiling Springs - Sidewalk project adjacent to Boiling Springs Elementary School
- Cleveland County Schools - *Let's Go Biking!* training as part of *Let's Go NC!* pedestrian and bicycle safety skills curriculum

Rutherford County:

- Bike to School Day 2017 - Spindale Elementary School
- Rutherford Elementary School - Bicycle Safety through PE Class
- Spindale Fire Department -
 - Coordinated Walk to School Day events at Spindale Elementary
 - Hosted bicycle skills clinics for kids
 - Bicycle safety program utilizing old Train Depot along the Thermal Belt Trail
 - Partnered with Spindale Elementary to teach *Let's Go NC!* bicycle safety curriculum through PE class
 - Active Routes to School provided incentive stickers, bicycle helmets and bicycle repair supplies to support the Fire Department's efforts
- Spindale Police - purchased three bicycles to be used on the Thermal Belt Trail for safety patrol

McDowell County:

- Safe Routes to School Strategic Action Plan completed by the City of Marion (2012)
- Bike to School Day 2017 - East McDowell Junior High (Marion), Eastfield Global Magnet (Marion), Pleasant Gardens Elementary (Marion), Marion Elementary, Nebo Elementary, and Old Fort Elementary
- McDowell County Schools teaches the *Let's Go NC!* bicycle safety curriculum in all 8 elementary schools to 4th and 5th grade students
- The McDowell Schools, Active Routes to School and McDowell County Catalyst for Healthy Eating and Active Living sponsored a group bicycle ride for parents and students on the Joseph P. McDowell Historical Catawba River Greenway in Spring 2016 and 2017.
- The City of Marion of Marion (McDowell County) and Active Routes to School sponsored a Cycloviva event in May 2015

Polk County:

- Safe Routes to School Action Plan completed by the City of Saluda (2011)
- Bike to School Day 2017 - Saluda Elementary, Tryon Elementary
- Polk Middle School's after school program sponsored their first bicycle club in Spring Semester 2017.

BICYCLE BROCHURE MAPS

Purpose: Encourage bicycling by highlighting bicycling routes, destinations, and tips for safe bicycling.

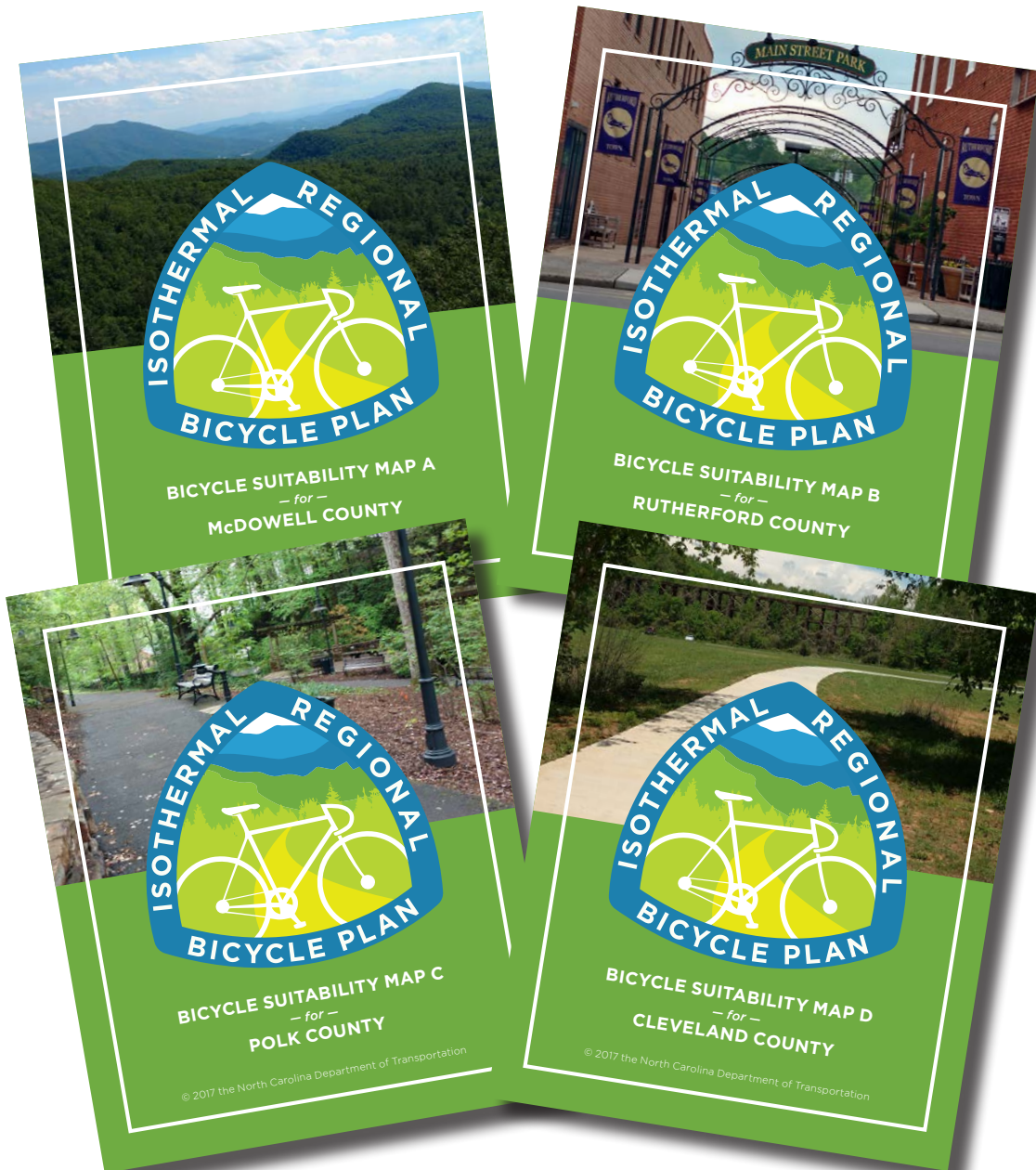
Audience: General public, tourists

Partners: NCDOT, Isothermal PDC, counties, municipalities, local advocates, cycling groups, tourism agencies, and chambers of commerce.

Description: One of the most effective ways of encouraging people to bike is through the use of

brochure guides describing enjoyable routes and destinations for bicycling. Four such maps have been developed for the Isothermal Region showing the suitability of existing roadways and routes for bicycling. These maps should be printed as needed and actively distributed to residents and visitors by the partners noted at left; they should also be updated on a regular basis as new facilities are implemented (every five years or less).

Online & Print Versions: Contact the Isothermal Planning & Development Commission.



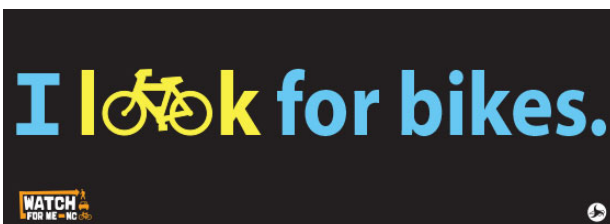
WATCH FOR ME NC: MEDIA CAMPAIGN

Purpose: To improve bicyclist and pedestrian safety by influencing the behaviors of drivers, bicyclists and pedestrians through safety messaging and enforcement.

Audience: Pedestrians, cyclists, motorists, law enforcement officers.

Partners: NCDOT, Isothermal PDC, municipalities and counties.

Description: 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" materials can be placed in strategic places throughout the Isothermal region, including at gas stations, where drivers will see them (right).

Watch for Me NC is an ongoing statewide grant program administered by the NCDOT Division of Bicycle and Pedestrian Transportation (NCDOT DBPT). The Isothermal PDC should contact NCDOT DBPT to request materials and guidance. Additionally, the City of Marion is already actively engaged in the program and the Isothermal PDC should request guidance from them as well. As a part of this program, the Isothermal PDC 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 website: watchformenc.org

City of Marion - www.watchformenc.org/about/partner-community-profiles/marion/

Comprehensive list of participants and further information - www.watchformenc.org/about/



BICYCLE WAYFINDING SIGNAGE

Purpose: Encourage bicycling to and from tourism destinations; help bicyclists navigate along suggested bicycling routes.

Audience: General public

Partners: NCDOT, Isothermal PDC, counties, municipalities, and cycling groups.

Description: The Isothermal Region should develop and install standardized, branded wayfinding signs to support the circulation of bicyclists along proposed signed routes.

Wayfinding signage enhances resident and visitor orientation. A clear wayfinding system should support the character of the region and contribute to economic development by indicating key tourism and agritourism destinations.

A regional plan logo was developed during this planning process, featuring mountain silhouettes, overlaid with a bicycle silhouette. This logo could be updated for the regional routes logo as well (see opposite page). This establishes a brand for bicycling in the Isothermal Region and communicates to current and potential cyclists that they are riding on one piece of a broader network of facilities, while also creating an awareness of the bikeway system to all roadway users.

The jurisdictions of the Isothermal Region have varying levels of bicycle and automobile wayfinding currently in place, and varying branding strategies. The signage details on the following pages present options that follow the Manual on Uniform Traffic Control Devices (MUTCD) guidelines followed by NCDOT, as well as options that allow for local community identification logos. Since all signs carry a cohesive element – the regional logo – the MUTCD-based signs can be applied on state-owned roads and localized signs on locally-owned roads. Upon implementation, local jurisdictions can work with NCDOT to select signage for a particular roadway.



Existing signage for the State Bike Route 8 in Saluda.

Wayfinding Signage Considerations:

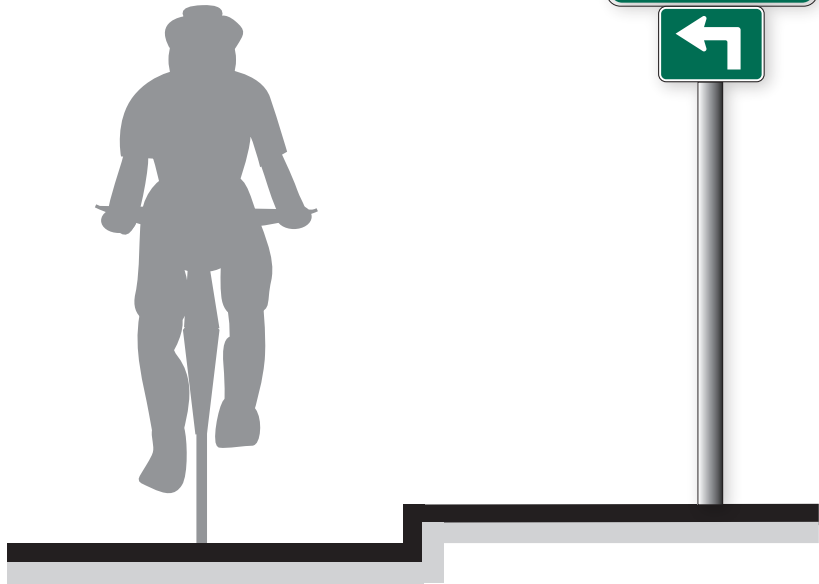
- Signs are placed at decision points along bicycle routes – typically at the intersection of two or more bikeways and at other key locations leading to and along bicycle routes.
- Bicycle wayfinding signs also visually cue motorists that they are driving along a bicycle route and should use caution.
- MUTCD guidelines and state law should be followed for wayfinding sign placement, which includes mounting height and lateral placement from edge of path or roadway. It is recommended that these signs be posted at a level most visible to bicyclists.
- Green is the color used for directional guidance and is the most common color of bicycle wayfinding signage in the US, including those in the MUTCD.
- See **Appendix A: Design Guide Resources** for a listing of documents that provide the most up-to-date detail about wayfinding sign types, wayfinding sign placement, typical applications, and design features.



Wayfinding signs can include local community identification logos.

Example Signage

See **Appendix A: Design Guidelines** for detail about wayfinding sign types, wayfinding sign placement, typical applications, and design features.



Isothermal Regional Bike Route Logo

Versions of the logo are available in .ai and .eps formats with the fonts outlined. CMYK color palette below:



- Light Blue: C73 M22 Y3 K0
- Dark Blue: C83 M40 Y16 K0
- Light Green: C50 M2 Y100 K0
- Dark Green: C62 M11 Y100 K1
- Yellow/Green: C34 M0 Y94 K0
- Yellow: C12 M0 Y85 K0

A CMYK color palette is provided for the logo (but gray-scale or black and white versions would also be acceptable in approved instances). The font used in the logo is "Gotham Bold" and should not be altered or changed. The logo should not be reproduced or duplicated without the approved vectorized typeface.

Regional Route Number

BICYCLE RIDES AND RACES: CAPITALIZING ON BICYCLE EVENTS

Purpose: Expand and promote opportunities for bicycle-oriented tourism through rides and races; support communities as they seek to define themselves as a good place for bicycle events and tourism.

Audience: Event bicyclists, long-distance bicyclists

Partners: Local and regional visitor bureaus, bicycle event managers, hospitality industry and local businesses; local advocates, Isothermal Regional Bicycle Committee

Description: Multiple annual bicycle rides and races utilize the scenic landscape across the Isothermal region and these are excellent opportunities to promote and celebrate bicycling through the communities in which these events cross. The following rides/races are held annually that are within or partially cross through the Isothermal region:

- Tour de Lure
- The Assaults (Mt. Mitchell/Marion)
- Tour de Leaves
- Tour de Pumpkin
- Gears and Gables
- Gran Fondo Hincapie

Combined, these events bring thousands of bicyclists and tourists to the region each year, presenting an opportunity for communities and businesses to capture tourism dollars and market local destinations and rural amenities.

“Bikes in Beds”, a 2015 report in Haywood County, NC details bicycle tourists and specifically bicyclists that participate in these types of rides and events. Many cyclists that engage in these types of events:

- Ride on 30-, 50-, or 100-mile single-day or multi-day organized events and may do this with a group, a spouse/partner or friends.
- Seek scenic areas or locations that offer some type of “reward” in terms of scenic beauty or



Infographic from the 'Bikes in Beds' report completed for Haywood County, NC.

historic value.

- May seek these events in places where they are also planning a vacation.
- Will identify pre-event ride cue sheets from local bike clubs to scout the route.
- Find events that contribute to a charity that matches their values.

Challenges for Event Bicyclists in western NC include:

- Lack of bike lanes/shoulders
- Lack of signage/wayfinding
- Terrain
- Limited published routes

Event Cyclists' needs may include:

- Well-organized events
- Convenient access
- A safe, dry place to store their bike overnight
- Healthy breakfast at lodging
- Camping near event start
- Scenic vistas or routes
- Cool places to eat and drink
- Maps or cue sheets
- Bike shop for repair or rental



Photo by the Rutherford Outdoor Coalition taken at a bicycle event in the Isothermal region.

Ways in which communities, partner organizations, and businesses across the Isothermal region can expand upon these event-based tourism opportunities include:

- Create a local/regional brand for promotional purposes
- Develop an education campaign for hospitality industry and motorists
- Identify/promote bicycle-friendly businesses
- Cross-market with other outdoor activities

Further incorporating this market opportunity into the local and regional tourism strategies, combined with bicycle infrastructure improvements, is another way in which communities and businesses across the region can efficiently move towards a more bicycle friendly region and diversify economic opportunity.

Further Resources:

Bikes in Beds Report: www.isothermalbikeplan.com (under resources and studies)

Bicycling event websites:

- Tour de Lure - www.ymcawnc.org/tourdelure
- The Assaults - <http://theassaults.com/assault-on-mt-mitchell/>
- Tour de Leaves - www.tourdeleaves.com
- Tour de Pumpkin - www.rutherfordoutdoor.org/cycling-tours-race/tour-de-pumpkin
- Gears and Gables - www.rutherfordhousingpartnership.com/events/
- Gran Fondo Hincapie - granfondohincapie.com/?stay=1

CYCLE TO FARM EVENTS: LEVERAGING BICYCLE TOURISM WITH AGRITOURISM

Purpose: Create and promote opportunities for bicycle-oriented tourism and agritourism; support communities as they seek to define themselves as a good place for bicycle tourism.

Audience: Bicycle tourists; visitors who enjoy recreational cycling, and fresh, local food

Partners: Farm owners and operators, North Carolina Department of Agriculture and Consumer Services Agritourism Office, local and regional visitors bureaus, cycling clubs and trail groups, and private tour managers that specialize in these types of tours (see following page); Isothermal Regional Bicycle Committee.

Description: Many rural communities throughout the U.S. are looking to tourism as a priority within their economic development plans, and bicycle tourism and agritourism are two popular and growing niche markets. Rural communities often have unique assets to offer visitors as bicyclists seek open spaces, lightly traveled roads, and the intimate experience that only small towns can provide. Efficiently identifying opportunities and creating targeted marketing plans can help the Isothermal Region become a bicycling destination and reap the benefits of this low-impact, sustainable tourism segment.

Interested communities and organizations in the region should convene a working group to complete an opportunity analysis and action plan for fostering bicycle tourism. The working group should start by educating themselves about the market sector (what cycle tourists want; sub-markets within the overall niche and how they differ; demographics of cycle tourists) and develop a shared understanding of the benefits of bicycle tourism to communities. Next, the group should organize a pilot program event or series of events that includes rides to multiple destinations, such as farms, vineyards, historic sites, and natural areas. The involvement of a group tour manager is

recommended, specifically ones that have experience working in rural areas.

The presence of inns, bed and breakfasts, and quality camping areas could be an asset to the development of this program as connections between lodging and destinations would be important to the success of this program. An action plan should be created to prioritize efforts that will make the biggest difference, followed by a media outreach strategy to market the region to potential bicycle tourists.

Sample Programs and Resources:

Cycle to Farm: Cycle. Eat. Repeat. (Black Mountain, NC): <http://cycletofarm.com/>

North Carolina Department of Agriculture and Consumer Services Agritourism Office: <http://www.ncagr.gov/markets/agritourism/>

Oregon Bicycle Tourism Partnership <http://industry.traveloregon.com/industry-resources/product-development/bicycle-tourism-development/oregon-bicycle-tourism-partnership/>



A self-serve vegetable stand in Rutherford County along NC Bike Route 8 is one example of many sites in the region that could be highlighted along a regional network of signed bicycle routes.

cycle to farm[®]

CYCLE. EAT. REPEAT.

created by *velo girl*
RIDES[®]



The Isothermal Region could boost agritourism in its rural landscapes by leveraging it with bicycle tourism.

Images on this page used with permission from Cycle to Farm by Velo Girl Rides. For more information go to cycletofarm.com.

POLICY STRATEGIES
5
CHAPTER FIVE



OVERVIEW

The policy objectives and associated strategies presented in this chapter aim to improve the underlying land use and transportation conditions that fundamentally promote bicycle use at the regional and local level. These are presented as options for consideration by local governments in the region, to adapt and incorporate into their own local regulations, as appropriate for each community.

Bicycling needs must be considered within the context of the Isothermal Region's transportation and land use system. To improve safety, community character, and transportation choices requires investment in public transit, bikeways, sidewalks and land use patterns that put a variety of destinations and services within close proximity. Through the statewide adoption of Complete Street design guidelines, and by working to advance Context-Sensitive Solutions (CSS), the North Carolina Department of Transportation is a willing partner to those communities desiring a transportation system that reinforces community character for economic development, community health, and livability. With this in mind, the following policy objectives and associated strategies aim to improve the underlying land use and transportation conditions that fundamentally promote bicycle use at the regional and local level. Such policies include:

- Recognize the interrelationship between land use decisions (planning and development) and transportation decisions.
- Reinforce basic urban, suburban, and rural design principles that result in development of sustainable and attractive districts, neighborhoods, and corridors supportive of bicycling and walking and other modes of travel.

- Improve the balance of protected rural areas and vibrant downtown environments that make the Isothermal region special.
- Provide separation for bicyclists, when possible, even in constrained areas of significant topographical challenges.

One of the most cost effective implementation strategies for the Isothermal Region and its communities is to establish land use and transportation policies and development regulations that promote bikeable new development, programs, and capital projects. This chapter provides a more general set of policy recommendations that they may be considered and applied in different communities throughout the region.

PRIORITY POLICY RECOMMENDATIONS

Regulatory standards and policies were considered through the lens of the project vision and goals, specifically, the vision of making the Isothermal Region a place where: *"Bicycling is an accepted, normal, and safe means of traveling around in the Isothermal region."*



Bicycling allows residents to experience the beauty of the region and to live healthy lifestyles. Bicycle networks, programs, and events attract people to the Isothermal region, boosting tourism and economic development. “

The policy review tables (Tables 5.1 to 5.4) are organized into these overall categories:

1. Complete Streets and Greenways
2. Bicycle-oriented Design Elements
3. Connectivity
4. Policy Considerations by Settlement Type

These categories are interrelated, but based on the existing conditions analysis and the goals of this plan, the following key recommendations should be implemented first.

EXAMPLE DEVELOPMENT REGULATIONS

Given the large number of jurisdictions in the Isothermal Region, this plan offers example municipal ordinances to be referenced as models for local communities. In addition, the project team identified appropriate model regulatory and policy language from around

PRIORITY POLICY *and* REGULATORY RECOMMENDATIONS:

1. **Develop and adopt local Complete Street Policies for each regional community. Update development regulations and engineering standards to include and reflect best practices for Complete Streets and bikeway design.**
2. **Include requirements to include bikeways and bicycle friendly crossings in new development.**
3. **Require dedication or reservation of adopted greenway alignments in new developments and along major roadways, as appropriate to regional connectivity, adopted plans, and roadway context. Consider application of a corridor overlay district that would preserve right-of-way or require dedication or construction of planned greenway alignments and promote other trail-oriented-development.**
4. **Adopt bicycle parking requirements and standards in local zoning codes.**
5. **Revise and update connectivity requirements to promote comprehensive bikeway networks.**
6. **Assign greenway construction and maintenance to appropriate municipal and county departments, including park and recreation or public works departments.**
7. **Work with the local NCDOT Division Engineers to develop a bicycle-friendly specific Rumble Strip Policy and application process that enhances the NCDOT R-44 Practice Memo. This could be modeled on the policy developed by NCDOT Division 14 and/or include references to state and national best practices for bicycle-friendly rumble strip application, especially on bike routes and roads with shoulders likely to be used by cyclists:**
 - **League of American Bicyclists “Bicycling and Rumble Strips”:** http://www.advocacyadvantage.org/docs/rumble_strips.pdf
 - **NCDOT Division 14 rumble strip guidelines (noted in Appendix A Design Guidelines).**
8. **Develop a policy to require NCDOT and local and regional agencies to review the recommendations of this plan to ensure that NCDOT corridor projects include the recommended bikeways and treatments.**
9. **Provide paved shoulder in rural areas where possible and bicycle “pull-outs” or respites along bicycle routes, especially where paved shoulder cannot be provided due to topographical constraints.**

These approaches complement the infrastructure and program recommendations provided in this planning document.

North Carolina and the U.S. for elements including land use/transportation integration, connectivity, Complete Streets, and bicycle parking. These provide example methods for regional communities to maximize on-road bicycle and multi-use trail improvements in conjunction with new development, redevelopment, and corridor improvement projects. Recommended policy language to enhance multi-use trail development is also included.

The tables below include recommendations for bicycle-related elements of Complete Streets and complete bicycle networks. Designated bikeways and trails and end-of-trip facilities such as bicycle parking are some of

the most fundamental elements of Complete Streets for bicycle users. Access management, multi-modal level of service assessments, and traffic calming are also critical for developing complete street networks for bicycling through the development review and capital project implementation process. The NCDOT *Complete Street Planning and Design Guidelines* and the design guidelines that accompany this plan also include detailed recommendations on complete street design elements for implementing communities. These guidelines provide an excellent basis for locally-adopted complete street policy, regulatory tools, and design guidance.

NC MUNICIPALITIES *with* MODEL REGULATORY POLICIES

The following NC communities have model development polices that serve as good examples for communities in the Isothermal Region. These model ordinances support bicycling and the development of bikeways and greenway trails (some sections of these documents are also referenced in the tables on the following pages):

- City of Wilson, North Carolina, Unified Development Ordinance
- Town of Wake Forest, North Carolina, Unified Development Ordinance
- Town of Davidson, North Carolina, Planning Ordinance

STATE AND FEDERAL POLICIES AND GUIDELINES

These policies describe how bicycles and pedestrian improvement are to be developed in North Carolina. For full policies, visit: <https://connect.ncdot.gov/projects/BikePed/Pages/Policies-Guidelines.aspx>

- ***Greenway Accommodations Memo***: Approved in 2015, N.C. Department of Transportation guidelines, approaches and cost-sharing recommendations for proposed greenways under bridges.
- ***Greenway Accommodations Guidelines***: Approved in 2015, N.C. Department of Transportation guidelines, approaches and cost-sharing recommendations for proposed greenways under bridges.
- ***Administrative Action to Include Greenway Plans***: N.C. Department of Transportation administrative guidelines for considering greenways and greenway crossings during the highway planning process to ensure that critical corridors for future greenways are not severed by highway construction.
- ***Complete Streets***: N.C. Department of Transportation policy on when and how planners and designers should include other forms of transportation, including accommodations for bicyclists and pedestrians, in transportation projects in municipal areas.
- ***Bicycle Policy & Guidelines***: N.C. Department of Transportation policy and guidelines for planning, designing, building, maintaining and operating bicycle facilities and accommodations.
- ***Pedestrian Policy & Guidelines***: N.C. Department of Transportation policy and guidelines for planning, designing, building, maintaining and operating pedestrian facilities and accommodations.
- ***Bridge Policy***: N.C. Department of Transportation policy establishing design elements for new and reconstructed bridges on the state's road system, including requirements for sidewalks and bicycle facilities on bridges.
- ***Traffic Engineering Policies, Practices and Legal Authority***: N.C. Department of Transportation policies and federal design guidelines for specific pedestrian and bicycle safety accommodations.



TABLE 5.1 COMPLETE STREETS & GREENWAYS

TOPICS/STRATEGIES	GENERAL RECOMMENDATIONS
<p>1.1 Implement Complete Streets Policy</p> <p>A Complete Streets policy allows cities and towns to work towards creating a street network that encourages pedestrian and bicycle travel and provides safe and comfortable roadways for all users.</p>	<p>In addition to the very thorough NCDOT Complete Streets Planning and Design Guidelines (https://connect.ncdot.gov/projects/BikePed/Pages/Complete-Streets.aspx), the National Complete Streets Coalition provides great guidelines for designing streets that cater to all users: (http://www.completestreets.org/resources/complete-streets-best-practices/).</p>
<p>1.2 Develop Complete Street Design Guidelines for a variety of contexts and all street/roadway user groups</p> <p>The topics below include recommendations for bicycle-related elements of Complete Streets. Designated bikeways and trails and end-of trip facilities such as bicycle parking are some of the most fundamental elements of Complete Streets for bicycle users. Access management, multi-modal level of service assessments, and traffic calming are also critical for developing complete street networks through the development review and capital project implementation process.</p> <p>The NCDOT Complete Street Guidelines and the design guidelines that accompany this plan also include detailed recommendations on complete street design elements for bicycle users.</p>	<p>Isothermal communities could adopt and endorse the NCDOT guidelines and other national guidelines, including the NACTO <i>Urban Street Design Guide</i>: http://nacto.org/publication/urban-street-design-guide/ and the FHWA <i>Small Town and Rural Multimodal Network Guide</i>: http://ruraldesignguide.com/</p> <p>The design guidelines would then need to be integrated into development standards for new development, as was done with the <i>Raleigh Street Design Manual</i> (http://www.raleighnc.gov/content/extra/Books/PlanDev/StreetDesignManual/#1) and</p> <p>The <i>Charlotte Urban Street Design Guidelines</i>: http://charlottenc.gov/Transportation/PlansProjects/Documents/USDG%20Full%20Document.pdf</p> <p>See also the excellent <i>Major & Collector Street Plan: Implementing Complete Streets for Nashville/Davidson County, TN</i>.</p>
<p>1.3. Require bike accommodations by roadway type</p>	<p>See Chapter 4 of the NCDOT <i>Complete Streets Planning and Design Guidelines</i> for recommendations of bikeway type by roadway type. Consider including these guidelines by reference in local design guidance or requirements.</p> <p>Also: The design guidelines recommended as part of the Isothermal Regional Bicycle Plan should be considered for incorporation or inclusion by reference in the regional communities' engineering and design standards and subdivision regulations.</p> <p>The NACTO <i>Urban Bikeway Design Guide</i> provides additional design details for various on-street bikeway treatments and could be adopted by reference in regional ordinances and/or engineering standards. Many cities have taken this approach. http://nacto.org/cities-for-cycling/design-guide/ and the FHWA <i>Small Town and Rural Multimodal Network Guide</i>: http://ruraldesignguide.com/</p>
<p>1.4. Require designated bikeways (bike lanes, shoulders, greenways, etc) during new development or redevelopment</p>	<p>Generally, as traffic volumes exceed 3,000 vehicles per day and traffic speeds exceed 25mph, facilities to separate bicycle and motor vehicle traffic are recommended. Multi-lane roads are typically more dangerous for all users because of the increased traffic volume, the potential for higher speeds, and the additional number of conflict locations due to turning vehicles.</p> <p>See Chapter 4 of the NCDOT <i>Complete Streets Planning and Design Guidelines</i> for guidance.</p> <p>Also, see: Chapters 6 of Wake Forest, NC UDO for recommendations for bikeways and greenways, esp. sections 6.8.2, 6.9, 6.10. http://www.wakeforestnc.gov/udo.aspx</p> <p>Chapter 7 of the Wilson, NC UDO regarding greenways. http://www.wilsonnc.org/wp-content/uploads/2014/12/CH-7-Parks-Open-Space.pdf</p>

TABLE 5.1 COMPLETE STREETS & GREENWAYS (CONTINUED)

TOPICS/STRATEGIES	GENERAL RECOMMENDATIONS
<p>1.5. Require dedication, reservation or development of greenways</p>	<p>Consider expanding requirements for greenway reservation, dedication, or provision in new developments where a greenway or trail is shown on an adopted plan or where a property connects to an existing or proposed greenway. Where greenway construction cannot politically or legally be required, consider offering incentives in the form of reduced fees, cost sharing, density bonuses, or reduction in other open space requirements when adopted greenways are constructed through private development. See the incentives offered by the City of Asheville to promote public policy goals. For example: http://www.ashevillenc.gov/departments/sustainability/resources.htm</p> <p>For additional examples of incentives, see also: https://www.law.ufl.edu/_pdf/academics/centers-clinics/clinics/conservation/resources/incentive_strategies.pdf</p> <p>Ideally, development regulations should require the construction and maintenance of greenways to local standards unless a maintenance agreement is established with a local government.</p> <p>See requirements in Wake Forest, NC UDO, Section 6.8.2 Greenways: <i>“When required by Wake Forest Open Space & Greenways Plan or the Wake Forest Transportation Plan, greenways and multi-use paths shall be provided according to the provisions [that follow in the section cited above].”</i> http://www.wakeforestnc.gov/udo.aspx</p> <p>Good Model: (New Hanover County Zoning Ordinance): The Riverfront Mixed Use District includes the following provision: <i>“Riverfront facilities shall provide multi-modal transportation opportunities, including public boating, walking, bicycling, and public bus or water taxi uses and the facilities necessary for such uses.”</i></p>
<p>1.6. Require new bike lanes, greenways, etc., to connect to existing facilities</p>	<p>Connectivity of facilities is critical for walking and biking conditions. New development should be required to connect to or extend existing bicycle and pedestrian facilities.</p> <p>See:</p> <ul style="list-style-type: none"> • Chapters 6 of Wake Forest, NC UDO for recommendations for bikeways and greenways, esp. sections 6.5.3, 6.8.2, 6.9, 6.10. http://www.wakeforestnc.gov/udo.aspx • Chapter 7 of the Wilson, NC UDO regarding greenways. http://www.wilsonnc.org/wp-content/uploads/2014/12/CH-7-Parks-Open-Space.pdf <p>Good Model: (New Hanover County Zoning Ordinance): The EDZD Zoning District provides points for new developments that connect to the existing bikeway network and key destinations and provides a good definition of the bikeway network. (Section 54.1-14 and following.)</p>



TABLE 5.1 COMPLETE STREETS & GREENWAYS (CONTINUED)

TOPICS/STRATEGIES	GENERAL RECOMMENDATIONS
<p>1.7. Consider bicycle concerns and Level of Service (LOS) in Traffic Impact Analyses and other engineering studies</p>	<p>Isothermal communities should consider adopting multi-modal of service standards where active transportation and transit use are expected to be high. Consideration of bicycle and pedestrian levels of service assure adequate facilities for bicyclists and pedestrians in new development and capital improvements. This also helps promote walking and bicycling as a legitimate means of transportation.</p> <p>The NCDOT <i>Complete Streets Planning and Design Guidelines</i> provides factors of “Quality of Service” and LOS for bicycle, pedestrian, and transit modes (See Chapter 3, page 39 and Chapter 5): http://www.completestreetsnc.org/wp-content/themes/CompleteStreets_Custom/pdfs/NCDOT-Complete-Streets-Planning-Design-Guidelines.pdf</p> <p>The City of Raleigh uses a multimodal level of service approach in determining road improvements and traffic mitigation: http://www.raleighnc.gov/content/extra/Books/PlanDev/StreetDesignManual/#71</p> <p>Charlotte, NC uses Pedestrian LOS and Bicycle LOS Methodologies for intersection improvements in their <i>Urban Street Design Guidelines</i>: http://charmec.org/city/charlotte/transportation/plansprojects/pages/urban%20street%20design%20guidelines.aspx</p>
<p>1.8. Adopt traffic calming programs, policies, and standards</p> <p>Traffic calming on local streets increases safety and comfort for all roadway users, including cyclists. It also increases neighborhood livability.</p>	<p>Traffic calming tools are especially important where bike routes or bike boulevards are proposed on local residential or sub-collector streets.</p> <p>The National Complete Streets Coalition provides good guidelines for traffic calming through their best practices manual: (https://smartgrowthamerica.org/resources/).</p> <p>See also the NACTO <i>Urban Bikeway Design Guide</i> section on Bicycle Boulevards.</p>
<p>1.9. Develop an access management program or policy</p> <p>Limiting turning movements on major roadways and requiring cross-access between adjacent parcels of land, including commercial developments, is a great tool for reducing the amount of traffic and turning movements on major roads while increasing safety and connectivity for pedestrians, bicycles, and cars.</p>	<p>The NCDOT <i>Complete Streets Planning and Design Guidelines</i> provides recommended “Access Density” guidelines (See Chapter 4, page 61 and following). These guidelines could be the basis for regulatory updates to the county or municipal codes: http://www.completestreetsnc.org/wp-content/themes/CompleteStreets_Custom/pdfs/NCDOT-Complete-Streets-Planning-Design-Guidelines.pdf</p>
<p>1.10. Provide bicycle pull-outs along bicycle routes.</p>	<p>Providing bicycle pull-outs or respites where possible, increases safety and comfort for bicyclists, especially in areas where paved shoulder cannot be provided due to topographic constraints.</p>

TABLE 5.2 BICYCLE-ORIENTED DESIGN ELEMENTS

TOPICS/STRATEGIES	GENERAL RECOMMENDATIONS
<p>2.1. Adopt bicycle parking requirements</p>	<p>Bicycles should receive equal consideration when calculating parking needs with specific calculations provided for determining the amount of bicycle parking provided by district type or land use type. Design and location standards for bicycle parking should be clearly stated to provide for safe and convenient access to destinations. Different standards of bicycle parking are needed for short-term visitors and customers and for longer term users like employees, residents, and students.</p> <p>See City of Wilson UDO, Chapter 9: Parking & Driveways, Section 9.4 and 9.6: http://www.wilsonnc.org/wp-content/uploads/2014/12/CH-9-Parking-Driveways-.pdf</p> <p>Good standards for bicycle parking design can be found through the Association of Pedestrian and Bicycle Professionals' <i>Bicycle Parking Guidelines</i>. (www.apbp.org)</p> <p>Bicycle Parking Model Ordinance, Change Lab Solutions: http://changelabsolutions.org/publications/bike-parking</p> <p>City of San Francisco Zoning Administrator Bulletin for designs/layout/etc. The bulletin is in itself a great document that includes limits on hanging racks, how to park family bikes, and various configurations: http://208.121.200.84/ftp/files/publications_reports/bicycle_parking_reqs/Leg_BicycleParking_ZABulletinNo.9.pdf</p>

TABLE 5.3 CONNECTIVITY

TOPICS/STRATEGIES	GENERAL RECOMMENDATIONS
<p>3.1. Revise block size requirements</p> <p><i>"[A] Good [street] network provides more direct (shorter) routes for bicyclists and pedestrians to gain access to the thoroughfares and to the land uses along them (or allows them to avoid the thoroughfare altogether). Likewise, good connections can also allow short-range, local [motor] vehicular traffic more direct routes and access, resulting in less traffic and congestion on the thoroughfares. This can, in turn, help make the thoroughfare itself function as a better, more complete street. For all of these reasons, a complete local street network should generally provide for multiple points of access, short block lengths, and as many connections as possible."</i> (NCDOT Complete Streets Planning and Design Guidelines, p 59)</p>	<p>Development density should determine the length of a block, with shorter blocks being more appropriate in areas of higher density. Maximum block length in any situation should rarely exceed 800-1000 feet for good connectivity. In areas with highest development density (urbanized, mixed use centers and high density neighborhoods), block lengths can be as little as 200 feet. In areas with blocks as long as 800 feet or greater, a pedestrian and/or bicycle path of 6-8 feet in width should be required, with an easement of 15-20 feet wide.</p> <p>See the example table on page 59 of the NCDOT <i>Complete Streets Planning and Design Guidelines</i> for a context-based approach to block size.</p> <p>Consider allowing larger blocks – up to a maximum, such as 800 feet – where development densities are expected be lower (> 4 du/a). See City of Charlotte Subdivision Ordinance, Section 20-23 for example of connectivity requirements and block standards: http://charlottenc.gov/planning/Subdivision/Pages/Home.aspx</p>



TABLE 5.3 CONNECTIVITY (CONTINUED)

TOPICS/STRATEGIES	GENERAL RECOMMENDATIONS
<p>3.2. Require connectivity/cross-access between adjacent land parcels</p> <p><i>“[A] Good [street] network provides more direct (shorter) routes for bicyclists and pedestrians to gain access to the thoroughfares and to the land uses along them (or allows them to avoid the thoroughfare altogether). Likewise, good connections can also allow short-range, local [motor] vehicular traffic more direct routes and access, resulting in less traffic and congestion on the thoroughfares. This can, in turn, help make the thoroughfare itself function as a better, more complete street. For all of these reasons, a complete local street network should generally provide for multiple points of access, short block lengths, and as many connections as possible.”</i> (NCDOT Complete Streets Planning and Design Guidelines, p 59)</p>	<p>See notes above regarding Block Size. Requiring connectivity or cross-access between adjacent developments is a great tool for reducing the amount of traffic on major roads while increasing connectivity for pedestrians, bicycles, service vehicles, and neighborhood access.</p> <p>For good model language, see City of Wilson, NC UDO, Section 6.4: Connectivity: http://www.wilsonnc.org/wp-content/uploads/2014/12/CH-6-Infrastructure-Standards.pdf</p> <p>Or City of Wake Forest, NC UDO, Section 6.5, Connectivity: http://www.wakeforestnc.gov/udo.aspx</p> <p>Both codes above also provide requirements for when bicycle/pedestrian connections between parcels, public open space, and between cul-de-sacs is required.</p> <p>See also the excellent <i>Major & Collector Street Plan: Implementing Complete Streets</i> for Nashville/Davidson County, TN: http://www.nashville.gov/Portals/0/SiteContent/Planning/docs/NashvilleNext/PlanVolumes/next-volume5-MCSP.pdf</p>
<p>3.3. Limit dead end streets or cul-de-sacs</p> <p>Dead end streets or Cul-de-sacs, while good at limiting motor vehicular traffic in an area, are a severe hindrance to pedestrian and bicycle connectivity and overall neighborhood accessibility, including for emergency access and other services.</p>	<p>Consider requiring other traffic calming measures that allow for connectivity and improve the pedestrian and biking environment such as street trees, narrow street width standards, and T intersections.</p> <p>Make the maximum length for Cul-de-sacs 250-300 feet to limit the distance that a person would have to travel along a cul-de-sac.</p> <p>For good model language, see City of Wilson, NC UDO, Section 6.4: Connectivity: http://www.wilsonnc.org/wp-content/uploads/2014/12/CH-6-Infrastructure-Standards.pdf</p> <p>Or City of Wake Forest, NC UDO, Section 6.5, Connectivity: http://www.wakeforestnc.gov/udo.aspx</p>
<p>The documents to the right were referenced for this policy and regulatory review.</p> <p>Other references for best practices are listed in the column on the far right.</p>	<p>REFERENCED DOCUMENTS AND RESOURCES:</p> <ol style="list-style-type: none"> 1. NCDOT <i>Complete Streets Planning and Design Guidelines</i> (July 2012): http://www.completestreetsnc.org/wp-content/themes/CompleteStreets_Custom/pdfs/NCDOT-CompleteStreets-Planning-Design-Guidelines.pdf 2. NCDOT Traditional Neighborhood Development (TND) Guidelines: https://connect.ncdot.gov/projects/Roadway/RoadwayDesignAdministrativeDocuments/Traditional%20Neighborhood%20Development%20Manual.pdf 3. City of Wilson, NC UDO: https://www.wilsonnc.org/development-services/unified-development-ordinance/ 4. Town of Wendell, NC UDO: http://www.townofwendell.com/departments/planning/development/zoning/udo-unified-development-ordinance 5. City of Wake Forest, NC UDO: http://www.wakeforestnc.gov/udo.aspx 6. See Town of Davidson, NC Planning Ordinance, https://www.ci.davidson.nc.us/1006/Planning-Ordinance 7. Association of Pedestrian and Bicycle Professionals' <i>Bicycle Parking Guidelines</i>. (www.apbp.org) 8. <i>Making Neighborhoods More Walkable and Bikeable</i>, ChangeLab Solutions: http://changelabsolutions.org/sites/default/files/MoveThisWay_FINAL-20130905.pdf 9. <i>Getting the Wheels Rolling: A Guide to Using Policy to Create Bicycle Friendly Communities</i>, ChangeLab Solutions http://changelabsolutions.org/bike-policies <p>And other documents noted in this column in the preceding tables.</p>

TABLE 5.4 POLICY CONSIDERATIONS BY SETTLEMENT TYPES

Table 5.4 presents a general set of policy considerations that are organized in tabular form and calibrated to the region's range of settlement types, so that they may be considered and applied in different communities throughout the region.



Natural



Farmland



Hamlet



Village



Town



City

Transportation Network

Objective: Accommodate bicyclists through the ongoing development of a context-sensitive regional and local transportation infrastructure network.

Ensure that the region's thoroughfare system is compatible with adjacent land uses and natural/built character.	•	•	•	•	•	•
Promote positive health, recreation, transportation, economic, and environmental benefits of bicycle investments.	•	•	•	•	•	•
Coordinate with NCDOT Context Sensitive Solutions and the Complete Streets Policy along and across state roadways.	•	•	•	•	•	•
Require new development to minimize driveway accesses in order to reduce conflict points.				•	•	•
Partner with State and local entities to explore alternative funding sources that support transportation options throughout the region, including integrating bicycle and pedestrian facilities.	•	•	•	•	•	•
Encourage local jurisdictions to require development to fund proportional share of transportation infrastructure costs.			•	•	•	•

TABLE 5.4 POLICY CONSIDERATIONS BY SETTLEMENT TYPES (CONTINUED)



	Natural	Farmland	Hamlet	Village	Town	City	
Work with all jurisdictions to reduce motor vehicle speeds by implementing proven traffic-calming measures.					•	•	•
Supplement subdivision regulations with context-appropriate block size and street connectivity standards.			•	•	•	•	
Bikeway Infrastructure							
<i>Objective: Accommodate bicyclists through the ongoing development of context-appropriate bikeways, bicycle parking, and bike-way signing and wayfinding.</i>							
Ensure that the maintenance/expansion of the regional thoroughfare system serves bicyclists and pedestrians.	•	•	•	•	•	•	
Coordinate planning, design, and implementation of context-sensitive bicycle improvements with the Facility Continuum (page 41).	•	•	•	•	•	•	
Use this Isothermal Regional Bicycle Plan to guide future planning, design, and implementation of bicycle infrastructure in conjunction with other local and regional planning and development projects.	•	•	•	•	•	•	
Encourage county/municipal parking requirements to include bicycle parking at areas of regional and local significance, such as schools, government offices, churches etc.			•	•	•	•	

TABLE 5.4 POLICY CONSIDERATIONS BY SETTLEMENT TYPES (CONTINUED)



	Natural	Farmland	Hamlet	Village	Town	City
Encourage county/municipal parking requirements to follow the Association for Pedestrian and Bicycle Professional's (APBP) bicycle parking design and location guidelines, including provisions for short- and long-term parking.			•	•	•	•
Work with state, county, and local entities to enhance the safety and visibility of the regional bicycle network by implementing appropriate safety and wayfinding signage improvements.	•	•	•	•	•	•
Environmental Protection						
<i>Objective: Protect natural land by directing public infrastructure spending and private development to areas where they will have the greatest social and economic benefit and the least environmental impact and transportation cost.</i>						
Establish a regional Transfer of Development Rights (TDR) program and/or support existing or new conservation easement, land trusts, and other tools to preserve the region's rural and working landscapes.	•	•				
Protect regional wetlands, wetland buffers, floodways, floodplains, aquifer recharge areas, woodland, productive farmland, wildlife habitat and important scenic views by disallowing new development along certain scenic roadways.	•	•				
Help property owners maintain the agricultural use of their land through a regional tax relief or land valuation mechanisms calibrated to agricultural production value, as opposed to its commercial or residential real estate value.			•			

TABLE 5.4 POLICY CONSIDERATIONS BY SETTLEMENT TYPES (CONTINUED)



	Natural	Farmland	Hamlet	Village	Town	City
Avoid the location of public facilities (schools, government offices etc.) within Natural or Farmland areas.	•	•				
To protect regional open space, enhance environmental health, and increase recreational opportunities, establish Hamlet, Village, Town, and City District areas as regional (TDR) “receiving areas.”			•	•	•	•
Encourage local municipalities to identify and maintain a permanent rural “green” preserve around the Hamlet, Village, Town, and City areas with a focus on improving and protecting ecological areas.			•	•	•	•
Encourage the protection, preservation and enhancement of riparian corridors within new development and the redevelopment of existing, underutilized parcels to maximize public access, connectivity, and recreational bicycling.			•	•	•	•
Regional Growth						
<i>Objective: Direct public infrastructure spending and private development to developed areas where the greatest social and economic benefit can be realized with the least environmental and transportation costs.</i>						
Ensure that adequate public services, infrastructure, and facilities are available or funded prior to approval of new development to ensure that the cost is not unnecessarily burdensome to existing residents.			•	•	•	•

TABLE 5.4 POLICY CONSIDERATIONS BY SETTLEMENT TYPES (CONTINUED)



	Natural	Farmland	Hamlet	Village	Town	City
If adequate public facilities are not available, require new development of a certain size to fund its proportional share of infrastructure costs.			•	•	•	•
Encourage county and local governments to replace use-based zoning code with form-based, pedestrian-oriented zoning, especially within existing or proposed residential neighborhoods and mixed-use main street / commercial corridors.				•	•	•
Prioritize application processing and/or create other financial incentives for projects within previously developed areas or areas regulated by form-based codes zoning.				•	•	•
Wherever practical, incentivize land devoted to surface parking lots to be developed into more productive uses.					•	•
Encourage and support the evolution of auto-oriented, strip-style commercial development into mixed-use activity centers that support a more walkable and bicycle-friendly environment.				•	•	•
Encourage the Isothermal Region counties and local municipalities to evaluate the strength of proposed development projects through the creation of a smart growth scorecard, or similar tool.	•	•	•	•	•	•

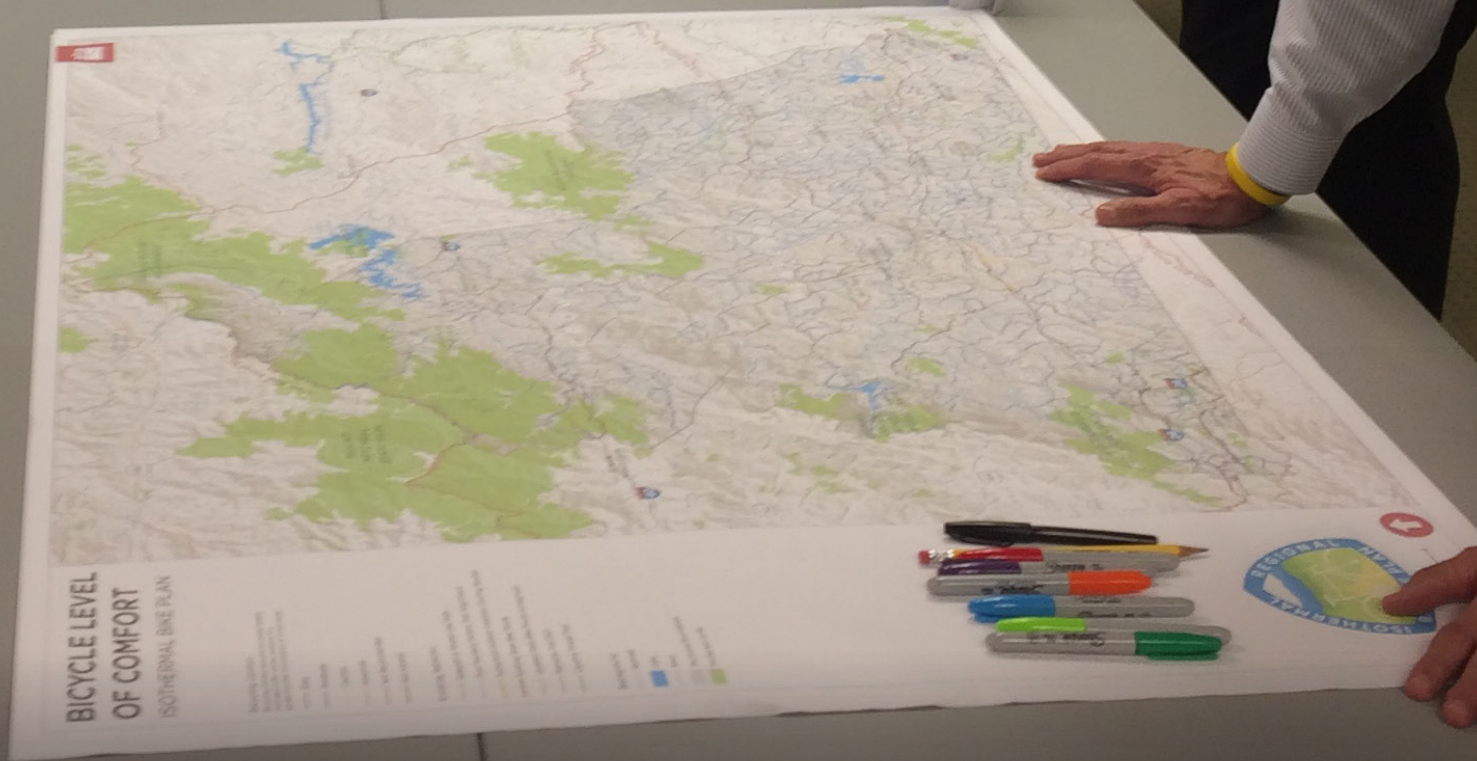
- Are we making good use of existing bicycle facilities?
- What are the best destinations & regions?
- What are the best routes between destinations?
- What are the best target areas for those routes?



IMPLEMENTATION ACTION PLAN

6

CHAPTER SIX



Successful implementation will require dedicated efforts from many agencies and organizations throughout the region, such as those serving on this plan's Steering Committee. Above, committee members review draft maps.

OVERVIEW

The recommendations in this plan represent a major investment with enormous positive impacts for residents, businesses, and visitors in the Isothermal Region. Successful implementation will require a consistent, coordinated effort by regional planners, NCDOT, and the many counties, municipalities, private partners, stakeholders, and advocates in the region.

This chapter details priority action steps for the region. The action steps presented do not cover every individual infrastructure, policy, and program recommendation of this plan. Rather, they call out priority items within each of these categories in order to provide guidance for moving forward on the most important items. For each action step, a lead agency, potential support agencies, and time frame for completion are suggested.

STAKEHOLDER COORDINATION FOR IMPLEMENTATION

Successful implementation will take both individual efforts from local governments, as well as coordinated efforts among a wide variety of stakeholders that cover this plan's entire study area.

The Isothermal RPO and the Gastonia-Cleveland-Lincoln MPO, in particular, can play a key role in coordination of this plan's recommendations for project development (see project development examples on the following page). They can do that by coordinating project funding with NCDOT Divisions 12, 13, and 14, and by adding progress

reports about this plan's implementation to the agendas of regularly scheduled RPO and MPO meetings.

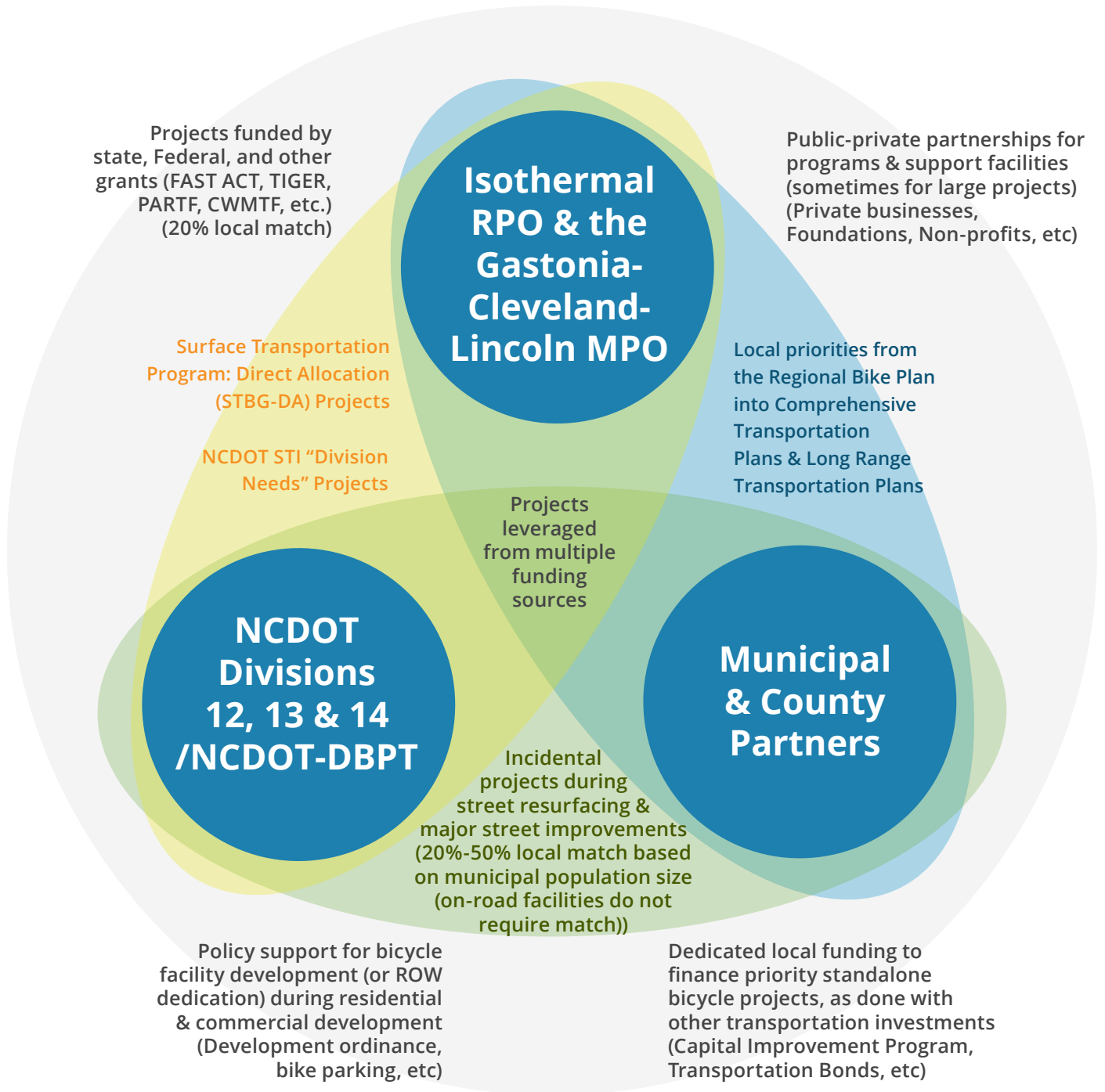
Ideally, RPO and MPO representatives would champion this plan, and would be sure its recommendations stay at the forefront of regional discussions for top projects. These representatives could also draw upon the input and guidance of other stakeholders, including non-governmental representatives from groups like the Rutherford Outdoor Coalition, or local and regional cycling clubs.

The RPO, MPO, and local governments in the region should have the topic of this Plan's implementation as an agenda item at least biannually, and could use the action steps listed in this chapter for guidance as topics of discussion.

The purpose of discussing this plan at these meetings should be to identify specific tasks that could be completed before the next meeting (i.e., applying for grants, securing local funding matches, initiating bicycle education programs, incorporating recommended facilities into design plans, updating local policies, etc.).

PROJECT DEVELOPMENT OPPORTUNITIES for the REGIONAL BICYCLE PLAN RECOMMENDATIONS

Some of the project development opportunities shown below may require involvement from all three of the major groups listed (RPO & MPO, municipal/county partners, and NCDOT), but are placed in rough proximity of the groups that might lead such efforts.



SUMMARY OF KEY ACTION STEPS

These action steps draw from the opportunities shown on the previous page. These should be the guiding steps for local governments, the RPO, and the MPO to initiate plan implementation and to begin on top projects.

YEARS 1-5: PILOT PROJECTS & STRATEGIC PREPARATION *for* PROJECT DEVELOPMENT

1

1. Adopt/endorse the plan locally and regionally. Adoption signals intent to complete projects over time, but *does not* commit to funding. Having an adopted plan is helpful in securing funding from federal, state, and private agencies.
2. Update Comprehensive Transportation Plans (CTPs) & Long Range Transportation Plans (L RTPs) with recommendations from this Regional Bicycle Plan.
3. Local governments should update their development regulations to better support bicycling, and to ensure dedication of right-of-way (ROW) for bicycle facilities on adopted plans (see Chapter 5). This is a key step to the long-term development of recommended trail corridors, like the Saluda Grade Rail-Trail.
4. Local governments should submit projects for funding through the RPO and MPO, coordinating with NCDOT on STBG-DA (for GCLMPO) funding and STI Division Needs projects.
5. Local governments, the RPO, and the MPO should identify 1-3 pilot projects or programs that can be implemented in partnership with one another, with relatively low overall costs (restriping, signage, education programs, etc.).
6. Local governments should consider dedication of regularly recurring local funding for top projects and for incidental projects. A 20% local match may be required for state/federal funding; this can be met through local Capital Improvement Programs (CIPs), local bonds, or similar (see Appendix B).
7. Local governments, the RPO, and the MPO should explore potential program or project funding through public-private partnerships (see section on 'Engaging Private Funding' in this chapter).
8. Prepare "shovel-ready", high-impact projects for potential future U.S. DOT grant funding such as TIGER grants (or similar), by securing project corridor ROW & initiating the design phase.
9. Research & prepare grant applications for bicycle & trail projects (see Appendix B).

YEARS 6-10: CONTINUED PROJECT DEVELOPMENT

2

By this phase, if the majority of steps above are complete, many of this plan's projects should be at various stages of funding, design, and development. In year 5 of this plan (2023), reassess overall systemwide goals and reevaluate the overall approach to implementation. In year 10 (2028), complete a full plan update. Years 6-10 will mainly be a continuation of this process, seeing projects through to completion. Based on similar planning and implementation efforts in North Carolina and nationally, this plan would be a success if all 26 of the top projects were completed by year 10, along with key policy and program recommendations.

YEAR 10: FULL PLAN UPDATE

3

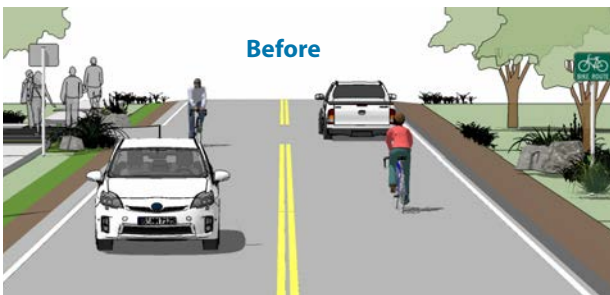
Reconfirm regional priorities and long-term projects; update recommendations accordingly. Evaluate what has worked and what has not for project implementation.

EXAMPLE TYPES OF PROJECT DEVELOPMENT ON EXISTING ROADWAYS

Three common types of bicycle facility implementation for existing roadways are described below and on the following pages: Roadway widening, lane narrowing, and lane reconfiguration.

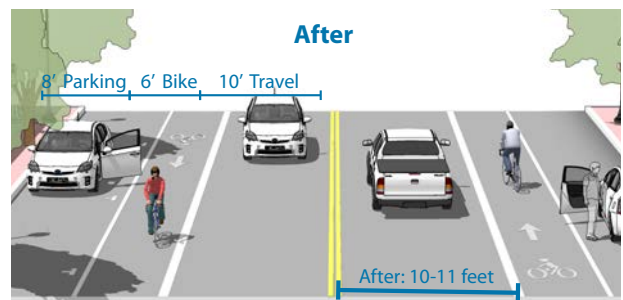
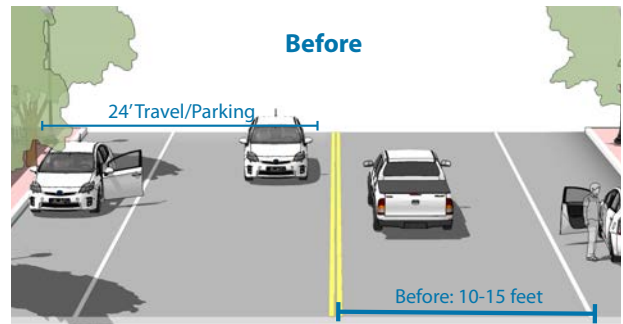
Roadway Widening: Bike lanes can be accommodated on streets with excess right-of-way through shoulder widening. Although roadway widening incurs higher expenses compared with re-striping projects, bike lanes can be added to streets currently lacking curbs, gutters and sidewalks without the high costs of major infrastructure reconstruction (they can be added by expanding roads *with* curb and gutter as well, but at a greater cost).

Typical application is on roads lacking curbs, gutters and sidewalks. There should be a four-foot minimum width for the bicycle lane when no curb and gutter is present, with a six-foot width preferred. If it is not possible to meet minimum bicycle lane dimensions, a reduced width paved shoulder can still improve conditions for bicyclists on constrained roadways. Overall guidance on bicycle lanes and paved shoulders applies to this treatment; for more information, see Appendix A for a list of Design Guide Resources.



Lane Narrowing: Lane narrowing utilizes roadway space that exceeds minimum standards to provide the needed space for bike lanes. Many roadways have existing travel lanes that are wider than those prescribed in local and national roadway design standards, or which are not marked. Typical application includes:

- On roadways with wide lane widths. Most standards allow for the use of 11 foot and sometimes 10 foot wide travel lanes to create space for bike lanes.
- Special consideration should be given to the amount of heavy vehicle traffic and horizontal curvature before the decision is made to narrow travel lanes. Center turn lanes can also be narrowed in some situations to free up pavement space for bike lanes.



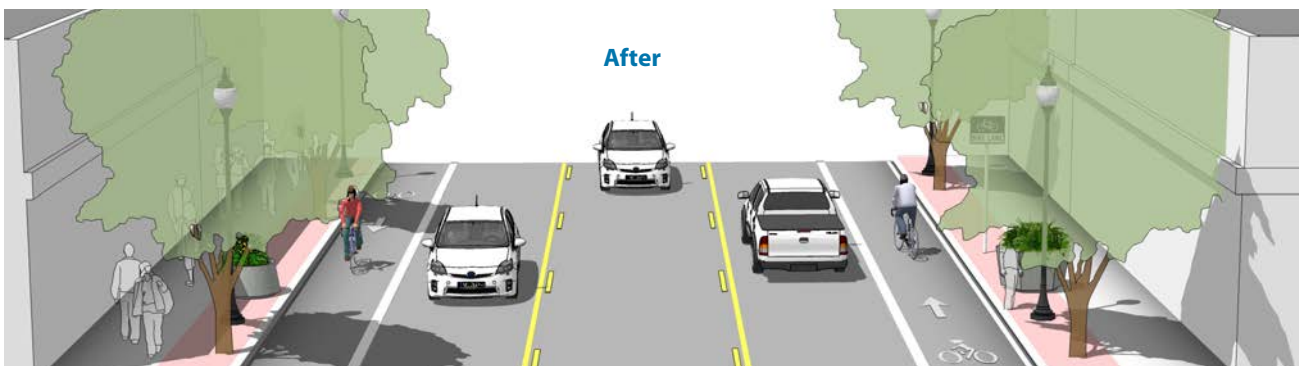
Example lane-narrowing opportunity: N Main St Boiling Springs, NC

Lane Reconfiguration: The removal of a single travel lane will generally provide sufficient space for bike lanes on both sides of a street. Streets with excess vehicle capacity provide opportunities for bike lane retrofit projects. Depending on a street's existing configuration, traffic operations, user needs and safety concerns, various lane reduction configurations may apply. For instance, a four-lane street (with two travel lanes in each direction) could be modified to provide one travel lane in each direction, a center turn lane, and bike lanes. Prior to implementing this measure, a traffic analysis should identify potential impacts. Considerations include:

- Width depends on project. No narrowing may be needed if a lane is removed.
- Guidance on bicycle lanes applies to this treatment.; see Appendix A for a list of Design Guide Resources.



Example lane-reconfiguration recommendation: Oak Street in Spindale, NC (photo-rendering of "after" scenario).





Grand opening of the Razorback Greenway, a regional trail project that benefited from \$40M in private investment and USDOT funding.

ENGAGING PRIVATE FUNDING

In the Isothermal Region, many of the recommended long-term bicycle facility projects are in the form of greenway trails and rail-trails (see projects proposed throughout Chapter 3). According to public comment forms, greenway trails and other types of separated bikeways are the preferred facility type of many current and potential bicyclists, yet they are also the most challenging to develop. This is due to the costs related to trail construction and assembling trail right-of-way (as opposed to many on-road bicycle projects that can be achieved through restriping within existing public right-of-way). With cost as a major deterrent to realizing these long-term, long-distance greenway projects, it is important to look at how other communities are achieving success in this area.

Across the United States, one of the fastest emerging funding sources for greenway development is the private sector. Philanthropic organizations, corporate and family foundations, non-profit organizations and

corporations have stepped up their involvement in greenway facility development in the form of financial support. This trend is occurring for various reasons, including support for improvements to quality of life, health and wellness, alternative transportation, conservation of natural resources and economic development. Most importantly, private financial support has enabled the greenway development process to move faster, so that facilities can be completed more efficiently. Two exemplary projects illustrate how this works:

- 1) In Northwest Arkansas, the Razorback Regional Greenway was conceived by the Northwest Arkansas Regional Planning Commission as a network of primarily on-road trails spanning the two-county region (Benton and Washington counties). In 2009, the Walton Family Foundation stepped in and spearheaded a public-private partnership that resulted in the development of a 36-mile, primarily off-road, world class regional greenway.

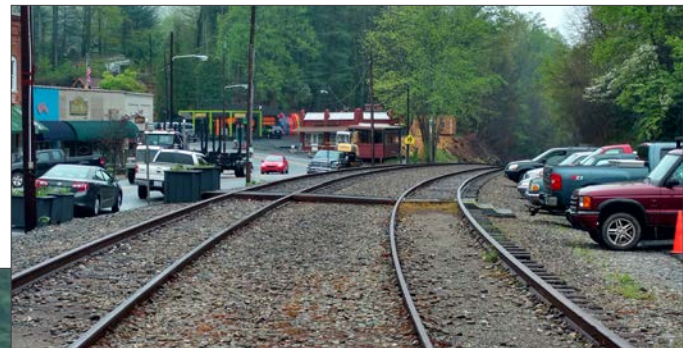
The Razorback Regional Greenway was funded from a combination of public and private funds, including a USDOT TIGER 2 grant of \$15 million, and a dollar for dollar gift from the Walton Family Foundation of \$15 million. Other grant funds were added later bringing the total funding to more than \$40 million. Without the lead gift from the Family Foundation, the project would never have happened. The Foundation based its gift on two community goals: 1) improve the health of local residents, and 2) support economic development throughout the region to keep Northwest Arkansas competitive for years to come. The 36-mile Razorback Regional Greenway was officially completed and opened for use in May 2015.

2) In Memphis, Tennessee, the 36-mile Wolf River Greenway has been the brainchild of the Wolf River Conservancy (a non-profit land trust based in Memphis) for more than 35 years. Using a traditional approach of relying on public sector leadership and funding to build the project, the Conservancy

became frustrated with the glacial pace of greenway facility development – in 35 years, approximately 5 miles of trail had been completed. In 2014, the Conservancy decided to fund the development of 22 miles of the trail within the Memphis city limits using private sector funds. As of 2016, the Conservancy has raised approximately \$40 million in support of facility development, with more than half of that coming from private sector sources. The Conservancy has then leveraged the private sector support to gain public sector support from the City of Memphis and Shelby County. The Conservancy expects to design, permit and build the entire 22 mile Memphis portion of the Greenway by 2019.

These are just two examples of ways in which private sector funding is used to support greenway facility development. There are many more examples just like the ones mentioned above occurring across the United States.

Completion of the Saluda Grade Rail-Trail in the Isothermal Region would be a huge undertaking financially, with incredible benefits for the region in terms of transportation, recreation, health and economic development. Private sector funding could help propel this project forward. Right & below: Existing and proposed sections of the Saluda Grade Rail Trail in Saluda, NC.



Key Steps to Engaging Private Funding

Assuming that a worthy greenway project has been identified, there are four key steps in the process: 1) develop the “pitch”, 2) make the ask, 3) leverage the lead gift, and 4) invite private sector and public sector groups to participate.

Step One: Develop the “Pitch”

The first step is to finalize the vision and scope of the project, along with its benefits to the community. The “pitch” is typically summarized in the form of marketing materials, such as reports, digital media presentations, and informational handouts that define the important elements of the greenway project.

The Carolina Thread Trail in the Charlotte Metro Region offers an excellent example for “developing the pitch.” The Catawba Land Conservancy (CLC) and the Trust for Public Land (TPL) worked with Greenways Incorporated to prepare a vision statement and

economic case statement that together defined the goals and objectives of “The Thread Trail,” a regional greenway project. The “pitch” was carefully crafted so that it could be distilled into simple terms and delivered through a concise presentation. CLC and TPL worked with other Charlotte based firms to develop graphic elements of the pitch, including a logo that defined the “brand” for the project. The combination of these materials constituted “the pitch,” and enabled CLC and TPL to take the next step in the process – making the ask for financial support.

Likewise, both the Razorback Regional Greenway in Northwest Arkansas and the Wolf River Greenway in Memphis, Tennessee, undertook similar efforts in developing the pitch. In Northwest Arkansas, a compressed timeframe, centered around a design charrette, produced the pitch. The Walton Family Foundation funded the design charrette process that resulted in the preparation of a vision, conceptual framework and economic case statement for the



The Carolina Thread Trail in the Charlotte Metro Region offers an excellent example for building partnerships for trail development.



The Wolf River Conservancy leveraged private sector support for trail development to gain public sector support from the City of Memphis and Shelby County.

Razorback Regional Greenway. In Memphis, the Wolf River Conservancy used a similar approach, and also commissioned Alta Planning + Design to prepare an economic study regarding the benefits of the Greenway to the regional community.

Step Two: Making the Ask

Once the pitch has been prepared, it is time to “make the ask.” For greenway projects, making the ask can occur in different ways. Generally, two different strategies can be employed, one that targets public funding sources and the other that targets private funding sources.

For the Carolina Thread Trail, the major “ask” occurred during a breakfast meeting of philanthropic and corporate groups. The invitation only breakfast generated more than \$15 million in support of the Thread Trail project, and was the catalytic event

that launched the project. Both CLC and TPL worked extremely hard in advance of the breakfast to deliver the pitch to participants so that when the time came for the ask, the results were more or less expected.

Other “asks” can be more complicated. The Razorback Regional Greenway went through a protracted ask that involved an application for federal funding. The federal grant was matched dollar for dollar by the Walton Family Foundation, creating the opportunity for full project development. In Memphis, the Wolf River Conservancy’s support came from \$24 million in private sector funding with an additional \$16 million in public sector funding. Sometimes, the “ask” can stretch for months and more than a year. Depending on the size of the greenway project, raising large sums of money to support greenway development takes time.



Step Three: Leverage the Lead Gift

All three of the projects used as examples in this chapter utilized a “lead gift” as leverage for raising additional funds. A lead gift is important for several reasons. First, a lead gift from a prominent and respected local project sponsor signifies the importance of the project throughout the entire community. Second, a lead gift is often used to leverage other private funds. The lead sponsor will often call upon other private funders to support the greenway. Third, a lead gift may be used as a matching source of funding for public sector grants.

To secure a lead gift, it will be necessary to spend time with a potential project sponsor to thoroughly explain the merits and benefits of the greenway project. Most importantly, the greenway benefits must align with the interests and goals of the sponsor, and represent an opportunity to fulfill a specific mission of the sponsor.

Lead gifts typically are significant in order to be effective. Some project sponsors will pledge a lead gift premised on the ability to raise the balance of funds within a defined time period. Some project sponsors will specify that the lead gift must be matched in a defined proportion to the balance of funds raised.

Lead gifts are very important to the success of fund raising as they typically establish credibility for the greenway initiative and provide the first tangible evidence of financial support.

Step Four: The Invite List

Which groups, organizations and entities should be on a “short list” of invitees to help fund greenway projects in North Carolina? The following is not a complete list, but helps to narrow the field of likely candidates for consideration. See Appendix B for more potential participants.

- **Foundation for the Carolinas:** This foundation strengthens regions through innovative community initiatives. Since 1958, Foundation for the Carolinas has served as a catalyst for charitable good, connecting individuals, companies and organizations to needs and philanthropic opportunities across the region and beyond. This community foundation is dedicated to the collective strength of communities, working in close partnership with donors, civic leaders and nonprofits to help achieve a wide variety of charitable goals and to inspire philanthropy that will benefit generations to come. Today, Foundation for the Carolinas is one of the largest community foundations in the United States.
- **Trust for Public Land (TPL):** TPL’s mission is to create parks and protect land for people, ensuring healthy, livable communities for generations to come. Every park, playground, and public space they create is an open invitation to explore, wonder, discover, and play. TPL has been connecting communities to the outdoors—and to each other—since 1972. Today, millions of Americans live within a 10-minute walk of a park or natural area they helped create, with more visitors every year.
- **The Conservation Fund:** The Conservation Fund practices conservation to achieve environmental and economic outcomes. Their staff throughout the country create and implement innovative, practical ways to benefit the natural world and the well-being of Americans from every walk of life. Conservation takes many forms, and The Fund’s programs interpret and practice conservation in a mutually-reinforcing way - working in concert to make sure the value of natural resources in America remain essential to our prosperity. The Fund’s focus is on conservation and communities

- creating as many pathways possible for people and organizations to protect their natural resources and save the places that matter most - properties with ecological, historic and/or cultural significance. They deliver conservation and economic vitality through strong partnerships with government, business and colleague organizations.

- **Blue Cross Blue Shield Foundation of North Carolina:** Their mission is to improve the health and well-being of all North Carolinians. They recognize that a North Carolina with healthy people living in active communities reduces health risks and improves health outcomes. Health is a complex equation that is as much determined by the environment as it is by the individual. Their strategy is to look ahead to get at the core drivers of poor health and to support lasting system-wide changes.
- **North Carolina Community Foundation:** The NCCF is the single statewide community foundation serving North Carolina and has made \$101 million in grants since its inception in 1988. With more than \$237 million in assets, the NCCF sustains 1,200 endowments established to provide long-term support of a broad range of community needs, nonprofit organizations, institutions and scholarships.
- **Duke Energy Foundation:** The Duke Energy Foundation provides philanthropic support to address the needs vital to the health of communities. Annually, the Foundation funds more than \$25 million in charitable grants, with a focus on education, environment, economic and workforce development and community impact.

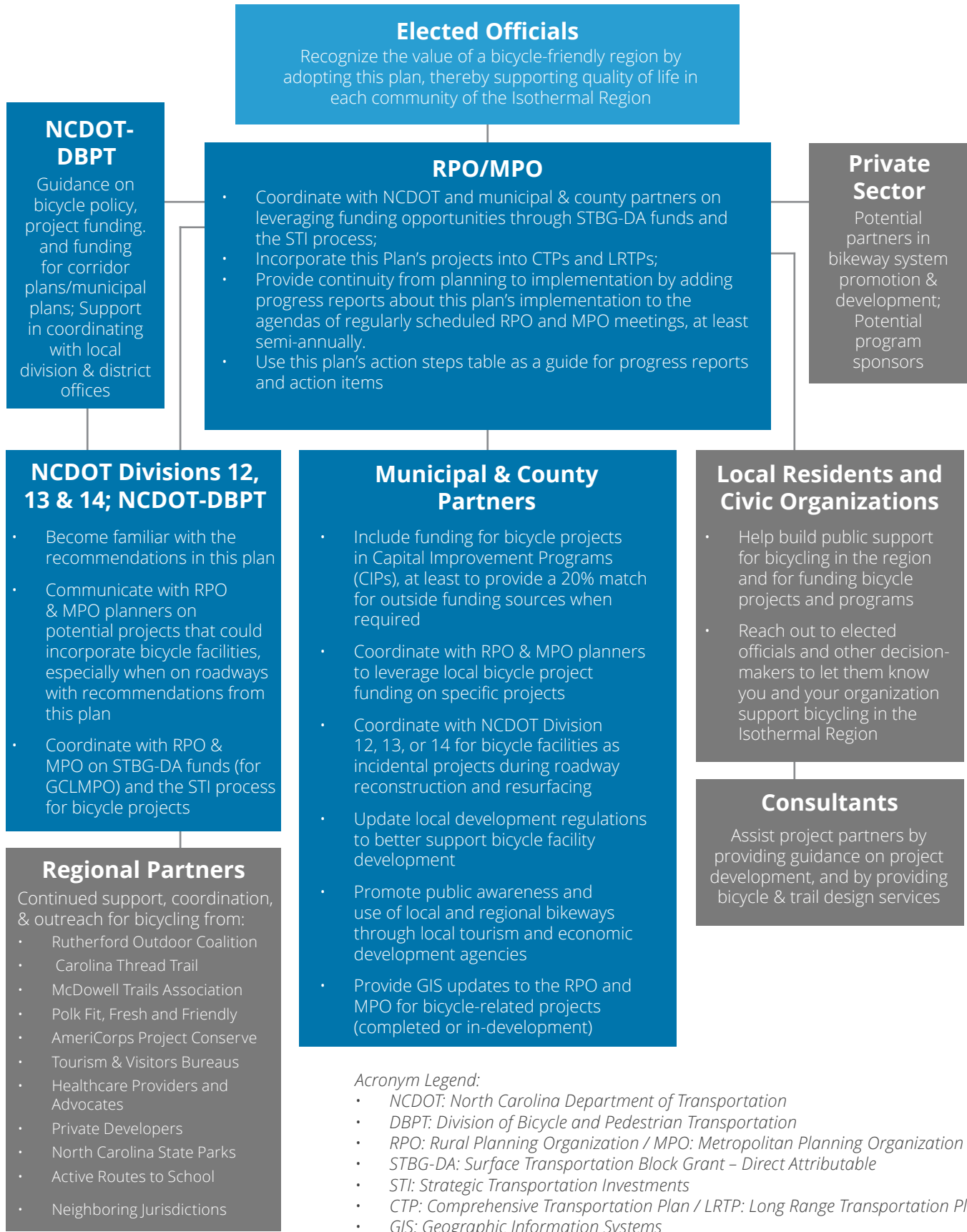
FUNDING RESOURCES IN APPENDIX B

See Appendix B for information on more than 50 potential funding resources, in the following funding categories. While some are directly related to bicycle infrastructure, others are focused on land conservation that could assist in establishing greenway trail right-of-way.

- **FEDERAL FUNDING** (13 resources)
- **STATE FUNDING** (13 resources)
- **LOCAL GOVERNMENT FUNDING** (14 resources)
- **PRIVATE AND NON-PROFIT FUNDING** (21 Resources)



ORGANIZATIONAL FRAMEWORK *for* IMPLEMENTATION



IMPLEMENTATION ACTION STEPS TABLE

POLICY ACTION STEPS					
#	Task	Lead Agency	Support	Details	Phase
1	Present Plan to Local Communities for Adoption or Endorsement	Isothermal PDC	Project Steering Committee Members	The plan should be presented to elected officials in 2018. Focus on the health and economic benefits of bicycling (Chapter 1) and key recommendations (Chapters 3-4). Adoption signals intent to implement the plan over time; it <i>does not</i> commit funding.	Short Term (2018)
2	Meet with NCDOT to coordinate on key recommendations	County and Municipal Partners + Isothermal PDC	NCDOT Division 12, 13, & 14 + NCDOT-DBPT	This plan and the recommended bicycle facilities should be officially recognized by NCDOT. For example, NCDOT should refer to this document when assessing the impact of future projects and plans, such as bicycle facilities on future bridge improvements. Effort should be made between state and local partners to include parallel bicycle facilities on planned future roadways and roadway reconstruction projects, especially where they appear on adopted plans.	Short Term (2018)
3	Amend county and local development ordinances and technical standards	County and Municipal Partners	County & Local Planning Boards	County and local development ordinances should be considered for amendment to ensure that, as developments are planned and reviewed, the recommended bicycle facilities and trail corridors identified in this plan are protected. This would entail amending development regulations to have developers set aside land for facilities whenever a development proposal overlaps with the proposed routes, as adopted. Local governments should also consider requirements and tools like dedicating easements, connections to adjacent land uses, issuing credits, and offering some form of recognition to developers who go above and beyond the requirements for trail development. See Chapter 5 for more information.	Short Term (2018)
4	Revise sewer, stormwater and utility easement policies	County and Municipal Partners	County & Local Planning Boards	All new sewer, stormwater and utility easements should be considered for allowing public access as a matter of right. Such a consideration should allow for access that does not require landowner approval for each parcel the easement overlaps. As trails are developed, also review applicable existing easements for similar revision considerations.	Short Term (2018)
5	Develop a corporate sponsorship policy	County and Municipal Partners	Local Private Sector Partners	For a comprehensive sponsorship policy example, see that of Portland Parks and Recreation: www.portlandonline.com/shared/cfm/image.cfm?id=155570 . For a sponsorship brochure example, see that of the 'Mountains to Sound Greenway': https://mtsgreenway.org/support/sponsorships/	Short Term (2018)
6	Enforcement - Restraint of Animals	Police Departments	NCDOT, County and Municipal Partners	Loose dogs attacking bicyclists in rural parts of the region has been cited by numerous bicyclists in Polk County during this planning process. Polk County (and all four counties), currently have laws that require all privately owned animals to be restrained within their private property or under control if off the property. These laws are critical to bicyclists and pedestrians in rural areas and must be enforced.	Short Term (2018); ongoing
7	Develop a coordinated operations & maintenance plan	County and Municipal Partners	NCDOT Division 12, 13, & 14	This plan will help to apportion responsibility between agencies where facilities cross jurisdictional boundaries or where pooled efforts can reduce costs.	Short Term (2018)



PROGRAM ACTION STEPS

#	Task	Lead Agency	Support	Details	Phase
1	Release the brochure maps produced for this plan	Isothermal PDC	Local & Regional agencies	Also consider providing a similar web-based and/or mobile component.	Short Term (2018)
2	Establish a directory of stakeholder contacts for the Isothermal region	Isothermal PDC	All Project Stakeholders	The group could include representatives listed in the acknowledgments of this plan, plus others from the groups listed in the organizational framework chart. The directory should be posted on MPO and RPO websites.	Short Term (2018)
3	Regularly discuss progress on plan implementation & the next steps that are needed	Isothermal PDC	All Project Stakeholders	Progress reports about this plan's implementation should be added to the agendas of regularly scheduled Isothermal PDC meetings. The purpose is to establish regional coordination for bicycle facility development between the member agencies. Meeting discussions should evaluate implementation progress and set goals to be achieved before the next meeting. These meeting agendas could also feature special presentations by stakeholders and invited guests related to plan progress.	Short Term (2018); Semi-annual meetings thereafter
4	Share GIS data with the PBIN as updates are made to both existing and planned bicycle facilities in the region	County and Municipal Partners	MPOs and RPOs	The Pedestrian and Bicycle Infrastructure Network (PBIN) is a statewide Geographic Information System (GIS) inventory of existing and planned bicycling and walking facilities in North Carolina. The PBIN is maintained by the North Carolina Department of Transportation Division of Bicycle and Pedestrian Transportation and Institute for Transportation Research and Education (ITRE). More information can be found here: https://connect.ncdot.gov/projects/bikeped/pages/pbin.aspx .	Ongoing; Consider Semi-annual updates (consider same time as workshop)
5	Conduct bicycle facility ridership counts	Isothermal PDC or County and Municipal Partners	Planning Consultant or Using In-House Equipment	Bicycle facility usage data is needed to strengthen grant requests and influence policy and funding decisions. A complete picture of bicyclist characteristics can be developed and outcomes can help to identify if additional amenities would improve the bicyclist experience.	Short Term (2018-2019)
6	Coordinate with NC's Active Routes to School program on bicycle connectivity	County Schools/ Partners	County Planners, Fire and Police Departments	Connectivity must be considered as 'essential' not 'bonus' on the front end of school site development. Also coordinate programming efforts with the Regions 2 & 4 Active Routes to School Coordinators (Let's Go NC Pedestrian & Bicycle Safety Curriculum can also be accessed at - https://connect.ncdot.gov/projects/BikePed/Pages/LetsGoNC.aspx)	Short Term (2018-2019)
7	Establish a regional branding and wayfinding system for bicycle routes and other points of interest throughout the region	Isothermal PDC	Planning Consultant or In-House Design	A wayfinding system is recommended to create a cohesive and easy-to-use platform for navigating the regional bicycle route system, once more of the longer-distance routes are connected throughout the region. The system should be designed so that it is flexible enough to be updated as new projects are completed, and should be implemented in conjunction with a statewide and national marketing strategy. See Chapter 4 and Appendix A for more information about bicycle signage and wayfinding.	Medium Term (2019-2020)
8	Launch Priority Programs	Isothermal PDC or County and Municipal Partners	All Project Stakeholders	Stakeholders should coordinate to launch new programs, such as those also described in Chapter 4, including a regional website, county Trail Coordinator positions, Active Routes to School, bicycling maps/ brochures, a wayfinding program, bicycle events, Cycle to Farm events, and apply to Watch for Me NC.	Medium Term (2019-2020)

INFRASTRUCTURE ACTION STEPS

#	Task	Lead Agency	Support	Details	Phase
1	Identify and secure specific funding sources for Priority Projects & begin design and construction phases as soon as possible	Isothermal PDC, County, and Municipal Partners	NCDOT Division 12, 13, & 14 + NCDOT-DBPT	Partnerships for joint funding opportunities should be pursued (see graphics/tables on pages 138, 139, and 148). Combine financial and management resources for bicycle facility development with surrounding municipalities, regional entities, and private sector partners (also see ‘Engaging Private Funding’ section of this Chapter). “Shovel-ready” designed projects should be prepared in the event that future funds become available. For Priority Projects 4,10,11,17, and 24, which are programmed in the 2018-2027 STIP, coordinate with NCDOT to incorporate recommendations from this plan.	Short Term (2018); Ongoing
2	Gather further public support and input during the design phase for projects	County & Municipal Partners	Local Advocates & Public	Involve the general public in the design stage for bicycle facility development. Some groups can help with both routing ideas and public support from specific neighborhoods.	Short Term (2018); Ongoing
3	Develop a long term funding strategy	County & Municipal Partners	Isothermal PDC	To allow continued development of the overall system, capital funds for bicycle facility construction should be set aside every year, even if only a small amount; small amounts of local and county funding can be matched to outside funding sources, such as federal, state and private funds. Funding for an ongoing maintenance program should also be included in local operating budgets. Cross-jurisdictional projects lend themselves well to collaboration on funding as coordinated multi-jurisdictional projects are looked upon more favorably by outside funding sources than single-jurisdiction applications.	Short Term (2018); Ongoing
4	Maintain paved shoulders	NCDOT	County & Municipal Partners	When paved shoulders are implemented, especially along sections that carry higher traffic volumes and accumulate excess debris, regular maintenance should include clearing this debris so that bicyclists are not deterred from riding in this space.	Short Term (2018); Ongoing
5	Re-evaluate and reconfirm the short term priorities	Isothermal PDC, County & Municipal Partners	Project Consultants	Every year, reevaluate short-term priorities based on what has been completed, and reconfirm the agenda of “priority” projects. Consider sticking with earlier projects that were not successful to-date, versus new opportunities that may have arisen or become more feasible since 2018.	Medium Term (2019-ongoing)
6	Update this Plan	Isothermal PDC	Project Consultants	In year 5 of this plan (2023), reassess overall systemwide goals and reevaluate the overall approach to implementation. In year 10 (2028), complete a full plan update.	Long Term (2023 & 2028)
7	Measure performance	Isothermal PDC	County & Municipal Partners	See the following pages for potential performance measures that can be used to monitor progress of plan implementation over time.	Ongoing



PERFORMANCE MEASURES

Measuring performance over time is essential to implementation. Tracking performance measures within communities and across the region will allow implementing agencies to understand progress, communicate successes and challenges, and motivate leaders to take further actions. The following performance measures were selected to track progress toward the goals of this plan. Implementation progress updates at RPO and MPO meetings could be used as an opportunity to evaluate progress against these measures. Individual counties or municipalities may also be interested in tracking and reporting progress independently.

Goal 1: Increase the quality of bicycling throughout the region

Objectives

- Encourage and support regional, sub-regional, and local bicycle advocacy groups
- Increase connections between neighborhoods, schools, and businesses
- Increase bicycle facilities

Performance Measures

- Number of advocacy groups promoting bicycling
- Measure of connectivity: Percentage of new projects built as Complete Streets with connectivity to surrounding destinations
- Percentage of roadways that have designated or separated bicycle facilities
- Percentage of signalized intersections that have bike and pedestrian friendly accommodations
- Percentage of bridges with bicycle facilities
- Total funding devoted to the construction of bicycle facilities

Goal 2: Improve health outcomes in the region

Objectives

- Increase access to recreational bicycle facilities
- Increase bicycle exercise and activity rates among all age groups

Performance Measures

- Mileage of greenways per person (residents and visitors)
- Percentage of proposed rail-trails and Carolina Thread Trail completed through the region
- Physical inactivity rates & obesity rates
- Reduction in transportation-related emissions from increase in bicycling trips

Goal 3: Improve safety for all cyclists

Objectives

- Reduce cyclist crashes
- Engage law enforcement in bicycle safety
- Improve cyclist and driver adherence to traffic laws

Performance Measures

- Bicyclist crash and fatality rates per capita
- Percentage of police departments completing bicycle education courses
- Number of citations related to bicycle safety violations to bicyclists and motorists
- Distribute 'Ride Guide: North Carolina Bicycle Laws' - https://www.bikelaw.com/wp-content/uploads/2014/11/BIKELAW_RG_NC_Web.pdf

Goal 4: Increase bicycling trips by residents and visitors

Objectives

- Increase education on the social, economic, and health benefits of bicycling
- Increase bicycle mode share for commuting
- Improve resources for bicycle tourists

Performance Measures

- Towns, businesses, and colleges designated as Bicycle Friendly by the League of American Bicyclists
- Number of schools participating in bicycle safety education/encouragement programs
- Bicyclist mode share
- Bicyclist counts
- Number of tourism websites promoting cycling
- Number of brochures or guides available to tourists

Goal 5: Promote and encourage growth of tourism economy

Objectives

- Increase economic growth, job creation, and tourism revenue through bicycling

Performance Measures

- Return on investment measures such as job creation, small business development, tourism, home prices
- Number of Chambers of Commerce, Visitor Bureaus, and other groups promoting bicycling
- Number of bike events in region and corresponding economic impact
- Number of visitors coming to region partially due to bicycling amenities



Prepared for the Isothermal Planning & Development Commission
Prepared by Alta Planning + Design
Funding from NCDOT, Division of Bicycle and Pedestrian Transportation, 2017