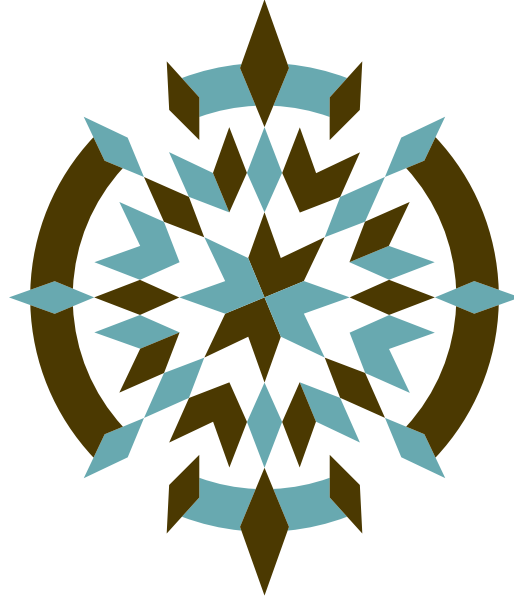

CAROLINA THREAD TRAIL
MASTER PLAN
FOR IREDELL COUNTY
COMMUNITIES



**CAROLINA
THREAD
TRAIL**

*Weaving
Communities
Together*

AUGUST 2011



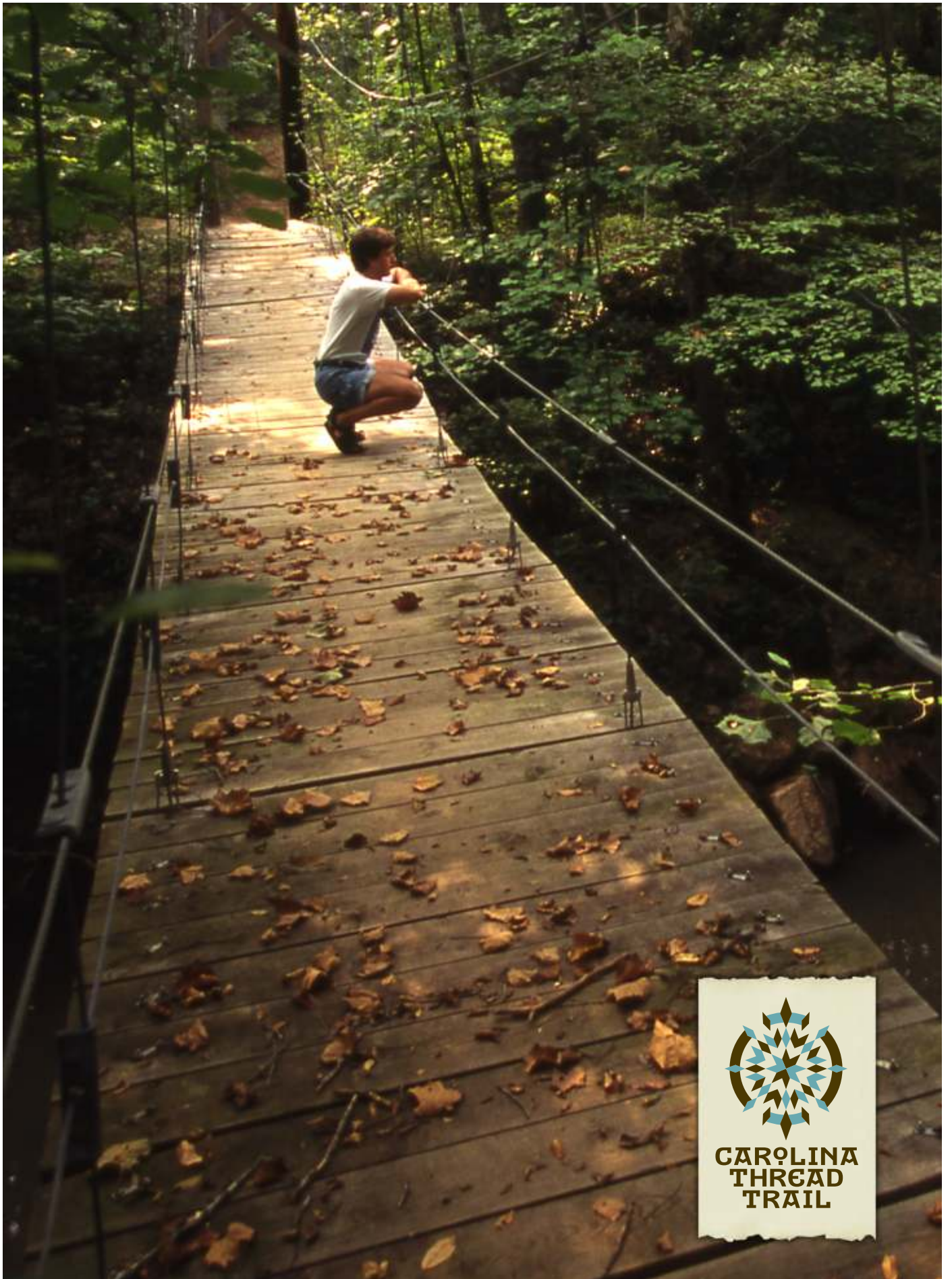


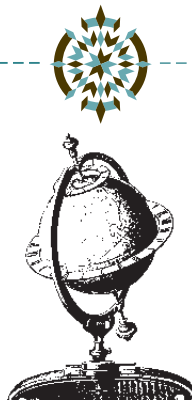




TABLE OF CONTENTS

Acknowledgements	7
Plan Adoption	10
Executive Summary	11
Community input	13
Chapter 1. Introduction	17
Carolina Thread Trail	17
Chapter 2. Greenway Benefits	19
Chapter 3. Existing Conditions	23
Chapter 4. Stakeholder and Public Outreach	33
Chapter 5. Carolina Thread Trail Routes	43
Chapter 6. Recommended Actions for Implementation	59
Chapter 7. Conclusion	67
Appendix I: Design Guidelines	69
Appendix II: Maintenance and Management	107
Appendix III: Overview of Funding Options	109
Footnotes	149





ACKNOWLEDGEMENTS

The following organizations signed resolutions of support at the outset of this effort to work with neighboring communities and with the Carolina Thread Trail to plan, design, and build trails that will connect our communities:

Pine Lake Preparatory School
Iredell County Board of Health
Hikers of Iredell Club
Iredell County
City of Statesville
Probus Club of Lake Norman
Town of Mooresville
Town of Troutman
Town of Love Valley
Town of Harmony
Central Lake Norman Golden Boys
Iredell County Healthy Carolinians
Statesville Convention and Visitor's Bureau
Race City Civitan Club

Iredell County Carolina Thread Trail Steering Committee
Ron Smith
Director, Iredell County Planning & Development Department
Elinor Hiltz
Planner II, Iredell County Planning & Development Department
Rebecca Harper
Planner III, Iredell County Planning & Development Department
Steve Warren
Planning Administrator, Iredell County Planning & Development Department
Neil Burke
Transportation Planner, Town of Mooresville Planning Department
Ken Vaughn
Director, Iredell County Cooperative Extension
Erika Martin
Director, Town of Troutman Planning & Zoning
Katherine Land
Iredell County Health Department
Jeff Archer
First Flight Bicycles, Statesville
Bill Galloway
Resident/Bicyclist
Sherry Ashley
Assistant Director, Town of Statesville Planning Department
Don Bartrell
Iredell Chambers of Commerce/Golden Boys
Larry Pressley
City Engineer, City of Statesville
Brendon Pritchard
Assistant City Engineer, City of Statesville
Brent Cornelison
Director, City of Statesville Recreation & Parks Department
Sally Daley
Chief Executive Officer, Girl Scouts Hornets Nest Council
Robert Woody
Recreation Director, Iredell County Parks and Recreation



Michelle Hepler
Recreation Program Administrator, Iredell County Parks and Recreation

Blair Israel
Regional Planner, Centralina COG

Leah Mitcham
Mooresville Convention and Visitor's Bureau

Tim Johnson
Mountain Region Trails Specialist, NC State Trails Program

Vicki Taylor
State Park Advisory/Hydro Relicensing

Ken Manuel
Duke Energy Aquatic Weed Program

Jason Gwinn
Park Ranger, Lake Norman State Park

Tim Brown
Planning Director, Town of Mooresville Planning Department

John Allen
Farming Community

Casey Rhinehart
Lake Norman State Park

David Bradley
Statesville Chamber of Commerce

Dee Ham
Hikers of Iredell Club

Jim King
Town of Mooresville

Tori Callanan
Town of Love Valley

Randi Gates
Community Coordinator, Carolina Thread Trail

Iredell County Carolina Thread Trail Technical Advisory Team

Ron Smith
Director, Iredell County Planning & Development Department

Elinor Hiltz
Planner II, Iredell County Planning & Development Department

Rebecca Harper
Planner III, Iredell County Planning & Development Department

Neil Burke
Transportation Planner, Town of Mooresville Planning Department

Erika Martin
Director, Town of Troutman Planning & Zoning

Sherry Ashley
Assistant Director, Town of Statesville Planning Department

Jason Walser
Executive Director, The LandTrust for Central North Carolina

Tim Johnson
Western Region Trails Specialist, North Carolina Division of Parks & Recreation

Mark Stafford
Division 12 Operations Engineer, North Carolina DOT

Patrick Norman
Division 12, District 2, Operations Engineer, North Carolina DOT

Blair Israel
Regional Planner, Centralina COG

Randi Gates
Community Coordinator, Carolina Thread Trail

John Cock
Alta Planning + Design

Maya Agarwal
Alta Planning + Design

Bob Heuer
Trust for Public Land

Amanda Huggins
The Lawrence Group

Bob Heuer
Trust for Public Land



Consultant Team

Jeff Olson

Alta Planning + Design

John Cock

Alta Planning + Design

Maya Agarwal

Alta Planning + Design

Jean Crow Crowther

Alta Planning + Design

Anne Bothner-By

Alta Planning + Design

Bob Heuer

Trust for Public Land

Amanda Huggins

The Lawrence Group



PLAN ADOPTION

*The following have adopted this Carolina Thread Trail Master
Plan for Iredell County Communities:*

Iredell County
City of Statesville
Town of Mooresville
Town of Troutman
Town of Love Valley
Town of Harmony



EXECUTIVE SUMMARY

Local governments in the 15-county Charlotte-Mecklenburg area are eligible to receive Greenway Master Planning Grants from the Carolina Thread Trail. In early 2010, the Carolina Thread Trail made available a planning grant to Iredell County and its municipalities to further develop their vision for The Thread, building off of the planning work that had already been done in the County. The grantee, Iredell County, has managed the grant, working closely with the consultants who have overseen the planning process.

The Carolina Thread Trail is a regional network of greenways, trails and conserved lands that will reach approximately 2.3 million citizens and effectively link people, places, cities, towns and attractions. The scale of The Thread's connectivity is unparalleled and is based on certain guiding principles and core values: Collaboration, Community Self-Determination, Connectivity, Inclusivity, Leverage, and Respect for the Land and Respect for the Landowners. The recommended Thread route for Iredell County includes a total of 116.8 miles of greenways and trails. The broadly defined greenway and trail corridors present multiple opportunities for adjustments for a defined route, so that landowners can continue to be involved in fine tuning and defining the location of trails and amenities.

ADOPT THE PLAN

Adopting the Carolina Thread Trail Master Plan for Iredell County is a critical step in identifying the County's trail opportunities and challenges. Once adopted, the plan will influence County and municipal policy and decisions regarding trail development in the County, as well as make the County eligible for funding by various sources, helping to ensure that the implementation of the trail moves forward efficiently and effectively.

BUILD PUBLIC SUPPORT FOR TRAIL IMPLEMENTATION

A trail system such as the Carolina Thread Trail will be most successful when supported by a county-wide citizens' group. Ultimately a group, such as a "Friends of the Carolina Thread Trail" coalition, could work to ensure that public and political interest in the Carolina Thread Trail remains high and that the trails are successfully used and maintained once built.

COMPLETE TOP PRIORITY SEGMENTS

In light of the extensiveness of the Carolina Thread Trail network, it is important that Iredell County prioritize specific routes for development. That prioritization is based on public support, the importance of the connection, right-of-way availability, cost and available funding, and ease of implementation. These criteria established seven high priority Carolina Thread Trail routes which are shown in Chapter 5. Table 8 provides a concise summary of priority trail routes.

KNIT TOGETHER FUNDING FROM A VARIETY OF SOURCES

A variety of potential funding sources are available to help pay for the Carolina Thread Trail in Iredell County including private, local, state, regional, and federal funding programs. Weaving the resources of these varying sources together can assist in leveraging funds received and meeting match requirements.



Currently, the Carolina Thread Trail is leading a private fundraising effort to provide catalytic seed funding for trail planning, design, land acquisition, and construction for local governments and communities that plan for and adopt greenway master plans. Federal funds can be an essential component of funding larger, more expensive trail projects. Each category of funding is described in detail in Appendix III.

EVALUATE LAND OR RIGHT OF WAY ACQUISITION OPTIONS

Land and right of way acquisition along the proposed route will weigh heavily in assessing each segment's ease of implementation. Negotiations with railroads, utility companies, municipal governments and agencies, and private property owners will be required. The recommended actions for implementation included in Chapter 6 of this plan provide a clear guide for pursuing appropriate options.

DESIGN, CONSTRUCT AND MAINTAIN TRAILS

The design, construction, and sustenance of new segments of the Carolina Thread Trail will provide benchmarks for progress toward completion of the proposed network. Iredell County should qualitatively measure its successes toward achieving the goals of the Carolina Thread Trail Master Plan and establish measurable indicators of advancement.

CONCLUSION

With the guiding principles of the Carolina Thread Trail Master Plan process held constant, implementation of the Carolina Thread Trail in Iredell County will help the region achieve a world-class recreation and transportation system. Additionally, it will help to achieve educational, environmental, health, economic and community advantages.



Carolina Thread Trail received \$250,000 from Lowe's Foundation for trail development in Iredell County

COMMUNITY INPUT



Attendees at the public workshop in Statesville



Public meeting participants in Harmony



Public meeting participants in Harmony



Based on the Carolina Thread Trail guiding principle of "Community Self-Determination", the master planning process included citizen input from all over the county.

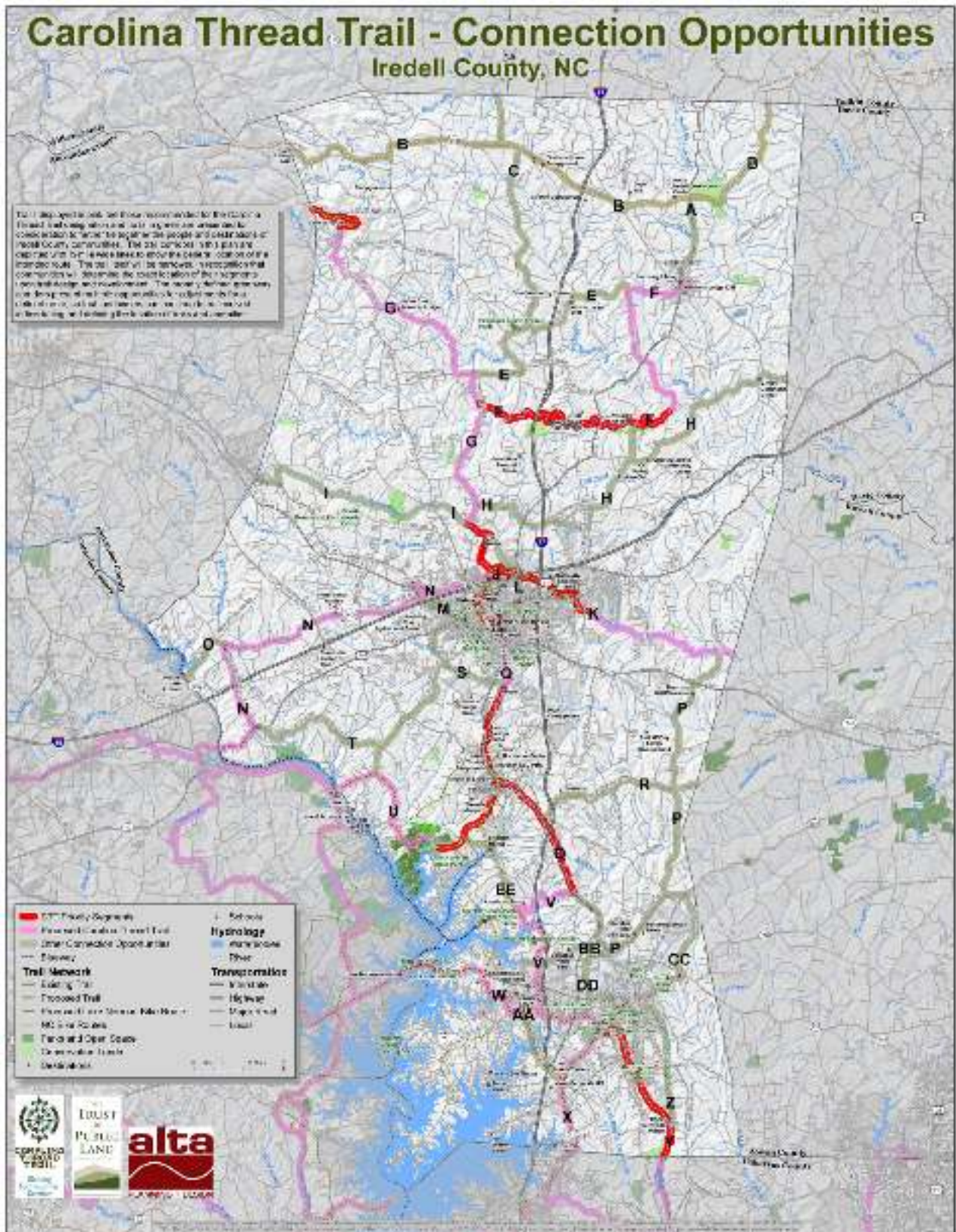
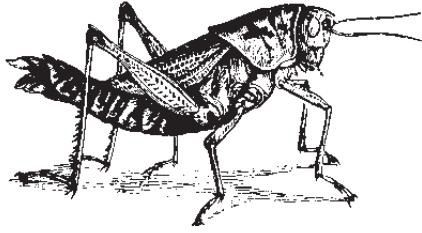


Figure 1: Top priority trail segments





CHAPTER 1. INTRODUCTION CAROLINA THREAD TRAIL

PURPOSE AND PLAN OBJECTIVES

Local governments in the 15-county Charlotte-Mecklenburg area are eligible to receive Greenway Master Planning Grants from the Carolina Thread Trail. In early 2010, the Carolina Thread Trail made available a planning grant to Iredell County and its municipalities to further develop their vision for The Thread, building off of the planning work that had already been done in the County. The grantee, Iredell County, has managed the grant, working closely with the consultants who have overseen the planning process.

CAROLINA THREAD TRAIL

The Carolina Thread Trail is a regional network of greenways, trails and conserved lands that will reach approximately 2.3 million citizens. It will link people, places, cities, towns and attractions. The Thread will help preserve our natural areas and will be a place for the exploration of nature, culture, science and history, for family adventures and celebrations of friendship. It will be for young, old, athlete and average. This is a landmark project, and creates a legacy that will give so much, to so many, for so long.

The scale of The Thread's connectivity is unparalleled and is based on certain guiding principles and core values: Collaboration, Community Self-Determination, Connectivity, Inclusivity, Leverage, and Respect for the Land and Respect for the Landowners.

COLLABORATION AND SELF-DETERMINATION

Collaboration and communication among the Iredell County Communities is almost as important as connectivity. The Master Plan aims to encourage a collaborative process by which greenways are conceived and designed in cooperation with adjoining communities in such a way that

The Thread will help preserve our natural areas and will be a place for the exploration of nature, culture, science and history, for family adventures and celebrations of friendship.

a regional asset is created out of a series of interrelated local decisions and actions.

CONNECTIVITY AND INCLUSIVITY

Creating connections between communities and historical, cultural and recreational attractions is important. The Carolina Thread Trail seeks to create a region known for its "ribbons of green" connecting people to each other and to their heritage. In offering the vision of greater community interaction, the program seeks to build bonds among diverse neighborhoods, as well as afford all residents greater access to our natural surroundings. Through this Master Plan, these goals are established.

LEVERAGE

The Plan's success depends upon generating additional investment of outside capital in our region's natural resources. Funding sources of the local, state and federal level are included in Appendix III.

RESPECT FOR THE LAND AND LANDOWNERS

During the planning process, Iredell County communities determined the location of their preferred segments of The Thread by considering multiple alternative routes. Portions of these routes included public lands or property owned by interested landholders, including developers who may want to offer this amenity to their neighborhoods.



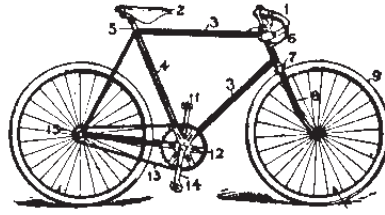
The broad corridors featured present multiple opportunities, and adjustments to the route will be incorporated as more landowners are engaged. Expert trail builders indicate that trails are built by assimilating parcels over time in this fashion.

Through an inclusive, collaborative process, each county and the communities within that county decide where their local trail systems will connect and become part of The Thread. However, not all local trails and greenways will become part of the Carolina Thread Trail. Analogous to our highway systems, The Thread will develop as a “green interstate” focused on linking local trails and regionally significant attractions. Other trails will continue to exist or be planned but may not receive the Carolina Thread Trail designation. Local trails will retain their own identities, whether or not they are designated as part of The Thread.

The look and feel of the Carolina Thread Trail may vary from community to community and county to county. Designation as the Carolina Thread Trail will signify that a particular trail is part of a plan to create an interconnected system, a plan created by local communities working together with their neighbors to identify connection points and to build trails that will grow together over time.



Citizens reporting at a Statesville public meeting: collaboration and self-determination are principles of the Carolina Thread Trail process.



CHAPTER 2. GREENWAY BENEFITS

Implementing the Carolina Thread Trail in Iredell County will help the region achieve a world-class recreation and transportation system. Multi-use trail facilities will result in expanded recreation and mobility options for Iredell County residents and visitors, especially those who seek to integrate a healthy lifestyle into their daily activities. Given the scenic beauty of the area, the trail will also offer important recreational opportunities. Benefits can be found in a number of categories, including education, environment, health, economics, and overall community rewards.

EDUCATION

Trails are excellent outdoor classrooms that allow trail users to learn about the natural environment, develop an appreciation for open spaces, and establish a conservation ethic. An understanding of one's natural environment can lead to future efforts to preserve ecologically important areas. Trails can also highlight historical and cultural sites and encourage trail users to learn about the historical significance and unique culture heritage of an area.

ENVIRONMENTAL

The Federal Highway Administration (FHWA) conducted a case study published in 1993 titled The Environmental Benefits of Bicycling and Walking in the United States.

Green space contributes to healthy places through:

- *Stress reduction*
- *Air filtration*
- *Encouragement of physical activity*
- *Economic enhancement*
- *Carbon sequestration*

This study states that "...bicycle-riding and walking do not contribute to the environmental damage inherent in extracting, transporting, processing and burning petroleum or other fossil fuels". The FHWA also reports that Americans are willing to walk to destinations up to two miles away and bicycle up to five miles away. Given that nearly half of all trips taken are for a distance of five miles or less¹, encouraging bicycling and walking as a transportation option can reduce:

- Fossil fuel use.
- CO₂ (carbon dioxide), CO (carbon monoxide), NO_x (nitrogen oxides) and VOC (volatile organic compounds) emissions.
- Traffic congestion.
- Vehicle miles traveled (VMT).

Connecting homes, schools, parks, downtown and recreation destinations, along with cultural attractions with a trail system can encourage local residents to walk or bike to destinations. People choosing to ride or walk rather than drive are typically replacing short automobile trips, which contribute disproportionately high amounts of pollutant emissions. These emission reductions benefit all residents, whether they are trails users or not.

HEALTH

Americans' lack of physical activity is leading to an increase in a variety of health conditions including hypertension, cancer, heart disease, diabetes, and obesity, which will soon eclipse tobacco as the number one preventable cause of death in the United States. In 2005, less than half of U.S. adults met the Centers for Disease Control/American College of Sports Medicine recommendations for daily physical activity levels².



The Surgeon General's 1992 report, "Physical Activity and Health," determined that physical activity can help reduce cardiovascular disease, lower the risk of colon cancer, lower the risk of diabetes, lower the risk of osteoporosis, reduce the risk of obesity, and relieve symptoms of depression and anxiety. The report also contains a 1991 Center for Disease Control study that shows walking is the most common form of exercise for 44.1 percent of the population over 18 years of age.

Bicycling and walking offer a way to integrate physical activity into busy schedules, and have been demonstrated to improve these conditions as well as to contribute to emotional well-being. Studies show that frequency of trail use is directly proportional to the distance that one lives from trail access points, and regular trail users see health benefits. It logically follows that communities with greater access to trail systems and recreational opportunities will have healthier populations.

In addition to individual health benefits, physical activity provides fiscal rewards to the entire community with a reduction in health care costs and lost days of work. The studies reviewed report an average annual per capita health cost savings of \$128.³

ECONOMIC

An integrated and consistent trail system can result in significant economic benefits to the region. The types of economic benefits include: increased property values, tourism revenue, increased consumer spending, local business expansion, public spending savings and household savings.

A number of studies show that home prices near trails are higher than home prices farther away from trails. Along the Little Miami Scenic Trail in Ohio, an increased sales price of \$7.05 for each foot closer to the trail was recorded⁴. This study was conducted in response to concerns by residents of property value decreases due



Trails in greenways and parks encourage walking and outdoor recreation.

to an increase of crime, traffic and noise resulting from the trail. In 2006, a study analyzed home values in seven Massachusetts towns near the Minuteman Bikeway and Nashua River Rail Trail. Homes near the trails sold at 99.3 percent of the listing price, compared to 98.1 percent for other homes in these towns. Additionally, homes near the trails sold in an average of 20 days faster compared to other homes⁵. Findings from the Trust for Public Land's *Economic Benefits of Parks and Open Space* (1999), and the Rails-to-Trails Conservancy's *Economic Benefits of Trails and Greenways* (2005) provide additional examples for how this value is realized in property value across the country. For example, in Apex, NC, the Shepard's Vineyard housing



development added \$5,000 to the price of 40 homes adjacent to the regional greenway – and those homes were still the first to sell. In Salem, OR, land adjacent to a greenbelt was found to be worth about \$1,200 per acre more than land only 1000 feet away.

Bicycle-related tourism has been shown to bring in significant revenue to a region. Studies of bicycle tourism in Colorado, Maine and the Outer Banks Region of North Carolina estimate annual bicycle tourism revenues ranging from \$15 million to \$193 million in 1999 dollars^{6, 7, 8}.

Bicycle and pedestrian facilities can also lead to increased spending by consumers. A 1991 National Park Service study found that long rural trails generated more revenue per person than shorter urban trails. The study estimated average expenditures of rail-trail users at \$1.90 per person to \$14.88 per person⁹.

A high-quality bicycling environment can bring bicycle-related businesses to the region. Portland, Oregon's bicycle industry was worth approximately \$90 million in 2009. A study of the economic impact of bicycling in Colorado found that manufacturing contributes \$763 million, and retail sales and service contribute up to \$193 million to that region^{10, 6}.

Bicycle and pedestrian infrastructure saves public

dollars as well. A lane of roadway will accommodate five to ten times more pedestrian and bicycle traffic than driving and the cost of bicycling and pedestrian infrastructure is just a small fraction of that of building highways. Trails and paths can also be efficient connections to transit, reducing the need for expensive and land-gobbling park-and-ride stations.

Household savings can be found by utilizing non-motorized transportation. Transportation is second to housing as a proportion of household budgets. Between 2002 and 2008, fuel costs rose from 3% of household expenditures to 8.5%. Walking and/or bicycling can help the community shave transportation expenses from their budgets.

COMMUNITY

The extent of bicycling and walking in a community has been described as a barometer of how well that community is advancing its citizens' quality of life. Areas that are busy with bicyclists and walkers are considered to be environments that work at a human scale, and foster a heightened sense of neighborhood and community. These benefits are impossible to quantify, but when asked to identify civic places that they are most proud of, residents will most often name places where walking and bicycling are common, such as a popular greenway, a river front project, a neighborhood market, Main Street, or downtown.

Walking and bicycling are also good choices for families. A bicycle enables a young person to explore his or her neighborhood, visit places without being driven by parents, and experience the freedom of personal decision-making. More trips by bicycle and on foot mean fewer trips by car. In turn, this means less traffic congestion in the community. There are also more opportunities to speak to neighbors and more "eyes on the street" to discourage crime and violence. It is no accident that communities with

A comparison of GIS and medical record data show a positive correlation between urban nature and health, including:

- *Respiratory disease*
- *Cardiovascular disease*
- *Mental health*
- *Musculoskeletal Pain*
- *Neurological disease*
- *Digestive complaints*

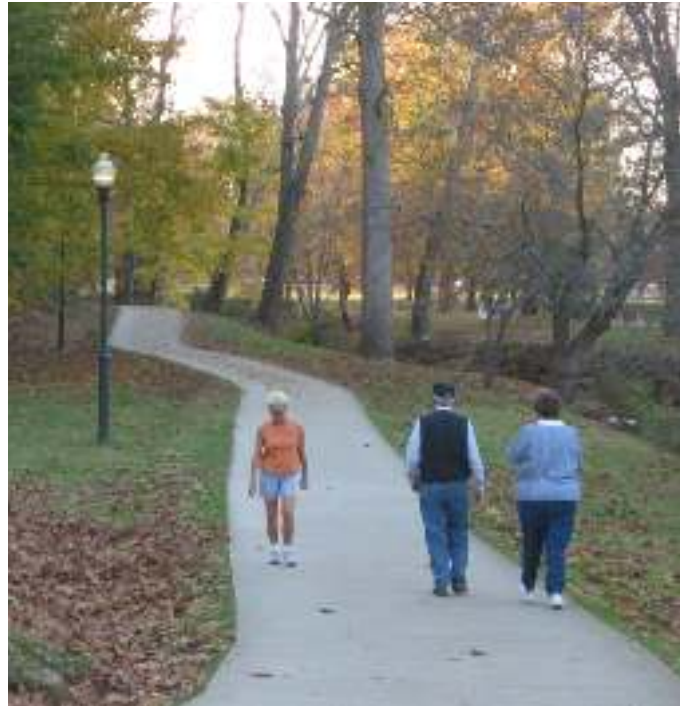
(Mass et al, 2009)¹¹



low crime rates and high levels of walking and bicycling are generally attractive and friendly places to live.

PROTECTING PEOPLE AND PROPERTY FROM FLOOD DAMAGE

The protection of open spaces associated with trail and greenway development often also protects natural floodplains along rivers and streams. According to the Federal Emergency Management Agency (FEMA), the implementation of floodplain ordinances is estimated to prevent \$1.1 billion in flood damages annually. By restoring developed floodplains to their natural state and protecting them as greenways, many riverside communities are preventing potential flood damages and related costs.¹²



Trail located in floodplain



CHAPTER 3. EXISTING CONDITIONS

GEOGRAPHY OF THE STUDY AREA/LAND COVER

Iredell County encompasses 576 square miles and is situated in the Piedmont of the State of North Carolina. The county seat, Statesville, is located approximately 45 miles north of Charlotte and approximately 130 miles west of Raleigh, the state capital. Lake Norman, the nation's largest manmade lake by surface area, extends into the southwest portion of Iredell County, providing approximately 520 miles of shoreline. The county is bounded by Cabarrus, Rowan, Mecklenburg, Lincoln, Catawba, Alexander, Wilkes, Yadkin, and Davie Counties.¹³

Iredell County's landform consists of ridges with creeks in the valleys. The Brushy Mountains extend into the northwest corner of the county, including Fox Mountain with an elevation of 1,760 feet above sea level. Where the South Yadkin River crosses the county line, the elevation is 700 feet above sea level, the lowest point in the county. The loamy soil is well-drained and watered by the presence of numerous creeks. When chemically supplemented with fertilizer, the soil is agriculturally productive.¹⁴

POPULATION

From the 2008 demographic forecast study prepared by Warren & Associates, Iredell County's population has grown approximately 22.2% between 2000 and 2007 from a population of 122,660 in 2000 to 149,877 in 2007. The U.S. Census Bureau estimates the 2009 population of Iredell County at 158,153, suggesting that population has increased 5.5% since 2007 (<http://quickfacts.census.gov>). The Warren & Associates study indicates that almost 30% of the population increase occurred in the census tract that includes the Mount Mourne area south of Mooresville and lakeside communities west of I-77 and south of NC-150, in

the southern part of the county. The study projects Iredell County's population to increase by nearly 40,000 by 2015, representing a growth rate of more than 26%. The study projects over 15,000 additional households by 2015, a majority of them located in the Lake Norman and South Iredell High School Attendance Zones.¹⁵ The population of North Carolina increased from 8,049,313 in 2000 to 9,222,414 in 2008, an increase of 14.6%. The Iredell County Demographic Forecast reports that the county population will add another 39,941 people by the year 2015, a 22% increase from 149,877 to 189,818.¹⁶

ECONOMY

Approximately 50% of farmland in Iredell County is in actual crop use. The other 50% is either woodland, pasture, or lands used for other purposes. The crops produced in Iredell County in 2006 included but were not limited to: barley, corn, hay, soybeans, tobacco, and wheat. Livestock raised in Iredell County include: dairy and beef cattle and hatching egg production. Responding to the county's promotion for agricultural diversification, new farm products and activities have increasingly become important to Iredell County's economy. The greenhouse and plant nursery business is growing in importance to Iredell County farmers. The winery and vineyard business, flourishing along the US 421 corridor, is also becoming more prevalent in Iredell County. These and other agricultural products have also increased interest in agri-tourism, where visitors come to experience the farm environment and directly purchase farm products.¹⁷

EXISTING PARKS AND TRAILS

Iredell County currently offers its residents park and recreation facilities at two County owned parks, Stumpy



Creek Park and the Outdoor Education Center. These two park facilities provide 126 acres of designated parkland containing limited active and passive recreation opportunities. Iredell County has taken several important steps to provide a district park for residents in the northern section of the county (North Iredell Park). Land for this park (57 acres) has been purchased and a master plan has been developed.

To offset this lack of County owned facilities, the Parks and Recreation Department has worked diligently with Iredell-Statesville Schools and churches throughout the county to assemble an extensive network of ballfields and gymnasiums to program a variety of athletic leagues. These joint-use facilities currently provide the “backbone” of the Department’s recreation facilities and programs.¹⁸ Iredell County is also served by Lake Norman State Park, and by numerous parks operated by the County’s municipal governments.

REVIEW OF COMMUNITY PLANS

To supplement public and stakeholder outreach, the project team reviewed various community plans for policy direction and goals as they pertain to the provision and planning for trails in Iredell County. The development of each plan reviewed below involved public input and final adoption by the responsible legislative body.

Iredell County 2030 Horizon Plan

The Iredell County 2030 Horizon Plan was adopted by the Iredell County Board of Commissioners on September 15, 2009. The long range plan establishes a set of goals, policies, and strategies for the County in six key areas: Growth Management and Land Use, Agricultural Preservation, Transportation, Economic Development, Cultural, Environmental and Water Resources, and Public Services and Facilities.

The Plan examines key transportation planning

issues and challenges facing Iredell County. Currently, there is no mass transit system that serves residents in Iredell County. The County operates the Iredell County Area Transportation System (ICATS) which provides door-to-door demand-response paratransit service for human service consumers and the general public. In regards to bicycling, the Plan mentions the Lake Norman Bike Route plan which will provide bicycle facility improvements in the Lake Norman area.

The Plan recommended several goals and strategies related to bicycles, pedestrian and greenway trails that would create an interconnected system that provides access to recreational opportunities to Iredell County residents. Key strategies include:

- Develop a comprehensive bicycle network.
- Create multi-modal connections at transportation hubs across the County.
- Work with NCDOT to include bike facilities on roadway improvements.
- Consider requiring new developments to include bike and pedestrian facilities and pathway.
- Promote the development of the Carolina Thread Trail.

Iredell County Comprehensive Parks & Recreation Master Plan

The Comprehensive Parks and Recreation Master Plan was created for Iredell County in October 2008. The purpose of the plan is to discuss the need for park and recreation facilities and establish standards for future park development. Pedestrian, biking and greenway trails were noted as the top priority for the County in all of its existing and future parks. According to a public survey, there is a very strong desire from residents to develop greenways in the County.

Eighty-nine percent of those surveyed said they would like to see more greenways in the area.

Key recommendations in the Plan include:

- Focus on developing district parks/sports complexes,



Trails provide opportunities for physical activity and access to open space



greenways/open space and special use facilities.

- Encourage the NCDOT to include bike lanes whenever roadway improvements or construction is made or develop wider shoulders to accommodate bikers.
- Develop a County-wide greenway master plan in conjunction with Statesville and Mooresville and coordinate planning efforts with the Carolina Thread Trail.
- Develop a countywide bicycle plan.
- Encourage the NCDOT to include bike lanes whenever roadway improvements or construction is made or develop wider shoulders to accommodate bikers.
- Require developers to accommodate bicycle traffic in roadway improvements they construct as part of the development process.
- Utilize federal SAFETEA-LU program funds to construct bike lanes and greenway trails.

Beyond recommending a countywide greenway master plan, the plan goes on to state that “the development of [the greenway plan], and the implementation of the initial phases of a greenway system, should be one of Iredell County’s highest park improvement priorities.”

The report notes that 94% of respondents to the public survey indicated that they either currently walk or would like to walk. A total of \$1,650,000 was included in the master plan’s Capital Improvement Program specifically for the greenway program. This cost includes 5 miles at \$300,000 per mile, along with \$150,000 for planning and design.

The public survey revealed that greenways are the most desired type of recreational facility among Iredell County residents. 89% of residents would like to see greenways in the county as compared to 86% wanting open space and 67% desiring athletic fields. Additionally, walking, jogging or fitness trails ranked highest for total interest levels of specific activities. 90% of respondents chose that option, while 66% chose bicycling. The master



Statesville Greenway Under Construction (Source: City of Statesville Recreation and Parks Department)

plan later notes that “the importance of bikeways was expressed in every public input venue undertaken as part of this planning report.”

Several existing facilities are highlighted in this document as noteworthy destinations:

Regional Parks:

- Lake Norman State Park

Special Use Parks:

- Outdoor Education Center
- Tomlinson North Family Park
- Scott’s Creek Recreation Center
- I-40 Science and Nature Park

District Parks:

- North Iredell Park
- Stumpy Creek Park

2006 Town of Mooresville Comprehensive Pedestrian Plan

The Town of Mooresville completed the Mooresville Comprehensive Pedestrian Plan in the summer of 2006. The community and Town Staff worked together to build a plan that is based on pedestrian-friendly public land use and development policies, and also a plan that will be a huge part of the current planning process for their new zoning,



transportation, and bicycle plans. Since the Plan's adoption, proposed developments have incorporated requirements to include shared-use paths, better connectivity, mixed land uses and other components of the Pedestrian Plan that would also benefit bicycle access. Twenty high-density mixed-use Pedestrian Oriented Development Zones were identified that would create small micro-communities that are ½ to 1 mile across. Paved multi-use pathways link these communities together for pedestrians and also provide a corridor for bicycles to use in substitution of roadways.

Along with identifying, pricing, and ranking twenty-five miles of multi-use greenway paths, this transportation plan recommended several guidelines and policy changes related to recreation that would;

- Set design guidelines for greenway trails,
- Give transportation priority to the connections of pedestrian access to parks,
- Limit sprawl development,
- Incorporate aesthetics and landscaping into transportation design, and
- Require new development to set aside public green space.

2008 Town of Mooresville Comprehensive Bicycle Plan

Recommendations in this plan connect twenty-five miles of proposed multi-use greenway paths (including recommended routes for the Carolina Thread Trail) with potential on-street bike accommodations throughout the Town of Mooresville. In addition, guidelines suggested in the Plan will help to determine the appropriate type of bicycle facility on roadways according to their traffic volumes and speeds and techniques are offered for the acquisition of land for on and off-road paths.

Town of Mooresville Parks and Greenways Master Plan

Although Mooresville does not have any developed greenways, the Town completed a Parks and Greenways Master Plan with a horizon year of 2010 in 2005. This planning effort identified several potential greenways, but did not focus on providing implementation details. The greenways identified in the Parks and Greenways Master Plan are incorporated into the recommendations for the Mooresville Comprehensive Pedestrian and Bicycle Plans, and some are already in the initial planning stages.

Town of Mooresville Comprehensive Land Use Plan

The Mooresville Comprehensive Land Use Plan was completed in 2008. It was one of three plans initiated in 2006 as a coordinated effort by the Mooresville Planning Department. Although the Plan is adopted as an official public document, it is not a development ordinance. The Plan sets the framework and basis for the Town's Zoning Ordinance and Comprehensive Transportation Plan to ensure the Town's goals are implemented through the regulatory process.

In regards to Transportation, the plan is framed within the following community vision:

"Mooresville's transportation system is an integrated multi-modal, user-friendly network of well-designed streets that support auto, transit, and pedestrian and bicycle traffic."

The general principles of the plan outlines the need to use the existing road systems more efficiently and concentrate growth among existing areas of development, among other things. The Comprehensive Land Use Plan recommends a compact, pedestrian oriented form of development that requires an integrated network of pedestrian and bicycle facilities.



Other Town of Mooresville Transportation Plans

A Comprehensive Transportation Plan for Mooresville was completed in 2008, examining all modes of transportation in the area, as specified by NCDOT, including highways, bicycles, pedestrians, transit and freight.

In recommending infrastructure improvements, high priority corridors were identified. The plan advised that the Coddle Creek Highway, NC Highway 3 corridor should include a multi-use path for its entire length. A multi-use path was also recommended for NC Highway 115/Mecklenburg Highway from Lowrance Avenue to the Mecklenburg County line. For NC Highway 150/Plaza Drive/Oakridge Farm Highway, striped bike lanes were recommended. Though other corridors and major and

minor thoroughfares are discussed in this report, only the previously mentioned roadways included specific plans for bicycle or pedestrian treatments.

Mooresville completed a Thoroughfare Plan in 1997. This plan outlined proposed locations for new major and minor thoroughfares and interchanges, including new east-west and north-south connectors in the Mount Mourne area and new I-77 interchanges at Langtree Road and Brawley School Road. Several of the projects identified in the thoroughfare plan have been advanced to more detailed stages of planning. The initial thoroughfare plan addressed roadways only, and did not specifically identify bicycle enhancements associated with the proposed roadways. However, bicycle lanes and sidewalks are now included in the plans for the NCDOT widening project of



Lake Norman State Park (Source: E. Martin, Town of Troutman)



Historical Reenactment at Fort Dobbs (Source: Fort Dobbs State Historic Site)

Brawley School Road. In addition, Langtree Road's I-77 interchange bridge will be built with the width needed to stripe the lanes for bicycles in the future.

Town of Mooresville Small-Area Plans

In recent years, several small area land use plans and master plans have been developed for specific areas within the Mooresville region. The Mount Mourne and South Iredell Master Plan utilized public and stakeholder input to create a framework for development in the rapidly-growing Mount Mourne area. The transportation elements of this plan focused primarily on street connections and circulation; however, several of the recommendations included provisions for increased pedestrian and bicycle accommodations, including a recommendation to “require new developments to have an internal roadway network that encourages pedestrian and bicycle trips within the neighborhood” (page 28). Also, Article 16 (Mount Mourne Planning Area) provides specific regulations pertaining to biking.

In addition, the Plan recommends a greenway to be constructed within new residential neighborhoods east of NC 115. A similar facility is proposed to provide pedestrian connectivity as part of the Town of Mooresville Pedestrian Plan. A developer has completed a master plan for a large

tract east of NC 115, including the greenway in the design. Many of the projects described in other plans will be replicated in this plan, especially if they feed directly into other recommended bicycle corridors.

The Cascade Neighborhood Master Plan was published in March 2003. This planning process defined specific strategies to redevelop the historic Cascade neighborhood located just north of Mooresville's downtown. One of the ten specific recommendations is to “increase the street and sidewalk network within the neighborhood to allow for connections and appropriate infill development” (page 5). Furthermore, potential greenways are identified to connect to adjoining neighborhoods.

The Town completed its update of its zoning ordinances in 2008. The update of the zoning ordinance was largely based off of the Pedestrian Oriented Development Zone concept from the Town of Mooresville Comprehensive Pedestrian Plan, creating activity center and neighborhood “nodes” that are intended to develop into higher density communities that are ideal for walking and biking and that create a sense of place.

This plan is expected to serve as a stand-alone plan and therefore emphasizes projects already defined in past plans that may serve as appropriate bicycle projects. However, not all projects from other plans are identified in this bicycle plan. This does not necessarily mean that those projects would not make decent bicycle projects.

Town of Mooresville Capital Improvement Plans

The Downtown Mooresville Master Plan was completed in 2000, and places a strong emphasis on increasing the pedestrian friendliness of downtown Mooresville, which can also improve bicycle conditions to an extent as both of these travel modes depend on similar conditions such as traffic calming and compact development. It also recommends the construction of a greenway through Liberty Park to neighborhoods south of downtown (page 11). These



connections are also proposed in the Town of Mooresville Comprehensive Pedestrian Plan, and in the Town of Mooresville Comprehensive Bicycle Plan.

Conceptual Master Plan for Dye Creek (Mooresville)

This is a 2-mile trail along the Dye Creek waterway extending from the southeastern end of Downtown Mooresville to Bellingham Park (at its southern terminus). The plan divides the trail into three phases, or sections and was completed in April 2009. Additional destinations along the way include the War Memorial/Recreation Center, Willow Valley Park, Mooresville High School, Mooresville Middle School, Edgemoor Park, Glenwood Memorial Park, and South Elementary School. A trail extension to Edgemoor Park, to both of the Mooresville schools, and to Wilson Avenue bike lanes would require a connector trail off Section 1. A trail extension to the South Elementary School would require a connector trail off Section 2. Total estimated cost (not including connectors) is just under \$2 million.

This conceptual level plan was completed and adopted by the Town Board in 2009.

Troutman Pedestrian Plan

The Troutman Pedestrian Plan was completed in February 2008. The Plan examines existing conditions, current policies, ordinances and plans, current projects and programs, key issues, recommendations, and funding. According to the Plan, there is currently only one existing trail in Troutman, known as “Richardson Greenway”. The Greenway trail runs between North Main Street and North Eastway Drive and provides direct connections to destinations and other sidewalks in the area. The Greenway trail is limited as it stops at the Troutman Village Shopping Center and it only serves residents on one side of US 21. There are also several proposed trail projects.

• North Track Trail – converts an existing railroad bed into

a pedestrian trail that runs from the northern end of the proposed North main Street sidewalk at Murdock Road to the YMCA facility and Barium Springs (0.5 miles).

- Murdock Farms Trail – provides a pedestrian link from Town Center at Main Street through the proposed Murdock Farms development to Perry Road (1.2 miles).
- Streamwood Trail – Connect Town Center to Lake Norman and proposed shopping and Park and Ride. Establish a link with multi-purpose trail connecting Aberdeen Village Loop on South Main Street to proposed Streamwood community and proposed Autumn Leaf Road sidewalk (2.4 miles).
- St. Lawrence Trail – Connect Town Center and future developments to South Iredell High School. Provides links to proposed Barium Springs Village and multi-use trail at the intersection of Talley Road and West Avenue into the proposed St. Lawrence development (1.7 miles, primary route).
- YMCA Trails – Improves existing trails and provides connection to existing Barium Springs campus paths and proposed North Track trail. (1.0+ miles).
- Eastside Trail – provides linkage from Town Center to CTP Park and Ride and future Exit 42 development. (2.0 miles).
- Fairground Plaza Trail – Provides connection from proposed St. Lawrence development to business district at North Main Street and Old Mountain Road. (0.9 miles).
- Town Hall Trail – Provides connection from proposed Murdock Farms community to the Town Center. (0.6 miles).
- Brookside Trail – Provide connection from proposed Brookside community to Town Center. (1.1 miles).
- Brookside Trail Extension - Provide connection from existing Meadow Glen community south of Autumn Leaf Road and areas beyond to Town Center (0.8 miles to current ETJ limit).
- Fairgrounds Trail – Provide pedestrian connection from



YMCA to east Troutman trail system. Provide sidewalk connection from Old Murdock Road along wide side of street to north end of Town Hall Trail (0.5 sidewalk miles, 0.6 trail miles).

One key recommendation in the Plan was to modify the Town's greenway trails and open space ordinance to provide design standards for greenways, include a reference to the Troutman Pedestrian Plan that address the location of additional sidewalks required in non-subdivision developments and require the dedication of open space for greenway development.

Town of Troutman Comprehensive Transportation Plan

The Comprehensive Transportation Plan was prepared for the Town of Troutman in July 2009. The plan includes recommendations for highway, public transportation and rail, and bicycle improvements. There are several proposed residential and commercial developments along the route as well as several wetlands in the National Wetland Inventory. At the time the CTP was developed, a pedestrian network had not been established. However, a Pedestrian Plan was later developed for the Town of Troutman.

Town of Troutman 2020 Comprehensive Parks and Recreation Plan

The Troutman 2020 Comprehensive Parks and Recreation Plan was adopted by the Town Board of Aldermen on January 13, 2011. The plan focuses on the need for parks and recreation in the Troutman area with a close look at the overlapping needs of youth and adults in the community. Recreation needs surveys from the general public and students from South Iredell High School showed a strong public preference for trails (trails were the most highly preferred facility among the general public and the 4th highest preferred facility among South Iredell students). Additional public input meetings revealed that 79% of participants desired multi-use trails, with schools and

shopping areas as the the most important destinations.

Key recommendations of the plan related to trails include:

- Make safety a top priority for trails.
- Reinforce the sidewalk network throughout Town.
- Widen existing thoroughfares to accommodate bicycle use.
- Preserve waters, open space, and natural areas.
- Ensure that trails are accessible to all members of the community.
- Create a greenway/trail network.

Statesville Greenways

In December 2006, the city of Statesville developed a greenway map that highlights existing and proposed greenways, existing and proposed sidewalks, and walking lanes. There are a total of 9 proposed greenways on the map that provide connections to existing greenways, fill gaps in the network, and establish greenways in new areas of the city.

Larkin Greenway Master Plan

In April 2007, a greenway master plan was developed for the Larkin development in Statesville. The primary community access trail is 6.8 miles long and includes pedestrian and bicycle accommodations. The proposed trail system runs along an existing stream. Additionally, proposed greenway and open space points provide connections to neighborhood access points.

Lake Norman Bike Route

The Centralina Council of Governments is leading the planning efforts for an on and off-road bicycle route around Lake Norman. The bicycle route will utilize low-volume roads, improve higher-volume roads through techniques such as adding / expanding paved shoulders, and provide off-road connections where necessary to create a 150-mile bicycle loop around Lake Norman. The route was updated after the adoption of the plan February 2010 and currently runs along Highways 73, 16, 150 and 115, among others.



It is intended that the route will traverse the lake on the Highway 150 bridge. On the Lake's northern end, the route passes through Lake Norman State Park. Portions of the proposed route pass through Troutman and Mooresville in Iredell County, and portions of Mecklenburg, Lincoln, and Catawba Counties.



Bicyclists at Lake Norman State Park (Source: E. Martin, Town of Troutman)



CHAPTER 4. STAKEHOLDER AND PUBLIC OUTREACH

Citizen and stakeholder input were the cornerstone for formulating the Carolina Thread Trail recommendations in Iredell County. Community and stakeholder input provided a clear framework for Carolina Thread Trail planning that reflects the current priorities of the community, while looking to the future. Most residents care deeply about the future of Iredell County's trail and open space system and appreciated the opportunity to offer feedback in the development of this Plan. Public outreach was local and grassroots-oriented, with varied and extensive methods to involve the community, specifically including:

- Creation of the Iredell County Carolina Thread Trail Steering Committee.
- Two public opinion surveys.
- Interactive project website allowing users to add, and vote on, proposed destinations and routes.
- Six Public Workshops held throughout the county.
- Formal and informal outreach to citizens, stakeholder and agency groups, and property owners.

Iredell County Carolina Thread Trail Steering Committee

Public outreach began with a Steering Committee meeting in which members from the County were introduced to the Carolina Thread Trail planning process. The Iredell County Carolina Thread Trail Steering Committee is a committee of agency staff and citizens appointed by County Commissioners and Municipal Councils. The steering committee was created to assist in completing the plan. A list of the committee members is included in the acknowledgements section. The committee provided information, ideas, and feedback during the planning process, assisted in overcoming obstacles, represented public, agency and organization interests and policies, and assisted in building

support for the plan process and recommendations. The members provided ongoing feedback during the process to create a master plan which reflects the real needs of Iredell County.

The steering committee met monthly or bi-monthly over the course of the process, including five meetings facilitated by the consultant team.

Iredell County Carolina Thread Trail Technical Advisory Team (TAT)

The Iredell County Carolina Thread Trail Technical Advisory Team (TAT), a subcommittee of the Steering Committee, was composed of various public agency representatives from participating jurisdictions across the county and the region to provide technical oversight and input on trail alignments in the development of the Carolina Thread Trail Plan for Iredell County. A list of TAT members is included in the acknowledgements section. The TAT met via conference call throughout the course of the project to recommend preliminary alignments for the Carolina Thread Trail based on local knowledge and public input.



Steering Committee Participants



PUBLIC WORKSHOPS

In order to gain further insight into the public’s perceptions of the needed trail facilities in Iredell County, the Carolina Thread Trail Steering Committee held two rounds of public workshops for the Carolina Thread Trail Greenway Master Plan project.

First Round Public Workshops

The first series of workshops were held during the summer of 2010 at:

- The Iredell County Agricultural Resource Center in Statesville on June 29, 2010.
- The Union Grove Community Building in Harmony on July 14, 2010.

- Lowe’s Family YMCA in Mooresville on July 15, 2010.
- Participants were asked to discuss their vision for the long-term future of Iredell County’s Carolina Thread Trail, their preferences for facility types and uses, and their opinions about opportunities and constraints for the trail within the area.

Steering Committee members recruited attendance at the workshops by posting flyers in public places and notices on public websites. The Steering Committee also announced the meetings through e-mail distribution lists and through personal contacts.

Nearly 90 participants attended the summer 2010 public workshops to learn about the project, engage in group discussions and participate in mapping exercises.

Workshop flyers were used to advertise both rounds of public meetings



This included local elected officials, representatives from multiple industries, long-term residents and newcomers, families and senior citizens, and many others. Each workshop began with an introductory presentation on the Carolina Thread Trail planning process. The presentation was followed by a facilitated small group discussion on current issues, future visions and opportunities for enhancing and expanding recreation and trail facilities and programs. The outcome of each meeting included detailed recommendations of potential greenway and trail routes.

Public Workshop Comment Summary

While the vast majority of comments supported development of the trail network, there were several concerns noted by the participants that should be taken into account as the project moves forward. Protection of private property is a primary concern of Iredell County. The needs of the agricultural community were mentioned specifically, including such issues as the possibility of cars, trucks, bicyclists, and tractors sharing the same roads. Additionally, many residents felt that finding funds for the construction, maintenance and operation of the trail network may be challenging.

Overall, the public workshops expressed a clear love of Iredell County – its historic features, natural landscape, thriving industries, and growing cities. Many residents expressed interest in creating a trail network that would be used by locals and visitors alike, and would ultimately serve as an exhibition of the best of what Iredell County has to offer.

The feedback from the first round of public meeting is summarized as follows:

- The trail network should serve all types of users and support those who choose to commute by biking or walking. The accommodation of families, children, and seniors were considered especially important, and the

particular needs of runners/joggers were also noted. Bicycling and equestrian uses were supported at each public meeting, as well.

- Connectivity should be a priority within the trail network. Close proximity to destinations (including schools), links to existing trails, and north-to-south access should be established.
- Participants in the public meetings seemed to have equal interest in natural, wild environments and more populated, urban environments. Both were recommended as priorities in each workshop.
- In the same vein, equal interest in natural surface and paved trails was cited. Though some citizens strongly preferred one rather than the other, the ideas expressed suggested that varying types of users would benefit from varied types of surfaces.
- Schools were described as a key destination for trail access at every public meeting. Additionally, safe routes for students to walk and bike to school seemed to be one topic that had political backing in Iredell County.
- Iredell County has several significant historical attractions. These surfaced as one of the most popular



Attendees at the 2nd round public meeting in Harmony



destinations for the trail network, with Fort Dobbs and Allison Woods gaining the most attention. Beyond that, downtowns were highly ranked, as were local parks, state parks, and campground areas.

- Multi-use paths, natural surface trails, and bike lanes were the most desired type of facility. Water-based trails and trails adjacent to the County's waterways were also highly ranked.
- Public right-of-ways and existing easements are the preferred locations for trail construction. Additionally, citizens highly ranked safe and secure areas as appropriate places for trails.
- Areas least desirable for trail development included industrial corridors, busy highways and highly commercialized centers. The comments also suggested that private property, and working farms in particular, should be avoided.



Participants at the 2nd round public meeting in Harmony

Second Round Public Workshops

In November of 2010, the second round of public meetings took place. These meetings were conducted in:

- The Union Grove Community Building in Harmony on November 18, 2010.
- The Iredell County Agricultural Resource Center in Statesville on November 29, 2010.
- Pine Lake Preparatory School in Mooresville on November 30, 2010.

Preliminary recommendations, based on the input from earlier public meetings, were presented to attendees. These meetings were attended by nearly 50 citizens and stakeholders, including elected officials and local land owners. Many of the attendees at the second round workshops had not attended the first round workshops or participated in the prior public outreach efforts. The attendees came with strong opinions related to the potential alignments of the Carolina Thread Trail. The map on the following page represents participants votes for



Participants at the 2nd round public meeting in Mooresville



the priority trail segments. This input proved very valuable in refining the recommended Carolina Thread Trail routes and developing the plan priorities.

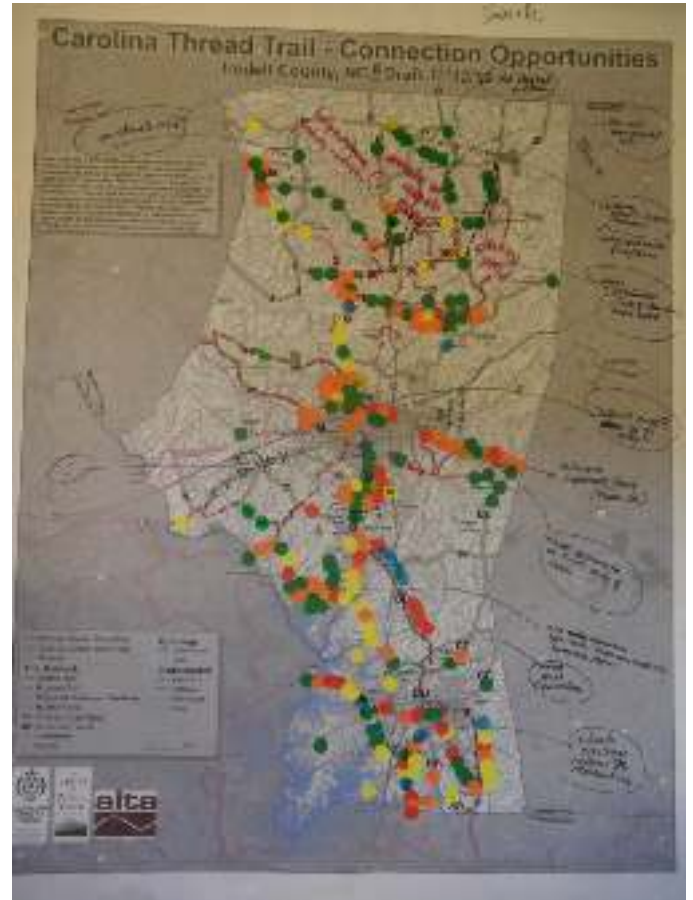
The following is a summary of the comments received during the discussion and question and answer portion of the public meetings.

Support for trails in Iredell County:

- Connections will be very important, particularly to cultural and recreational destinations.
- Trails along roadways are less desired by some users.
- Some routes are located in beautiful countryside.

Concerns about trails in Iredell County:

- Trails should be safe: avoid areas used for hunting; avoid busy roadways.
- Trails must be policed and maintained.
- Concerns about lack of connectivity.



Priority Carolina Thread Trail trail routes identified by second round public meeting participants.



DESTINATIONS

The county is a destination for equestrian sports and on- and off-road cycling. Iredell County's rivers, fields and waterways continue to accommodate many active and passive use outdoor recreational activities such as fresh-water fishing, hiking, boating and paddle sports.

The following sites were identified by the public and the Iredell County Carolina Thread Trail Steering Committee as important potential destinations for the Thread Trail (listed in order of preference on the survey and website results):

- Lake Norman State Park, lake access points
- Downtown areas in Iredell County, such as Mooresville, Statesville, Troutman, and Harmony
- Fort Dobbs
- Allison Woods
- Stumpy Creek access
- Rocky River headwaters
- YMCAs, such as Lowe's and Barium Springs
- Hager Creek
- Lowe's Corporate HQ
- Love Valley
- Linney's Mill
- Libraries
- Fiddler's Grove Camp
- Bus stops
- Vineyards and wineries, such as Daveste Vineyards
- Office centers/places of work
- Schools
- Recreation facilities/sports complexes
- Existing parks, such as Bellingham Park (Mooresville)
- Planned parks, such as Cornelius Road Park and Troutman ESC Park
- Trail connection points to adjacent counties
- Girl Scouts and Boy Scouts camps
- Canola fields that bloom yellow in April

- Railroad trestle
- Zootastic
- Barium Springs



PUBLIC SURVEYS

Self-Selected Survey

As a key component of the public input process, the Steering Committee prepared two surveys, an initial survey and a follow-up survey, intended to assess the trail needs, attitudes and opinions of the residents of Iredell County. The surveys were posted online at www.surveymonkey.com. The first survey was available between mid-June and the beginning of October 2010. The follow-up survey was available from late November 2010 through January, 2011. The surveys were also available in hard copy format at both rounds of public meetings and links to the surveys were included on numerous jurisdictions and organizations websites.

The surveys allowed “self-selected” individuals to have their comments included in the survey results. Self-selected individuals choose to participate in the survey and they tend to be more familiar with the recreational opportunities in Iredell County. Since familiarity can be a source of bias, self-selected surveys are not statistically valid, although they do provide insight into local public opinion. (It is worth noting, however, that the survey in the Iredell County Park & Recreation Master Plan that showed strong support for greenways was a random sample survey.)

Initial Survey

The initial survey netted nearly 650 responses. Generally, the results of the survey indicated that most respondents were male (67.0%), between 41-50 years of age (31.6%), and lived in an incorporated area (52.1%). Respondents were asked to provide their home zip code; most respondents indicated zip codes from the City of Statesville and the Town of Mooresville. The following summary provides highlights of the survey results.

Initial Survey Results

Proximity to Greenway

Question 1 asked how close respondents live to a greenway. Most respondents (46.7 percent) indicated that they live more than two miles from a greenway. More detailed responses are depicted in Figure 2.

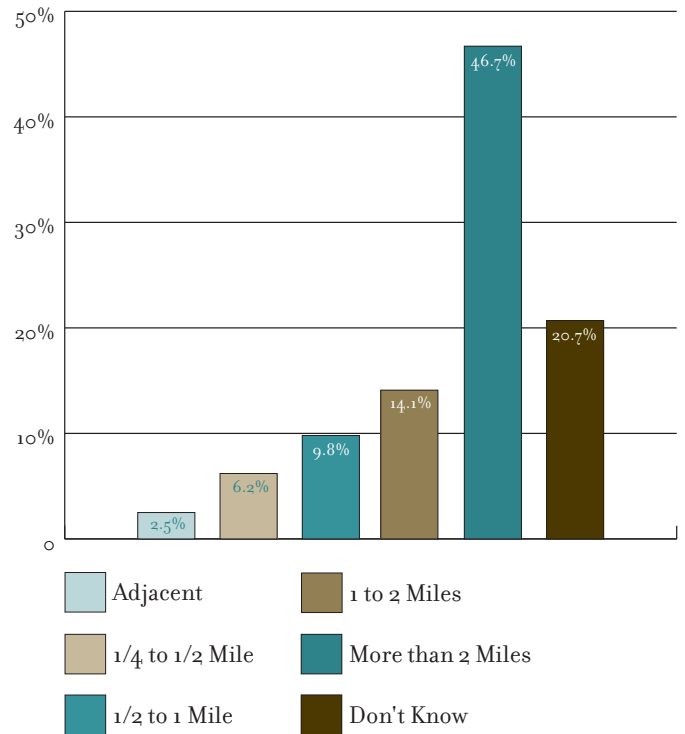


Figure 2: Iredell County Carolina Thread Trail User Survey

Trail Use Preferences

Question 3 asked respondents to indicate how they would use trails and greenways if access and availability were enhanced. A majority of respondents indicated that they would use trails/greenways for walking (83.1 percent) and bicycling (81.6 percent). More detailed responses are depicted in Figure 3.

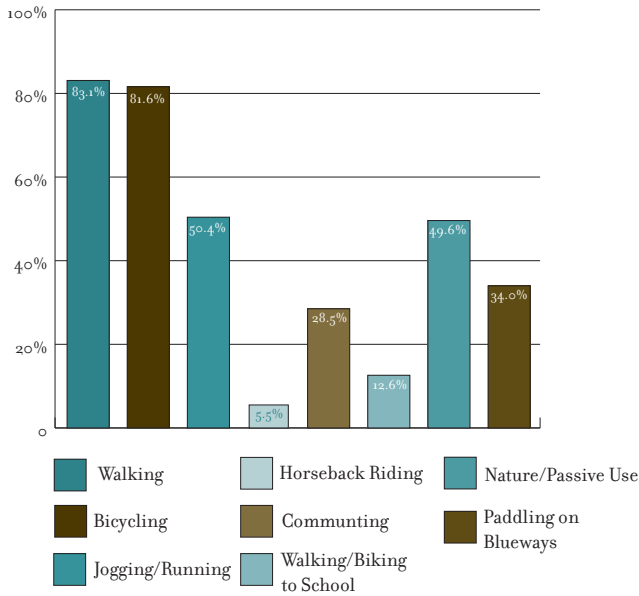


Figure 3: Iredell County Carolina Thread Trail User Survey

Preferred Greenway Destinations

Question 4 asked respondents to rank their first through fifth most important trail/greenway destinations. The highest-ranking destination was parks. The top ten destinations are identified in Table 1.

Table 1. Top Ten Destinations (Initial Survey)		
Which of these sites would be most important as greenway destinations?	Rating Average	Response Count
Parks	1.87	517
Lake or River Access Points	2.79	394
Downtowns	3.03	409
Rec. Facilities/Sports Complexes	3.04	398
Schools	3.06	167
Historic Areas	3.39	380
Office Centers/Places of Work	3.51	140
Libraries	3.57	94
Vineyards and Wineries	3.60	158
Bus Stops	3.71	49

Preferred Bicycle/Pedestrian Facility Types

Respondents were given the opportunity to indicate what type of bicycle/pedestrian facilities would be appropriate for the Carolina Thread Trail in Iredell County. Most respondents (89.1%) preferred multi-use trails. More detailed responses are depicted in Figure 4.

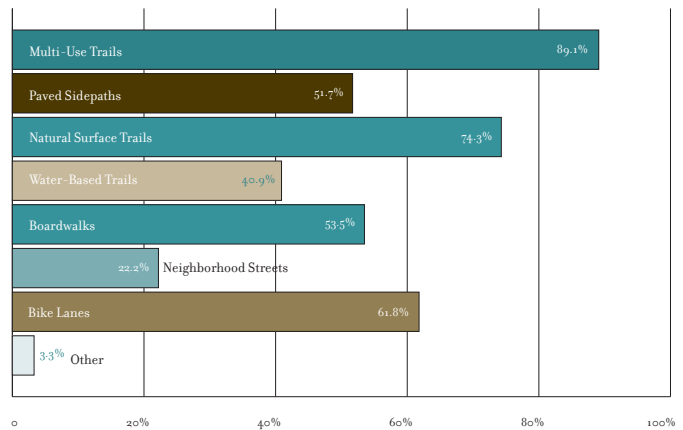


Figure 4: Iredell County Carolina Thread Trail User Survey

Carolina Thread Trail Funding

Respondents were given an opportunity to indicate how trails and greenways should be funded in Iredell County. The ranking of funding sources identified by respondents is listed in Table 2.

Table 2. Top Funding Sources for Iredell County Trails		
How should trails and greenways be funded in Iredell County?	Response Percent	Response Count
Fundraising & Donations	71.5%	430
Matching Funds	69.1%	415
Current Taxes	54.7%	329
Government Bonds	37.1%	223
New Taxes	27.5%	165
Usage Fees & Charges	24.3%	146
Don't Know	6.7%	40

Respondents were next asked to indicate how much they would be willing to pay on an annual basis to develop and improve trails and greenways in Iredell County. Most



respondents (26.6%) indicated that they would be willing to pay up to \$25 for trails in Iredell County. More detailed responses are depicted in Figure 5.

Follow-up Survey

The purpose of the follow-up survey was to confirm the

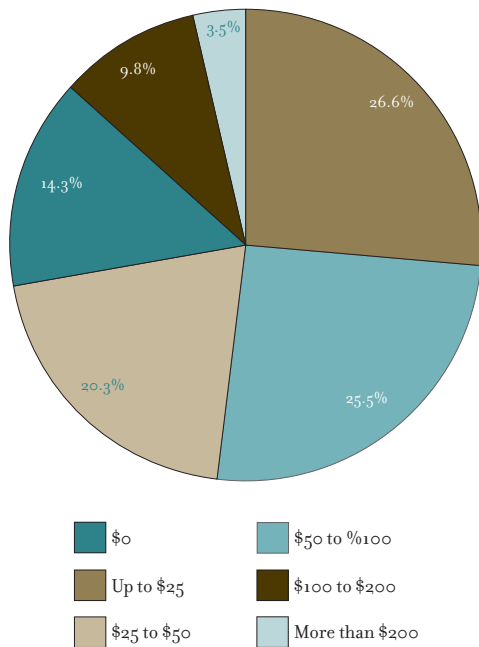


Figure 5: Iredell County Carolina Thread Trail User Survey

results of the initial survey, as to elicit feedback regarding potential Carolina Thread Trail routes and destinations. The follow-up survey had 110 respondents. Similar to the initial survey, most respondents to the follow-up survey were male (70.9%) and between 41-50 years of age (29.1%). Most respondents lived outside of an incorporated area (56.5%). Most respondents had participated in the initial survey (64.3%).

The follow-up survey asks respondents to rank their first through fifth most important trail/greenway destinations, including a list of more specific destinations. The top ten destinations are identified in Table 3.

Table 3. Top Ten Destinations (Follow Up Survey)

Please rank the top 5 destinations for Iredell County Trails	Rating Average	Response Count
Lake Norman State Park	1.76	85
Downtown Statesville	2.60	48
Allison Woods	2.92	37
Lowe's Corporate HQ	2.92	25
Stumpy Creek Access Area	3.16	31
Fort Dobbs	3.26	43
Linney's Mill	3.33	24
Fiddler's Grove Campground	3.50	20
Libraries	3.62	21
Rocky River Headquarters	3.71	21

Respondents were asked to indicate which criteria to prioritize when determining which routes to implement. The majority of respondents indicated that the importance of the connection and the number of destinations served is the most important criteria to consider when prioritizing Thread Trail routes.

Respondents were presented with the following draft map of potential Carolina Thread Trail routes, and asked which potential routes would be their priorities to implement.

Respondents to the follow-up survey indicated that proposed routes Q, V, G, W, and N should be priority routes.

The project team compiled information from the two surveys, the two rounds of public meetings, and the website to help inform proposed Carolina Thread Trail routes in Iredell County. Priority Carolina Thread Trail routes are presented in the following chapter.



CHAPTER 5. CAROLINA THREAD TRAIL ROUTES

The proposed Carolina Thread Trail route for Iredell County is outlined in this chapter and reflects the community priorities articulated through the public input process. Chapter 4 of this plan outlines the community input process that informed the Carolina Thread Trail Master Plan recommendations. Public outreach was local and grassroots-oriented, with varied and extensive methods to involve the community.

The recommended route includes a total of 116.8 miles of Carolina Thread Trail greenways (84.83 miles in unincorporated areas and 31.97 miles in local municipalities). Of this total, 8.8 miles are existing greenways and 13.6 miles of greenways represent trails previously recommended in other local planning efforts. The remaining 94.3 miles of newly-proposed greenways are located along streams, utility and roads rights-of-ways, existing sidewalks and rail corridors.

Trails on sidewalks are better suited for pedestrians and children than for adult bicyclists. To accommodate these users, the addition of parallel bicycle facilities is recommended.

The proposed Carolina Thread Trail routes connect the municipalities of Mooresville, Troutman, Statesville, Harmony, and Love Valley.

Figure 6 depicts the location of the proposed trails. Trails displayed in pink are those recommended for the Carolina Thread Trail designation and trails in green are presented for consideration to further tie together the people and destinations of Iredell County communities. The trail corridors in this plan are depicted with ¼ mile wide lines to show the general location of the intended route. The trail itself will be narrower, in recognition that communities will determine the exact location of their segments upon trail design and development. The broadly

defined greenway corridors present multiple opportunities for adjustments for a defined route, so that landowners can continue to be involved in fine tuning and defining the location of trails and amenities.

Table 4 shows the mileage of proposed trails per Iredell County community. The mileage does not reflect planned or proposed local greenways per adopted local plans. The mileage also does not reflect proposed blueways.



Bicyclists at Lake Norman State Park (Source: B. Israel, Centralina COG)



Tables 6 and 7 present a summary description of the proposed Carolina Thread Trail and other trail routes. The tables outline trail types, lengths, connections made, and access. The Carolina Thread Trail will connect 6 towns, 38 destinations, 23 schools, and over 50,000 residents. Appendix I includes further discussion regarding Iredell County CTT recommended trail types.

Figures 7 through 9 depict proposed Carolina Thread Trail routes, with priority routes shown in red. Route prioritization is described further in the next chapter. Figures 10 through 14 depict proposed Carolina Thread Trail routes within municipalities at a larger scale.

Table 4: Trail Mileage by Community
Iredell County Carolina Thread Trail

Jurisdictions	Proposed Thread Route (Pink Lines)	Other Connection Opportunities (Green Lines)
Statesville	11.61	5.94
Love Valley	2.33	0.00
Harmony	1.36	0.88
Mooresville	12.62	11.24
Troutman	4.05	0.01
Iredell County Unincorporated	84.83	123.93
Iredell County Total	116.8	142



Lake Norman (Source: B. Israel, Centralina COG)

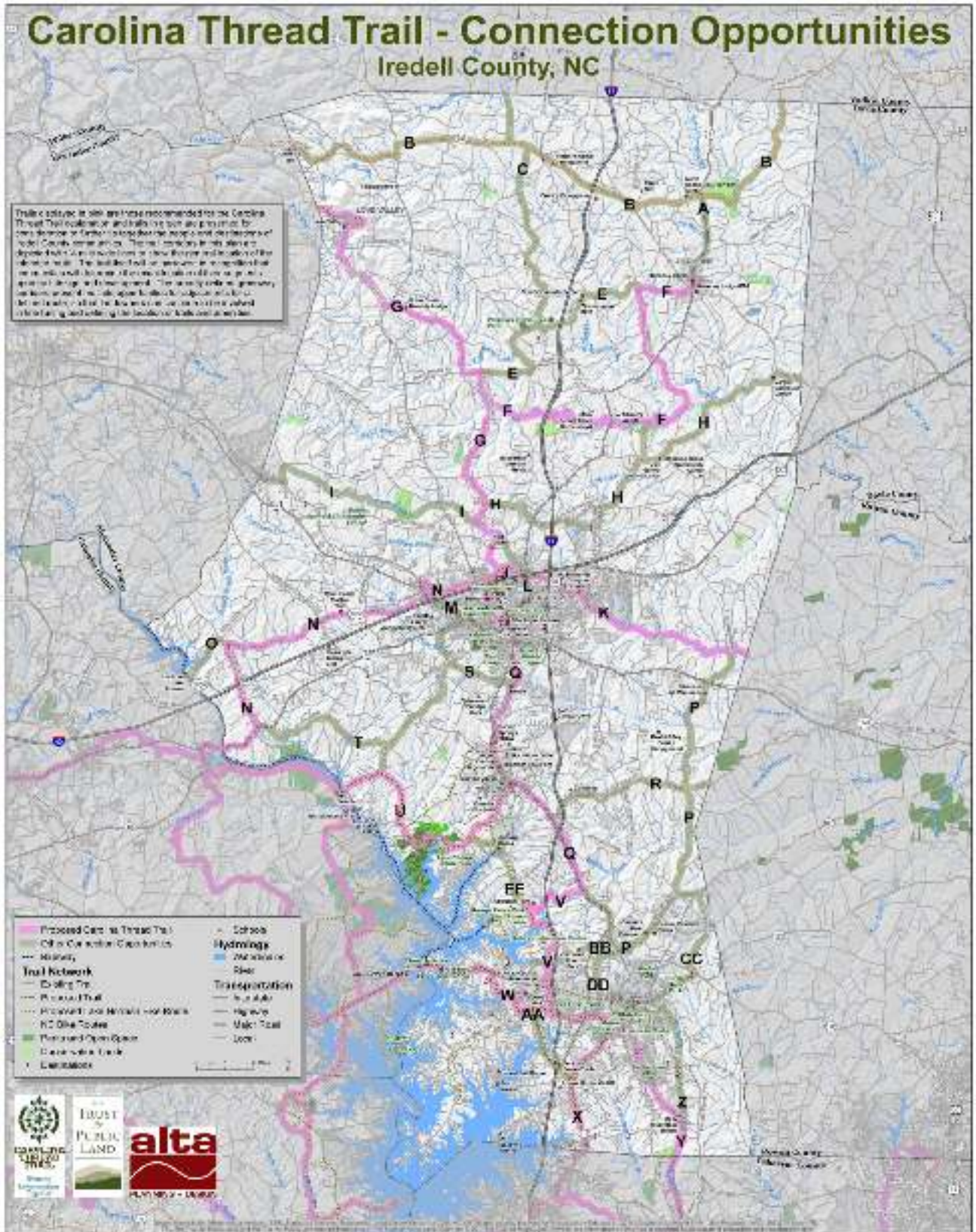


Figure 6: Proposed Carolina Thread Trail Routes for Iredell County



**Iredell County
Proposed Carolina Thread Trail Route**

Route	Proposed CTT Route	
	Miles	Percentage
Total Length (mi)	116.8	
Existing Greenways (mi)	8.8	7.5%
Proposed Greenways (mi)	13.6	11.6%
Newly Proposed Greenway (mi)	94.3	80.7%
New Trail via Stream/River Corridor (mi)	17.9	15.3%
New Trail via New Trail	11	0.9%
New Trail via Existing Sidewalks (mi)	2.8	2.4%
New Trail via Proposed Sidewalk (mi)	3.1	2.7%
New Trail via Bike Route (mi)	12.7	10.4%
New Trail via Existing Road ROW (mi)	44.4	38.0%
New Trail via Rail Corridor (mi)	9.3	8.0%
Connections and Destinations		
Town Connections	6	100.0%
Cross-Country Connections	7	
Destinations within walking distance*	38	53.5%
Schools within walking distance*	23	33.8%
Through Parks (mi)	3.2	2.7%
Access		
Children within service area**	12,830	35.3%
Seniors within service area**	6,991	37.7%
Total Residents within service area**	51,764	35.4%
Low Income Households within service area**	7,238	36.1%
Regional Metrics		
Miles per 1000 residents	0.90	
Miles per 10 sq miles county area	1.96	

*Walking Distance assumed at 1/2 mi

**Service Area assumed at 1/2 mi

***Based on 2007 census projections (Claritas)

TOTALS

Towns	6
Destinations	71
Schools	68
Children (under 18)***	36,378
Seniors (over 55)***	18,559
Residents***	146,280
Low Income HHS (less than \$20K/yr)***	20,037
County Area (sq mi)	597.0

Table 5: Proposed Carolina Thread Trail Route Analysis for Iredell County



Table 6: Proposed Carolina Thread Trail Route
Iredell County Greenway Connection Identification

ID	TYPE	DESCRIPTION	MILES
F	River Corridor, Road ROW	Starting at segment G follow South Yadkin River east then take Chief Thomas Rd. north to Tabor Rd., then follow Tomlin Rd east to US 21, then north on US 21 to Highland Point Ave., ending at the existing trail in Thomason Moore Park.	17.4
G	Road ROW, Existing Trail	Starting at segment J (Fourth Creek) go north on S. Chipley Ford then west on Snow Creek Rd., then take N. Chipley Ford to Dobson Farm to Mountain View to Love Valley Rd. Connecting to existing trail and ending at Alexander County line.	17.2
J	River Corridor, Existing Trail, Existing Sidewalk, Road ROW, New Trail	Starting in Statesville follow W. Broad to N. Mulberry St. to West End Ave. Then go north on N. Race to Ridgeway to Hartness to Lakewood to Hillcrest to Radio. Cross segments N and K and take Morrison creek north. Then onto "New Trail" through Fort Dobbs, then following a short section of Fourth Creek ending at segment G.	5.8
K	River Corridor, Existing Trail, Proposed Trail	From segment J head east on the existing trail along Morrison Creek. Then taking the existing trail along Fourth Creek. Following Fourth Creek to the Rowan County line.	10.6
N	Road ROW, River Corridor	Starting at the Carolina Thread Trail connection at the Catawba County line follow Hwy 70 to Sharon School Rd. to Island Ford Rd. Take rail corridor north to Gregory Creek ending at segment J.	16.5
Q	Existing Sidewalk, Existing Trail, Proposed Trail	From the intersection with segments V and DD south of Troutman follow the rail corridor north to Troutman. Then follow N. Main on existing trail to proposed sidewalk on N. Main to proposed trail on the rail corridor between Troutman and Statesville. Ending at segments J and L in Statesville.	11.3
U	Bike Route	Starting at the Carolina Thread Trail connection in Catawba County follow Buffalo Shoals east to Pineville to E. Monbo to St. Johns through Lake Norman State Park on State Park Rd. to Perth Rd. where segment EE joins to Wagner St to West Ave to Rumble St ending at segment Q in Troutman.	10.1
V	Bike Route, Proposed Trail	Starting at segment W head north on Rolling Hills Rd. to Bluefield Rd. to Cornelius to Judas Rd. Turn right on Rankin Hill Rd to Parkertown Rd. ending at segments Q and DD.	7.7
W	Bike Route	From the Carolina Thread Trail connection in Catawba County follow Hwy 150 to Doolie Rd. to Plantation Ridge Dr. to Morrison Plantation Pk. to Brawley School Rd. to W. Wilson to W. Lowrance ending at segment X and Y. (Plantation Ridge Drive does not currently intersect Doolie Road. The Town of Mooresville is in the process of conducting an alignment study for this connection, and there is no timeline for construction. The proposed roadway crosssection will include a multi-use sidepath.)	8.9
X	Proposed Trail	From the Mecklenburg County line travel north on the rail corridor proposed trail to intersection with segments W and Y.	5.0
Y	Road ROW, River Corridor	From the junction of segment X and W in Mooresville follow E. Gray south to Smith to E. Brawley to E. Mills to College then travel south on Dye Creek to the Rocky River ending at the Mecklenburg County line.	6.3



Table 7: Other Connection Opportunities
Iredell County Greenway Connection Identification

ID	TYPE	DESCRIPTION	MILES
A	Road ROW	From Harmony head north along US 21 ending at segment B.	3.5
B	Bike Route	From Alexander County line head east on Linneys Mill Rd. to Wilkesboro Hwy. to W. Memorial Hwy. to W. Houstonville Rd. to E. Houstonville Rd. to Sandy Springs Rd. ending at the Yadkin County line.	22.0
C	Road ROW	From the Wilkes County line head south along Warren Bridge Rd. across segment B to Jennings Rd. end at segment E.	8.8
E	Road ROW	From segment G follow Snow Creek Rd to Friendship Rd. to Bussell Rd. to Jennings to Olin LP. to Tatum Rd. to Tabor Rd ending at segment F.	9.3
H	Road ROW	From segment G follow Nixon Rd. to Shumaker Rd. to Jane Sowers Rd. to Brookview Rd. to Old Mocksville Rd. ending at the Davie County line. There is a short spur to connect to segment F that follows Church Lake Rd.	16.4
I	River Corridor, Road ROW, Rail Corridor	From segments G and J follow Fourth Creek west. Then take Midway Rd. to make connection with segment M on the Alexander rail corridor. There is also a short connection on Fourth Creek between segments J and K.	10.9
L	Road ROW, Existing Sidewalk	From segment K follow Sullivan Rd. south to existing sidewalk along Davie Ave. to E. Broad St. ending at segments Q in Statesville.	2.2
M	Existing Sidewalk, Rail Corridor	From segment J in Statesville follow West End Ave. to the Alexander rail corridor ending at segment N.	2.6
O	Road ROW	From segment N follow Island Ford Rd west ending at Lookout Lake Access	2.2
P	Road ROW	From segment DD follow Mazeppa Rd. to Triplett Rd. to Elmwood Rd. ending at segment K.	12.9
R	Road ROW	From segment Q follow Ostwalt Amity Rd. ending at the Rowan County line.	6.4
S	River Corridor Proposed, Trail	From segment Q follow Third Creek utilizing a small section of proposed trail to connect to Newton Dr to Phoenix St. ending at segment M.	5.3
T	Road ROW	From segment N follow Hickory Hwy to Eufola Rd. to Buffalo Shoals Rd. Take Buffalo Shoals Rd south to connect to segment U or take Buffalo Shoals Rd north to connect to segment S.	10.7
Z	River Corridor, Proposed Trail	From segment Y follow the Rocky River north to Dogwood Ln to Culp St. to E. Iredell Ave to W. Iredell to Academy to W. Moore to the creek corridor proposed trail ending at segment DD in Mooresville.	7.2
AA	Road ROW	From segment X follow Fairview Rd to Centre Church Rd to Williamson Rd ending at segment W	3.2
BB	Proposed Trail, River Corridor, Road ROW	From segment DD follow Adventure Ln connecting to Byers Creek across segment V ending at Lake Norman.	3.1
CC	Road ROW	From segment Z follow N. Main St. to Landis Hwy. to Wiggins Rd. to Mazeppa Rd. ending at segment P.	6.4
DD	Rail Corridor, Proposed Trail	From segments Q and V follow the rail corridor south to Reeds Creek proposed trail ending at segment W.	5.6
EE	Road ROW, Proposed Trail	Starting at segment V head north on Judas to Perth Rd then onto proposed trail to segment U.	3.5

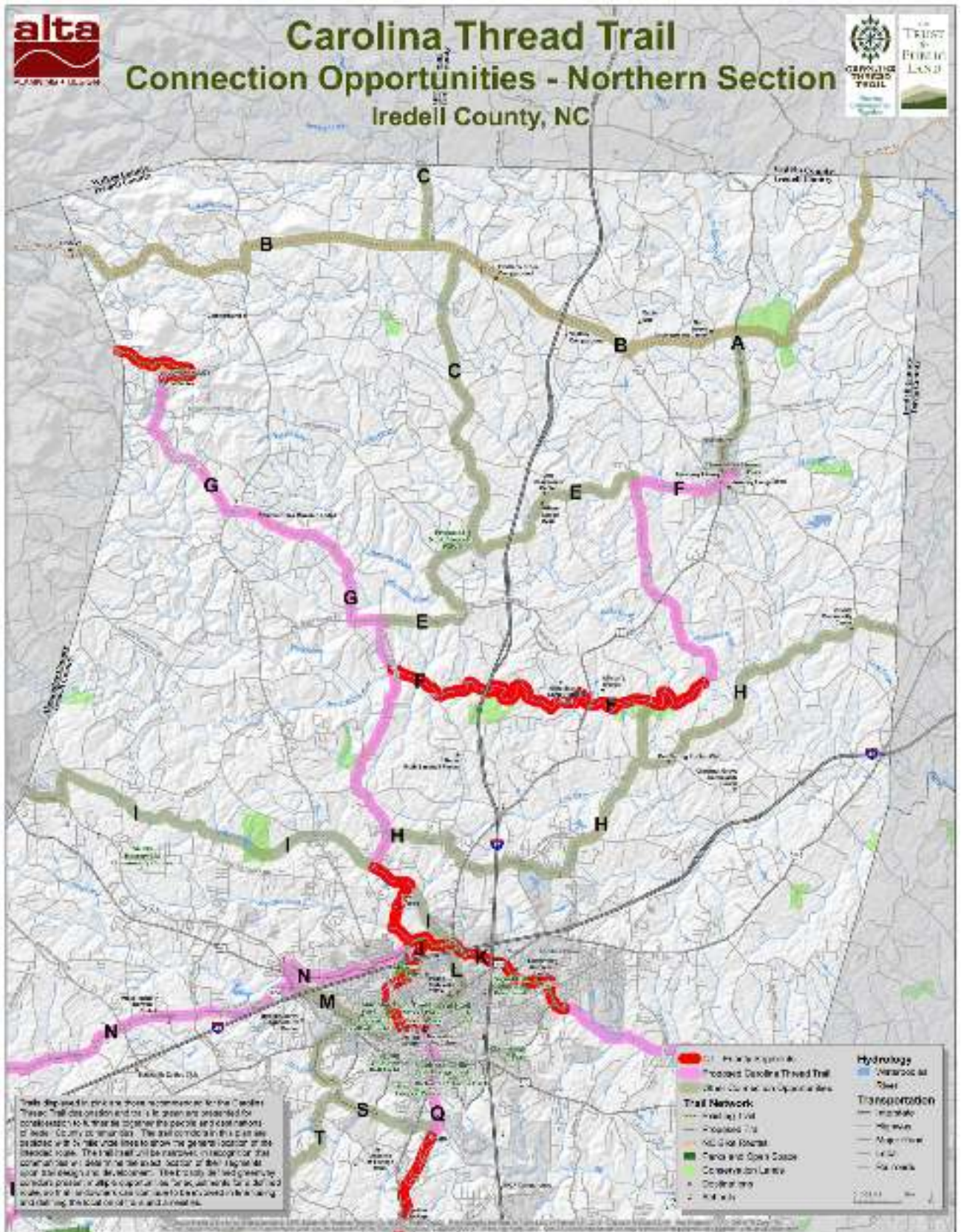


Figure 7: Connection Opportunities-Northern Section



Figure 8: Connection Opportunities-Central Section

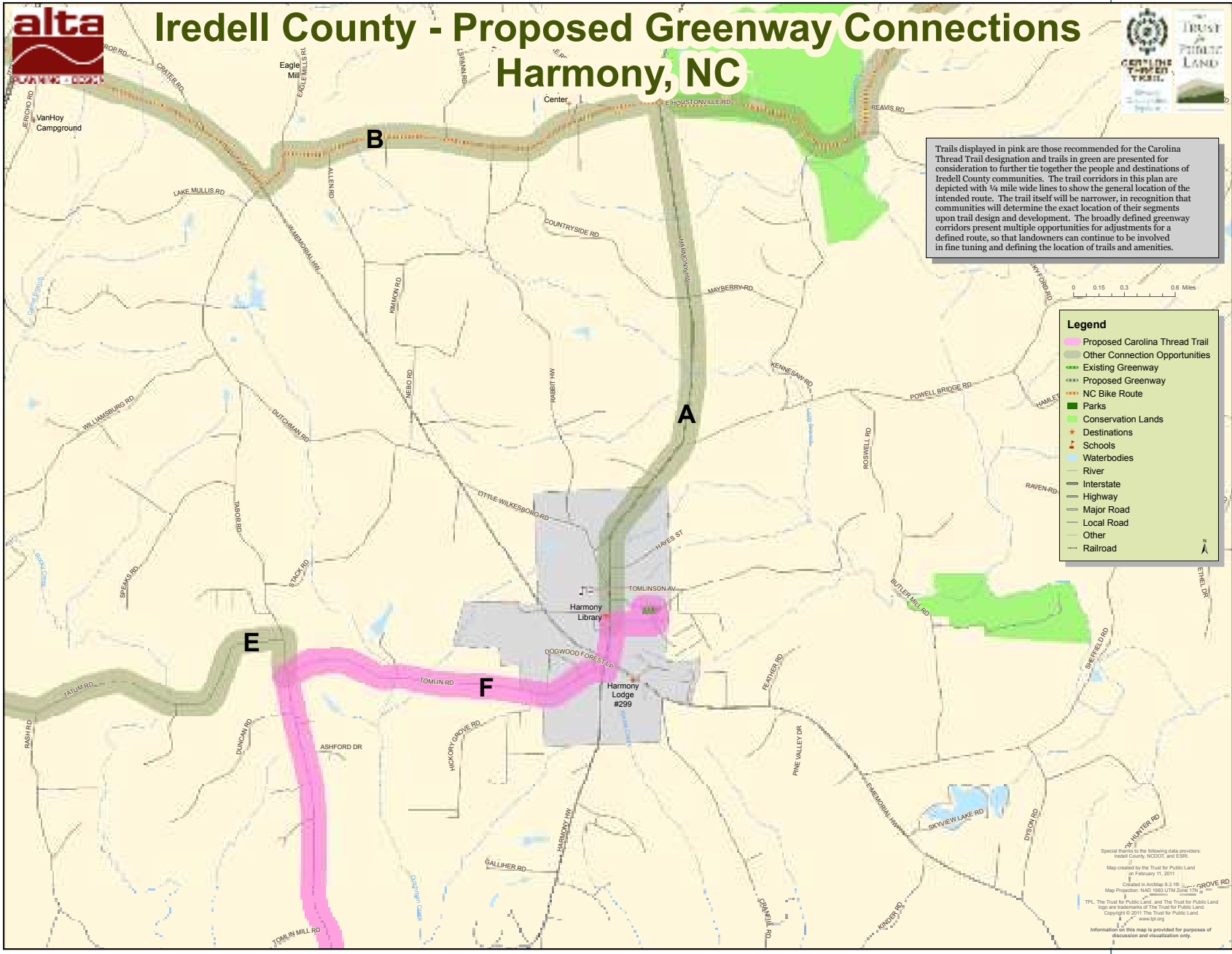
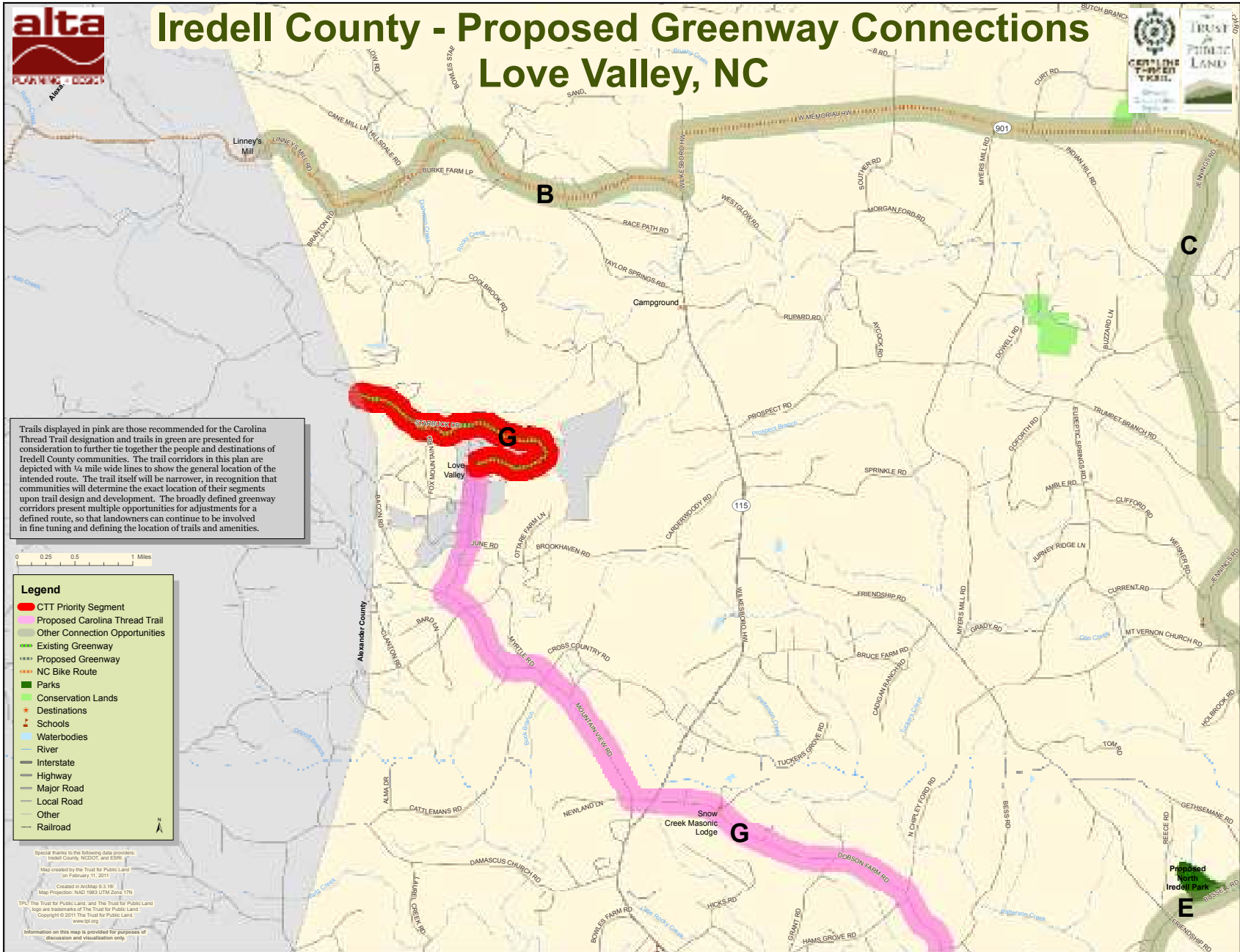


Figure 10: Priority Greenway Connections - Harmony





Iredell County - Proposed Greenway Connections Love Valley, NC



Trails displayed in pink are those recommended for the Carolina Thread Trail designation and trails in green are presented for consideration to further tie together the people and destinations of Iredell County communities. The trail corridors in this plan are depicted with 1/4 mile wide lines to show the general location of the intended route. The trail itself will be narrower, in recognition that communities will determine the exact location of their segments upon trail design and development. The broadly defined greenway corridors present multiple opportunities for adjustments for a defined route, so that landowners can continue to be involved in fine tuning and defining the location of trails and amenities.

Figure 11: Priority Greenway Connections - Love Valley





Iredell County - Proposed Greenway Connections Mooresville, NC

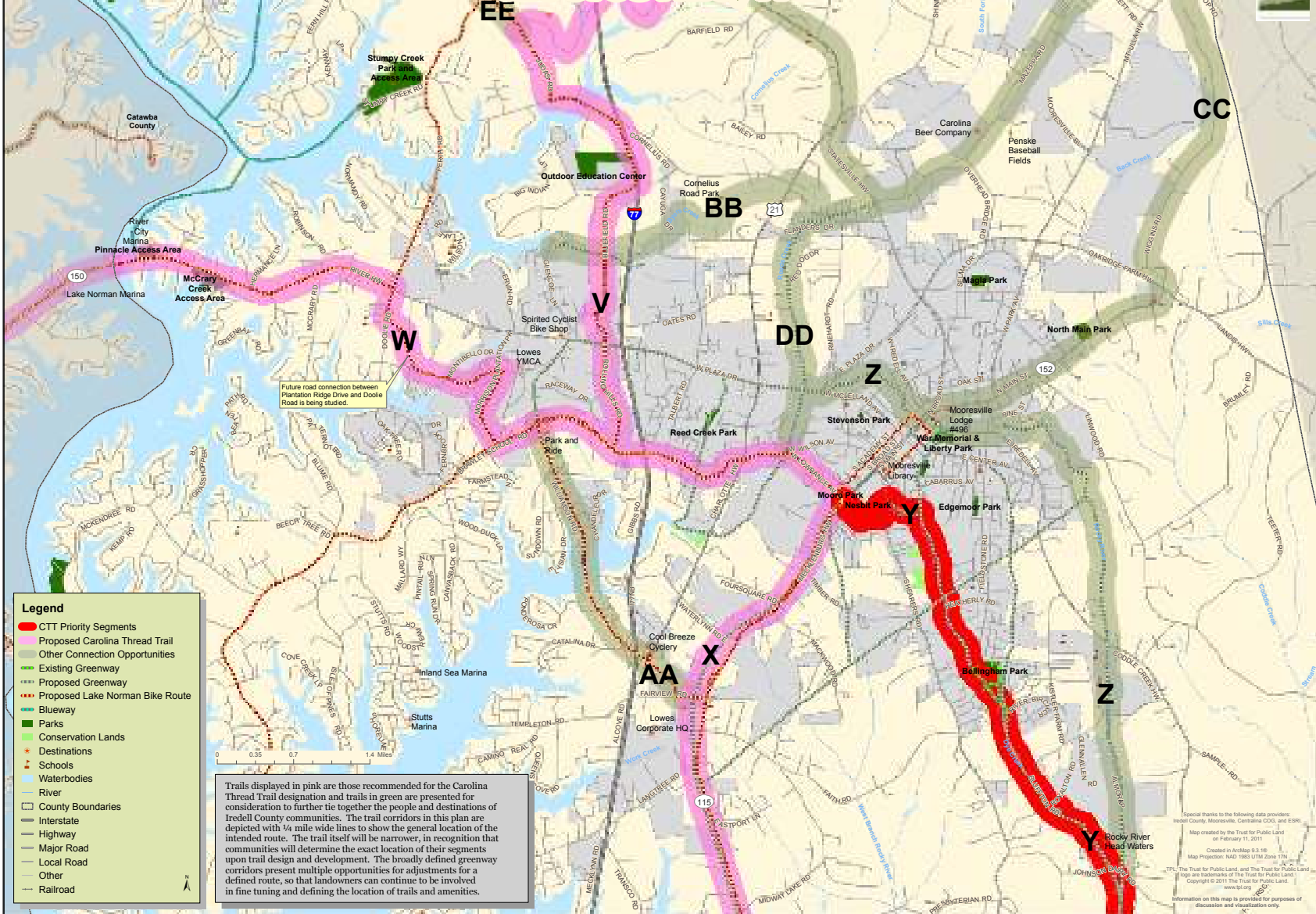


Figure 12: Priority Greenway Connections - Mooresville





Iredell County - Proposed Greenway Connections Statesville, NC

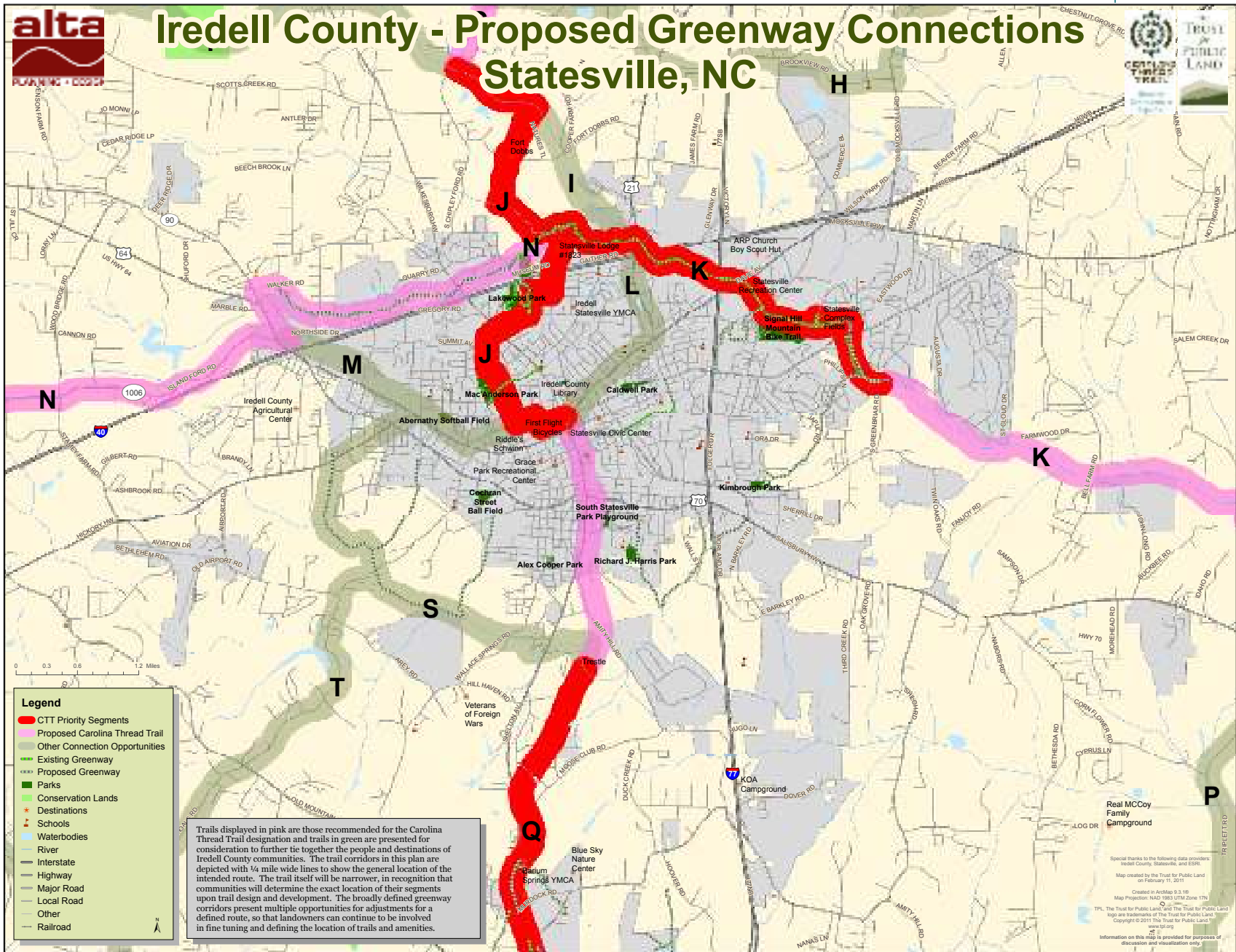


Figure 13: Priority Greenway Connections - Statesville





Iredell County - Proposed Greenway Connections Troutman, NC

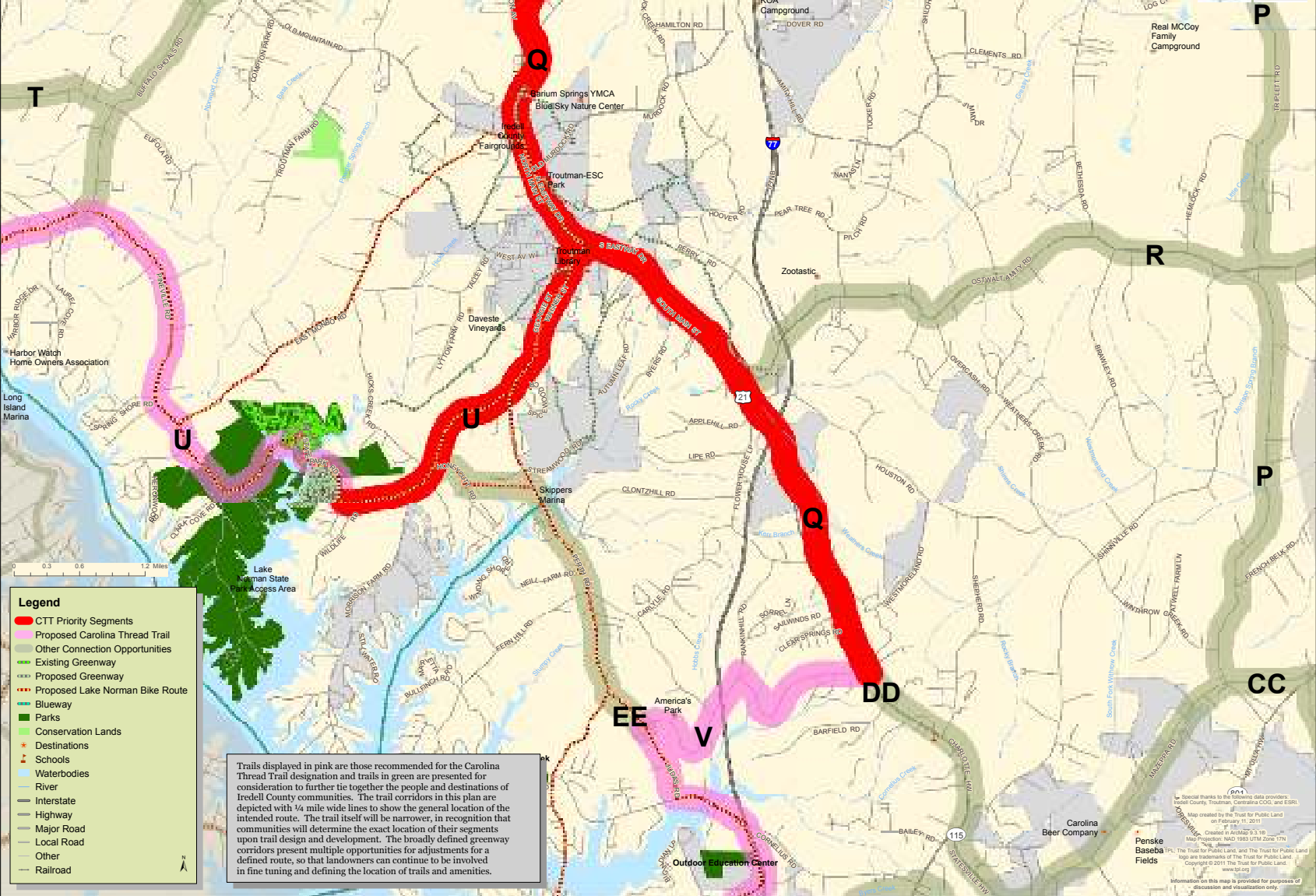


Figure 14: Priority Greenway Connections - Troutman





Bellingham Park Trail (Source: Town of Mooresville)





CHAPTER 6. RECOMMENDED ACTIONS FOR IMPLEMENTATION

ADOPT THE PLAN

The Carolina Thread Trail Master Plan for Iredell County Communities will be an important tool for County and municipal residents, boards, and officials as the community makes decisions about economic development, land use, transportation, open space preservation, environmental protection, and recreation development in Iredell County. Adopting the Carolina Thread Trail Plan for Iredell County is a critical first step in identifying the County's trail opportunities and challenges and will influence County and municipal policy and decisions regarding trail development in the County. Adopting the Master Plan will help Iredell County get the Carolina Thread Trail built, by making the County eligible for catalytic seed funding from the Carolina Thread Trail and other sources and provide key political and public support for this visionary effort.

BUILD PUBLIC SUPPORT

Establish a “Friends of the Carolina Thread Trail” Organization

A trail system such as the Carolina Thread Trail will be most successful when supported by a county-wide citizens' group. Iredell County communities have tremendous social capital that should be tapped to provide implementation opportunities for the Carolina Thread Trail. The primary purpose of a Friends group would be to generate support and interest in the Carolina Thread Trail among local and regional partners. Ultimately, such a group should work to ensure that public and political interest in the Carolina Thread Trail remains high and that the trails are successfully used and maintained once built.

A Friends group could organize events that improve the trail corridors, including tree plantings, clean-up activities, trail monitoring, bridge building, and

invasive plant removal. The group could work with other civic organizations and local businesses to get in-kind donations for cleaning up trail corridors. For example, a local hauling service could donate a truck to haul away debris or a local nursery could donate native plants for enhancement activities. The group could also perform fundraising activities for trail enhancements, such as interpretive sites. Additionally, the group could be responsible for assisting the County and municipalities with grant writing efforts to secure state funding for the next phases of development.

Develop a Trail Identity for Iredell County

A unique and identifiable image for trail and greenway signs in the county will create a sense of continuity and consistency throughout the trail corridors, especially on local greenways that tie into the Carolina Thread Trail. Project partners could coordinate with local schools, artists, and college and university students to develop an image or concept that embodies the trail and greenway corridors for trail signs, interpretive areas, and maps and that ties in with the overall Carolina Thread Trail identity and logo elements. Potential themes include:

- Dominant landscape elements – creeks, the lakes, Catawba River, Lake Norman, hills and mountains, vegetation.
- Walking and bicycling elements – silhouettes of people walking and riding, equipment.
- Place names – community names; creek, river, or lake name.
- Historic elements – pioneers, Native American cultures, agriculture, railroad.
- Environmental elements – wildlife habitats, floodplains, watersheds.



COMPLETE PRIORITY GREENWAY ROUTES

Greenway Prioritization

Priority Carolina Thread Trail routes were determined based on consensus of the Steering Committee. A representative cross-section of the Steering Committee identified six priority routes. Then the Steering Committee added another priority route between the Town of Troutman and Lake Norman State Park, due to the public's overwhelming support of Lake Norman State Park as a key destination. Seven Carolina Thread Trail routes are identified as high priority Thread Trail routes as a result.

Figure 15 depicts routes that received high public support. (Detailed maps indicating priority routes are provided in Chapter 5.) Figure 16 depicts the locations of the priority routes. Table 8 outlines the greenway routes that are identified as high priority. Routes are listed in alphabetical order.

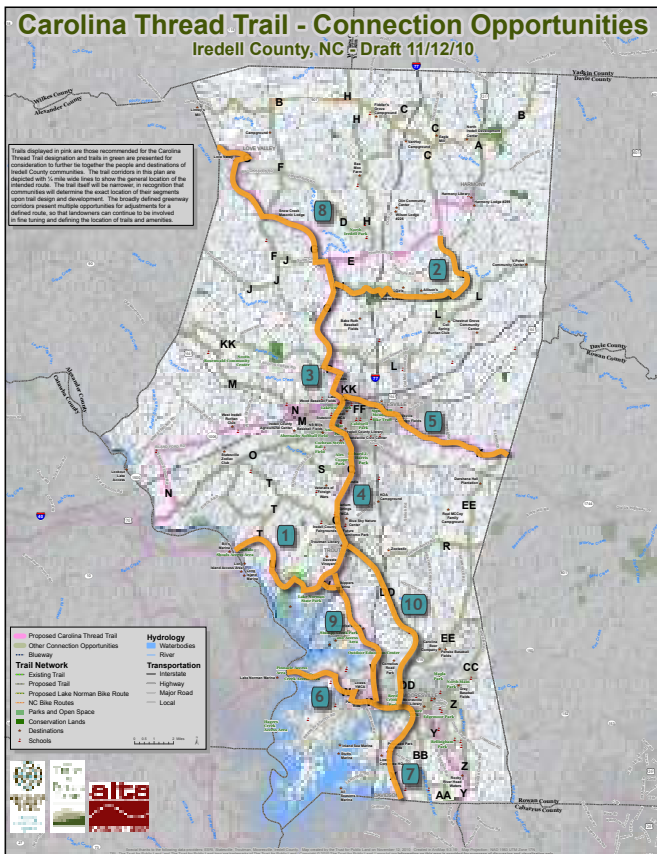


Figure 15: Public ranking of Carolina Thread Trail routes for Iredell County

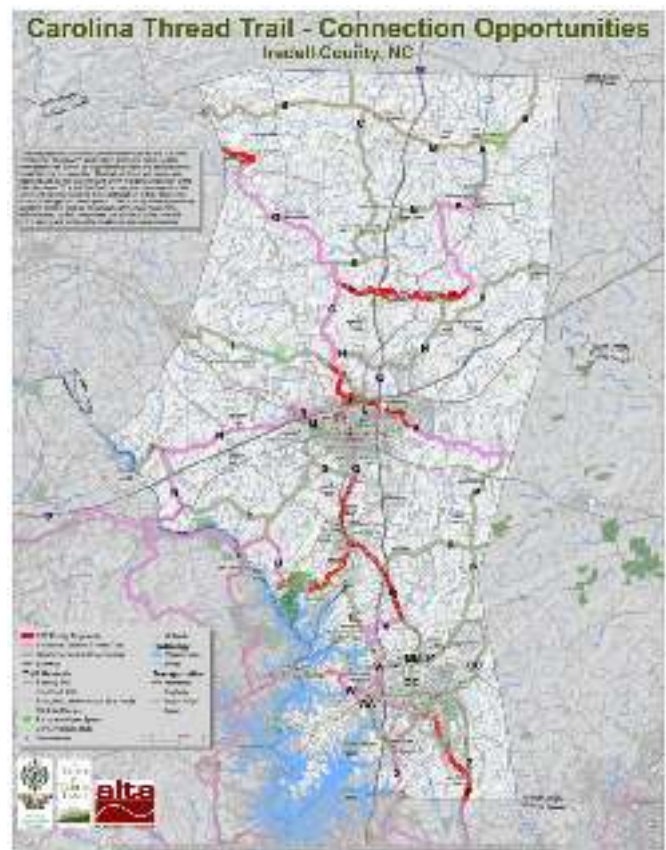


Figure 16: Priority Greenway Routes



Table 8: Carolina Thread Trail Priority Segments
Iredell County Greenway Connection Identification

ID	TYPE	DESCRIPTION	MILES
F	River Corridor	Starting at segment G follow South Yadkin River east to Chief Thomas Rd.	9.5
G	Existing Trail	From Love Valley take existing trail ending at Alexander County line.	2.5
J	River Corridor, Existing Trail, Existing Sidewalk, Road ROW, New Trail	Starting in Statesville follow W. Broad to N. Mulberry St. to West End Ave. Then go north on N. Race to Ridgeway to Hartness to Lakewood to Hillcrest to Radio. Cross segments N and K and take Morrison creek north. Then onto "New Trail" through Fort Dobbs, then following a short section of Fourth Creek ending at segment G.	5.8
K	Existing Trail, Proposed Trail	From segment J head east on the existing trail along Morrison Creek. Then taking the existing trail along Fourth Creek ending at S. Greenbriar Rd.	4.3
Q	Existing Sidewalk, Existing Trail, Proposed Greenway	From the intersection with segments V and DD south of Troutman follow the rail corridor north to Troutman. Then follow N. Main on existing trail to proposed sidewalk on N. Main to proposed trail on the rail corridor between Troutman and Statesville. Ending at segment S at the Trestle.	8.7
U	Bike Route	From Troutman take Rumble St. to West Ave. to Wagner St. to Perth Rd. to State Park Rd. ending at Lake Norman State Park.	3.6
Y	Road ROW, River Corridor	From the junction of segment X and W in Mooresville follow E. Gray south to Smith to E. Brawley to E. Mills to College then travel south on Dye Creek to the Rocky River ending at the Mecklenburg County line.	6.3

TRAIL COST ESTIMATES

Trail construction costs vary by location, state of the economy, condition of right-of-way, and surface type. The following list identifies the range of costs associated with different trail surface types. These costs are based on local construction sources, as well as national sources (including the Rails-to-Trails Conservancy) and experience in other regions. Costs are given per mile, and do not include land acquisition.

- Asphalt - \$100K - \$750K
- Concrete - \$300K - \$500K
- Crushed/granular stone - \$60K - \$130K
- Soil cement - \$60K - \$100K
- Resin-based stabilized material – varies
- Boardwalk - \$1.5 mil – \$2 mil
- Natural surface - \$35K – \$120K

INITIATE OTHER PRIORITY ACTION STEPS AND POLICY RECOMMENDATIONS

This Carolina Thread Trail Master Plan for Iredell County Communities is intended to serve as a point of beginning in developing a network of trails in Iredell County with connections to the surrounding region. The steps required to implement the trails identified in this plan will vary by project and by municipality. The goals, recommended policies, and action steps listed below supply the policy and implementation framework for the Master Plan at the county and municipal level.

The aspirations of county residents and other stakeholders expressed during the planning process are directly reflected in the recommended action steps. The recommendations are a composite of feedback from focus groups and stakeholders, Steering Committee input, initial survey, follow-up survey, interactive website, as well as six



public meetings during the planning phase of the project.

This master planning process is ongoing, and will require continual re-examination of goals and priorities to reflect shifts in user patterns, community desires, demographics, availability of land and availability of financial resources. As such, the recommendations addressed in this master plan should be regularly reviewed and updated.

The following action steps and policy recommendations should be considered in planning and implementing future Carolina Thread Trail improvements in Iredell County.

Action Step #1

Strategically pursue trail projects to maximize results and minimize costs.

- 1.1 Develop the proposed Carolina Thread Trail routes (approximately 116 miles) and other recommended local greenways/trails as reflected in the adopted Carolina Thread Trail Master Plan for Iredell County Communities as well as locally adopted pedestrian, bicycle, and greenway plans.
- 1.2 Pursue land and/or easements and funding for higher-priority trail projects first.
- 1.3 Work with local agencies and private landholders to secure trail easements and access to greenspace for trail connections.
 - 1.3.1 Coordinate with local railroad owners and operators for potential rail-with-trail or rail-to-trail opportunities, and with utility companies for potential trail opportunities within utility corridors.
 - 1.3.2 Provide coordination with other trail development efforts in the region.
- 1.4 In the case where grant requirements or construction in conjunction with another project make construction of a lower priority trail project possible, pursue funding sources for that trail project regardless of priority.

- 1.5 Publish a public report documenting the status and ongoing actions for all trail projects at the end of each fiscal year.

Action Step # 2

Ensure that the Carolina Thread Trail Master Plan for Iredell County project list is current and relevant.

- 2.1 Review and update the Carolina Thread Trail Master Plan for Iredell County Communities as needed, at a minimum of every ten years, with input from the Iredell County Carolina Thread Trail Steering Committee, Carolina Thread Trail Subcommittee, local advocacy groups, and land use agencies.
- 2.2 Facilitate a bi-annual staff meeting comprised of municipal employees, to receive project updates and potentially rework plan priorities.
- 2.3 Share updated Carolina Thread Trail Master Plan project list with the public and the municipalities.

Action Step # 3

Integrate Carolina Thread Trail planning and construction into the communities day-to-day activities of planning, designing, funding, constructing and maintaining infrastructure.

- 3.1 Promote recreation easements and open space corridors through existing and future development areas for use as linear parks and trails. Integrate the siting of proposed trail segments into the development review process.
- 3.2 Install approved trail projects simultaneous with road, stormwater, or utility improvements projects scheduled in the same area, regardless of the priority placed upon a trail project.
- 3.3 Adopt policies that promote walking and bicycling.
- 3.4 Adopt a Complete Streets Policy to ensure that consideration of bicycle and pedestrian facilities are included in all major construction and reconstruction projects. Bicycle and pedestrian facilities should be addressed at the project scoping stage.



3.5 Coordinate regularly with NCDOT as applicable.

Action Step # 4

Encourage private donors to support the Carolina Thread Trail.

4.1 Institute an “Adopt a Trail” program to encourage corporations, institutions and individual private donors to support the Carolina Thread Trail system.

4.2 Leverage this program to enhance maintenance through volunteer work to connect philanthropy with fundraising to sustain the system.

4.3 Evaluate the opportunities for establishing a philanthropic giving program that can be used to support the construction and maintenance of Iredell County’s Carolina Thread Trail.

Action Step #5

Qualitatively measure Iredell County’s progress toward implementing the Carolina Thread Trail Master Plan

5.1 Establish measures of effectiveness to evaluate the County’s progress toward meeting the goal outlined in this Carolina Thread Trail Master Plan.

5.2 Include measurable indicators of progress and time-sensitive targets for the County to meet.

FUND TRAIL IMPLEMENTATION

Funding for the Carolina Thread Trail and Local Greenways

A variety of potential funding sources are available to help pay for the Carolina Thread Trail in Iredell County, including private, local, State, regional, and Federal funding programs. Many of these involve the completion of extensive applications with clear documentation of the project need, costs, and benefits, and which compete with similar applications from other communities.

A summary of potential public funding sources for trail projects is provided in Appendix III. Some are restricted

to specific types of improvements. It is important to note that many of the funding sources are highly competitive and it is impossible to determine exactly which projects will be funded by which funding sources. It is also difficult to pinpoint the timing of projects, due to dependence on competitive funding sources, timing of related infrastructure and development projects, and the overall economy.

Right-Of-Way Acquisition Strategies For Trails

The relationship of the parties in a trail corridor will be driven to a great extent by which entity holds the dominant property interest. The type of property acquisition influences both the ease of implementing the project and the liability burden. There are five types of property acquisition: donation, purchases, landowner incentive measures, conservation easements, and licenses.

Donation

A landowner may donate property for a trail.

Purchases

Market Value Purchase

Through a written purchase and sale agreement, a local government purchases land at the present market value based on an independent appraisal. Timing, payment of real estate taxes and other contingencies are negotiable.

Partial Value Purchase (or Bargain Sale)

In a bargain sale, the landowner agrees to sell for less than the property’s fair market value. A landowner’s decision to proceed with a bargain sale is unique and personal; landowners with a strong sense of civic pride, long community history or concerns about capital gains are possible candidates for this approach. In addition to cash proceeds upon closing, the landowner may be entitled to a charitable income tax deduction based on the difference



between the land's fair market value and its sale price.

Option to Purchase Agreement

This is a binding contract between a landowner and the local government that would only apply according to the conditions of the option and limits the seller's power to revoke an offer. Once in place and signed, the Option Agreement may be triggered at a future, specified date or upon the completion of designated conditions. Option Agreements can be made for any time duration and can include all of the language pertinent to closing a property sale.

Right of First Refusal

In this agreement, the landowner grants the local government the first chance to purchase the property once the landowner wishes to sell. The agreement does not establish the sale price for the property, and the landowner is free to refuse to sell it for the price offered by the government agency. This is the weakest form of agreement between an owner and a prospective buyer.

Life Estates & Bequests

In the event a landowner wishes to remain on the property for a long period of time or until death, several variations on a sale agreement exist. In a life estate agreement, the landowner may continue to live on the land by donating a remainder interest and retaining a "reserved life estate." Specifically, the landowner donates or sells the property to the local government, but reserves the right for the seller or any other named person to continue to live on and use the property. When the owner or other specified person dies or releases his/her life interest, full title and control over the property will be transferred to the local government. By donating a remainder interest, the landowner may be eligible for a tax deduction when the gift is made. In a bequest, the landowner designates in a will or trust document that the property is to be transferred to the local government upon death. While a life estate offers the local government some degree of title control during

the life of the landowner, a bequest does not. Unless the intent to bequest is disclosed to and known by the local government in advance, no guarantees exist with regard to the condition of the property upon transfer or to any liabilities that may exist.

Landowner Incentive Measures

The following tools should be considered by the County and local municipalities as a means to incentivize developer participation in the development of the Carolina Thread Trail and local greenway network.

Density Bonuses

Density bonuses are a planning tool used to encourage a variety of public land use objectives, usually in urban areas. They offer the incentive of being able to develop at densities beyond current regulations in one area, in return for concessions in another. Density bonuses are applied to a single parcel or development. An example is allowing developers of multi-family units to build at higher densities if they provide a certain number of low-income units or public open space. For density bonuses to work, market forces must support densities at a higher level than current regulations.

IRC 1031 Exchange

If the landowner owns business or investment property, an IRC Section 1031 Exchange can facilitate the exchange of like-kind property solely for business or investment purposes. No capital gain or loss is recognized under Internal Revenue Code Section 1031 (see www.irc.gov for more details).

Conservation Easements

In most instances, full ownership acquisition is not necessary for trail development, and, in many cases, is not really an option. Easements typically are acquired when the landowner is willing to forego use of the property and development rights for an extended period. Through



a conservation easement, a landowner voluntarily agrees to sell or donate certain rights associated with his or her property – often the right to subdivide or develop – and a private organization or public agency agrees to hold the right to enforce the landowner’s promise not to exercise those rights. In essence, the rights are forfeited and no longer exist. This is a legal agreement between the landowner and the local government (or private organization) that permanently limits uses of the land in order to conserve a portion of the property for public use or protection.

Typically, this approach is used to provide trail corridors where only a small portion of the land is needed or for the strategic protection of natural resources and habitat. The landowner still owns the property, but the use of the land is restricted. Conservation easements may result in an income tax deduction and reduced property taxes and estate taxes. The preservation and protection of habitat or resources lands may best be coordinated with the local land trust or conservancy, since that organization will likely have staff resources, a systematic planning approach and access to non-governmental funds to facilitate aggressive or large scale transactions.

The list below provides an overview of easement agreement issues.

Easement Agreement

A model easement agreement should:

- Guarantee exclusive use or uses compatible.
- Be granted in perpetuity.
- Include air rights if there is any possible need for a structure.
- Broadly define purpose of the easement and identify all conceivable activities, uses, invitees, and vehicular types allowed to avoid any need to renegotiate with fee interest owner in future.
- State that all structures and fixtures installed as part of a trail are property of grantee.

- Include subsurface rights for use by utility franchises.

It is also understood that major landowners would want an easement agreement to address issues on their side. Through cooperative negotiation, the following issues should be addressed in an easement agreement:

- Access needs related to maintenance, etc.
- Trail management plan.
- Future improvements or modifications to the trail.

Licenses

A license is usually a fixed-term agreement that provides limited rights to the licensee for use of the property. Typically, these are employed in situations when the property cannot be sold (e.g., a publicly owned, active electrical utility corridor), or the owner wants to retain use of and everyday control over the property. The trail management authority obtains permission to build and operate a trail. However, it will have little control over the property, and may be subject to some stringent requirements that complicate trail development and operation. The list below provides an example of model license agreement language.

License Agreement

A model license agreement should:

- Provide an acceptable term length with an option to renew.
- Identify all conceivable activities, uses, invitees, and vehicular types.
- Provide clarity on maintenance responsibilities.
- Specify limits on other uses of license property.

As with easement agreements, property owners would want a license agreement to address issues on their side. Through cooperative negotiation, the following issues should be addressed in a license agreement:

- Access needs related to maintenance, etc.
- Trail management plan.
- Future improvements or modifications to the trail.



Chapter 6. Recommended Actions for Implementation



CHAPTER 7. CONCLUSION

Through a collaborative planning process, community members in Iredell County articulated a sense of place and showed excitement about honoring special landscapes and destinations for economic, psychological, cultural and health reasons by connecting them and interacting with them on foot, on horseback, on bicycle and other modes. Given the rate of growth in the region, the Carolina Thread Trail is a key to maintaining Iredell County's quality of life. This report outlines an ambitious plan for developing a comprehensive network of trails across Iredell County.

The Carolina Thread Trail will help connect the communities of Iredell County. The Thread will serve as a green infrastructure that both preserves the County's heritage and creates new opportunities for future generations. Each community will create its own unique link in the trail

system, and in turn Iredell County will be connected to the entire region. This is a rare opportunity for residents, businesses, agencies, organizations and communities to create a positive legacy. With this plan in place, Iredell County and the Carolina Thread Trail are moving forward and on the right path.

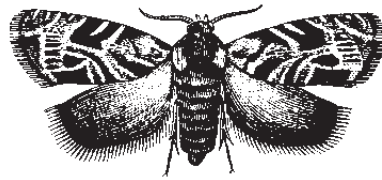
The many community partners who have been involved in the planning process recognize the urgency of starting a county-wide and region-wide linear park system now, while opportunities still exist for making connections and linking important places. They also recognize that this plan will not be implemented overnight, and that while segments should begin appearing soon, it will take years, if not decades, to link them all together. The time to start is now.



Rail Corridor in Troutman (Source: Centralina Council of Governments)



Chapter 7. Conclusion



APPENDIX I: DESIGN GUIDELINES

The Carolina Thread Trail system will accommodate a wide range of users including: pedestrians, bicyclists, equestrians, kayakers, canoers, and persons with mobility impairments. The Carolina Thread Trail system will also pass through a number of different landscapes in Iredell County. Trail character will vary in response to the landscape or built environment in which it is located.

There are a number of federal, state and local guidelines that apply to pedestrian and bicycle facilities. While these documents are not absolute standards, public agencies may require projects to meet the guidelines as a minimum condition for key dimensions including slope, horizontal and vertical clearances, surface conditions, signage and pavement markings.

This section presents trail design guidelines for typical facilities that may occur in Iredell County, including:

- Paved Multi-Use Paths and Bikeways
- Natural Surface Trails
- Rails-with-Trails
- Unique Trail Applications
- Accessible Trails
- Trails and Roadway Crossings
- Signs and Way-finding
- Trail Amenities
- Drainage and Erosion Control

These design guidelines are based on applicable mandatory or advisory state and federal standards and are not engineering specifications. Design engineering should be conducted by licensed professionals and should meet all local design and construction standards.

REFERENCE MATERIALS

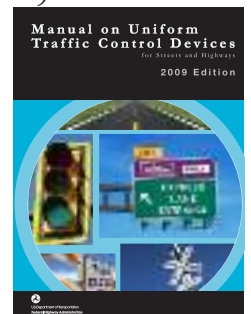
Reference materials used to support the design guideline recommendations include:

American Association of State Highway and Transportation Officials (AASHTO) Guidelines for the Development of Bicycle Facilities, 1999

The current version of this nationally recognized document is the 3rd Edition, dated 1999. The new guide is anticipated to be nearly three times larger than the 1999 edition, with significant alterations. Additional content includes over seventy pages on the design of on-street bicycle facilities. The new guidelines should be used to update the design guidelines when they become available.

Manual of Uniform Traffic Control Devices (MUTCD), 2009

The 2009 Federal MUTCD includes Part 9: Traffic Controls for Bicycle Facilities, along with detailed guidelines for pedestrian facilities crossings available, and is available online at: http://mutcd.fhwa.dot.gov/kno_2009.htm.



Equestrian Design Guidebook for Trails, Trailheads and Campgrounds

The needs of equestrians require specific design treatments. The Equestrian Design Guidebook for Trails, Trailheads and Campgrounds was developed for the U.S.



Forest Service in cooperation with the Recreational Trails Program of the Federal Highway Administration in 2007. This guide provides practical strategies and models for developing recreation opportunities for equestrians, including trail and amenity design.



North Carolina Department of Transportation (NCDOT) Guidelines and Resources

In North Carolina, bicycles are legally defined as vehicles. NCDOT publishes “A Guide to North Carolina Bicycle and Pedestrian Laws” as a reference document for planners, citizens and law enforcement officials, available on NCDOT’s website. Other documents available on the website are the Greenways Administrative Process and the Bicycle and Bikeways Act. The website can be accessed at: http://www.ncdot.org/transit/bicycle/laws/laws_intro.html

NCDOT also publishes the Bicycle Facilities Planning and Design Guidelines. Published in 1994, this comprehensive manual outlines detailed planning and design considerations specific to North Carolina.

Rails-with-Trails: Lessons Learned

This report was prepared at the direction of the U.S. Department of Transportation for the purpose of examining safety, design, and liability issues associated with the development of shared use paths and other trails within or adjacent to active railroad and transit rights-of-way.



This document is intended to explore lessons learned from the experience of Rails-with-Trails (RWTs), and suggest practices to enhance safety and security for railroads, transit, and trail users.

Universal Design/ADA Access

Good design for the Carolina Thread Trail will ensure universal access for all. In addition, all greenway paths and other trails that receive funding from state or federal sources

must conform to Americans with Disabilities Act (ADA) guidelines. The Federal Highway Administration publishes a guidebook entitled Designing Sidewalks and Trails for Access. Chapter 5,



Trail Design for Access is the most relevant portion of the report and is available online at: <http://www.fhwa.dot.gov/environment/sidewalks/chap5a.htm>

Another good resource is Universal Access to Outdoor Recreation: A Design Guide, which details the systems and elements needed to ensure universal access to recreation sites. The guide helps users determine the appropriate level of access for a range of outdoor sites.

Blueway Design Guidelines

The Carolina Thread Trail in Iredell County may include designated Blueways to accommodate the growing interest in the use of small paddlecrafts (i.e. kayaks and canoes) to experience waterways along the trail. To assist with designing this important element within the greenway, the following resources can provide step-by-step guidelines for planning, building and managing water trails:

- Water Trail Toolbox: How to Plan, Build and Manage a Water Trail, published by the non-profit Chesapeake Bay Gateways Network. This report can be found online at: <http://www.baygateways.net/watertrailtools.cfm>.
- Blueways: A Water Trail Network for Northwestern Indiana (Chapter Three) published by The Northwestern Indianan Regional Planning Commission & Openland Project. This report can be found online at: <http://www.nirpc.org/OldNirpc/pdf/Chapter%203,%20Blueways%20-%20Part%201.pdf>



The design guidelines are organized into the following sections:

Paved Multi-Use Paths and Bikeways

Paved multi-use paths and bikeways, for purposes of this plan, include trails that meet or are proposed to meet the dimensional, geometric and functional standards set forth by NCDOT and AASHTO. They are paved surface multi-use pathways, bicycle lanes, bicycle routes and bicycle boulevards that serve a variety of commuter trips, utilitarian trips, and recreational trips.

Natural Surface Trails

Natural surface trails are primarily recreational trails that serve a variety of recreational user groups. Natural surface trails may occasionally serve transportation needs such as: school access, commuter use, or local errands. There is no one set of standards for natural surface trails, but there are many resources available for constructing successful trails.

Rails-With-Trails

The linear nature of rail corridors offers trail connection opportunities that might not otherwise be available. Railroad companies own wide rights-of-ways that often can accommodate a trail. Trails in active rail corridors must be designed to meet both the operational needs of the railway system and road systems, as well as the safety of trail users. National design standards have not been developed for Rails-With-Trails, although guidelines have been developed from studies conducted by the Federal Highway Administration and the Rails-To-Trails Conservancy.

Unique Trail Applications

This section will cover special trail design treatments that may be required to complete the trail connections, including trails in a floodplain, boardwalks, water trails and the accommodation of non-compatible users (i.e. equestrians and bicyclists) in the same trail corridor. These trails

will require special attention to trail planning, design and construction.

Accessible Trail Design

Accessible trail design is important to both recreational and transportation trails and the standards for accessibility are generally established by the United States Access Board and the U.S. Department of Transportation, Federal Highway Administration and Recreational Trails Program Guidance. The discussion included in this section introduces the basic concepts of accessible trail design which provide for the needs of people with varied mobility requirements.

Trail and Roadway Crossings

The design of trail crossings of streets, roads, highways, railroads and driveways must account for a variety of factors and always requires site specific traffic engineering and safety analysis. The framework presented here introduces the key variables that influence trail crossings.

Signs and Way-Finding

A comprehensive sign system increases user safety, comfort and helps make a trail system memorable. This section covers regulatory, etiquette, way-finding and identity, informational and interpretive, and striping signs and markings.

Trail Amenities

Trail support facilities should provide trail users with the accommodations they need and encourage use of the facilities.

Drainage and Erosion Control

Design of trails to maximize drainage, minimize erosion, and ensure long-term sustainability is critically important to trail and resource managers. This section introduces basic drainage and erosion control concepts.



PAVED MULTI-USE PATHS AND BIKEWAYS

Multi-Use Paths

Multi-use paths typically have their own right-of-way and are designed for two-way bicycle and pedestrian traffic. These paths are also designed to accommodate maintenance and emergency vehicles. This type of path should not be used if there are numerous driveway and intersection conflicts.

Guidelines

According to American Association of State and Highway Transportation Officials (AASHTO) design guidelines, two-way multi-use paths should be designed to be a minimum of 8 feet in width. However, 8 foot wide sections should be reserved for pinch points that have physical or environmental constraints.

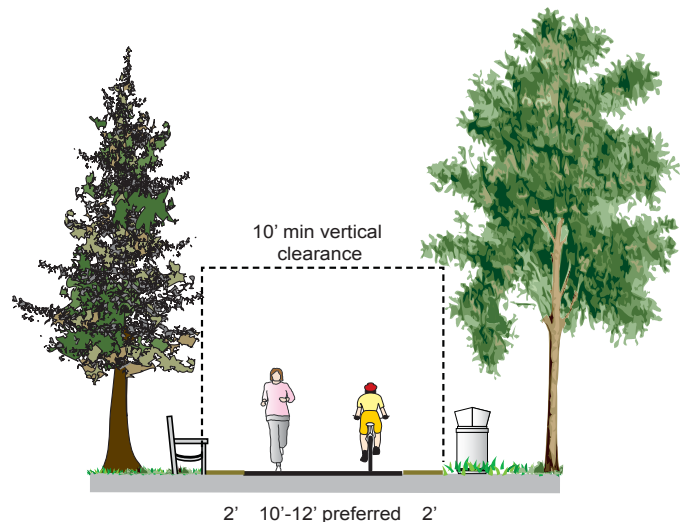
- A width of 10-12 feet is the preferred recommendation, allowing for maintenance vehicles. Paved paths less than 12 feet have been found to break up along the edges due to vehicle loads.
- A 10 foot vertical clearance should be maintained on multi-use trails. This area should be free from tree limbs and any other obstructions that may interfere with pathway use.
- Stopping sight distance on horizontal curves and lateral clearance can be calculated using the equations in the AASHTO Guide 1999. Stopping sight distance refers to the distance required to bring a bicycle to a full controlled stop; this is a function of the bicyclist's perception and brake reaction time, the initial speed of the bicycle, the coefficient of friction between the tires and the pavement, and the braking ability of the bicycle.
- The minimum design speed for bike paths is 20 miles per hour, except on sections where there are long downgrades (not applicable to grades steeper than 4% and longer than

500 feet). Speed bumps or other surface irregularities or obstacles should never be used to slow bicycles.

- A yellow centerline stripe is standard for multi-use paths in many regions, especially at: blind corners, high traffic areas, areas of narrow path width, intersection approaches, and/or areas where nighttime riding is expected with limited lighting.

Potential Applications

- Regional trails and local access trails to schools, parks, and neighborhoods
- Some community connector trails and pathways.





Multi-Use Paths Adjacent to Roadways

Pathways adjacent to roadways can provide critical links in regional trail systems where a local or NCDOT public right-of-way is the only viable alignment alternative. These pathway types are used where it is desirable to completely separate multiple user groups from high speed or high volume car traffic. Particular design attention is required at intersections, including driveways, where motorists may not expect bicyclists to enter the intersection. Guidance on appropriate pathway design, warning and regulatory signage, and intersection control devices is available in a variety of technical manuals (AASHTO *Guidebook for Development of Bicycle Facilities*, and MUTCD) and professional engineering judgment must be applied.

Guidelines

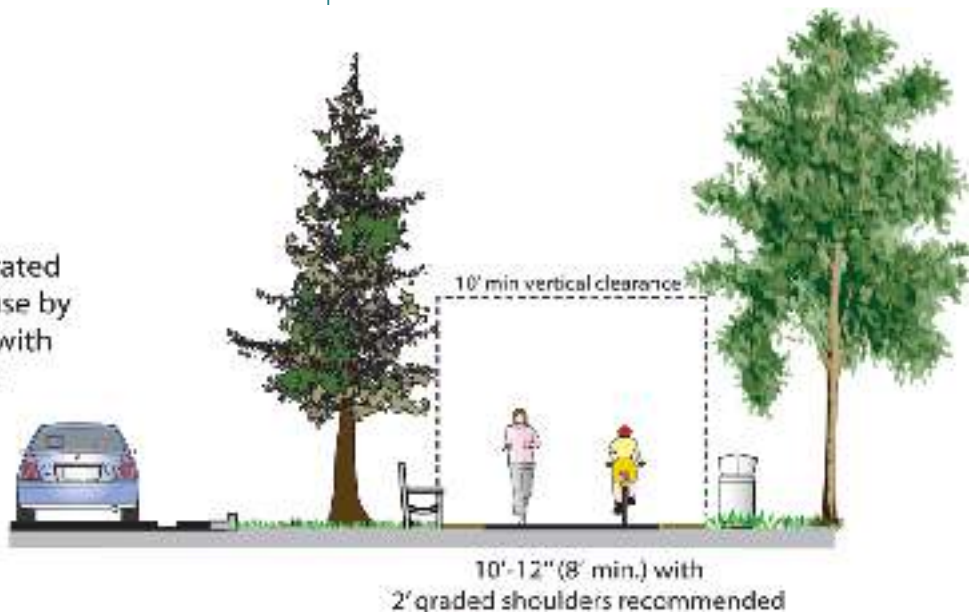
- Separation from automobile traffic by a 5 foot (min.) separation.
- Trail widths of 10 feet to 12 feet (8 foot min.) to avoid conflicts between users.
- Asphalt or concrete paved surface to minimize maintenance requirements.
- Longitudinal grades of less than 5%. A 2% to 3% slope preferred where possible.
- Cross slopes of 2% or less.
- 10 foot vertical clearance.

Potential Applications

- Publicly-owned easements and right-of-ways that connect major community destinations or connect independent communities and may provide a non-motorized commute facility.
- Rights-of-way where a separated path is feasible and complimentary to the existing State Route transportation function.



Provides completely separated right-of-way for exclusive use by bicycles and pedestrians with cross-flow minimized





Bike Lanes

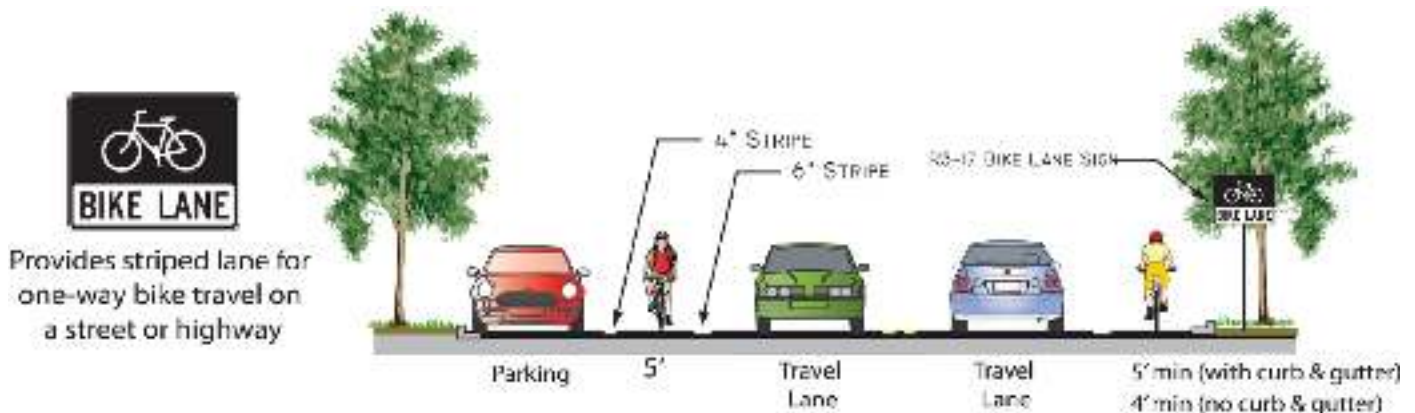
Bike Lanes are a marked space along the length of a roadway for exclusive use of cyclists. Bike lanes create a visual separation between bicycle and automobile facilities, thereby increasing bicyclist's comfort and confidence. Bike lanes are typically used on major through streets with average daily traffic (ADT) counts of 3,000 or higher and should be one-way facilities that carry bicycle traffic in the same direction as motor vehicle traffic.

Guidelines

- A 5 foot width is recommended for bike lanes without on-street parking. This width allows for added separation between bicyclists and vehicles.
- A 5 foot minimum with normal gutter, measured from curb face with vertical curb; or 5 feet measured from the gutter pan seam where curb and gutter are used.
- A 4 foot width minimum if no gutter exists, measured from edge of pavement.
- If adjacent to on-street parking, 5 foot width minimum. Parking bays may vary in width up to 9 feet wide.
- 10 foot vertical clearance.

Potential Applications

- Streets and roads that provide connections to community destinations, e.g. shopping, schools, library, and employment centers.





Bike Routes

A bike route is a signed route on a road, street or path and does not require that the road include any special bicycle facilities. According to AASHTO, bike routes suggest to bicyclists that a particular route has advantages over other alternate routes. Further, AASHTO indicates that bike routes serve one of two purposes: To provide continuity to other bicycle facilities (usually bike lanes) or to designate preferred routes through high demand corridors. Bike routes are typically found on lower volume streets and can provide directional wayfinding signage to assist the bicyclist in navigating.

Guidelines

- AASHTO recommends 10- to 12-foot lanes on rural and urban arterials (“Green Book”, 2004).
- Bicycle Route Signage installed at decision points along designated bicycle routes and at regular intervals. Intervals should consider the location of the bike route, i.e. longer intervals for regional routes and shorter intervals for local routes.

Potential Applications

- Local streets and streets without adequate width for bike lanes.
- Regional roadways where safe and convenient bicycle travel is prioritized.
- Can incorporate pavement markings, traffic calming and other streetscape treatments, depending on traffic volumes, vehicle and bicycle circulation patterns, street connectivity, street width, physical constraints, and other parameters.



Pavement marking



Provides for shared-use with pedestrians or motor vehicles, typically on lower volume roadways





Bicycle Boulevards

Bicycle boulevards are bike routes on low-volume and low-speed streets that have been optimized for bicycle travel through treatments such as traffic calming and traffic reduction, signage and pavement markings, and intersection crossing treatments. These treatments allow through movements for cyclists while discouraging similar through trips by non-local motorized traffic. Motor vehicle access to properties along the route is maintained.

Bicycle Boulevard treatments have five main “application levels” based on the level of physical intensity desired. Level 1 represents the least physically-intensive treatments that can be implemented at relatively low cost. Identifying appropriate application levels for individual bicycle boulevard corridors provides a basis for selecting appropriate site-specific improvements. The five bicycle boulevard application level treatments include the following:

- Level 1: Signage
- Level 2: Pavement markings
- Level 3: Intersection treatments
- Level 4: Traffic calming
- Level 5: Traffic diversion

Guidelines

- Supplemental arrows to indicate approaching turns.
- Install markings just after each intersection and in intervals of approximately 200 feet.
- Install markings near high volume driveways or other conflict points to alert drivers.
- Pavement marking signs can range from 12 to 24 inches in diameter (Portland, Oregon) to 30 feet long by 6 feet wide (Berkeley, California).
- Size and placement guidance for pavement markings are provided in the California MUTCD.



Bicycle route sign



Frequent pavement markings act as a “breadcrumb trail” for cyclists.



- Apply markings with paint or thermoplastic. Thermoplastic tends to last longer.
- Increase the skid resistance and retro-reflectivity by using glass beads.
- Do not use bicycle boulevard markings or shared lane markings within bicycle lanes.

Potential Applications

- Low-volume and low-speed streets.
- On corridors where other bikeway treatment may not be feasible due to right-of-way or funding constraints.



NATURAL SURFACE TRAILS

The successful design, construction and management of natural soft-surface trails is critical to building a trail network that accommodates a wide range of users. The following trail classification guidelines are not a “how-to” for building trails, rather they offer a framework for management and decision making to help build a trail

system in Iredell County. In addition, this guide establishes standard terms and definitions that can aid communication with planning partners about trail needs, design guidelines and environmental issues. Table 9 provides a summary of natural surface trail classification standard dimensions.

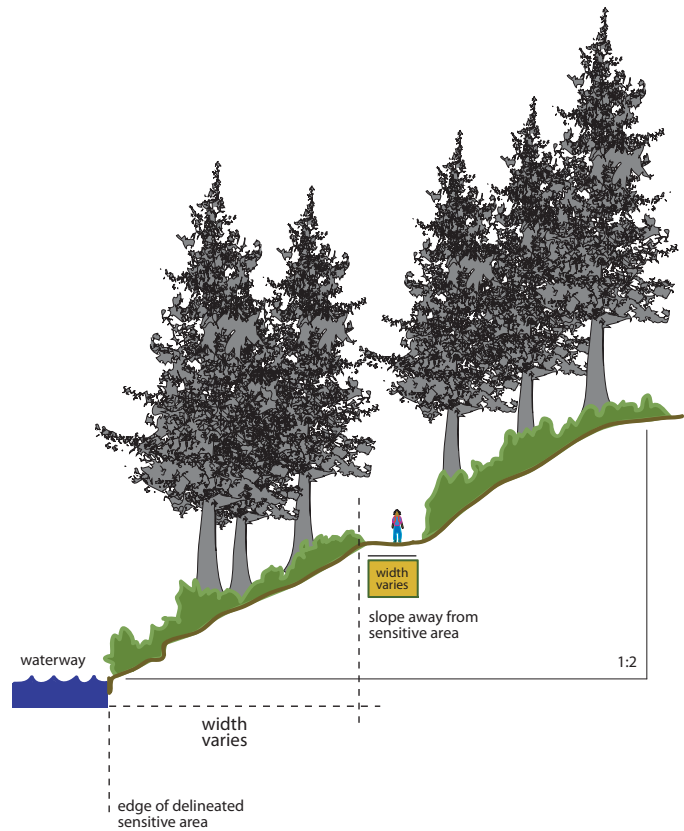


Table 9. Natural Surface Classifications Summary

Trail Type	Tread Width	Trail Corridor	Surface	Average Grade	Max Grade*	Outslope	Turn Radius
Hiking Trail	18"-48"	3'-6' (w) 7'-8' (h)	Native soil and rock; compacted	5%	15-25%	2-5%	3'
Mountain Bike Trail	12"-36"	2'-6' (w) 6-8' (h)	Native soil and rock; compacted	2-10%	≥15%	5-10%	≥2'
Multipurpose Trail	10'-12'	10'-16' (w) 8-12' (h)	Native soil or compacted granulated stone	2-5%	10%	2-4%	5-10'

* Max grade depends largely on soil type and running distance of slope



Hiking Trail

Hiking trails accommodate walking and hiking in a variety of contexts and are generally defined by the presence of tread dips, trail structures and bridges where required, but are generally compacted natural soil surface. Typical trail widths vary from 18-48 inches and vegetation should be maintained clear on both sides of the trail tread for a minimum of 24-36 inches.

To encourage the natural appearance of the trail, vegetation under 18-22 inches and 8-12 inches from the trail edge can remain. Vegetation 18-22 inches and over should be cleared to meet the 24-36 inch horizontal clearance minimum (see illustrative graphic below). Where wheelchairs are expected, the height at which the additional clearance should begin is 8-10 inches above the trail surface.

Regulatory, resource protection and user reassurance signs, such as directional and destination signs, should be installed as part of the trail system.

A hiking trail is the minimum trail standard incorporated into a regional trails network. This facility

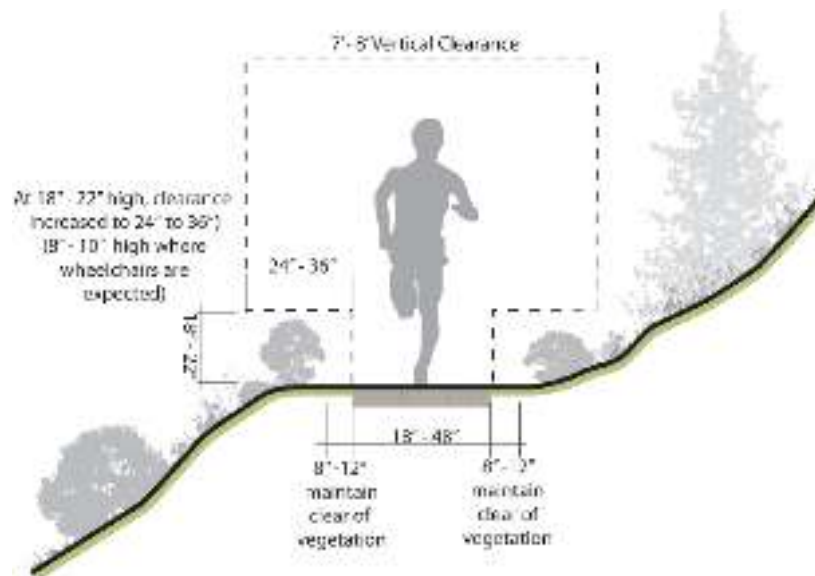
type is typically located at local and county parks and open space, undeveloped public rights-of-way such as utility corridors and in parkland and resource land units with frequent public access connecting to other regional trail network segments.

Guidelines

- Obstacles infrequently encountered.
- Vegetation cleared outside of trail way.
- Trail bridges as needed for resource protection and appropriate access.
- Generally native materials used.
- Trail tread width may vary from 18 inches to 48 inches depending on context and use.
- Trail clearance should be maintained on both sides of trail tread at 24-36 inches or greater.

Potential Applications

- Local parks and open space.
- State and federal parks and resource lands.
- Public utility corridors and rights-of-way not suited to paved multi-use pathways.





Mountain Bike Trail

Mountain bicyclists have a broad range of riding abilities. This guideline for single track mountain bike only trails focuses on recreational experience and a range of technical challenge. The International Mountain Bike Association (IMBA) has developed a classification system similar to ski runs, which is indicated by the colored symbols below. These symbols may accompany wayfinding

and warning signage to alert bikers of upcoming trail conditions. In addition, mountain bicyclists are typically permitted on shared-use trails (described in the following guideline) and should be aware that they must yield to all other users.

Potential Applications

- Mountain bike only segments of the regional trail network.
- Topographically varied terrain.

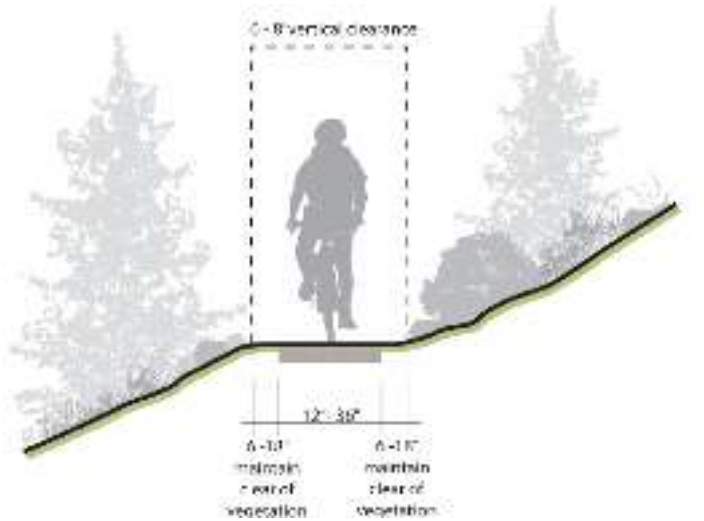


Table 10: Mountain Bike Trail Guidelines

Skill Level	Tread Width	Surface	Average Grade	Max Grade	Unavoidable Obstacles
Easiest ○	≥ 72"	Hardened or surfaced	<5%	10%	None
Easy ●	≥ 30"	Firm and stable	5%	15%	2"
Moderate ■	≥ 18"	Mostly stable; some variability	10%	15%	8"
Difficult ◆	≥ 12"	Variable	15%	15%	15"
Extremely Difficult ◆◆	≥ 6"	Widely variable & unpredictable	20%	20%	15"



Multi-Purpose Natural Surface Trail

Unless designated otherwise, all recreation trails are considered shared use trails. For instance, many mountain bike trails are also open to hikers. Multi-purpose trails are designed and managed for all types of users.

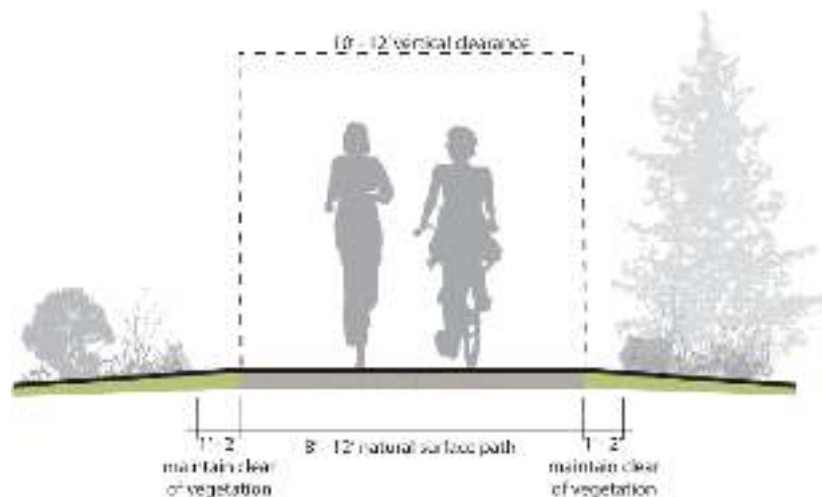
Anticipated levels of use, local public opinion and site evaluations should be used to determine whether or not a multipurpose trail is an appropriate solution. Multipurpose trails are wide enough to accommodate divergent user groups. As the width of the trail increases, the less technical the trail can be. Regulatory signs should be installed to alert trail users to their limitations and responsibilities for sharing the trail.

Guidelines

- Tread width 8 feet to 12 feet .
- Allowance for passing.
- Native materials or crushed rock.
- Very few obstacles.
- Prevailing grade 5% or less, with limited steeper segments.
- Visibility and trail clearance are an important design consideration.

Potential Applications

- Local parks and open space
- Low use areas of state and federal parks and resource lands
- Public utility corridors and rights-of-way not suited to paved multi-use pathways
- Not recommended as a high speed transportation facility for cyclists





Equestrian Trails

Trails reserved exclusively for equestrians are also called bridle trails, bridle paths, or bridleways. The needs of equestrian trail users are unique, due to the natural flight instinct of equine when startled. As with any trail design, the design of an equestrian trail facility should respond to the setting, needs of the trail users, level of use, and safety issues. Less developed or rural equestrian trail settings include a variety of types of spaces, such as rivers, open spaces, and drainages. Safety concerns for riders in rural settings involve: visibility, interactions with other trail users and natural hazards. Urban settings include developed or congested areas.

Equestrians include youth, elders, leisure riders, professional riders, organized groups, novices, and people with disabilities. Riders may recreate individually or in groups for pleasure, exercise or challenge. While some equestrians prefer wide, gentle trails, others seek a technically challenging route.

Trail facilities should provide enough space so that a horse feels at ease. Horses prefer to travel away from walls or barriers that they cannot see through or over and are most comfortable traveling in the tread that other stock have traveled.

Horizontal trail clearance will vary based on the trail setting. USDA/FHWA suggested widths, with clearance tolerances for a standard single- and double-track horse trails are shown in Table 11. A horse on a single-track will often travel 18 inches from a trail edge or tread surface. Single track treads vary from 1.5 feet in open areas to 8 feet in urban areas. Double-tracked equestrian trails are designed to be 5 feet to 6 feet wide in open areas and are often 8 feet to 12 feet wide in developed areas. A double-

track tread allows for equestrians to ride side by side while also providing a comfortable passing distance. This is a common configuration for moderately developed trails in rural settings where right-of-way is available.



Equestrians often like to travel side-by-side



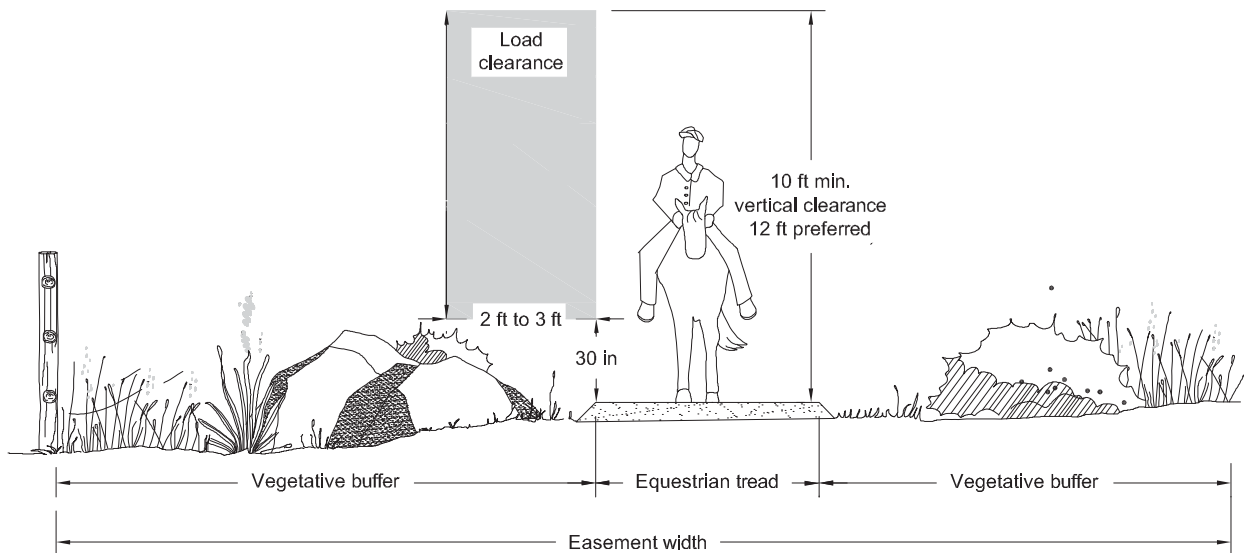
Table 11: Suggested Widths and Clearance for a Standard, Single-Track Horse Trail

Trail Element	Low development (feet)	Moderate development (feet)	High development (feet)
Trail width	1.5 to 2	3 to 6	8 to 12
Clearing width (horizontal)	5.5 to 8 (Tread plus 2' to 3' each side)	9 to 12 (Tread plus 3' each side)	14 to 18 (Tread plus 3' each side)
Vertical clearance (vertical)	10	10 to 12	10 to 12

Suggested Widths and Clearance for a Standard, Double-Track Horse Trail

Trail width	5 to 6	8 to 12
Clearing width (horizontal)	10 to 12 (Tread plus 2' to 3' each side)	14 to 18 (Tread plus 3' each side)
Vertical clearance (vertical)	10	10 to 12

Source: USDA/FHWA Equestrian Design Guidebook for Trails, Trailheads, and Campgrounds



Recommended guidelines for an equestrian-only trail. Source: USDA/FHWA, Equestrian Design Guidebook for Trails, Trailheads, and Campgrounds



RAILS - WITH - TRAILS

Railroad rights-of-way, including light rail rights-of-way, can present opportunities for path and trail construction. Typically, railroads follow favorable topography for bicycling and hiking and are located in scenic areas. However, they also present a range of security and safety issues for trail users that should be addressed through planning and design processes. National design standards have not been developed for rails with trails.

Setback is measured from the nearest edge of the trail to the centerline of the nearest railroad track. A review of 65 existing trails as part of the “Rails-with-Trails: Lessons Learned” study shows wide variance in the setback distance used today. Researchers attempted to determine if narrower setback distances have a direct correlation to safety problems. However, based on the almost non-existent record of claims, crashes, and other problems on these RWTs, they were unable to conclude a strong correlation between setback and safety. At an absolute minimum, the setback must keep trail users outside the “dynamic envelope” of the trains, defined as “the clearance required for the train and its cargo overhang due to any



Railroad rights-of-way provide opportunities for rail with trail

combination of loading, lateral motion, or suspension failure.” Additionally, in corridors with regular use of maintenance equipment that operates outside the dynamic envelope, the setback distance should allow adequate clearance between the maintenance equipment and the trail.

The Federal Railroad Administration (FRA) publishes minimum setback standards for fixed objects next to active railroad tracks, the distance between two active



Typical rail with trail section



tracks, and adjacent walkways (for railroad switchmen). These published setbacks represent the legal minimum setbacks based on the physical size of the railroad cars, and are commonly employed along all railroads and at all public grade crossings. Most Public Utilities Commissions (PUCs), which regulate railroad activities within states, also have specific minimum setbacks for any structures or improvements adjacent to railroads, including any sidewalk or trail that parallels active railroad tracks.

The *Rails-with-Trails: Lessons Learned* study outlines preferred setback distances, with encouragement toward as much setback distance as possible. The study details circumstances under which a RWT can be set back a minimum of 10 feet, with greater width preferred. Rail operators often prefer that reduced setbacks are accompanied by increased safety measures such as fencing.

The guidelines presented below are a result of studies completed by the Federal Highway Administration and Rails with Trails Conservancy, along with the PUC guidelines. Other useful sources include AASHTO, and AADAG.

Guidelines

- A 12 foot path is strongly recommended, as these paths often provide access for maintenance and emergency vehicles. Paths less than 12 feet wide can crack along the edges due to vehicle loads.
- Setbacks should be maximized and correlate with train type, speed, frequency, and separation technique, varying from 8.5 feet (9.5 feet on curves) to 100 feet.
- Less setback may be needed if the trail is vertically separated.
- Fencing and barriers should meet the requirements of

the railroad company.

- 5 feet to 6 feet high fencing is adequate for separation in most instances.
- Vegetation may grow on fencing to buffer noise.
- Storm and irrigation water from the trail should not flow or collect in the railroad right-of-way.
- At-grade trail crossings of the railroad should be minimized.



Rail with trail, Charlotte, North Carolina (Source: W. Weaver)



UNIQUE TRAIL APPLICATIONS

Special trail design treatments may be required on segments of the Carolina Thread Trail to complete the trail system. These trails may be constructed along a creek, within the floodplain or through sensitive biological areas or wetlands. Additionally, there may be situations where the available rights-of-way may require that non-compatible users (i.e. equestrians and bicyclists) share the same trail corridor. In these circumstances, special attention should be made in the planning, design and construction phases.

Floodway and Floodplain Trails

Trails that are developed in the floodway and floodplain due to right-of way constraints and channelized streams present challenges for the trail managing agency. The main conditions in which creek and floodplain trails occur in Iredell County are: on top of the creek bank in the floodway and on a slope in the floodplain. These conditions affect how each trail is constructed, although there are common guidelines that apply to both conditions.

Floodway and Floodplain Trail Guidelines

- Where feasible, trails should be located outside of the riparian forest buffer zone and active stream channel as defined by the Natural Resource Conservation Service of North Carolina to protect water quality and reduce erosion of stream banks.
- A width of 12 feet is the preferred recommendation, allowing for maintenance vehicles. Paved paths less than 12 feet have been found to break up along the edges due to vehicle loads.
- Trails that are developed in the floodway are recommended to be constructed of concrete, as these trails are prone to flooding. Concrete paths are better suited to withstand high-velocity stream flows that other

surface materials. Concrete surfaces are expensive, however, concrete is a better community investment as it lasts much longer than asphalt and is easier to maintain. When properly installed, concrete will last 25 years or longer and will need little maintenance. In wetland areas or perennially wet areas, boardwalk or elevated trails should be installed.



Paved multi-use path in a floodway



Paved multi-use path on a bank



Retaining wall doubles as seating

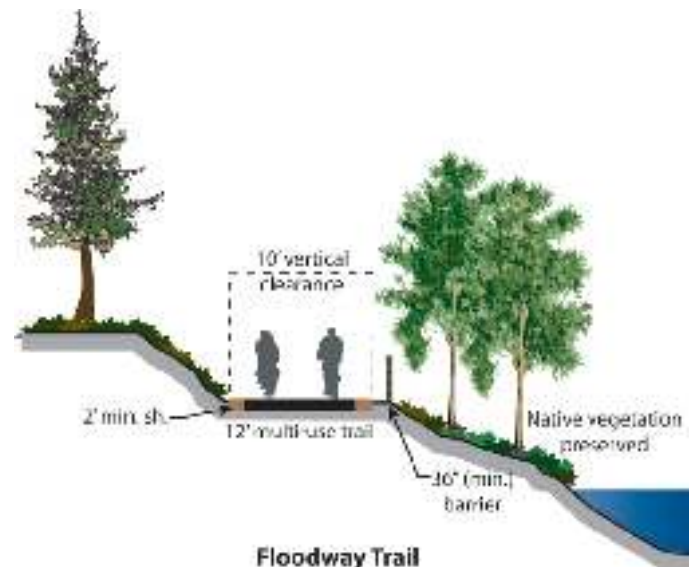


- Where the trails are located in drainage areas, and are expected to be inundated on an annual basis, the trail should be constructed of concrete of sufficient thickness to allow for regular blading (cleaning) of the surface by equipment.
- Trail shoulders should be a minimum of 2 feet.
- The trail should have a 2% cross slope to direct water to a sub drainage or swale.
- The trail should be designed to discourage trespass into environmentally sensitive areas by using natural barriers such as split rail fencing, rocks, and native vegetation buffers to steer people away from sensitive areas. Interpretive signs should be installed to explain why areas are sensitive.
- Where trails are located in narrow corridors, they should be complemented by frequent nodes to create greater diversity of the linear experience.
- Trail amenities (benches, signage, and trash receptacles) in floodways should be carefully considered. Where amenities are appropriate or necessary they should be installed to withstand high velocity flows.
- Retaining walls can double as seating areas and increase pedestrian comfort along trails.
- Concrete trail surfaces should be broom finished for traction.
- Joints should be saw-cut to reduce bumps.
- Concrete may be dyed any color to complement the surrounding environment, if desired.

Trails in the Floodway

The trail elevation in floodways should be set to minimized flooding impacts. The top of the creek bank is generally a good location for a creek trail. The top of the bank (or a bench on a slope) is generally flat and can provide a good platform for a trail. Because these areas are flat, grading is kept to a minimum and existing vegetation can be preserved. Erosion and bank stabilization problems are

also minimized. However, flooding frequency and high water lines may require trail elevations to be set above the creek bank. A geotechnical engineer should be consulted to assess flood elevation levels, soil conditions and a determination of appropriate trail profile materials and quantities.



Floodway Trail



Floodway Trail on Steep Slope



Additional Recommendations

- A vegetative buffer between the stream and trail should be preserved.
- Trail shoulders should not consist of a soft material to reduce replacement costs after a flood event.
- Install guard rail or fence where vertical drop of 18 inches or greater exists at edge of trail.
- Guardrail or fence should 36 inches high (minimum) to meet ADA guidelines.
- A retaining wall may be required to protect the trail base when the side slope grade exceeds 50 percent. Water must be allowed to drain around, beneath, or through the wall and must not be allowed to accumulate behind it.

Trails in the Floodplain

Floodplain trails are located outside of the floodway, but within the floodplain. These trails are subject to flooding when large storm events occur.

Additional Recommendations

- A wide vegetative buffer should be maintained.
- Existing terraces above the floodway can be utilized for trail alignments.
- Concrete is recommended for the trail surface, unless it is cost prohibitive. Asphalt could be used as an alternative surfacing material with the expectation of a lower life expectancy.





Elevated Trails

Sections of the Carolina Thread Trail may require an elevated trail treatment (i.e. boardwalk). Elevated treatments can minimize impact to sensitive wet areas and create “showcase” trail segments that allow users to experience riparian ecosystems with minimal impact.

Biological conditions may require platforms to be located so as not to shade sensitive resources. Trail treads should allow light to penetrate to vegetation under the trail. Screw piles are recommended for building boardwalks and viewing platforms along the Carolina Thread Trail. They are less disruptive to the creek bed than wooden pier foundations and more environmentally sensitive than using chemically treated lumber. Boardwalks can be very expensive and should go through an extensive design process so they do not contribute to flooding hazards, are ADA compliant, and minimize impact to the surrounding environment.



Boardwalk through a wetland



Boardwalk railings assist in keeping trail users away from sensitive areas



Elevated trail segment allows trail connectivity along a sensitive slope



Blueways

The term blueway refers to a *designated* route through a waterway, offering trail users an alternative way to see scenic and historical sites along a waterway or lake shore. Blueways can accommodate both motorized and non-motorized transportation.

Basic Design Guidelines

Access

The level of improvements at an access site will largely depend on the setting and the type of support facility that is needed. Access points are essentially trailheads. Major trailheads may require larger parking areas (15 to 20 parking spaces), restrooms, picnic tables and interpretative kiosks. Minor trailheads may provide only a few parking spaces and regulatory signage. In general, access points should:

- Allow enough room for paddlecraft to be unloaded from vehicles.
- Be located 1500 feet or less from the launch point.
- The slope between the parking area and the water's edge should be slight to moderate and should not exceed 20% (maximum). At major trailheads, the slope should meet the accessible trail design standards shown in this section where feasible.
- Where access points are anticipated to be heavily used, erosion mats or blankets should be used to stabilize the slope.
- Access points should not be located on the inside curve of a waterway, as silt and sand are commonly deposited in these areas.
- Sanitary facilities should be situated at all major trailheads.
- A "pack it in, pack it out" policy should be instituted along blueway trails to ensure the proper disposal of waste.

Minimum spacing of access points:

- Local neighborhood creeks, every mile preferred.
- Larger water bodies, every 3 to 4 miles to accommodate recreational paddlers.

Portages

Portages (routes by which boats and equipment are carried) should be kept to a minimum. If required, landing sites should be established above and below obstructions. Signage should be installed upstream of the obstruction to notify paddlers of the obstruction and direct paddlers to the landing site. The distance between the obstruction and the signage is dependent on current speed, sight lines and the slope and conditions of the banks. Portage trails should comply with the natural trail guidelines outlined in this document, using a trail width of 8 feet minimum.

Signage

Signage should be included to direct users to the river, and to inform users on the river. Uniform directional signage should be placed on nearby roadways to advertise landing locations. Uniform signage should be installed along the river to advertise landings, camping facilities (if applicable), portages, hazards and what level of experience is necessary to traverse the route.



Kayakers enjoying the river

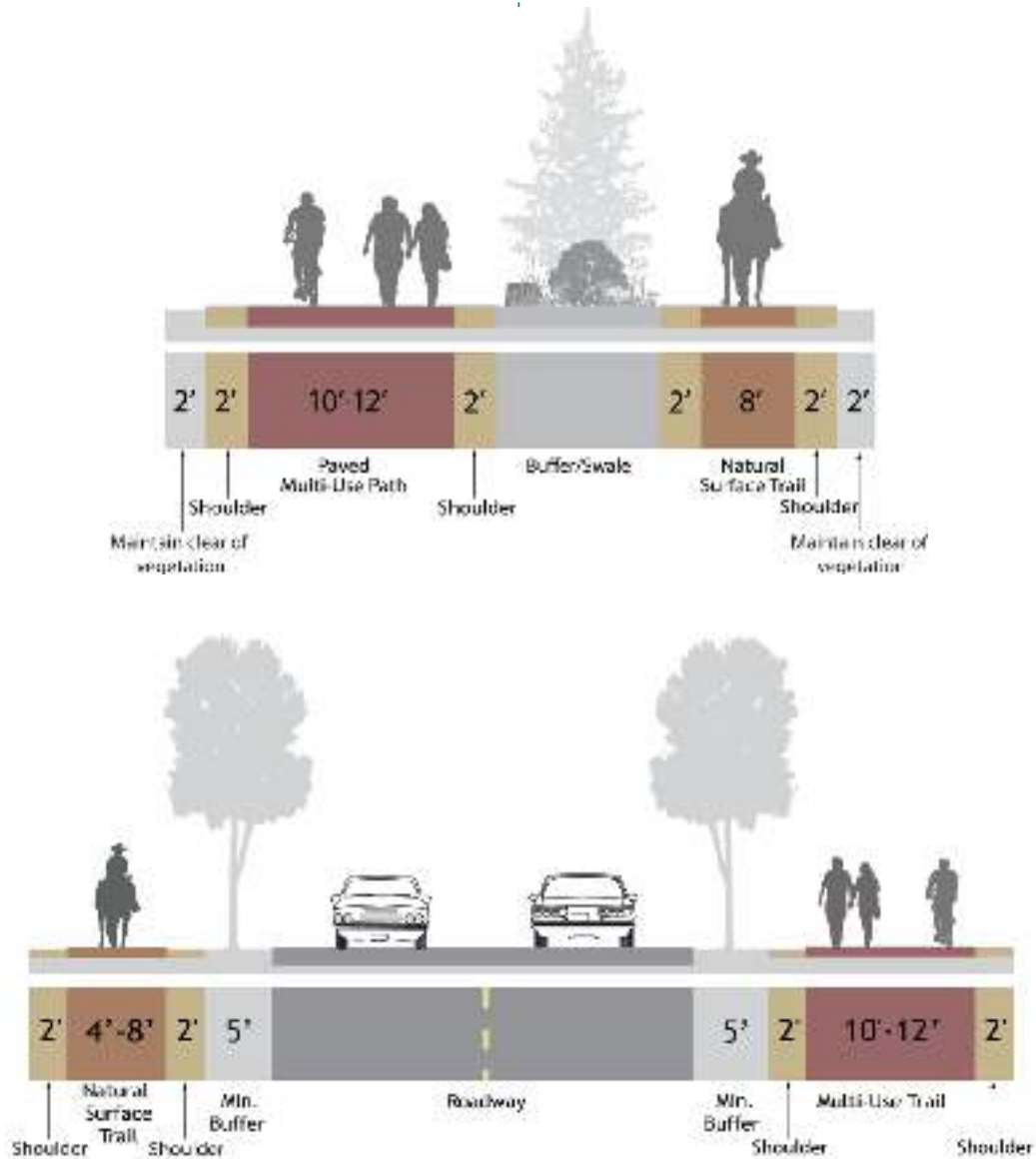


Shared-Use Corridors

Design that considers the interactions of all trail users is essential for a successful trail system. Limited right-of-way availability may require users to share corridors in the Carolina Thread Trail network.

Pedestrians and equestrians are often compatible on the same tread as they both accept unpaved surfaces

and move at relatively slow speeds. However, bicyclists and equestrians are not typically compatible sharing a trail. When a fast moving and quiet, cyclist approaches a horse from behind, the horse can be startled and shy or take flight. In areas where conflicts seem likely, efforts are made to physically separate the different user groups within the corridor.





ACCESSIBLE TRAIL DESIGN

General guidelines have been created in response to the American with Disabilities Act (ADA) for accessible trails. Constructing outdoor trails may have limitations that make meeting ADA guidelines difficult and sometimes prohibitive. Prohibitive impacts include: harm to significant cultural or natural resources, a significant change in the intended purpose of the trail, requirements of construction methods that are against federal, state or local regulations, or terrain characteristics that prevent compliance. The following standards serve to accommodate persons with disabilities in feasible situations.



Non-paved surfaces can meet the needs of users with disabilities when properly constructed

Table 12: Accessible Trail Design Standards

Trail Surface	Hard surface such as, asphalt, concrete, wood, compacted gravel	Provide smooth surface that accommodates wheelchairs
Trail Gradient	Less than 5% maximum without landings	
Less than 8.33% maximum with landings	Greater than 5% is too strenuous for wheelchair users	
Trail Cross Slope	2% maximum	Provide positive trail drainage, avoid excessive gravitational pull to side of trail
Trail Width	5' minimum	Accommodate a wide variety of users and allows for the passage of two wheelchairs
Trail Amenities, phones, drinking fountains and pedestrian- actuated buttons	Place no higher than 4' off ground	Provide access within reach of wheelchair users
Detectable pavement changes at curb ramp approaches	Place at top of ramp before entering roadways	Provide visual and/or tactile queues for visually impaired users
Trailhead Signage	Accessibility information such as trail gradient/ profile, distances, tread conditions, location of drinking fountains and rest stops	User convenience and safety
Parking	Provide at least one accessible parking area per every 25 vehicles spaces at each trailhead	User convenience and safety
Rest Areas	On trails specifically designated as accessible, provide rest areas or widened areas on the trail optimally at every 300 feet	User convenience and safety



TRAIL AND ROADWAY CROSSINGS

Trail / Roadway Crossings

It is highly desirable to minimize the number of potential vehicle-trail user conflicts. As a general rule, when roadway crossings are required, they should occur at established pedestrian crossings, or at locations completely away from the influence of intersections.

Trail approaches at roadways should always have Stop or Yield signs to minimize conflicts with autos. Bike crossing stencils may be placed in advance of trail crossings to alert motorists. Curb ramps should be designed to accommodate the range and number of users.

When considering a proposed off-street multi-use path and required at-grade crossings of roadways, it is important to remember two items: 1) trail users will be enjoying an auto-free experience and may enter into an intersection unexpectedly; and 2) motorists may not anticipate bicyclists riding out from a perpendicular trail into the roadway. However, in most cases, an at-grade trail can be properly designed to a reasonable degree of safety and meet existing traffic engineering standards.

Evaluation of multi-use trail crossings should involve an analysis of vehicular traffic patterns, as well as the behavior of trail users. This includes traffic speeds, street width, traffic volumes (average daily traffic and peak hour traffic), line of sight, and trail user profile (age distribution, range of mobility, destinations). A traffic safety study should be conducted as part of the actual civil engineering design of the proposed crossings to determine the most appropriate design features. This study would identify the most appropriate crossing options given available information, which must be verified and/or refined through the actual engineering and construction document stage.

CROSSING PROTOTYPES

Intersection approaches are based on established standards, published technical reports, and the experiences from existing facilities. Virtually all crossings fit into one of four basic categories:

Type 1: Unprotected/Marked

- Unprotected/marked crossings include trail crossings of residential, collector, and sometimes major arterial streets or railroad tracks.

Type 2: Route Users to Existing Intersection

- Trails that emerge near existing intersections may be routed to these locations, provided that sufficient protection is provided at the existing intersection.

Type 3: Signalized/Controlled

- Trail crossings that require signals or other control measures due to traffic volumes, speeds, and trail usage.

Type 4: Grade-Separated

- Bridges or under-crossings provide the maximum level of safety but also generally are the most expensive and have right-of-way, maintenance, and other public safety considerations.

Type 1: Unprotected/Marked Crossings

An unprotected crossing (Type 1) consists of a crosswalk, signing, and often no other devices to slow or stop traffic. The approach to designing crossings at mid-block locations depends on an evaluation of vehicular traffic, line of sight, trail traffic, use patterns, vehicle speed, road type and width, and other safety issues such as the proximity of schools. Unprotected crossings may be acceptable when the following thresholds are met:

Install crosswalks at all trail-roadway crossings

Maximum traffic volumes:

- Up to 15,000 ADT on two-lane roads, preferably with a median.



- Up to 12,000 ADT on four-lane.

Maximum travel speed

- 35 mi/h

Minimum line of sight:

- 25 mi/h zone: 250 feet
- 35 mi/h zone: 350 feet
- 45 mi/h zone: 450 feet

On two lane residential and collector roads below 15,000 ADT with average vehicle speeds of 35 mph or less, crosswalks and warning signs (“Bike Xing”) should be provided to warn motorists, and stop signs and slowing techniques (bollards/geometry) should be used on the trail approach. Care should be taken to keep vegetation and other obstacles out of the sight line for motorists and trail users. Engineering studies should be done to determine the appropriate level of traffic control and design.

A flashing yellow beacon or embedded pavement lights, may be used with a marked crosswalk, preferably one that is activated by the trail user rather than operating continuously. Some jurisdictions have successfully used flashing lights activated by motion detectors on the trail, triggering the lights as trail users approach the intersection. This equipment, while slightly more expensive, informs motorists about the presence of trail users. This type of added warning would be especially important at locations with restricted sight distance.

Type 2: Route Users to Existing Intersection

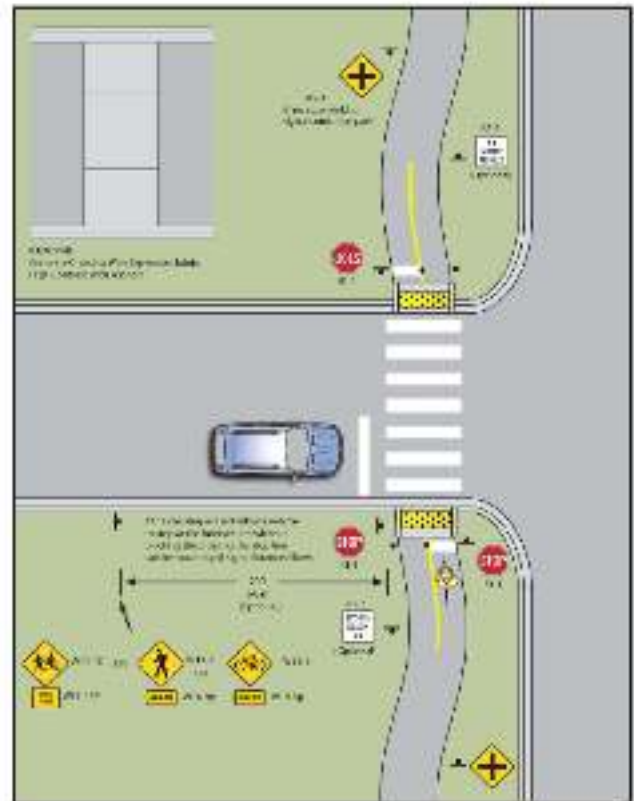
Crossings within 250 feet of an existing signalized intersection with pedestrian crosswalks are often diverted to the signalized intersection for safety purposes. For this option to be effective, barriers and signs may be needed to direct trail users to the signalized crossings. In most cases, signal modifications would be made to add pedestrian detection and to comply with ADA recommendations. In many cases, such as on most community trails parallel to roadways,

crossings are simply part of the existing intersection and are not a significant obstacle for trail users.

Type 3: Signalized/Controlled Crossings

New signalized crossings are recommended for crossings more than 250 feet from an existing signalized intersection and where the 85th percentile of travel speeds are 40 mph and above and/or average daily traffic counts (ADT) exceeds 15,000 vehicles. Each crossing, regardless of traffic speed or volume, requires additional review by a registered engineer to identify sight lines, potential impacts on traffic progression, timing with adjacent signals, capacity and safety.

Trail signals are normally activated by push buttons, but also may be triggered by motion detectors or weight sensors. The maximum delay for activation of the signal



Type 1 crossing improvements are recommended at trail intersections with major roads.



should be two minutes, with minimum crossing times determined by the width of the street. The signals may rest on flashing yellow or green for motorists when not activated, and should be supplemented by standard advanced warning signs. Typical costs for a signalized crossing range from \$150,000 to \$250,000.

Type 4: Grade-separated Crossings

Grade-separated crossings are needed where ADT exceeds 25,000 vehicles, and 85th percentile speeds exceed 45 mph. Safety is a major concern with both overcrossings and under-crossings. When designed properly, grade-separated crossings practically eliminate any safety concerns related to crossing a roadway.

Grade-separated crossing approaches should minimize the out-of-direction travel required by the trail user, so that users don't alternatively attempt to dart across the roadway. Under-crossings, like parking garages, have the reputation of being places where crimes occur, but these safety concerns can be addressed through design. An undercrossing can be designed to be spacious, well-lit, equipped with emergency cell phones at each end, and completely visible for its entire length prior to entering. For cyclists and pedestrians, vertical clearance should be kept to a minimum of 8 feet (12 feet for equestrians).

Over-crossings, or bridges, avoid darkness and safety concerns that occur with an at- or below-grade option. Any bicycle and pedestrian bridge needs to be approached via ADA compliant ramps (running slopes less than 5%). Bridges present unique opportunities for creating landmark architectural and artistic statements.



Type 3 Crossing



Type 4 Grade-Separated Overcrossing



Type 4 Grade-Separated Undercrossing



Railroad Crossings

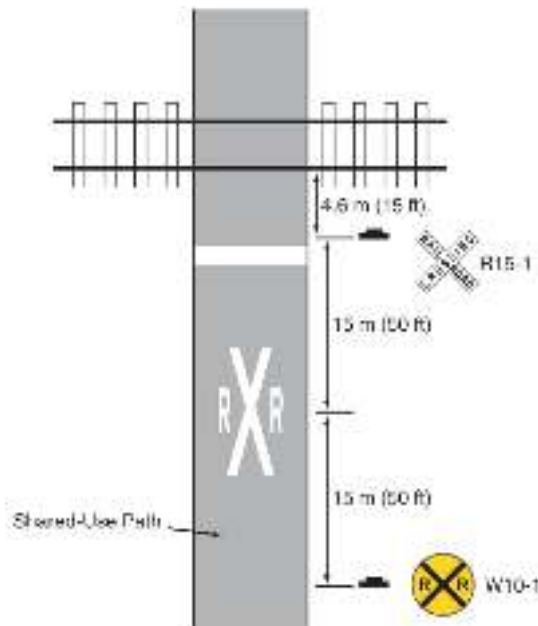
The preferred Carolina Thread Trail alignment may include at-grade crossings of the railroad tracks. New pedestrian railroad crossing flashers are typically not required for sidewalk crossings at legal crossings as they are redundant with adjacent vehicle crossing warning equipment.

Efforts should be made to have multi-use trails cross railroad tracks at as close to a 90 degree angle as possible. As crossing angles deviate from perpendicular angles, possibilities increase for a bicycle wheel to become trapped in the flangeway, or for cyclists to lose traction on wet rails. AASHTO guidelines do not specify a minimum crossing

angle; however, they do recommend that any crossing that is less than a 45 degree angle should be accompanied by a widening in the trail or shoulder area in order to permit a cyclist to cross the track at a safer angle, preferably perpendicular.

Standard concrete railroad crossings with compressible flangeway fillers permit rail operations while creating a smooth or subtle bump for cyclists.

Crossing materials should be skid resistant. Colored surfaces also help alert cyclists to potential conflict points. Rubber and concrete materials require less maintenance and have a longer lifespan than wood or asphalt.



MUTCD example of signing and marking for shared-use path / railroad crossing



Additional Crossing Enhancements

Additional measures may be taken to improve comfort and safety conditions for trail users at roadway intersections. These include: curb extensions, midway refuge islands and vehicle travel lane width reductions. Curb extensions effectively narrow the width of roadway that a trail user needs to cross. Also referred to as “bulb-outs,” curb extensions are a literal extension of the curb and sidewalk, or pedestrian realm into the travel way from each direction. Oftentimes, extensions occupy space formally taken by on-street parking. Shifting parking farther from the intersection with an extension provides for better visibility between trail users and motorists. Also, the real estate gained may be used for additional plantings or site furnishings.

Midway refuge islands provide a protected stopping point midway across roadways. Refuge islands are particularly appropriate in areas with high numbers of young people, the elderly and those with mobility impairments as they shorten the distance and thus time for which the trail user spends within the unprotected travel way.



Typical configuration of area roadway



Photosimulation of typical roadway depicting a median that also serves as a pedestrian refuge island. Refuge islands reduce the time pedestrians are exposed to vehicular traffic.



A curb extension can effectively narrow the width of the roadway.



SIGNS AND WAY-FINDING

Multi-use trail signs and markings should include: regulatory, way-finding, identity and informational or interpretive signs for bicyclists, pedestrians, paddlecraft users and motorists. Sign selection and placement should generally follow the guidelines in the Manual on Uniform Traffic Control Devices.

General Guidelines

- All signs shall be retro-reflective on shared-use paths. Lateral sign clearance shall be a minimum of three feet and a maximum of six feet from the near edge of the sign to the near edge of the path.
- Mounting height shall be between four and five feet from the bottom edge of the sign to the path surface level.
- All on-street signs should be oriented so as not to confuse motorists. The designs (though not the size) of signs and markings should generally be the same as used for motor vehicles.
- A yellow centerline stripe is standard for multi-use paths in many regions, especially at: blind corners, high traffic areas, where the path width narrows, intersection approaches, and/or areas where nighttime riding is expected with limited lighting.

- The final striping, marking, and signing plan for the Carolina Thread Trail will be resolved in the full design phase of the trail, and should be reviewed and approved by a licensed traffic engineer or civil engineer. This will be most important at locations where there are poor sight lines from the trail to cross-traffic (either pedestrian or motor vehicle).



Local identity sign with trail etiquette insert. (Photo credit: URS)



Informational sign about facility funding partners



MUTCD regulatory sign



Alternative bike route sign that can be customized with route number and community identity



Regulatory

Regulatory signs should state the rules and regulations associated with trail usage, as well as the managing agency, organization or group. The purpose of trail regulation is to promote user safety and enhance the enjoyment of all users. It is imperative that before the trail is opened, trail use regulations are developed and posted at trailheads and key access points. Trail maps and informational materials might include these regulations as well. Establishing that the trail facility is a regulated traffic environment just like other public rights of way is critical for compliance, and often results in a facility requiring minimal enforcement. Be sure to have an attorney review the trail regulations for consistency with existing ordinances and enforceability. In some locations, it may be necessary to pass additional ordinances to implement trail regulations.

Below is a sample of the most common items that should be covered in trail regulations:

- Hours of use
- Motorized vehicles, other than power-assisted wheelchairs, are prohibited
- Keep to the right except when passing
- Yield to on-coming traffic when passing
- Bicyclists yield to pedestrians
- Give an audible warning when passing
- Pets must always be on short leashes
- Travel no more than two abreast
- Alcoholic beverages are not permitted on the trail
- Do not wander off of trail onto adjacent properties

In addition, other warning signs informing users of approaching intersections and crossings of driveways will need to be installed.



MUTCD sign for narrow travel lanes that require sharing



A MUTCD approved combined pedestrian and bicycle trail crossing sign



Way-Finding and Identity

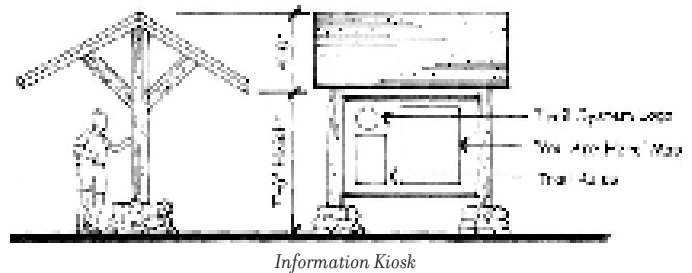
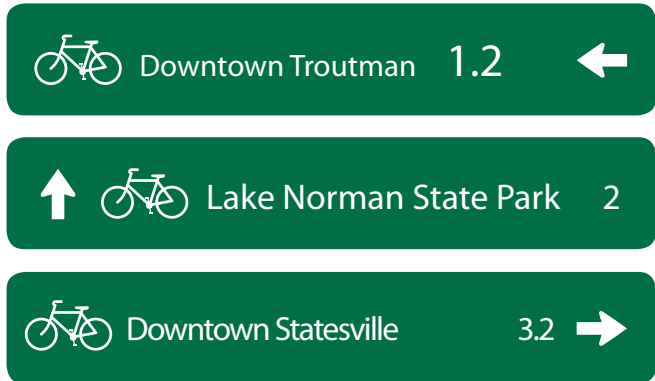
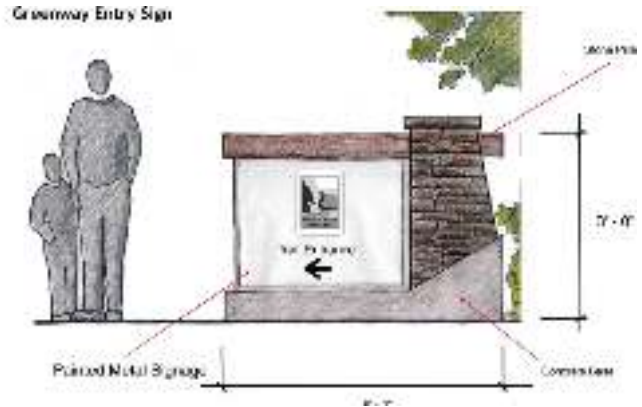
A comprehensive sign system makes a trail system memorable. Informational kiosks with maps at trailheads and other pedestrian generators (locations that create pedestrian activity, such as major housing, commercial attractions, transit stations, and schools) can provide enough information for someone to use the trail system with little introduction. A trail way-finding map typically includes: current location, nearby destinations and prominent natural and built features.

Trail legibility and identity is enhanced by having a consistent, unique logo or design that will help guide people to and on the trail. Gateways or entry markers at major access points with trail identity information further augments the trail experience. They should be visually clear and distinctive while maintaining consistency with other sign features found on the trail.

Clear, pedestrian-scaled, signs and markers will aid in way-finding and separation of user groups. Signs should be consolidated to avoid clutter and sign fatigue. In addition to a trail logo being posted on bollards, gates and at the trailheads, way-finding markers and signs should be placed at key decision points. Distances may also be marked periodically so that trail users who wish to pace themselves have a means of doing so.

Informational and Interpretive

Interpretive installations and signs enhance the trail experience by providing information about the history, environment and culture of the area. Installations may provide educational information while creating a unique and memorable experience. Interpretive signs should use similar materials, forms and colors as other sign elements found throughout the trail in order to provide a unified trail experience.





Trail Etiquette

Informing trail users of acceptable trail etiquette is a common issue when multiple user types are anticipated. Yielding the right-of-way is a courtesy and yet a necessary part of a safe trail experience involving multiple trail users. Trail right-of-way information should be posted at trail access points and along the trail. The message must be clear and easy to understand. The most common trail etiquette systems involve yielding of cyclists to pedestrians and equestrians and the yielding of pedestrians to equestrians. The education of trail users is a critical part of creating a safe trail environment for all trail users. Not everyone understands the innate flight sense of a horse. Guidelines should be clearly posted at trail access points. Education curriculums, similar to the “Safe Routes to Schools” Programs, could be used to encourage safe practices around equestrians on the trail.



User etiquette sign for a bridge



Trail etiquette signage advises trail users about proper interactions to minimize conflicts.



A commonly used multi-use trail etiquette sign



User Conflict Reduction Strategies

There are many means of separating trail users including: time, distance, screening, and barriers. Time separation applies when different user groups are expected to use a corridor at different times of the day or week (such as cyclists during weekday commute hours and equestrians during evenings or weekends only).

In corridors where adequate right-of-way is available, trail users may be separated by physical space. Vegetated buffers or barriers have successfully been used in many trail scenarios. Elevation changes are another means of effectively physically and visually separating different use corridors. Differing surfaces suitable to each user group, also help foster visual separation and clarity of where each user group should be. When trail corridors are constrained, the approach is often to locate the two different trail surfaces side by side with no separation. Oftentimes, an expanded trail shoulder serves the role of the equestrian facility.

When barriers are considered necessary to separate user types, options include: vegetation, walls, fences, railings and bollards. The accepted height for most equestrian barriers is 54 inches. Solid barriers significantly limit an animal's peripheral vision and sense of security and thus are not recommended. When solid walls are necessary, vegetation should be used to soften the structure's appearance.

Railings or safety barriers are recommended when a trail occurs within six feet of a steep slope (more than 3:1) with a vertical grade change or drop off of more than 30 inches.



An example of a trail system that clearly separates trail users



A motorized vehicle barrier that allows for equestrian passage

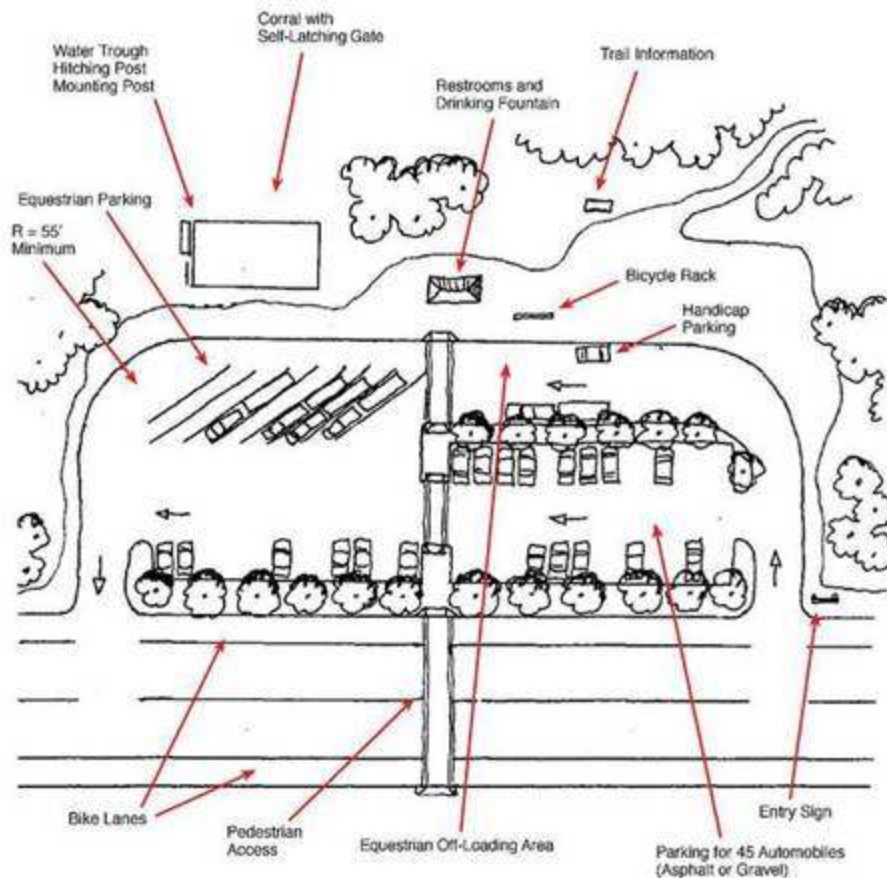


Trailheads

Clearly defined trail access points are crucial to making trails inviting. Trail access points should provide the appropriate facilities to accommodate the permitted user types and expected user volumes. The graphic below is an example of a major trailhead access point to a trail that allows hikers, equestrians and bikers. This trail also provides ADA access as indicated by the accessible parking stall nearest the entrance.

Trailheads should:

- Provide signage displaying permitted uses, regulations and emergency contact information.
- Provide wayfinding and informational signage.
- Provide the appropriate number of automobile, bike, and horse parking stalls based on the expected user volume.
- For major trail heads, provide restrooms and drinking fountains.



A major trailhead that accommodates equestrians



TRAIL AMENITIES

Trails with high user volumes, particularly those that access a destination point and drive-in access, should provide amenities to support users. Amenities include trash and recycling receptacles, benches, restrooms, and an informational kiosk. Trails that restrict biker or equestrian use should provide parking stalls for bikes and horses at their entrances.

Seating and Tables

Providing benches at key rest areas and other appropriate locations encourages people of all ages to use the trail by ensuring that they have a place to rest along the way. Benches can be simple with wood slates or more ornate with stone, wrought iron, and concrete. Benches should ideally utilize shady areas to provide trail users relief from the sun. Tables provide picnicking opportunities and should be installed in easily accessible areas near trailheads and parks. This will encourage both trail users and non-trail users to picnic. Trash receptacles should be installed accordingly.

Drinking Fountains

Drinking fountains provide relief to trail users and their pets. They should be installed in combination with seating where the topography requires extra exertion from the trail user. A spigot can be installed at lower levels, with a catch basin for watering dogs.

Trash Receptacles

Trash and dog waste receptacles help encourage trail users to keep the trail and trailheads free from debris. It is recommended that both types of receptacles be placed at trailheads and key access points along the trail. However, the National Park Service's ethic of "pack it in, pack it out" should be encouraged.

Bicycle Parking

Bicycle parking allows trail users to safely park their bicycles if they wish to stop along the way or leave their bicycle at trailheads while they hike. Bicycle parking may be installed at trailheads, bicycle trail intersections with trails that prohibit bicycle use, and at popular destinations along a trail.

Lighting

Lighting improves the safety of the trail or path user by increasing visibility during non-daylight hours. Lighting should consider the surrounding land use to minimize light pollution in unwanted areas such as residential areas. Lighting fixtures should be pedestrian scale and installed near benches, drinking fountains, bicycle racks, trailheads, and roadway crossings. Lighting is typically most appropriate along multi-use trails for transportation purposes.



Clockwise from top left: Pedestrian-scaled lighting along a paved path; bicycle racks encourage bicycle use; shaded seating increases trail users comfort and encourages trail use; seating and trash receptacle surround made from wood.



PUBLIC ART

Public art along a trail provides an opportunity to add interest to the trail experience and, depending on the scale and form, can become an “event” in itself and serve as a public draw. Public art can be aesthetic or functional, doubling as sitting or congregation areas. Local artists should be encouraged to produce artwork in a variety of materials for sites along the Carolina Thread Trail corridor that reflect the communities in Iredell County.



Interpretive panels on a decorative wall



Art installation along a trail in Lincoln, Nebraska



Art installation on a retaining wall



Art installation on a bikeway



DRAINAGE AND EROSION CONTROL

Erosion control is necessary to maintain a stable walkway and trail surface. Following land contours helps reduce erosion problems, minimizes maintenance and increases comfort levels on all trail types.

Paved Surfaces: A 2% cross slope will resolve most drainage issues on a paved path and should be used for both the trail and its shoulders. A maximum 1:6 slope may be used for the shoulders although 2% is preferred. For sections of cut where uphill water is collected in a ditch and directed to a catch basin, water should be directed under the trail in a drainage pipe of suitable dimensions. Per NCRA guidelines, water should always be directed away from rail tracks. During trail construction, local erosion control best practices should be followed.

Natural Surfaces: Erosion will occur on natural surface trails. Natural surface trails should be designed to accommodate erosion by shaping the tread to limit how much erosion occurs and to maintain a stable walkway and trail surface. The goal is to outslope the trail so that water sheets across, instead of down, its tread. Even the most well built trails will break down over time from forces such as compaction and displacement.

Designing trails with rolling grades is the preferred way to build sustainable natural surface trails. “Rolling grade” describes the series of dips, crests, climbs and drainage crossings linked in response to the existing landforms on the site to form a sustainable trail. The tread of the trail must be able to drain to a point lower than the trail at all times. When a natural rolling grade cannot be developed, grade reversals (sometimes known as grade dips, grade breaks, drain dips or rolling dips) are constructed to create trail undulations. Frequent grade reversals (grade dips, grade brakes, drain dips or rolling dips) are a critical element for controlling

erosion on sustainable trails. A general rule-of-thumb is to incorporate a grade reversal every 20 to 50 linear feet along the trail to divide the trail into smaller watersheds so the drainage characteristics from one section won't affect another section. Water flowing along a segment of trail that is deeply compacted will be trapped on the trail a short distance before it can drain.

Grade reversals have the added benefit of adding interest to any trail. All trail users appreciate the short downhill break during a long climb, or the opportunity to ‘let off their brakes’ for a bit during a long downhill trek.

Rolling grade and grade reversals are preferred to other mechanical methods of routing water off of trails such as water bars, check dams and culverts because they do not present a barrier to users.



Debris on an asphalt paved trail due to improper drainage design



Water erosion undercuts an asphalt trail surface, posing a safety issue for trail users and costly maintenance repairs.



APPENDIX II: MAINTENANCE AND MANAGEMENT

Trail Maintenance

Effective trail maintenance is critical to the overall success and safety of any trail system. Maintenance activities typically include: pavement stabilization, landscape maintenance, facility upkeep, sign replacement, pruning, litter removal and painting. A successful maintenance program requires continuity and often involves a high level of citizen participation. Routine maintenance on a year-round basis will not only improve trail safety, but will also prolong the life of the trail. The benefits of a good maintenance program are far-reaching, including:

- A high standard of maintenance is an effective advertisement to promote the trail as a local and regional recreational resource.
- Good maintenance can be an effective deterrent to vandalism, litter, and encroachments.
- A regular maintenance routine is necessary to preserve positive public relations between the adjacent land owners and managing agency.
- Good maintenance can make enforcement of regulations on the trail more efficient. Local clubs and interest groups will take pride in “their” trail and will be more apt to assist in protection of the trail.
- A proactive maintenance policy will help improve safety along the trail.

Ongoing trail maintenance likely includes some, if not all, of the following activities:

Inspections

A good maintenance program begins with a means of locating and identifying problems, such as erosion, vandalism, safety issues and plant replacement needs. Regular inspections can also alert staff to sections of trail that may need to be realigned to avoid on-going repairs in problem spots.

Vegetation

In general, plants should be allowed to grow in their natural state. Plantings along the trailside should be sited to maintain visibility between plantings and to avoid creating the feeling of an enclosed space. This will give trail users good, clear views of their surroundings, which enhances the aesthetic experience. Under-story vegetation within the trail right-of-way should not be allowed to grow higher than 36 inches. Selection and placement of trees should minimize vegetative litter on the trail as well as root uplifting of pavement. Vertical clearance along the trail should be periodically checked, and any overhanging branches should be pruned to a minimum vertical clearance of 10 feet (12 feet for equestrians).

Planted vegetation should be inspected during scheduled maintenance periods (Table 13 on the following page) to identify plants in need of replacement.

Surfacing

Asphalt

Asphalt is the recommended surface material for the multi-use segments. Cracks, ruts and water damage will need to be repaired periodically.

Where drainage problems exist along the trail, concrete construction and drainage pipes may need to be installed. Ditches and drainage structures need to be kept clear of debris to prevent wash outs and maintain positive drainage flow. Maintenance checks should be conducted immediately after each storm that causes localized flooding. Maintenance staff should inspect for erosion of the trail and trail shoulders. Erosion problems should be corrected as soon as possible.

The trail surface should be kept free of debris, especially broken glass and other sharp objects, loose



gravel, leaves and stray branches. Trail surfaces should be swept periodically. Soft shoulders should be well maintained to maximize their usability. Typical installation practices include two applications of herbicide when laying and installing granular surfaces and plant material.

Natural Surface Trails

Light maintenance of natural trails is recommended semi-annually. Maintenance would include cleaning and servicing water bars (though, mainly due to required maintenance, water bars are less preferred compared to rolling grade and grade reversals) and drains, raking loose rock, tightening signs and make sure posts are secure and upright. Inspection during regular light maintenance will assist staff in determining when heavy maintenance will be required.

Heavy maintenance activities may encompass installation or repair of drainage systems, re-establishing the cant of the trail through cut and fill, removing large embedded rocks and major corridor clearing. A heavy maintenance schedule will occur as needed.

Pest and Vegetation Management

Basic measures should be taken to protect the trail investment. This includes a bi-annual pruning along both sides of the trail to prevent invasion of plants into the pavement and shoulder areas. The recommended time of year for pruning is fall and spring. Wherever possible, vegetation control should be accomplished by mechanical means or hand labor. Some species may require spot application of state-approved herbicide.

Litter and Illegal Dumping

Staff or volunteers should remove litter along the trail. Litter receptacles should be placed at primary access points such as trailheads.

Illegal dumping should be controlled by vehicle barriers, regulatory signage and fines as much as possible. When it does occur, it should be removed as soon as possible

in order to prevent further dumping. Neighborhood volunteers, friends groups, alternative community service crews and inmate labor should be considered in addition to maintenance staff.

Signage

Signs should be replaced along the trail on an as-needed basis.

Flooding

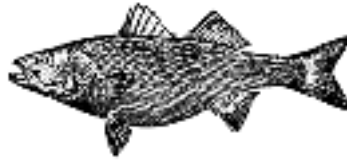
Portions of trail may be subjected to periodic flooding. Debris accumulated on the trail surface should be removed after each recession of water. Debris should be periodically removed from the waterway under any bridge structure.

Typical maintenance vehicles for the trail will be light pick-up trucks and occasionally heavy dump trucks and tractors. A mechanical sweeper is recommended to keep the trail clear of loose gravel and other debris. Care should be taken when operating heavier equipment on the trail to warn trail users and to avoid breaking the edge of the trail surface.

Table 13. Maintenance Recommendations

Item	Suggested Frequency
Sign replacement/repair	1-3 years
Pavement marking replacement	1-3 years
Planted Tree, Shrub, trimming/fertilization/replacement	5 months -1 year
Pavement sealing/potholes	5-15 years
Natural surface trails light maintenance	Bi-annually
Clean drainage system	After a storm event
Pavement sweeping	Monthly
Shoulder pruning*	Bi-annually (fall/spring)
Trash disposal	As needed, twice a week
Graffiti removal	As reported
Maintain benches, site amenities	1 year, or as needed
Pruning to maintain vertical clearance	1-4 years
Remove fallen trees	As needed
Weed control	Monthly
Water plants	As needed

*Additional maintenance may be required.



APPENDIX III: OVERVIEW OF FUNDING OPTIONS

Acquiring funding for projects and programs is considerably more likely if it can be leveraged with a variety of local, state, federal and public and private sources. This chapter identifies potential matching and major funding sources available for trail projects and programs as well as their associated need and criteria.

Private Funding - Private funding from citizens, philanthropic organizations, non-profits and local businesses should be used to build segments of the Iredell County Greenway system and the Carolina Thread Trail. The Carolina Thread Trail is leading a private fundraising effort to provide catalytic seed funding for trail planning, design, land acquisition, and construction for local governments and communities that plan for and adopt greenway master plans. These grant funds should be supplemented with other local, private sector monies to support future implementation of this master plan.

Public Funding - A variety of public funding dollars are available to support future development of the Iredell County trails.

- **Federal Funding** - Federal funding is a key source of funding for larger or more expensive trail projects. Some federal funds are direct appropriations to States and are therefore distributed and managed by a state agency. Other funds are distributed directly from the federal program.
- **State Funding** - Most state funding for greenway acquisition and development in North Carolina comes from NCDOT and trust funds. Local governments must provide matching funds for many of these sources, therefore Iredell County should consider establishing a dedicated, recurring source of revenue for greenway acquisition and development.

- **Local Funding Options** - Local governments generally use discretionary annual spending (General Fund), dedicated funding, and debt financing. Funding varies by community dependent on taxing capacity, budgetary resources, voter preference, and political will. The ability to establish dedicated funding sources may also depend on enabling authority. North Carolina has given local governments a limited number of options to fund land conservation and trail projects.

OVERVIEW OF LOCAL FUNDING OPTIONS

Revenue Bonds

The County could issue revenue bonds to fund bicycle and/or pedestrian improvements. This would spread the cost of the improvements over the life of the bonds. Certain types of bonds would require voter approval. The debt would have to be retired, so funding for repayment on the bond and the interest would be required.

A bond issued in Denver, Colorado funded \$5 million for trail development and also funded the city's bike planner for several years. The City of Albuquerque, New Mexico and Bernalillo County have a 5 percent set-aside of street bond funds for trails and bikeways. This has amounted to approximately \$1.2 million for the City every two years.

General Obligation Bonds (GOB)

General obligation bonds are issued with the underlying belief that a municipality will be able to repay its debt obligation through taxation or revenue from projects. This financial commitment does not require assets to be used as collateral, but is issued as "good faith debt". A GOB is a bond sold by a specified jurisdiction to investors



to raise money. Typically, money is raised for capital improvement projects and general improvements (i.e., open space acquisition and/or park and greenway construction); this depends on the local and state laws which are subject to change. A GOB requires a referendum approval before it is issued. This portion of the process is time sensitive as referenda are approved or denied during election years.

Special Assessment Bonds

A Special Assessment Bond is a special type of municipal bond used to fund a development project. Interest owed to lenders is paid by taxes levied on the community benefiting from the particular bond-funded project. For example, if a bond of this sort were issued to pay for sidewalks to be re-paved in a certain community, an additional tax would be levied on homeowners in the area benefiting from this project. Area homeowners get nicer walking paths, and they will probably see the value of their property increase accordingly, but this comes at a price. Their property taxes will increase to pay the interest owed to the bondholders by the municipality. Source: <http://www.investopedia.com>

State Revolving Bonds

There are a variety of revolving loan funds offered through the State for water pollution control and environmental protection. These revolving loan funds are available for local communities and act similar to revenue bonds which require upfront revenue repayment sources, limited repayment terms and low interest rates.

Installment Purchase Agreement (IPA)

An installment purchase agreement is basically a payment plan to compensate property owners for restrictions on the future use of their land. IPAs spread out payments so that landowners receive tax exempt interest over a period up to 30 years. The principal of the sales amount is due at the

end of the agreed upon term thus making the agreement favorable in terms of property taxes. However, because installment purchase agreements are essentially long-term debt, the agreements generally require the same approvals as general obligation bonds and require a dedicated funding source to be in place (American Farmland Trust, 2000).

Street User/Street Utility Fees

The County's municipalities could administer street user fees through residents' monthly water or other utility bills. The revenue generated by the street user fee is used for operations and maintenance of the street system. Revenue from this fund could be used to maintain on-street bicycle and pedestrian facilities, including routine sweeping of bicycle lanes and other designated bicycle routes. Additionally, this type of fee may free up more general fund money for off-street projects. Implementation of street user fees would require a public vote.

Developer Contributions

Another potential local source of funding is developer contributions. A developer may reduce the number of trips (and hence impacts and cost) by paying for on- and off-site bikeway and pedestrian improvements that will encourage residents to bicycle and walk rather than drive.

Mitigation Banking

Mitigation banking involves the creation, preservation, or enhancement of wetlands. This happens only when wetland losses are unavoidable in advance of development actions, when the wetland cannot be compensated for within the development's parameters, or when the wetland would not be as environmentally beneficial. It typically involves the consolidation of small, fragmented wetland mitigation projects into one large contiguous site. Units of restored, created, enhanced or preserved wetlands are expressed as



“credits” which may subsequently be withdrawn to offset “debits” incurred at a project development site.

Private Individual Donations

Private individual donations can come in the form of liquid investments (i.e. cash, stock, bonds) or land. Municipalities typically create funds to facilitate and simplify a transaction from an individual’s donation to the given municipality. Donations are mainly received when a widely supported capital improvement program is implemented. Such donations can improve capital budgets and/or projects.

Corporate Donations

Corporate donations are often received in the form of liquid investments (i.e. cash, stock, bonds) and in the form of land. Municipalities typically create funds to facilitate and simplify a transaction from a corporation’s donation to the given municipality. Donations are mainly received when a widely supported capital improvement program is implemented. Such donations can improve capital budgets and/or projects.

Corporate Sponsorships

Corporate sponsorships are often delivered in the form of services, personnel volunteers, liquid investments (cash or stock) or land. Municipalities often team with corporations for necessary and/or alternative funding. A sponsorship, which is the equivalent of a donation, usually involves some marketing elements or recognition in one form or another. The benefits of marketing often improve the image of the given corporation and are often thought to benefit both parties.

Foundation Grants

Foundation grants are provided by corporations, individuals, or organizations with a specific mission. The process involves an application which requires the municipality

to explain the direct relation between the foundation’s mission and the applicant’s reason for the funding needs.

Foundation grants can offer a wide range of awards from a thousand dollars to a million dollars. The award amounts depend on the foundation’s funding capacity and allocation decision.

Local Grants

Municipalities oftentimes offer a variety of grants, each with specific purposes. Local grants are limited to areas within the specific municipality’s border. These grants range from capital improvement projects to economic revitalization purposes. The award amounts of these grants depend on the local municipality’s funding capacity and allocation decisions. These grants are typically much lower than federal grants and state grants.

Fundraising / Campaign Drives

Organizations and individuals can participate in a fundraiser or a campaign drive. It is essential to market the purpose of a fundraiser to rally support and financial backing. Oftentimes fundraising satisfies the need for public awareness, public education, and financial support.

Land Trust Acquisition and Donation

Land trusts are held by a third party other than the primary holder and the beneficiaries. This land is oftentimes held in a corporation for facilitating the transfer between two parties. For conservation purposes, land is often held in a land trust and received through a land trust. A land trust typically has a specific purpose such as conservation and is used so land will be preserved as the primary holder had originally intended.

Greenway Specific Trust Fund

A greenway specific trust fund is a holding company designated to shelter land for the purpose of greenway usage.



This land should be preserved as intended and is protected by law. The trust can accept land, funding, or both. The land can be utilized for the actual greenway or for a potential land swap, which depends on the donor's specifications. Funding can be used for infrastructure, land acquisition, maintenance, and/or services. Examples of similarly specific funds can be found in the North Carolina Natural Heritage Trust Fund (www.ncnhhf.org) and the North Carolina Agriculture Development and Farmland Preservation Trust Fund (www.ncadfp.org).

Capital Budget Increase

An increase in the capital budget increases the financial capacity for capital improvements. This option is rarely exercised unless there is a specific use for the capital reallocation. Capital budget changes originate in the capacity of the federal government, state, county, town or city. It is possible for a jurisdiction to ask for a change in capital budget from more than one entity to obtain funding for a project.

Local Budget Yearly Contributions

Local governments may choose to contribute to capital improvement projects on an annual basis as opposed to a one-time budget allocation. A funding change such as this offers a project a financial perpetuity which is a continuous stream of funding. This is especially beneficial when a project requires additional funding for maintenance, operations, salaries, or scheduled enhancements.

Tax Increment Financing/Project Development Financing

Tax Increment Financing (TIF) is a tool to use future gains in taxes to finance the current improvements that will create those gains. When a public project (e.g., shared-use path) is constructed, surrounding property values generally increase and encourage surrounding development or redevelopment. The increased tax revenues are then

dedicated to finance the debt created by the original public improvement project.

In Lieu of Fees

Developers often dedicate open space or greenways in exchange for waiving fees associated with park and open space allocation requirements in respect to proposed development. These types of requirements are presented within local municipal codes and ordinances.

Utility Lease Revenue

A method to generate revenues from land leased to utilities for locating utility infrastructure on municipally owned parcels. This can improve capital budgets and support financial interest in property that would not otherwise create revenue for the government.

OVERVIEW OF FEDERAL FUNDING SOURCES

Federal funding is primarily distributed through a number of different programs established by the Federal Transportation Act. The latest federal transportation act, The Safe, Accountable, Flexible, Efficient Transportation Equity Act – a Legacy for Users (SAFETEA-LU) was enacted August 2005, as Public Law 109-59. SAFETEA-LU authorizes the Federal surface transportation programs for highways, highway safety, and transit for the five year period 2005-2009. The current SAFETEA-LU legislation is in the process of reauthorization. Funding has been extended through continuing resolutions, but it is not currently known when a new transportation bill will be approved. The federal transportation programs included in this document are included for reference; future use of these funds is contingent on the federal legislative process. It will be important for Iredell County and the Carolina Thread Trail to continue monitoring the development of new legislation, including federal stimulus funds, new federal Livability initiatives and the SAFETEA-LU



reauthorization process.

Federal funding is administered through the state (North Carolina State Department of Transportation) and regional planning agencies. Most, but not all, of these funding programs are oriented toward transportation versus recreation, with an emphasis on reducing auto trips and providing inter-modal connections. Federal funding is intended for capital improvements, safety, educational programs, and trail projects must relate to the surface transportation system.

Surface Transportation Act (SAFETEA-LU)

On August 10, 2005, the President signed into law the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). With guaranteed funding for highways, highway safety, and public transportation totaling \$244.1 billion, SAFETEA-LU represents the largest surface transportation investment in our Nation's history. SAFETEA-LU supplies the funds and refines the programmatic framework for investments needed to maintain and grow our vital transportation infrastructure.

Source: Federal Highway Administration Office
of Legislation and Intergovernmental Affairs
Program Analysis Team
Enhancements Unit
Department of Transportation
1534 Mail Service Center
Raleigh, NC 2766-1534
Tel: 919-733-2039

Surface Transportation Program (STP)

The Surface Transportation Program provides flexible funding that may be used by States and localities for projects on any Federal-aid highway, including the National Highway System, bridge projects on any public road, transit capital projects, and intracity and intercity bus

terminals and facilities.

Funds are subject to the overall Federal-aid obligation limitation. Apportioned funds are to be distributed based on the following factors:

- 25% based on total lane miles of Federal-aid highways.
- 40% based on vehicle miles traveled on lanes on Federal-aid highways.
- 35% based on estimated tax payments attributable to highway users in the States into the Highway Account of the Highway Trust Fund (often referred to as "contributions" to the Highway Account).

The Federal share is generally 80 percent, subject to the sliding scale adjustment. When the funds are used for Interstate projects to add high occupancy vehicle or auxiliary lanes, but not other lanes, the Federal share may be 90 percent, also subject to the sliding scale adjustment.

Source: www.fhwa.dot.gov
Enhancements Unit
Department of Transportation
1534 Mail Service Center
Raleigh, NC 2766-1534
Tel: 919-733-2039

Surface Transportation Program – Transportation Enhancement Activities

The Surface Transportation Program (STP) provides states with flexible funds which may be used for a wide variety of projects on any Federal-aid Highway including the National Highway System, bridges on any public road, and transit facilities.

Eligible bicycle improvements include on-street facilities, off-road shared-use paths, sidewalks, crosswalks, bicycle and pedestrian signals, parking, and other ancillary facilities. SAFETEA-LU also specifically clarifies that the modification of sidewalks to comply with the requirements of the Americans with Disabilities Act is an eligible activity. As an exception to the general rule



described above, STP-funded bicycle facilities may be located on local and collector roads which are not part of the Federal-aid Highway System. In addition, bicycle-related non-construction projects, such as maps, coordinator positions, and encouragement programs, are eligible for STP funds.

Source: www.fhwa.dot.gov/environment/te & www.enhancements.org

Department of Transportation
1534 Mail Service Center
Raleigh, NC 2766-1534
Tel: 919-733-2039

Recreational Trails Program (RTP)

The Recreational Trails Program of the Federal Transportation Bill provides funds to states to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses. Examples of trail uses include hiking, bicycling, in-line skating, equestrian use, and other non-motorized and motorized uses. These funds are available for both paved and unpaved trails, but may not be used to improve roads for general passenger vehicle use or to provide shoulders or sidewalks along roads.

Recreational Trails Program funds may be used for:

- Maintenance and restoration of existing trails.
- Purchase and lease of trail construction and maintenance equipment.
- Construction of new trails, including unpaved trails.
- Acquisition or easements of property for trails.
- State administrative costs related to this program (limited to seven percent of a State's funds).
- Operation of educational programs to promote safety and environmental protection related to trails (limited to five percent of a State's funds).

Source: <http://www.fhwa.dot.gov/environment/>

retrails

Contact: Darrell L McBane, State Trails Coordinator
NC Division of Parks & Recreation
MSC 1615
Raleigh NC 27699-1615
Tel: 919-715-8699
Fax :919-715-3085
Email: darrell.mcbane@ncdenr.gov

Highway Safety Improvement Program (HSIP)

This program funds projects designed to achieve significant reductions in traffic fatalities and serious injuries on all public roads, bikeways and walkways. This program includes the Railway-Highway Crossings Program and the High Risk Rural Roads Program.

Source: www.fhwa.dot.gov
Enhancements Unit
Department of Transportation
1534 Mail Service Center
Raleigh, NC 2766-1534
Tel: 919-733-2039

National Scenic Byways Program

The National Scenic Byways Program provides for the designation by the Secretary of Transportation of roads that have outstanding scenic, historic, cultural, natural, recreational, and archaeological qualities as All-American Roads or National Scenic Byways. To be considered for the designation as an All-American Road or National Scenic Byway, a road must be nominated by a State, Indian Tribe, or a Federal land management agency and must first be designated as a State scenic byway or, in the case of a road on Indian or Federal land, as a Tribal byway or a Federal land management agency byway.

The program also provides discretionary grants for scenic byway projects on All-American Roads, National



Scenic Byways, or State-designated scenic byways, and for planning, designing, and developing State scenic byway programs.

The normal Federal share is 80 percent, with a 20 percent non-Federal share required. However, Federal land management agencies may provide matching funds for projects on Federal or Indian lands. Projects must be developed through each State DOT. In making grants, priority is given to:

- Each eligible project associated with a highway that has been designated as a National Scenic Byway or All American Road and that is consistent with the corridor management plan for the byway;
- Each eligible project along a State designated scenic byway that is consistent with the corridor management plan for the byway, or is intended to foster the development of a plan, and is carried out to make the byway eligible for designation as a National Scenic Byway or All American Road; and
- Each eligible project that is associated with the development of a State scenic byway program or an activity related to the planning, design, or development of a State scenic byway program.

Types of improvements include:

- Construction along a scenic byway of a facility for pedestrians and bicyclists, rest area, turnout, highway shoulder improvement, passing lane, overlook, or interpretive facility.
- An improvement to a scenic byway that will enhance access to an area for the purpose of recreation, including water-related recreation.
- Protection of scenic, historical, recreational, cultural, natural, and archaeological resources in an area adjacent to a scenic byway.
- Development and provision of tourist information to the public, including interpretive information about a scenic byway.

- Development and implementation of a scenic byway marketing program.

Source: <http://www.bywaysonline.org/grants/>

Contact: Tel: 1-800-429-9297, option 3, option 5

E-mail: grants-support@byways.org

Safe Routes to School Program (SRTS)

The purpose of the Safe Routes to Schools (SRTS) program is to provide children a safe, healthy alternative to riding the bus or being driven to school. The SRTS Grants were established to address pedestrian and bicycle mobility and safety near schools. Application for these funds is open to any public agency. Agencies providing a funding match will be given preference.

Eligible projects may include three elements:

- **Engineering Improvements.** These physical improvements are designed to reduce potential bicycle and pedestrian conflicts with motor vehicles. Physical improvements may also reduce motor vehicle traffic volumes around schools, and establish safer and more accessible crossings. Eligible improvements include sidewalk improvements, traffic calming/speed reduction, pedestrian and bicycle crossing improvements, on-street bicycle facilities, off-street bicycle and pedestrian facilities, and secure bicycle parking facilities.
- **Education and Encouragement Efforts.** These programs are designed to teach children safe bicycling and walking skills while educating them about the health benefits, and environmental impacts. Projects and programs may include creation, distribution and implementation of educational materials; safety based field trips; interactive bicycle/pedestrian safety video games; and promotional events and activities (e.g., assemblies, bicycle rodeos, walking school buses).
- **Enforcement Efforts.** These programs aim to ensure that traffic laws near schools are obeyed. Law



enforcement activities apply to cyclists, pedestrians and motor vehicles alike. Projects may include development of a crossing guard program, enforcement equipment, photo enforcement, and pedestrian sting operations.

All projects must be within two miles of primary or middle schools (K-8). Project proposals are due in early May.

Source: www.fhwa.dot.gov

Enhancements Unit

Department of Transportation

1534 Mail Service Center

Raleigh, NC 2766-1534

Tel: 919-733-2039

Land and Water Conservation Fund (LWCF)

Land and Water Conservation Fund is a federally funded program that provides grants for planning and acquiring outdoor recreation areas and facilities, including trails. Funds can be used for right-of-way acquisition and construction.

Grant recipients must provide at least 50% matching funds in either cash or in-kind contributions. Applications are to be evaluated in a competitive process by a team of experts, with criteria developed by a citizen advisory committee. A portion of Federal revenue is derived from sale or lease of off-shore oil and gas resources. The program is administered by the US Department of the Interior through the National Park Service and the Intergovernmental Advisory Committee.

Source: <http://www.nps.gov/>

Contact: Division of Parks and Recreation

Dept. of Environmental and Natural Resources

P.O. Box 27687

Raleigh, NC 27611-7687

Tel: 919-733-4181

Environmental Protection Agency (EPA) - Environmental Education Grants Program

The Grants Program sponsored by EPA's Environmental Education Division (EED), Office of Children's Health Protection and Environmental Education, supports environmental education projects that enhance the public's awareness, knowledge, and skills to help people make informed decisions that affect environmental quality. EPA awards grants each year based on funding appropriated by Congress. Annual funding for the program ranges between \$2 and \$3 million. More than 75 percent of the grants awarded by this program receive less than \$15,000.

Source: <http://www.epa.gov/enviroed/grants.html>

Contact: Alice Chastain

U.S. EPA, Region 4

Environmental Education Grants

Office of Public Affairs

61 Forsyth Street SW

Atlanta, GA 30303

Email: chastain.alice@epa.gov

Community Block Development Grant Program (HUD-CBDG)

The Community Development Block Grants program provides money for streetscape revitalization, which may be largely comprised of pedestrian improvements. Federal Community Development Block Grant grantees may use funds for the following activities:

Acquiring real property; reconstructing or rehabilitating housing and other property; building public facilities and improvements, such as streets, sidewalks, community and senior citizen centers and recreational facilities; paying for planning and administrative expenses, such as costs related to developing a consolidated plan and managing Community Development Block Grants funds; provide



public services for youths, seniors, or the disabled; and initiatives such as neighborhood watch *programs*.

Contact: Greensboro Field Office
Asheville Building
1500 Pincroft Road, Suite 401
Greensboro, NC 27407-3838
Tel: 336-547-4001 (Field Office Director)
Fax: 336-547-4138

Congestion Mitigation/Air Quality Improvement Program

The Congestion Mitigation/Air Quality Improvement Program (CMAQ) provides funding for projects and programs in air quality non-attainment and maintenance areas for ozone, carbon monoxide, and particulate matter which reduce transportation related emissions. These federal funds can be used to build bicycle and pedestrian facilities that reduce travel by automobile.

Eligible bicycle and pedestrian facilities and programs include:

- Constructing bicycle and pedestrian facilities (paths, bike racks, support facilities, etc.) that are not exclusively recreational and reduce vehicle trips.
- Non-construction outreach related to safe bicycle use.
- Establishing and funding State bicycle/pedestrian coordinator positions for promoting and facilitating nonmotorized transportation modes through public education, safety programs, etc. (Limited to one full-time position per State).

States may choose to transfer a limited portion of their CMAQ apportionment to the following Federal-aid highway programs: Surface Transportation Program (STP), National Highway System (NHS), Highway Bridge Program (HBP), Interstate Maintenance (IM), Recreational Trails Program (RTP), and the Highway Safety Improvement Program (HSIP).

OVERVIEW OF NORTH CAROLINA FUNDING SOURCES

North Carolina DOT – Bicycle and Pedestrian Program

The North Carolina General Assembly enacted legislation (G.S. 136-71.12 Funds) that authorizes the North Carolina Department of Transportation (NCDOT) to spend any federal, state, local, or private funds available to the Department and designated for the accomplishment of Article 4A, Bicycle and Bikeway Act of 1974. In addition, the 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) requires the Department to set aside federal funds from eligible categories for the construction of bicycle and pedestrian transportation facilities.

State Construction Funds – State roadway construction funds (not including the Highway Trust Fund for Urban Loops and Interchanges) may be used for the construction of sidewalks and bicycle accommodations that are a part of roadway improvement projects.

Governor’s Highway Safety Program (GHSP) – GHSP funding is provided through an annual program, upon approval of specific project requests, to undertake a variety of pedestrian and bicycle safety initiatives. Amounts of GHSP funds vary from year to year, according to the specific amounts requested.

Independent Projects – \$6 million is set aside annually for the construction of bicycle improvements that are independent of scheduled highway projects in communities throughout the state. Eighty percent of these funds are from STP Enhancement funds, while state funds provide the remaining 20 percent. Currently, \$1.4 million is set aside annually for pedestrian hazard elimination projects in the 14 NCDOT highway divisions across the state; \$200,000 is allocated to the Division of Bicycle and



Pedestrian Transportation for projects such as training workshops, pedestrian safety and research projects, and other pedestrian needs statewide.

Incidental Projects – Bicycle accommodations such as bike lanes, widened paved shoulders and bicycle-safe bridge design are frequently included as incidental features of highway projects. In addition, bicycle-safe drainage grates are a standard feature of all highway construction. Most pedestrian safety accommodations built by NCDOT are included as part of scheduled highway improvement projects funded with a combination of federal and state roadway construction funds.

For all the above funding sources contact
www.ncdot.org

Contact: Robert Mosher, Division of Bicycle and Pedestrian Transportation
(Mail) 1552 Mail Service Center
(Delivery) 401 Oberlin Road, Suite 250
Raleigh, NC 27605
Raleigh, NC 27699-1552
Tel: 919-807-0777 (Main Office)
Fax 919-807-0768
Email: bikeped_transportation@dot.state.nc.us

North Carolina's Clean Water Management Trust Fund (CWMTF)

North Carolina's Clean Water Management Trust Fund (CWMTF) receives a direct appropriation from the General Assembly in order to issue grants to local governments, state agencies and conservation nonprofits to help finance projects that specifically address water pollution problems. The 21-member, independent, CWMTF Board of Trustees has full responsibility over the allocation of moneys from the Fund.

CWMTF funds projects that:

- Enhance or restore degraded waters;
- Protect unpolluted waters; and/or

- Contribute toward a network of riparian waters.

Source: <http://www.cwmtf.net>

Contact: Western Piedmont Field Representative:

Bern Schumak

Tel: 336-366-3801

Email: bschumak@surry.net.

North Carolina Parks and Recreation Trust Fund (PARTF)

The North Carolina General Assembly established the Parks and Recreation Trust Fund (PARTF) to fund improvements in the state's park system, to fund grants for local governments and to increase the public's access to the state's beaches. The Parks and Recreation Authority, an eleven-member appointed board, was also created to allocate funds from PARTF to the state parks and to the grants program for local governments.

PARTF is the primary source of funding for building and renovating facilities in the state parks as well as for buying land for new and existing parks. The PARTF program also provides dollar-for-dollar grants to local governments. Recipients use the grants to acquire land and/or to develop parks and recreational projects that serve the general public.

Source: <http://www.partf.net>

Contact: John Poole, Program Manager

1615 MSC

Raleigh, NC 27699-1615

Tel: 919-715-2662

Email: John.Poole@ncmail.net

North Carolina Farmland Preservation Trust Fund

The North Carolina Farmland Preservation Trust Fund supports the purchase of agricultural conservation easements, including transaction costs. Fund public and private enterprise programs that will promote profitable and sustainable farms by assisting farmers in developing



and implementing plans for the production of food, fiber and value-added products, agri-tourism activities, marketing and sales of agricultural products produced on the farm, and other agriculture-related business activities. The legislation also established a Trust Fund Advisory Committee to advise Commissioner Troxler on the prioritization and allocation of funds, the development of criteria for awarding funds, program planning, and other areas for the growth and development of family farms in North Carolina.

Source: <http://www.agr.state.nc.us/paffairs/farmlandpreservation.htm>

Contact: North Carolina Department of Agriculture & Consumer Services

(Mail) 1001 Mail Service Center

(Delivery) 2 West Edenton Street, Raleigh, NC 27601
Raleigh, NC 27699-1001

Tel: 919-733-7125

North Carolina Natural Heritage Trust Fund

The North Carolina Natural Heritage Trust Fund provides funding to select state agencies for the acquisition and protection of important natural areas, to preserve the state's ecological diversity and cultural heritage, and to inventory the natural heritage resources of the state. The trust fund is supported by 25% of the state's portion of the tax on real estate deed transfers and by a portion of the fees for personalized license plates. These sources now generate about \$19 million each year. Since its creation, the trust fund has contributed more than \$136 million through 345 grants to support the conservation of more than 217,000 acres.

Source: <http://www.ncnhtf.org/>

Contact: Lisa Riegel, Executive Director
MSC 1601

Raleigh, NC 27699-1601

Tel: 919-715-8014

Fax: 919-715-3060

Email: nc.nhtf@ncmail.net

North Carolina Conservation Income Tax Credit Program

The Income Tax Credit Program assists land-owners to protect the environment and the quality of life. A Credit is allowed against individual and corporate income taxes when real property is donated for conservation purposes. Interests in property that promote specific public benefits may be donated to a qualified recipient. Such conservation donations qualify for a substantial tax credit.

Source: <http://www.enr.state.nc.us/conservationtaxcredit/>

Contact: N.C. Department of Revenue

Tel: 919-733-4684

Fax: 919-733-3166

North Carolina Adopt-A-Trail Grants

The Adopt-A-Trail Grant Program (AAT) awards \$108,000 annually to government agencies, nonprofit organizations and private trail groups for trails projects. The funds can be used for trail building, trail signage and facilities, trail maintenance, trail brochures and maps, and other related uses. This grant requires no local match or in-kind services.

Source: <http://www.ncparks.gov/About/grants/trailsmain.php>

Contact: Darrell McBane

N.C. Division of Parks and Recreation

State Trails Program

1615 Mail Service Center

Raleigh, NC 27699-1615

Tel: 919-715-8699

Email: darrell.mcbane@ncdenr.gov



North Carolina Division of Water Quality - 319 Program Grants

By amendment to the Clean Water Act Section in 1987, the Section 319 Grant program was established to provide funding for efforts to curb non-point source (NPS) pollution, including that which occurs through storm water runoff. The U.S. Environmental Protection Agency provides funds to state and tribal agencies, which are then allocated via a competitive grant process to organizations to address current or potential NPS concerns. Funds may be used to demonstrate best management practices (BMPs), establish Total Maximum Daily Load (TMDL) for a watershed, or to restore impaired streams or other water resources. In North Carolina, the 319 Grant Program is administered by the Division of Water Quality of the Department of Environment and Natural Resources.

Each fiscal year North Carolina is awarded nearly 5 million dollars to address non-point source pollution through its 319 Grant program. Thirty percent of the funding supports ongoing state non-point source programs. The remaining seventy percent is made available through a competitive grants process. At the beginning of each year (normally by mid-February), the NC 319 Program issues a request for proposals with an open response period of three months. Grants are divided into two categories: Base and Incremental. Base Projects concern research-oriented, demonstrative, or educational purposes for identifying and preventing potential NPS areas in the state, where waters may be at risk of becoming impaired. Incremental projects seek to restore streams or other portions of watersheds that are already impaired and not presently satisfying their intended uses.

State and local governments, interstate and intrastate agencies, public and private nonprofit organizations, and educational institutions are eligible to apply for Section 319 monies. An interagency workgroup reviews the proposals

and selects those of merit to be funded.

Source: http://h2o.enr.state.nc.us/nps/Section_319_Grant_Program.htm

Contact: Mooresville Regional Office

610 East Center Ave

Suite 301

Mooresville, NC 28115

Tel: 704-663-1699

Fax: 704-663-6040

North Carolina Ecosystem Enhancement Program (EEP)

Clean water, clean air and thriving natural habitats are fundamental indicators of a healthy environment. Protecting North Carolina's ecosystems is critical to maintaining the state's quality of life, continuing its economic growth, and ensuring the health and well-being of its citizens. According to the three-party Memorandum of Agreement that established the initiative's procedures in July 2003, the mission of the Ecosystem Enhancement Program is to "restore, enhance, preserve and protect the functions associated with wetlands, streams and riparian areas, including but not limited to those necessary for the restoration, maintenance and protection of water quality and riparian habitats throughout North Carolina."

EEP provides:

- High-quality, cost-effective projects for watershed improvement and protection;
- Compensation for unavoidable environmental impacts associated with transportation infrastructure and economic development; and
- Detailed watershed-planning and project implementation efforts within North Carolina's threatened or degraded watersheds.

Source: <http://www.nceep.net>

Contact: MAIN OFFICE

(Mail) 1652 Mail Service Center

Raleigh, NC 27699-1652



(Delivery) 2728 Capital Blvd, Suite 1H 103
Raleigh NC 27604
Tel: 919-715-0476
Fax: 919-715-2219

North Carolina Wetlands Restoration Program (NCWRP)

Established by the General Assembly in 1996, the North Carolina Wetlands Restoration Program (NCWRP) is an innovative, non regulatory initiative to restore wetlands, streams and non-wetland riparian areas throughout the state. The Department of Environment and Natural Resources – Division of Water Quality oversees the program. The goals of NCWRP are:

- To restore functions and values lost through historic, current and future wetland and stream impacts.
- To achieve a net increase in wetland acres, functions and values in all of North Carolina's major river basins.
- To provide a consistent approach to address mitigation that may be required by law when dredging or filling wetlands, or altering of streams, is authorized.
- To increase the ecological effectiveness of required wetlands and stream mitigation.
- To promote a comprehensive approach to the protection of natural resources.

The NCWRP actively seeks land owners who have restorable wetland, riparian and stream sites.

Source: <http://h2o.enr.state.nc.us>
Contact: Bonnie Mullen
North Carolina Wetlands Restoration
NCWRP
Tel: 919-733-5208

Urban and Community Forestry Assistance Program

Urban and Community Forestry begins to address the stewardship of urban natural resources where 80 percent of the Nation lives. Important connections exist

between the quality of life in metropolitan areas and land consumption associated with sprawl. In addition there is a strong economic case for conservation of green open space to guide growth and revitalize city centers and older suburbs. The Urban and Community Forestry Program responds to these needs by maintaining, restoring, and improving the health of urban trees, forests, greenspaces and sustainable forest ecosystems for more than 70 million acres of America's urban and community forest resources. Through these efforts the Program encourages and promotes the creation of healthier, more livable urban environments across the Nation. The Program will continue to expand partnerships with non-governmental organizations to restore natural resources in older, declining cities and towns.

Source: <http://www.fs.fed.us/ucf/>
Contact: Ed Macie (R-8)
USDA Forest Service
1720 Peachtree Road, NW, Suite 850S
Atlanta, GA 30367
Tel: 404-347-1647
Fax: 404-347-2776
Email: emacie@fs.fed.us

Water Resources Development Grant Program

This program is designed to provide cost-share grants and technical assistance to local governments throughout North Carolina. Applications for grants are accepted for seven purposes: General Navigation, Recreational Navigation, Water Management, Stream Restoration, Beach Protection, Land Acquisition and Facility Development for Water-Based Recreation, and Aquatic Weed Control. There are two grant cycles per year. The application deadlines are January 1st and July 1st.

Contact John Sutherland, Jeff Bruton or Darren England for additional information.
Source: http://www.ncwater.org/Financial_



Assistance/

Contact: NC Division of Water Resources, DENR
1611 Mail Service Center
Raleigh, NC 27699-1611
Tel: 919-733-4064
Fax: 919-733-3558

Blue Cross Blue Shield Mini Grant

The BCBSNC Foundation developed the Mini-Grants category in order to provide funding opportunities for counties that are experiencing greater levels of economic distress. The Foundation is also interested in supporting smaller non-profit organizations that provide direct services within the specified geographic region. Specifically, funding is restricted to the 85 designated rural counties across the state. Organizations with an annual operating budget of less than \$500,000 are eligible to apply.

The BCBSNC Foundation funds programs that align with its mission and established focus areas. Applicants in the Mini-Grants category will engage in a competitive process for funding. The typical range is between \$1,500 - \$5,000.

Source: <http://www.bcbsnc.com/foundation/minigrants.html>
Contact: (Mail) P.O. Box 2291
Durham, NC 27702
Tel: 919-765-7347
Fax: 919-765-2433
Email: foundation@bcbsnc.com

Blue Cross Blue Shield Grant

The BCBSNC Foundation funds programs that align with its mission and established focus areas. Applicants in the Grants up to \$25,000 category, engage in a two-step, competitive process to identify those projects that meet all required eligibility criteria and present the most

compelling case for funding. The dollar amounts of grants awarded in this category typically range between \$5,000 - \$15,000.

Source: <http://www.bcbsnc.com/foundation/grants.html>

html

Contact: Mailing Address:

P.O. Box 2291

Durham, NC 27702

Tel: 919-765-7347

Fax: 919-765-2433

Email: foundation@bcbsnc.com

OVERVIEW OF PRIVATE FUNDING

Many communities have solicited greenway funding assistance from private foundations and other conservation-minded benefactors. Below are a few examples of private funding opportunities available in North Carolina.

American Greenways Program

Administered by The Conservation Fund, the American Greenways Program provides funding for the planning and design of greenways. Applications for funds can be made by local, regional or state-wide non-profit organizations and public agencies. The maximum award is \$2,500, but most range from \$500 to \$1,500. American Greenways Program monies may be used to fund unpaved trail development.

Bikes Belong Grant Program

The Bikes Belong Coalition of bicycle suppliers and retailers has awarded \$1.2 million and leveraged an additional \$470 million since its inception in 1999. The program funds corridor improvements, mountain bike trails, BMX parks, trails, and park access. It is funded by the Bikes Belong Employee Pro Purchase Program.



Foundation for the Carolinas

The Foundation provides strategic leadership in the community by convening stakeholders on critical issues related to the civic, social, environmental and economic health of the region. It also assists community leaders in better understanding the challenges confronting the region and helps find solutions to many of our most pressing community issues.

Source: <http://www.fftc.org/affiliates/community/nc/charlotte/>

Contact: Foundation For The Carolinas
217 S. Tryon Street
Charlotte, NC 28202.
Tel: 704-973-4500 / 800-973-7244

North Carolina Community Foundation (NCCF)

The North Carolina Community Foundation serves philanthropic donors and supports not-for-profit organizations throughout North Carolina. The NCCF makes grants from charitable funds established by individuals, families, corporations, and non-profit organizations. Donors make grants from over 800 funds that serve the following areas of interest:

- Arts and Humanities
- Community Service
- Education
- Environment
- Health
- Historic Preservation
- Religion
- Science
- Social Services
- Youth

Source: <http://www.nccommunityfoundation.org/>
Contact: 4601 Six Forks Road, Suite 524
Raleigh, North Carolina 27609

Tel: 919-828-4387 / 800-201-9533

Fax: 919-828-5495

The Cinergy Foundation

The Cinergy Foundation places special emphasis on projects that help communities help themselves. The Foundation supports local community, civic and leadership development projects. The Cinergy Foundation also views community foundations as positive vehicles for sustaining the long-term health of a community and promoting philanthropic causes. Infrastructure needs by a community will not be considered.

The Cinergy Foundation supports health and social service programs which promote healthy life styles and preventative medical care. United Way campaigns are included in Health and Social Services funding.

Source: <http://www.cinergy.com/foundation/categories.asp>

Contact: Rachelle Caldwell, Manager
Cinergy Foundation

Tel: 513-287-2363 / 800-262-3000 x 2363
The Cinergy Foundation
139 E. Fourth St.; EA029
Cincinnati, Ohio 45202

American Greenways Eastman Kodak Awards

Eastman Kodak, The Conservation Fund, and the National Geographic Society provide small grants to stimulate the planning and design of greenways in communities throughout America. The annual grants program was instituted in response to the President's Commission on Americans Outdoors recommendation to establish a national network of greenways. Made possible by a generous grant from Eastman Kodak, the program also honors groups and individuals whose ingenuity and creativity foster the creation of greenways.



The program goals include:

- Develop new, action-oriented greenway projects
- Assist grassroots greenway organizations
- Leverage additional money for conservation and greenway development
- Recognize and encourage greenway proponents and organizations

Source: <http://www.conservationfund.org>

Contact: The Conservation Fund

Tel: 703-525-6300

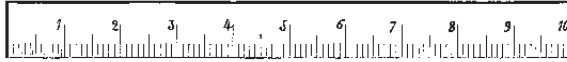
Email: greenways@conservationfund.org



Iredell County Canola Fields (Source: E. Hiltz, Iredell County)



Appendix III. Overview of Funding Options



FOOTNOTES

1. FHWA. 2006. *Federal Highway Administration University Course on Bicycle and Pedestrian Transportation: Student Workbook (second edition)*. Report No. HRT- 05-133.
2. Haskell, W. L., I. Lee, R. R. Pate, K. E. Powell, S. N. Blair, B. A. Franklin, C. A. Macera, G. W. Heath, P. D. Thompson and A. Bauman. (2007). *Physical Activity and Public Health: Updated Recommendation for Adults From the American College of Sports Medicine and the American Heart Association*. *Circulation: Journal of the American Heart Association*, 116, 1081-1093. Dallas: American Heart Association. Retrieved June 4, 2009, from <http://circ.ahajournals.org/cgi/reprint/CIRCULATIONAHA.107.185649>
3. Transportation Research Board for the National Cooperative Highway Research Program. (2006). *Guidelines for the Analysis of Investment in Bicycle Facilities (NCHRP Report 552, Appendix E: User Health Benefits)*. Washington D.C.: Transportation Research Board. Retrieved June 4, 2009, from: http://onlinepubs.trb.org/Onlinepubs/nchrp/nchrp_rpt_552.pdf
4. Karadeniz, D. (2008). *The Impact of the Little Miami Scenic Trail on Single Family Residential Property Values*. Unpublished master's thesis, University of Cincinnati. Retrieved June 2, 2009, from: <http://atfiles.org/files/pdf/LittleMiamiPropValue.pdf>
5. Los Angeles County Metropolitan Transportation Authority. (2007). *Bicycle Paths: Safety Concerns and Property Values*. Retrieved July 8, 2009, from: http://www.greenway.org/pdf/la_bikepath_safety.pdf
6. Colorado Dept. of Transportation and the Center for Research in Economic and Social Policy at the Univ. Colorado – Denver. (1999). *The Economic Impact of Bicycling in Colorado*. Retrieved June 1, 2009, from <http://atfiles.org/files/pdf/CObikeEcon.pdf>
7. Lawrie, J., J. Guenther, T. Cook, M. P. Meletioui, S. W. O'Brien of the Institute for Transportation Research and Education for the North Carolina Department of Transportation. (2004). *The Economic Impact of Investments in Bicycle Facilities: A Case Study of the Northern Outer Banks*. http://www.ncdot.org/transit/bicycle/safety/Economic_Impact_Study_PDFs/OBX%20EIS%20Tech%20Rprt%20Full.pdf
8. Wilbur Smith Associates in association with Buxton Communications and Bicycle Federation of America for Office of Passenger Transportation: Maine Department of Transportation. (April 2001). *Bicycle Tourism in Maine: Economic Impacts and Marketing*.
9. Center for International Public Management, Inc. for the Florida Dept. of Environmental Protection, Office of Greenways and Trails. (1998). *Thinking Green: A Guide to the Benefits and Costs of Greenways and Trails*. Retrieved June 1, 2009, from: <http://www.dep.state.fl.us/gwt/community/refguide/pdf/thinkgreen.pdf>
10. Alta Planning and Design. (September 2008). *The Value of the Bicycle-Related Industry in Portland*. Retrieved July 13, 2009, from: http://www.altaplanning.com/App_Content/
11. Maas, J., Verheij, R., de Vries, S., Spreeuwenberg, P., Schellevis, F., & Groenewegen, P. (2009). *Morbidity is related to a green living environment*. *Journal of Epidemiology & Community Health*, 63 (12), 967-973.
12. Federal Emergency Management Agency. (2005) *Building Stronger: State and Local Mitigation Planning*
- 13 <http://www.co.iredell.nc.us/about.asp>
- 14 <http://www.co.iredell.nc.us/about.asp>
- 15 Warren & Associates, "Iredell County Demographic Forecast 2007-2015", 2008.
- 16 Clarion Associates, "Iredell County 2030 Horizon Plan", September 15, 2009.
- 17 Clarion Associates, "Iredell County 2030 Horizon Plan", September 15, 2009.
- 18 Site Solutions, Iredell Parks and Recreation Department, "Comprehensive Recreation Master Plan", October 10, 2008.



Footnotes

