

HENDERSONVILLE BICYCLE PLAN



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D R A F T

Prepared for:



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ACKNOWLEDGMENTS

Thank you to all of the citizens, stakeholders, and City staff that contributed to the creation of the Hendersonville Bicycle Plan. Thank you specifically to the members of the steering committee, listed below.

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EXECUTIVE SUMMARY

Promoting and encouraging multimodal travel has become a major priority for the City of Hendersonville and for communities across the region, the state, and the country. The Hendersonville 2030 Comprehensive Plan recommended the creation of a comprehensive bicycle plan, building on the success the City has had in implementing the infrastructure recommendations from its 2007 Pedestrian Plan. Recognizing that bicycling—both as a form of transportation and as a recreational activity—can benefit the community’s mobility, safety, health, economy, environment, and livability, the City of Hendersonville applied for a grant through North Carolina Department of Transportation Division of Bicycle and Pedestrian Transportation’s (NCDOT-DBPT) Planning Grant Initiative. The planning grant, along with a 10% match from the City and a 20% match from the Blue Ridge Bicycle Club, funded the creation of this Bicycle Plan.

The development of the Hendersonville Bicycle Plan was spearheaded by a project team consisting of planners, engineers, bicycling advocates, citizens, and City staff. A 17-person steering committee met four times over the course of the Plan’s development, setting and refining the Plan’s direction to reflect the needs and desires of the community. Public input was a critical piece of the planning process, and public engagement strategies included four open houses, an online survey, and a public hearing. Ultimately, the overarching and aspirational vision of the Hendersonville Bicycle Plan is that:

The City of Hendersonville will have a bikeway system that is connected, safe, and comfortable for riders of all ages and abilities, supported by efforts that encourage and educate everyone who drives, bikes, and walks.

The Hendersonville Bicycle Plan consists of five major elements, followed by an Appendix. The Bicycle Plan begins with an introduction of Hendersonville and the impetus behind the creation of the Plan, followed by a detailed look at the demographic, operational, and administrative characteristics of Hendersonville. The Public Input chapter presents a synthesis of the input contributed by those who participated in the Plan’s public engagement activities. The Recommendations chapter details the facility, policy, and program recommendations to accomplish the Bicycle Plan’s vision, and the Implementation chapter provides a framework that describes a timeline of strategies and highlights the parties who will be responsible for implementing those strategies. Summaries of each chapter are shown on the next page.

INTRODUCTION

The Introduction chapter of the Hendersonville Bicycle Plan presents the timeline of the planning process, starting with NCDOT-DBPT awarding the planning grant to the City of Hendersonville and ending with adoption of the Plan by Hendersonville City Council. This chapter also introduces the Bicycle Plan's vision statement and four supporting goals, and describes how the vision of a more bicycle friendly Hendersonville would benefit residents, business owners, and visitors alike.

CURRENT CONDITIONS

The Current Conditions chapter defines the starting point for the Bicycle Plan. The chapter begins with an explanation of the Bicycle Plan's philosophy, encapsulated by what has traditionally been called the "Five Es," now joined by a sixth E: equity. Several maps depict where underserved populations live in Hendersonville, followed by a discussion of how residents get to work and the identification of non-work destinations. The chapter then transitions to an exploration of Hendersonville's transportation network in both driving and bicycling contexts. The chapter concludes with a recognition of existing policies and programs impacting bicycling in Hendersonville today and an inventory of previous planning efforts that set the stage for the Hendersonville Bicycle Plan.

PUBLIC INPUT

The Public Input chapter describes the Bicycle Plan's public engagement process and highlights some key findings. The Plan's public engagement included four meetings with the steering committee, an online survey consisting of a questionnaire and map exercise, four open house meetings that emphasized issues identification and project prioritization, and a public hearing.

RECOMMENDATIONS

The Recommendations chapter comprises three sections: an overview of the bicycle facility planning process, project profiles for the top five priority projects, and a compilation of program and policy recommendations. The project profiles include information about each project's purpose as well as implementation considerations, planning-level cost estimates, typical cross-sections, and conceptual images. The program and policy recommendations consist of encouragement, educational, and administrative improvements to enhance the City's bicycle friendliness.

IMPLEMENTATION

The Implementation chapter defines actionable steps for the City of Hendersonville and its partners in the short-, mid-, and long-term to accomplish the Bicycle Plan's vision. This action plan is supported by an organizational framework that indicates how the City's partners will be involved; information regarding local, state, federal, and private funding sources; suggestions for ways to measure the performance of the Bicycle Plan or its individual facility recommendations; and a listing of guidance documents for the planning and design of bicycle facilities.

CONTENTS

CHAPTER 1: INTRODUCTION	1
CHAPTER 2: CURRENT CONDITIONS	5
CHAPTER 3: PUBLIC INPUT	23
CHAPTER 4: RECOMMENDATIONS	29
CHAPTER 5: IMPLEMENTATION	51
CHAPTER 6: APPENDIX	61

FIGURES

FIGURE 1: PROJECT TIMELINE	1
FIGURE 2: POPULATION & HOUSEHOLDS	5
FIGURE 3: COMMUTE PATTERNS	10
FIGURE 4: KEY DESTINATIONS	12
FIGURE 5: PUBLIC INPUT TIMELINE	23
FIGURE 6: VISIONING EXERCISE RESULTS	26
FIGURE 7: BICYCLE FACILITY TOOLKIT	31
FIGURE 8: ORGANIZATIONAL FRAMEWORK	51
FIGURE 9: SUGGESTED PERFORMANCE MEASURES	58

TABLES

TABLE 1: BENEFITS OF BICYCLING	2
TABLE 2: PREVIOUS PLANNING EFFORTS	19
TABLE 3: PRIORITY PROJECTS	34
TABLE 4: TOP 5 PRIORITY PROJECTS	36
TABLE 5: POLICY & PROGRAM RECOMMENDATIONS	48
TABLE 6: IMPLEMENTATION PLAN	52
TABLE 7: BICYCLE FACILITY DESIGN GUIDANCE REFERENCES	59

MAPS

MAP 1: PERCENT POPULATION IN POVERTY	6
MAP 2: PERCENT MINORITY	7
MAP 3: PERCENT ELDERLY	8
MAP 4: PERCENT HOUSEHOLDS WITHOUT MOTOR VEHICLES	9
MAP 5: PERCENT WALKING TO WORK	11
MAP 6: CRASHES BY SEVERITY	14
MAP 7: BICYCLE ROUTES & FACILITIES	16
MAP 8: ONLINE SURVEY MAP EXERCISE RESULTS	25
MAP 9: HENDERSONVILLE	32
MAP 10: INVENTORY OF EXISTING & PLANNED FACILITIES	32
MAP 11: CRITICAL DESTINATIONS	32
MAP 12: STREETS RECOMMENDED FOR IMPROVEMENT	32
MAP 13: RECOMMENDED BICYCLE FACILITY PLAN	33
MAP 14: PRIORITY PROJECTS	35
MAP 15: TOP 5 PRIORITY PROJECTS	37

CHAPTER 1: INTRODUCTION



INTRODUCTION

BACKGROUND

The Hendersonville Bicycle Plan sets the stage for improving bicycling mobility and encouraging bicycling in the City of Hendersonville. Hendersonville’s continued growth will lead to increased demand on the transportation system. Encouraging bicycling through the construction of bicycle facilities, implementation of local policies, and creation of educational programs can play a part in creating a transportation system that is balanced, integrated, and connected.

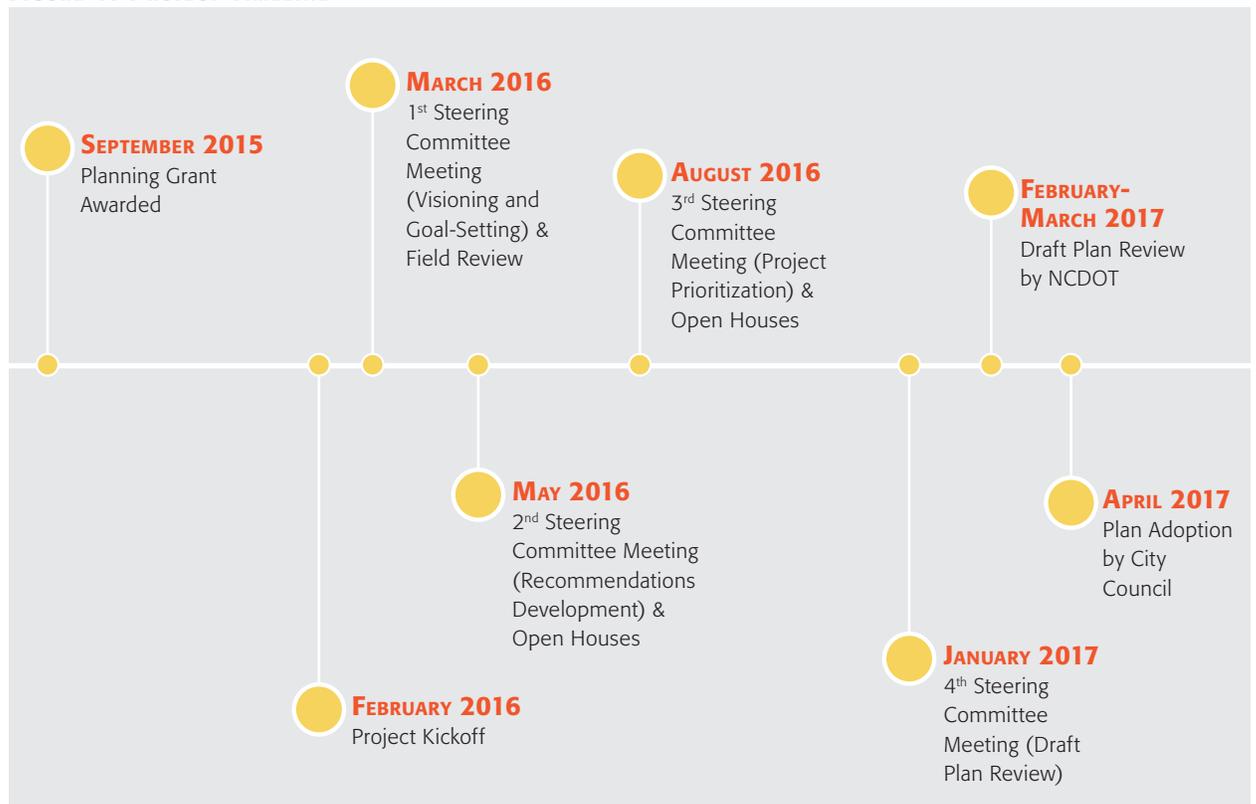
The development of the Hendersonville Bicycle Plan was funded by a grant awarded by the North Carolina Department of Transportation Division of Bicycle and Pedestrian Transportation (NCDOT-DBPT) through its Planning Grant Initiative and a local match provided by the City of Hendersonville and the Blue Ridge Bicycle Club. Through the planning Grant Initiative, NCDOT-DBPT encourages the development of bicycle and pedestrian plans at the municipal and county level by offering planning grants, totaling \$4.6 million across 186 municipalities and two counties since 2004.

TIMELINE

The development of the Hendersonville Bicycle Plan included several opportunities for public input, a field review, and four meetings with the Plan’s steering committee. The steering committee was made up of government staff, local advocates, educators, and health representatives, and guided the planning process to produce facility, program, and policy recommendations for the Hendersonville Bicycle Plan.

VISION & GOALS

FIGURE 1: PROJECT TIMELINE



The Hendersonville Bicycle Plan steering committee and the project team created a vision statement that succinctly communicates the desired future for bicycling in Hendersonville.

This vision statement served as a guide for the development of the Bicycle Plan’s recommendations, supported by the

The City of Hendersonville will have a bikeway system that is connected, safe, and comfortable for riders of all ages and abilities, supported by efforts that encourage and educate everyone who drives, bikes, and walks.

following goals:

- **Enhance transportation mobility** for everyone including children and elderly
- **Normalize bicycling** as a viable mode of transportation
- **Strengthen connections** between neighborhoods, schools, parks, and downtown
- **Improve travel safety, personal health, and quality of life**

BENEFITS OF BICYCLING

Bicycling for transportation and recreation can benefit the City of Hendersonville’s mobility, safety, health, economy, environment, and livability. These benefits are described in the following table.

TABLE 1: BENEFITS OF BICYCLING

CATEGORY	DEFINITION	POTENTIAL BENEFITS
Mobility	Mobility is the equitable availability of transportation options for everyone.	Only 0.1% of Hendersonville’s working population bikes to work. ¹ Bicycling can be an attractive travel mode for short trips that would otherwise be made by driving. Bicycling can also be an option for individuals without access to motor vehicles, which in Hendersonville comprises 16% of all households (significantly higher than the statewide average of 7%). ¹
Safety	Safe travel conditions result from effective design, enforcement, and education.	The presence of bike infrastructure and people on bicycles naturally calms traffic, and fully separated facilities can provide safe and comfortable travel ways. Recent bicycle crashes in Hendersonville underscore the safety concerns voiced by many members of the public during the public engagement process for the Plan.
Health	Health includes the mental state and physical condition of individuals and collective communities.	Almost a third of people who ride bicycles do so for exercise and fitness. ² Bicycling is a low-impact form of exercise that can reduce stress and diseases such as high blood pressure, diabetes, and obesity. 28% of Hendersonville’s population is elderly, which is twice the statewide average of 14%. ¹ These demographics contribute to the priority that the Plan places on the provision of safe bicycling conditions for people of all ages and abilities.

CATEGORY	DEFINITION	POTENTIAL BENEFITS
Economy	Strong economies are supported by job growth, increased sales revenue, and land development.	Improving bikeability can be a boon to homeowners and business owners, as bicycle investments can increase property values and retail sales, increase tourism, and lead to the creation of new jobs. ³ Bicycle tourism is already popular in western North Carolina due to the region's beautiful landscape, attractive destinations, and challenging terrain. Improving Hendersonville specifically as a destination for bicyclists could increase the sales revenue of local businesses.
Environment	Environmental stewardship holds the community accountable to protect natural resources.	More people on bikes can result in lower levels of motor vehicle emissions, cleaner air, and stronger preservation of streams and open spaces. As Hendersonville implements the programs, policies, and infrastructure projects recommended by the Plan, it is anticipated that a portion of trips that would have been made by car, releasing harmful emissions, will instead be made by bike.
Livability	Livability comprises quality of life, sense of place, and community vibrancy for residents and visitors.	Infrastructure features that increase comfort for bicyclists can enhance the character of communities by reducing motor vehicle speeds and improving safety. On Hendersonville's Main Street, for instance, the presence of more cyclists could further calm motor vehicle traffic and enhance the sense of place and walkability in downtown Hendersonville.

CHAPTER 2: CURRENT CONDITIONS



CURRENT CONDITIONS

The development of the Hendersonville Bicycle Plan started with the establishment of an understanding of Hendersonville’s current demographic, societal, administrative, geographic, physical, and operational contexts. Who lives in Hendersonville, current and future transportation preferences, and the factors that influence their travel choices are all important considerations for the Bicycle Plan.

The City of Hendersonville is located in western North Carolina approximately 20 miles south of Asheville, NC, 30 miles north of Greenville, SC, and 90 miles west of Charlotte, NC. Hendersonville is 6 square miles in size and is home to 13,350 people.⁴ Hendersonville’s vibrant Historic Downtown covers 14 city blocks that straddle the recently redesigned Main Street between Allen Street and 7th Avenue. Commercial development has generally followed the major arterials radiating from downtown, and the majority of residential neighborhoods are generally located in the western, northwestern, and southern portions of the City. Hendersonville can be accessed from Interstate 26 via US 64 which takes the names of 6th Avenue, Martin Luther King Jr. Boulevard, Four Seasons Boulevard, and Chimney Rock Road within city limits.

EQUITY

While transportation professionals have historically placed an emphasis on the 5 Es to advance bicycling, another element has recently emerged as a priority—equity.

Equity in transportation is fairness in how decision-makers meet the mobility, accessibility, and connectivity needs of the community they serve.⁵ Equity should not be confused with equality, which implies that all parts of a community should be allocated the same amount of resources. Instead, transportation officials should distribute resources in a way that considers the unique needs of underserved populations and seeks parity in mobility for all community members. Traditionally underserved populations include low income families, minorities, low vehicle ownership households, and the elderly. These groups are described in the figure below and maps on the following pages.

THE 5 ES OF IMPROVING BICYCLE-FRIENDLINESS

Engineering directs the safe and effective design and construction of bicycle infrastructure.

Education helps both motorists and bicyclists understand how to safely navigate the streets together.

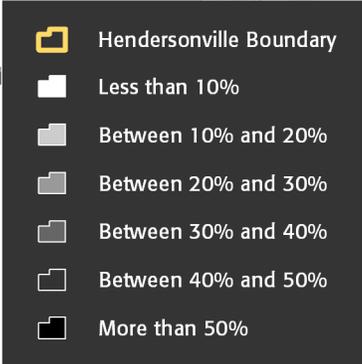
Encouragement promotes bicycling as a viable form of transportation and incentivizes bicycling.

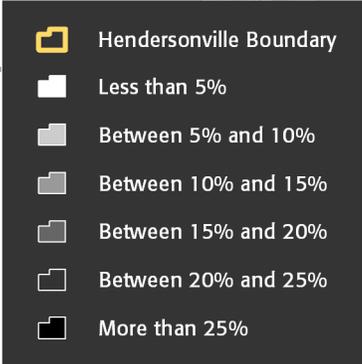
Enforcement ensures that all road users comply with local and state rules and regulations.

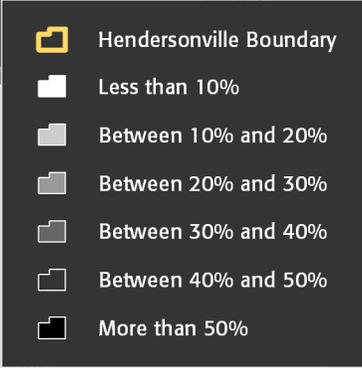
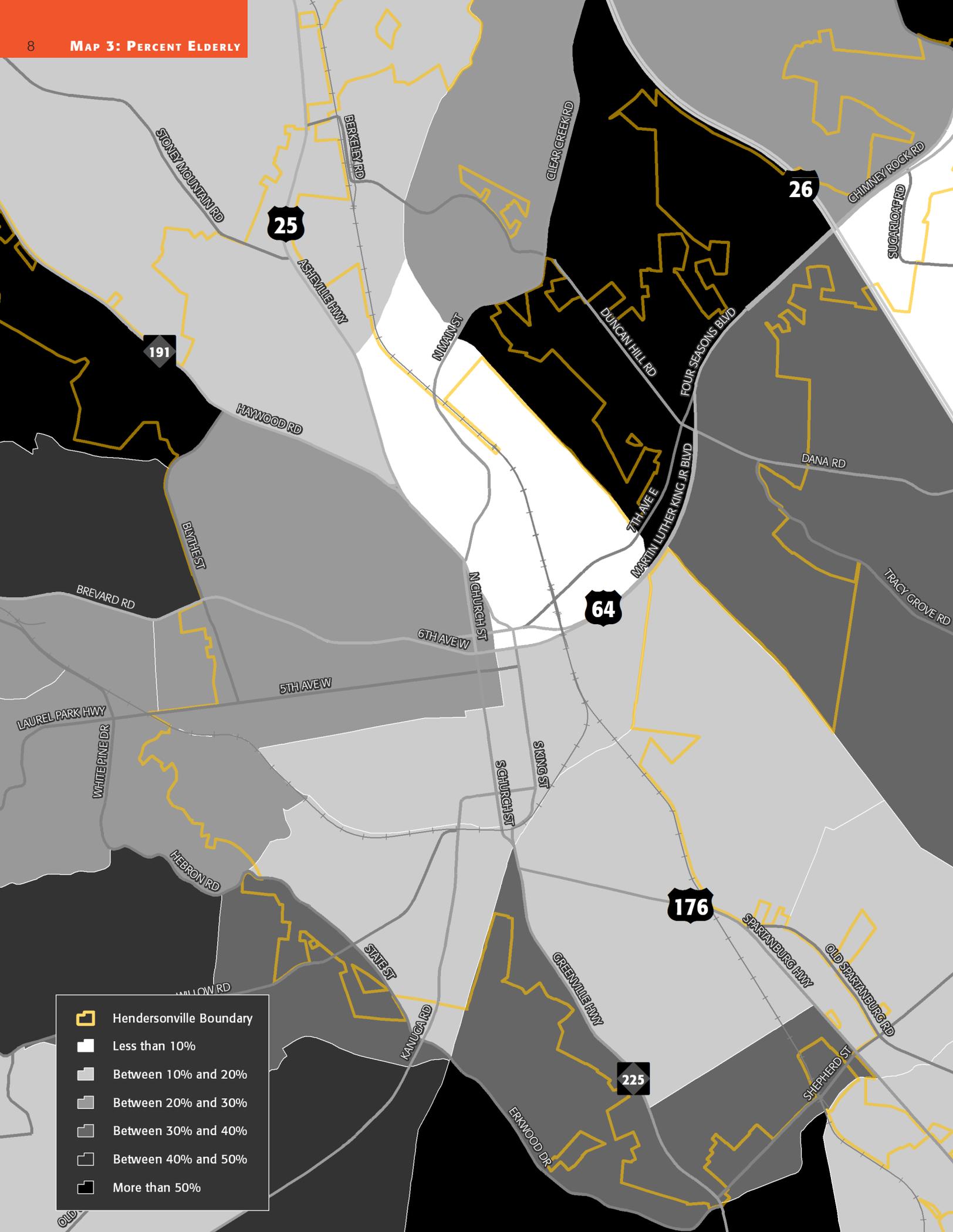
Evaluation and planning quantifies the benefits of bicycling investments to guide future decision-making.

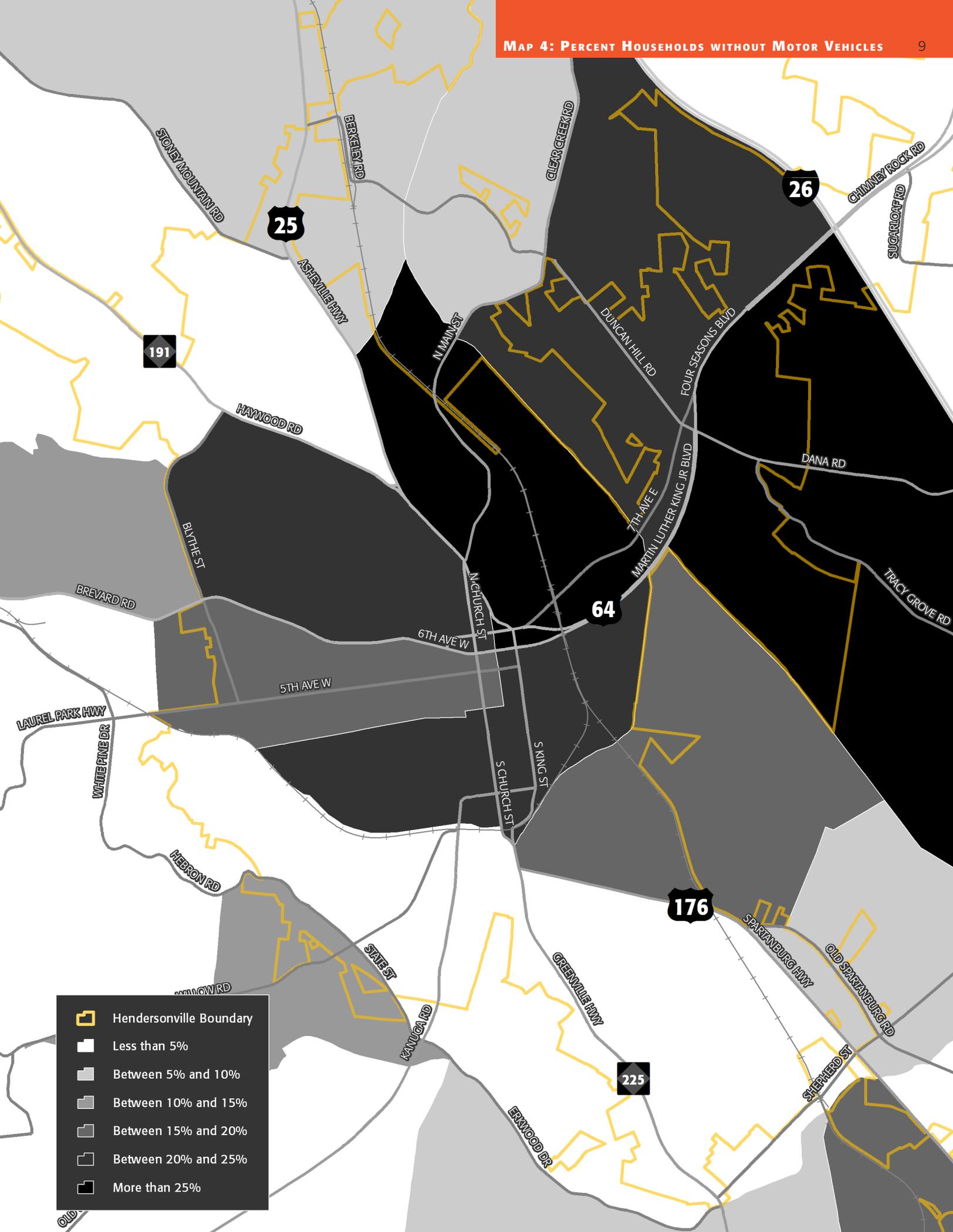
FIGURE 2: POPULATION & HOUSEHOLDS

POPULATION & HOUSEHOLDS	 Hendersonville	 Henderson County	 North Carolina
Population	13,350	108,642	9,750,405
Percent in Poverty	27.7%	14.8%	17.6%
Percent Minority	18.1%	8.7%	30.4%
Percent Over 64	28.1%	23.6%	13.8%
Households	5,920	45,534	3,742,514
Percent without Motor Vehicles	15.7%	5.8%	6.5%







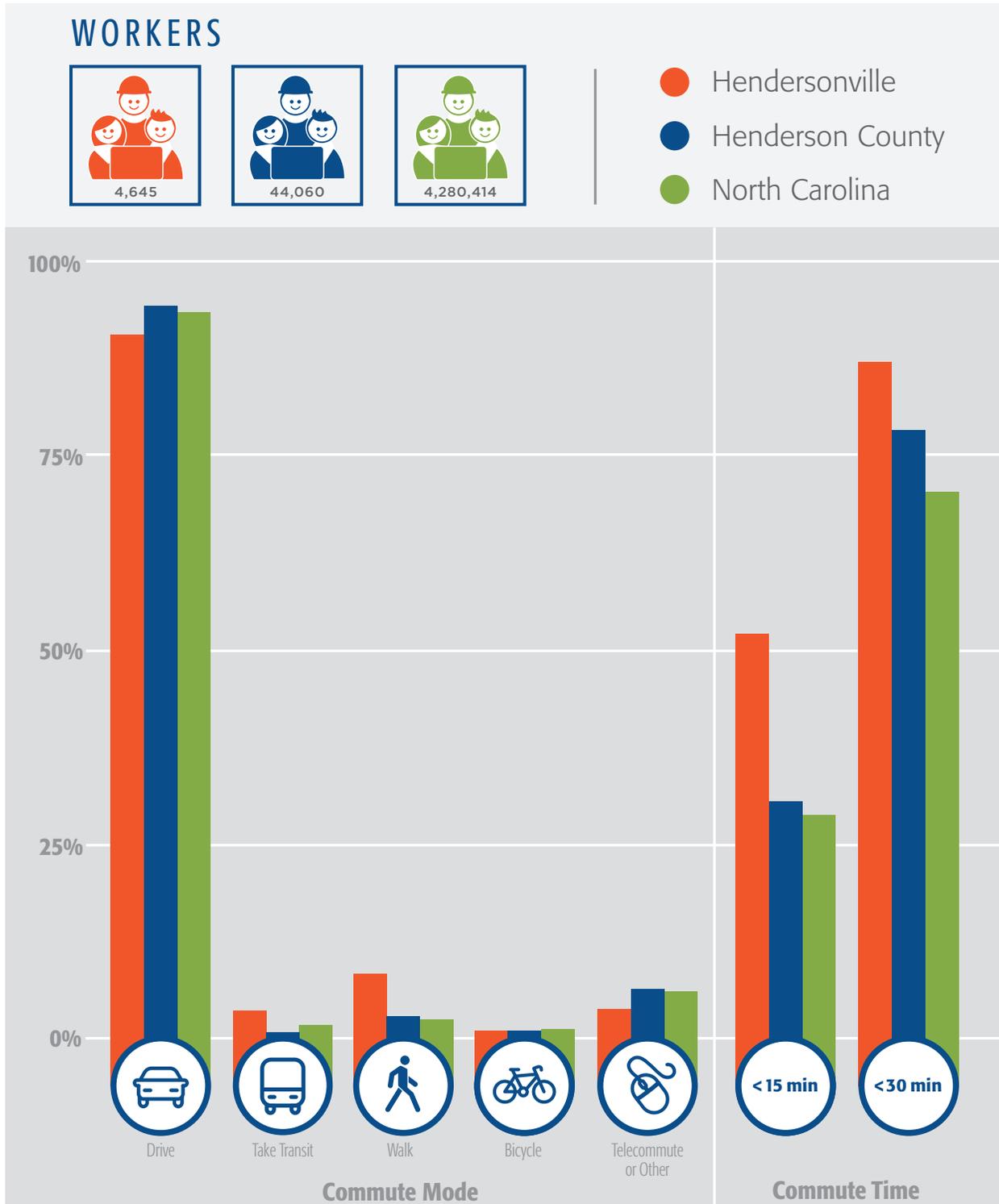


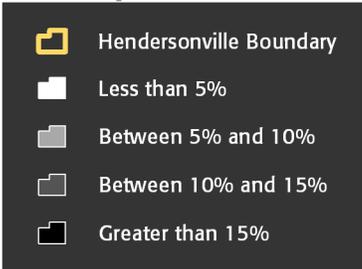
- Hendersonville Boundary
- Less than 5%
- Between 5% and 10%
- Between 10% and 15%
- Between 15% and 20%
- Between 20% and 25%
- More than 25%

COMMUTING

Four out of ten people nationwide who bicycle primarily do so for transportation (personal errands, visiting friends, and commuting), while the remainder bicycle primarily for recreation and exercise.⁶ Commuting to work or school is a major consideration for transportation planners, as commute trips generally occur when streets are the most congested. While commute data captured by the American Community Survey is fairly limited and does not effectively reflect commuters who utilize different modes throughout the week, throughout the day, or even within the same trip, the information still provides insight into commuters' primary mode of transportation. The figure below shows the travel patterns of Hendersonville's workers, and the map on the next page shows where people walk to get to work.

FIGURE 3: COMMUTE PATTERNS





DESTINATIONS

Developing a community-wide plan for improving bikeability requires the consideration of accessibility and connectivity to key destinations, including major employers, schools, parks, greenways, and other retail centers such as downtown and grocery stores. These destinations are shown in the figure below.

FIGURE 4: KEY DESTINATIONS



Sources: NC Commerce, Labor and Economic Analysis Division; Henderson County Public Schools; and the City of Hendersonville

STREET NETWORK

Hendersonville's street system is characterized by several major arterials radiating from its center, supported by a local grid network. Traveling along the major arterials or crossing them can subject bicyclists to high levels of stress, since the major arterials have no dedicated bicycle facilities and are generally high volume and high speed. One pair of one-way streets supports Hendersonville's downtown—Church Street (southbound) and King Street (northbound).

The top reasons individuals choose not to bicycle in Hendersonville are the relative lack of existing bikeways and because they feel that it's unsafe. A major barrier to bicycling along Hendersonville's streets is the fear of collisions with motorists, which is heightened along roadways with fast-moving motor vehicle traffic, high volumes of motor vehicle traffic, or large percentages of truck traffic. Other physical barriers to bicycling include one-way streets, variable topography, poor pavement conditions, and gaps in the street network.

CRASH STATISTICS

The North Carolina Department of Transportation documents and makes available crashes reported along state-maintained roadways. While this dataset doesn't include crashes that occur on local streets and does not reflect the frequency of close calls or near misses, it still provides insight in highlighting key corridors and intersections for improvement. Streets that are characterized by a high frequency of motor vehicle crashes, a high severity of motor vehicle crashes, or both are generally unsafe environments for bicycle travel.

Between January of 2013 and December of 2015, a total of 1,366 crashes occurred on state-maintained roadways in Hendersonville. In this same time period, there were three reported collisions involving bicyclists on state-maintained roads, one occurring on Hebron Road near W Lake Avenue and the other two occurring on US 64 eastbound in the interchange with I-26 and near St. Mary's Drive. Crashes color-coded by severity are shown on the following map.



	Bicyclist-Involved
	Fatal
	Disabling Injury
	Evident Injury
	Possible Injury
	No Injury
	Unknown

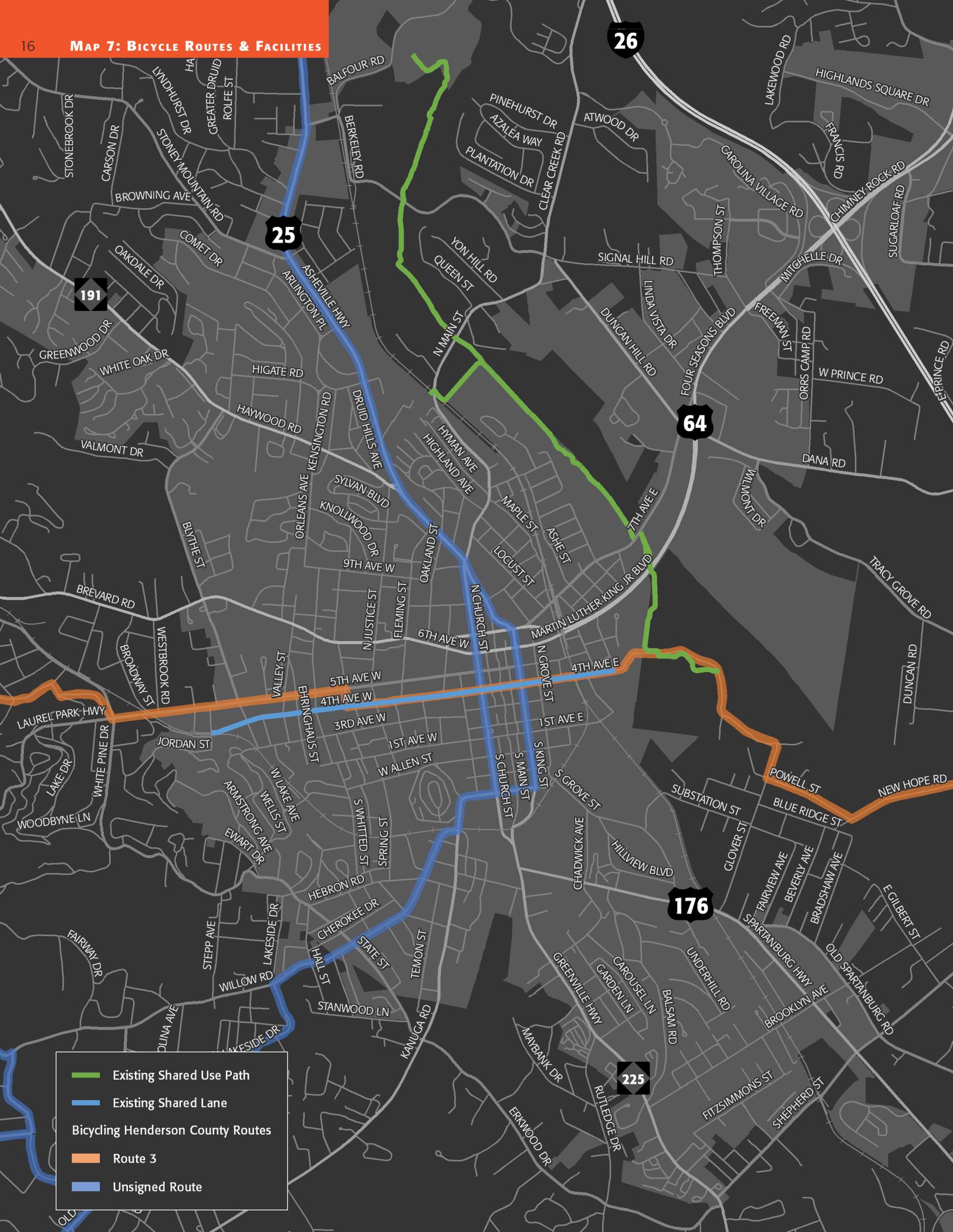
BICYCLE INFRASTRUCTURE AND ROUTES

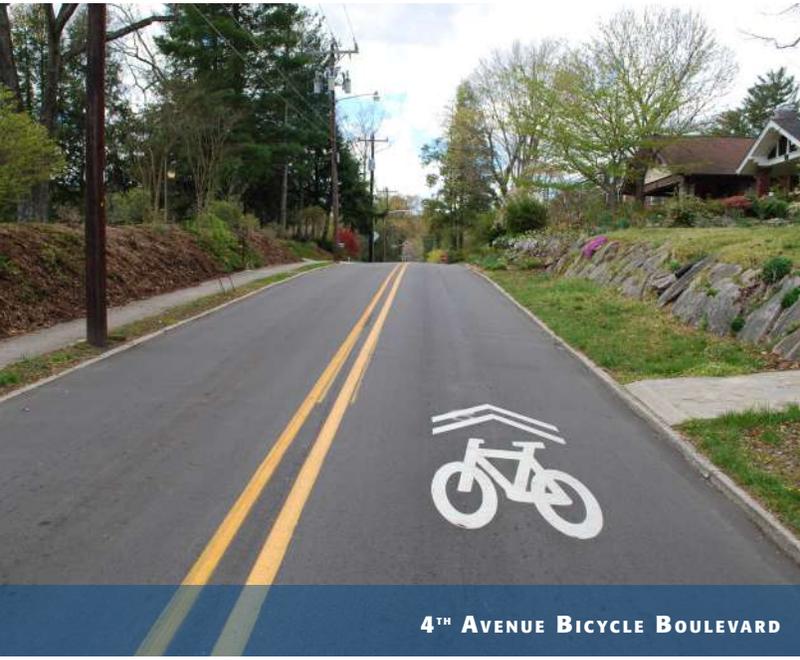
Dedicated bicycle facilities provide exclusive travel space for bicyclists. Traditional facilities are placed directly adjacent to general travel lanes, though more and more communities are installing bicycle lanes with striped buffers or vertical elements to improve safety and comfort. Shared facilities, such as shared lane markings, require bicyclists and motorists to share the street space. Shared use paths are off-street facilities shared by bicyclists and pedestrians. As of 2017, there are no dedicated bicycle facilities in Hendersonville.

Hendersonville's bicycle facilities include the 4th Avenue bicycle boulevard and the Oklawaha Greenway. The 4th Avenue bicycle boulevard comprises shared lane markings, also called "sharrows," and wayfinding signs between Jordan Street and Harris Street. The Oklawaha Greenway follows Mud Creek, connecting to Berkeley Mills Park at its northern end and Jackson Park at its southern end. An investigation is underway to extend the greenway south to the Blue Ridge Community College. In addition to the parks along the Oklawaha Greenway, the greenway can be accessed via North Main Street, Martin Circle, 7th Avenue, and 4th Avenue.

Along Main Street in Historic Downtown Hendersonville there are several public bicycle racks, and the City also owns and maintains two bicycle repair stations comprising a stand, tools, and a tire pump. The bicycle repair stations are located along the Oklawaha Greenway in Patton Park and near Berkeley Mills Park.

Bicycling Henderson County is a map showing a 184-mile system of bicycle routes located in Henderson County, and it formalizes two routes connecting to Hendersonville. One route is signed as Bicycle Route 3 and is Bicycling Henderson County's major east-west route. In Hendersonville, the route follows 5th Avenue and 4th Avenue, connecting the Town of Laurel Park on the west and Jackson Park in Henderson County on the east. The other bicycle route is unsigned and primarily utilizes Asheville Highway, Church Street, King Street, and Willow Road.





4TH AVENUE BICYCLE BOULEVARD



OKLAWAHA GREENWAY



DOWNTOWN BIKE RACK



PATTON PARK BIKE REPAIR STAND



BIKE ROUTE 3 SIGN ALONG 5TH AVENUE

POLICIES & PROGRAMS

Existing local policies impact Hendersonville bicycle-friendliness. For example, though rarely enforced, riding a bicycle on any sidewalk in Hendersonville is illegal as of 2017.⁷ This discourages less skilled bicyclists, including children, from bicycling along major arterials.

Within its zoning and subdivision ordinances, the City of Hendersonville requires that private land developers in some instances continue existing or planned sidewalk facilities within a quarter-mile of the development site and construct sidewalks within subdivisions. The ordinances do not require developers to construct bicycle facilities.

The Henderson County Parks & Recreation Department, in partnership with Trips for Kids WNC, hosts a series of bike skills classes for students in grades 3 to 5 every summer. The classes are free and teach young bicyclists to ride safely, skillfully, and confidently. Trips for Kids WNC is a chapter of Trips for Kids International, which uses bicycling to educate, develop, and encourage at-risk youth.

The Blue Ridge Bicycle Club, the bicycle advocacy group for western North Carolina, plans and regularly hosts rides and novice skills clinics, one of which takes place in Jackson Park or in Osceola Lake in Valley Hill located to the southwest of Hendersonville. The clinics are intended to teach novice riders how to ride safely and efficiently when riding alone or in groups.

Apple Country Public Transit, which operates three weekday bus routes throughout Hendersonville, Fletcher, and Laurel Park, supports bicycling. Their bike policy states that bicycles are allowed on all buses, and some buses are even equipped with external bicycle racks.

PREVIOUS PLANNING EFFORTS

The Hendersonville Bicycle Plan acknowledges that change wording that it is built upon a foundation of past transportation planning efforts in Hendersonville and the region. The Bicycle Plan considers and builds upon the key findings and recommendations of previously adopted plans, summarized on the following pages.

TABLE 2: PREVIOUS PLANNING EFFORTS

DESCRIPTION	RELEVANT FINDINGS & RECOMMENDATIONS
Hendersonville 2030 Comprehensive Plan⁸	
<p>The Hendersonville 2030 Comprehensive Plan provides:</p> <ul style="list-style-type: none"> • An analysis of development opportunities and constraints. • A road map for where, how, and when the community should grow. • A public participation process that creates consensus and promotes civic involvement. • Policies that promote sustainable and high-quality development that preserves and enhances quality of life and minimizes environmental impact. 	<ul style="list-style-type: none"> • The Transportation and Circulation element of the Plan includes affirmation that Hendersonville citizens have “expressed a strong desire throughout the planning process for improved walkability and bikeability throughout the City,” as well as for “a bike path system that connects to a regional bike path network.” • One goal of the Comprehensive Plan is to “develop a bicycle infrastructure that encourages bicycling as a form of transportation and recreation.” To meet this goal, the Plan recommends the pursuit of NCDOT grants to prepare a bicycle plan, an action which has resulted in the development of this Plan. • Strategies from the Transportation and Circulation element of the Comprehensive Plan that are echoed by the recommendations of the Bicycle Plan include: <ul style="list-style-type: none"> - Preserve and expand the public greenway system as a core component of the bicycle and pedestrian transportation system. - Incorporate bicycle lanes into future roadway improvements where appropriate. - Encourage bicycle parking facilities at key destinations. - Promote bicycling as a form of transportation and recreation. - Achieve status as a “Bicycle Friendly Community” as designated by the League of American Bicyclists.
City of Hendersonville Pedestrian Plan	
<p>The City of Hendersonville Pedestrian Plan was completed in 2007 and was funded through NCDOT-DBPT's Planning Grant Initiative. The Plan identifies existing pedestrian facilities and recommends long- and short-range projects and program priorities to enhance the existing network.</p>	<ul style="list-style-type: none"> • The Hendersonville Pedestrian Plan recommends coordination with North Carolina's Safe Routes to Schools program and National Walk to School Day events. • It also refers to bicycle and pedestrian safety education as a top priority to promote safety among bicyclists, pedestrians, and motorists.

DESCRIPTION	RELEVANT FINDINGS & RECOMMENDATIONS
Land of Sky Regional Council 2013 Blue Ridge Bicycle Plan⁹	
<p>The Blue Ridge Bicycle Plan (BRBP) encompasses the following counties:</p> <ul style="list-style-type: none"> • Buncombe • Haywood • Henderson • Jackson • Madison • Swain • Transylvania <p>The Plan provides the vision and goals for regional bicycle infrastructure, analysis of current conditions, a map of prioritized regional corridors for bicycle improvements in the future, and a list of policy recommendations. Recommendations from the Plan influence the inclusion of bicycle facilities along priority corridors when funding becomes available.</p>	<ul style="list-style-type: none"> • The BRBP provides evidence for the economic benefits of bike facilities: <ul style="list-style-type: none"> - Increased property values due to walkable or bikeable routes to schools - Revenue generated for the local economy from bike tours - Greenway trails give residents easier access to downtown shops and restaurants • The Plan refers to the Ecusta Rail Trail Study, which examined a 20-mile underutilized railway corridor connecting to Brevard, and the feasibility of constructing a multi-use path (greenway) along the corridor. The Ecusta Rail Trail Study has estimated a cost of approximately \$17 million to purchase right-of-way and complete the trail. • The Plan identified seven high priority recommendations: <ul style="list-style-type: none"> - Develop, implement and maintain a core network of safe and well-connected bicycle facilities (bike lanes and greenways). - Adopt city, county and region-wide “complete streets” policies. - Work towards having a comprehensive bicycle plan for each town/city and county. - Provide up-to-date bicycle maps (regional and local) to the public, that include safety- and skill level-appropriate recommendations. - Incorporate bicycle safety elements into Driver’s Education to ensure drivers know the rules, rights and responsibilities of both drivers and cyclists.
Ecusta Rail Trail Planning Study & Economic Impact Analysis	
<p>This study identifies alignment recommendations, railroad structural improvements, trailheads, scenic overlooks, and estimated costs for the proposed Ecusta Rail Trail.</p>	<ul style="list-style-type: none"> • The six phases of the Ecusta Rail Trail in Henderson County include: <ul style="list-style-type: none"> - Oklawaha Greenway in Jackson Park to Proposed Shared-Use Trailhead at Laurel Park - Etowah to EPONA property (located at the NW intersection of Brevard Road and Morgan Road) - Laurel Park to Sky Lake Drive - EPONA property to Proposed Shared-Use Trailhead at Grass Roots Café - Shared-use Trailhead at Grass Roots Café to Sky Lake Drive - Henderson/Transylvania County limits to Etowah

DESCRIPTION	RELEVANT FINDINGS & RECOMMENDATIONS
French Broad River Metropolitan Planning Organization 2040 Metropolitan Transportation Plan¹⁰	
<p>The French Broad River Metropolitan Planning Organization Metropolitan Transportation Plan (MTP) 2040 looks 25 years into the future. It forecasts changes in the region and seeks to identify transportation improvements needed to keep travelers and goods moving smoothly and how to pay for those improvements. The MTP was last updated in 2015 and contains two projects in the immediate Hendersonville area.</p>	<ul style="list-style-type: none"> • Oklawaha Greenway Extension to Blue Ridge Community College <ul style="list-style-type: none"> - Horizon 1: 2016-2020 - Project Description: Construct greenway along existing sewer easement. - From Jackson Park to Blue Ridge Community College - Complete Streets recommended. - Sponsor: Hendersonville (\$1,895,000) • Ecusta Rail Trail Phase 1 <ul style="list-style-type: none"> - Horizon 2: 2021-2025 - Project Description: Construct rail-to-trail. - From Oklawaha Greenway in Jackson Park to proposed trailhead in Laurel Park - Complete Streets recommended. - Sponsor: Henderson County (\$2,141,000)
North Carolina Department of Transportation 2016-2025 State Transportation Improvement Program¹¹	
<p>The NCDOT State Transportation Improvement Program (STIP) is a 10-year plan that identifies the construction funding for and scheduling of transportation projects throughout the state. The NCDOT 2016-2025 STIP provides a listing of funded transportation projects statewide with a ten-year horizon.</p>	<p>Three of the funded transportation improvements in the 2016-2025 STIP are located within Hendersonville:</p> <ul style="list-style-type: none"> • R-5748 <ul style="list-style-type: none"> - Roadway upgrades on SR 1127 (Kanuga Road) from US 25 Business (Church Street) to SR 1123 (Little River Road) - Right-of-way year: 2023 - Construction year: 2025 - Project cost: \$10,300,000 • B-5929 <ul style="list-style-type: none"> - Bridge replacement (440350) on Old Dana Road over Devils Fork Creek - Right-of-way year: 2017 - Construction year: 2018 - Project cost: \$890,000 • U-5886 <ul style="list-style-type: none"> - Realignment and extension of SR 1170 (White Street) from SR 1171 (Willow Road) to US 176 (Spartanburg Highway) - Right-of-way year: 2020 - Construction year: 2022 - Project cost: \$7,200,000

CHAPTER 3: PUBLIC INPUT

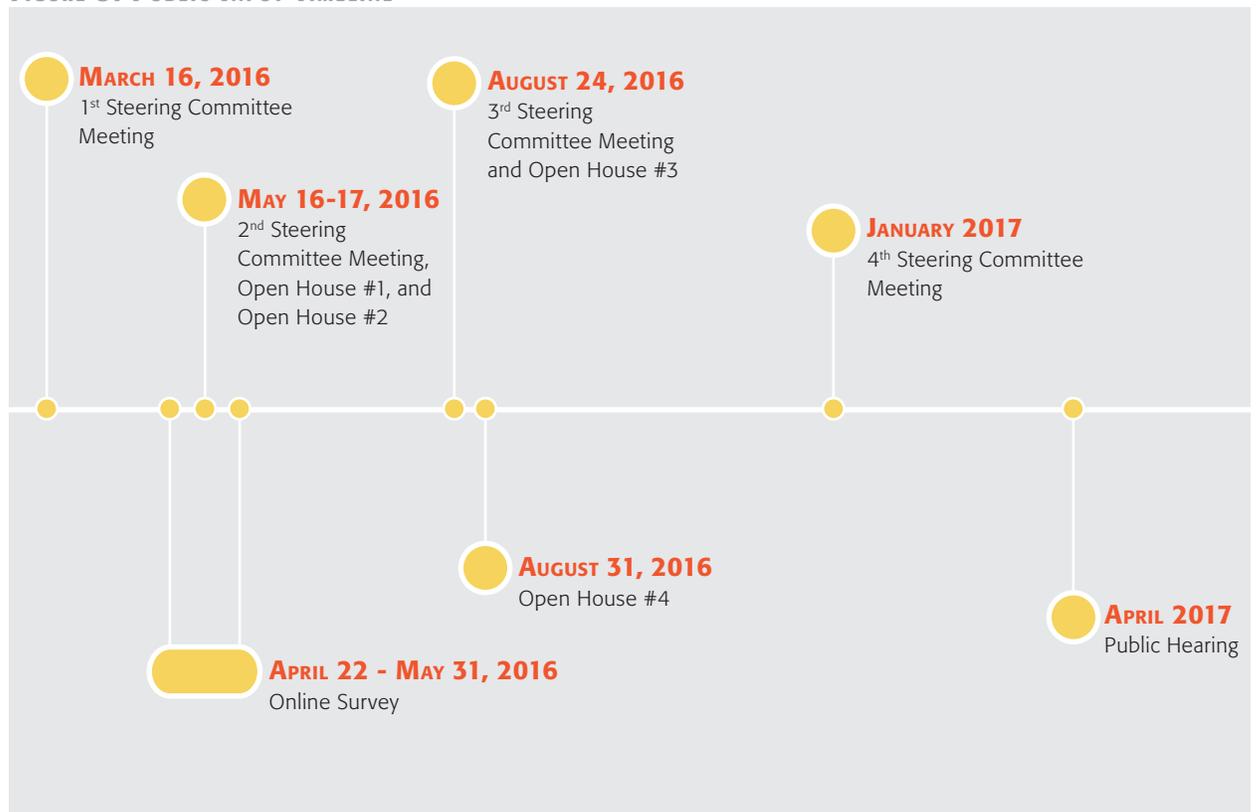


PUBLIC INPUT

Engaging the public during the bicycle planning process created the opportunity to capture and consider public opinion and increase awareness of the Bicycle Plan. Gaining an understanding of the public’s values increases the likelihood that the end product will offer viable strategies that are responsive to the needs of the community.

Hendersonville citizens helped the project team identify key destinations and priority corridors for facility recommendations. The public also provided feedback regarding the desirability of proposed program and policy recommendations. The public engagement process for the Hendersonville Bicycle Plan included several opportunities for the public to learn about the Plan and provide their input. The success of the public engagement process is due in large part to the support of the Blue Ridge Bicycle Club, who assisted with promotion and facilitation of public meetings and advertisement of the online survey.

FIGURE 5: PUBLIC INPUT TIMELINE



STEERING COMMITTEE

Convening four times during the creation of the Bicycle Plan, the Plan's steering committee included representation from the following entities and groups:

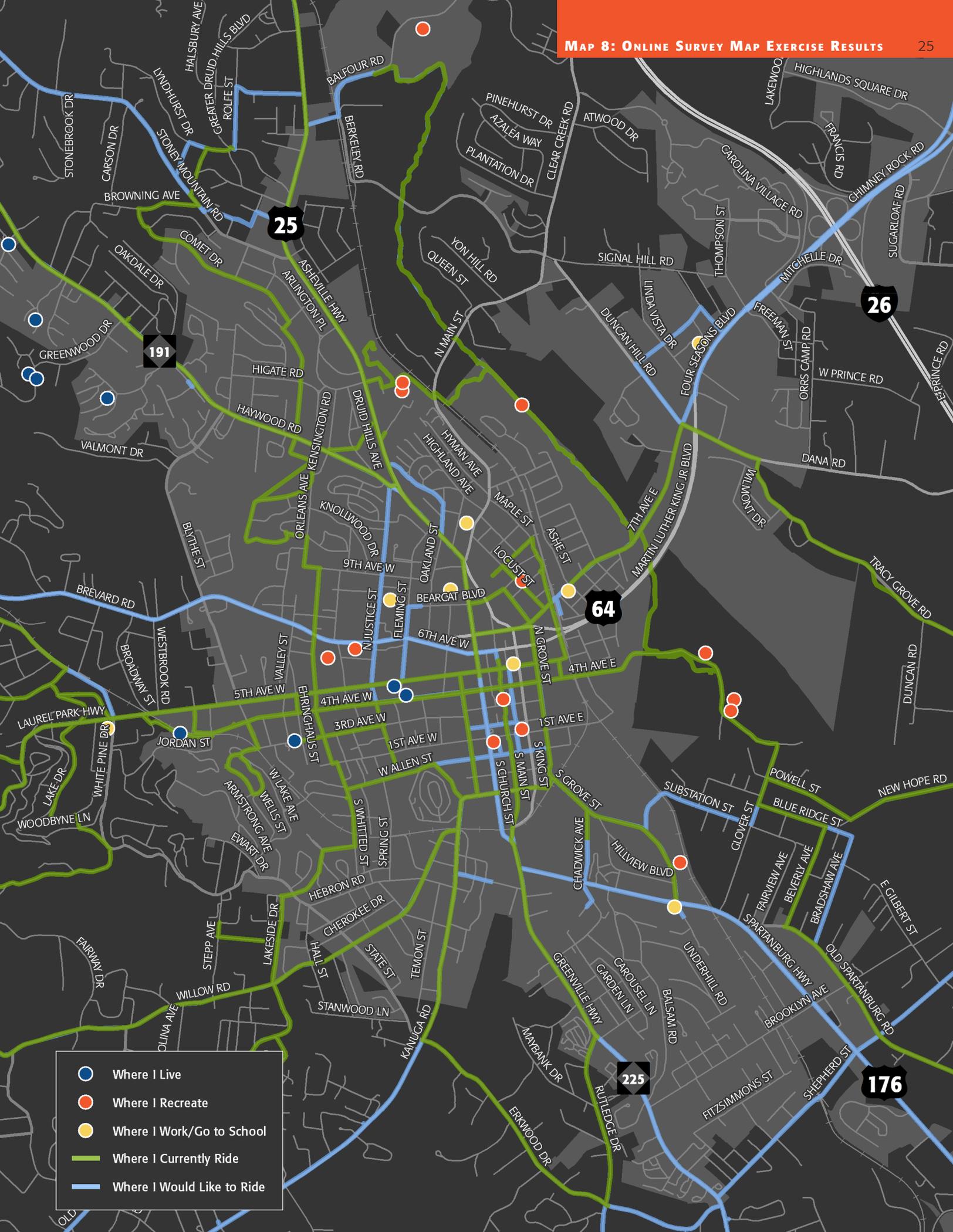
- City Council
- Senior citizens
- Blue Ridge Bicycle Club
- Public Works
- Police Department
- Development Assistance Department
- Henderson County Parks & Recreation
- Hendersonville High School
- Blue Ridge Community College
- Pardee Hospital
- French Broad River Metropolitan Planning Organization
- North Carolina Department of Transportation



ONLINE SURVEY

The project team created an interactive online survey to gather additional input from members of the Hendersonville community. This exercise expanded the reach of the public engagement process to include people who were unable to attend the public meetings.

The survey consisted of a brief questionnaire and a map where participants could mark their common biking routes, as well as where they would like to ride. The map also provided the opportunity for participants to mark where they live, work, recreate, and go to school. The results of the mapping exercise are shown on the following page.



- Where I Live
- Where I Recreate
- Where I Work/Go to School
- Where I Currently Ride
- Where I Would Like to Ride

The three most common responses to the statement, “I might ride my bike more...” were:

- If it were safer to ride
- If there were more off-street multi-use paths (greenways)
- If there were more on-street bikeways

Detailed results from the online survey are included in the Appendix.

PUBLIC MEETINGS

The project team held public meetings in May and August 2016. Information about the Plan was presented to the public at these meetings and attendees participated in a variety of activities to provide their input. The May open houses captured existing perceptions and desired bicycling conditions in Hendersonville, while the August open houses provided an opportunity for the public to review and rank the Plan’s recommendations.

The public played a key role in highlighting existing deficiencies in the street network for bicycling and prioritizing corridors for short-term improvements. They also identified key destinations, which were a major consideration for infrastructure recommendations.

At the August open houses, the public ranked the infrastructure projects that had been identified as priorities by the steering committee. These rankings (along with steering committee feedback and a data-driven scoring process) sorted the priority projects into short-term and mid-term tiers. The public also reviewed and ranked recommendations pertaining to bicycle education and encouragement. The public’s feedback influenced the Hendersonville Bicycle Plan’s recommendations and action plan, described in the Recommendations and Implementation chapters.

FIGURE 6: VISIONING EXERCISE RESULTS





city of
hendersonville
bicycle plan

VISION

The City of Hendersonville will have a connected bikeway system that is **safe** and **comfortable** for riders of **all ages and abilities**, as well as programs to encourage and educate **everyone** who drives, bikes, and walks.

GOAL

PROJECTS +
PROGRAMS +
POLICIES =
BICYCLE FRIENDLY HENDERSONVILLE

GREAT REASONS TO RIDE A BIKE

- IMPROVED HEALTH
- INCREASED BUSINESS
- VIBRANT COMMUNITIES
- CLEANER ENVIRONMENT

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TRUNG VO
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EVENTS

OPEN HOUSE
Wednesday, August 24th
City Operations Center
5pm-7pm

CITY COUNCIL PRESENTATION
Spring 2017



CHAPTER 4: RECOMMENDATIONS



RECOMMENDATIONS

INTRODUCTION

Generally speaking, there are four categories of bicyclists:

1. People who are comfortable riding on high-speed roadways (the "strong and fearless")
2. People who are comfortable sharing travel lanes with motorists but would prefer dedicated facilities (the "enthused and confident")
3. People who would like to ride but are worried about their safety (the "interested but concerned")
4. People who wouldn't even consider riding a bicycle ("no way, no how")

In a study published by Portland State University, over half of survey respondents reported being in the interested but concerned category of bicyclists. This group represents people who would ride their bikes more if it were safer, more convenient, and more comfortable to do so.¹² The Hendersonville Bicycle Plan seeks to serve the interested but concerned majority.

BICYCLE FACILITY PLAN

Hendersonville's recommended bicycle facility plan consists of individual projects along key streets and corridors. These projects support the City's goal to improve its infrastructure for bicyclists of all ages and abilities. The next steps for the City of Hendersonville, in partnership with the French Broad River Metropolitan Planning Organization (FBRMPO) and the North Carolina Department of Transportation (NCDOT), are to prioritize, design, fund, construct, and evaluate these projects. This initiates the prioritization process by identifying five projects that can be implemented in the next five to ten years.

FACILITY PLANNING PROCESS

The creation of the recommended bicycle facility plan began with the drafting of the Hendersonville Bicycle Plan's vision statement:

The City of Hendersonville will have a bikeway system that is connected, safe, and comfortable for riders of all ages and abilities, supported by efforts that encourage and educate everyone who drives, bikes, and walks.

The key words in the vision statement relating to facility planning are "connected," "safe," "comfortable," and "all ages and abilities." The vision statement serves as a reminder to the project team, the steering committee, and the public of what the Hendersonville Bicycle Plan is seeking to accomplish regarding infrastructure improvements from a big picture perspective.

Following consensus on the vision statement, the project team initiated an iterative process to create the recommended bicycle facility plan. This process, graphically displayed in the maps on the following pages, began with inventorying existing facilities, i.e. the 4th Avenue bicycle boulevard and the Oklawaha Greenway, and facility recommendations from previously adopted plans, including the Blue Ridge Bike Plan and the FBRMPO 2040 Metropolitan Transportation Plan.

The steering committee and the public then identified existing bicycle destinations as well as additional places where access by bike should be improved, including schools, parks, neighborhoods, and downtown Hendersonville. The Oklawaha Greenway serves as both a bikeway and a destination. This exercise yielded a mostly blank “connect the dots” map – the dots represent the destinations, and the lines represent the existing and planned bicycle facilities. The steering committee and the public were responsible for the initial connection of the dots, making decisions about which routes have the greatest potential for improvement considering the context of safety, comfort, connectivity, and equity. This step included superficial considerations of the operational and geometric characteristics of Hendersonville’s streets and opportunities to construct off-street facilities such as shared use paths.

The project team then reviewed the preliminary bicycle facility map to fill in network gaps, augment the network with additional recommendations, and make determinations about what facility type would characterize each recommendation. The graphic on the next page details the bicycle facility toolkit at the team’s disposal.

To determine the logical facility type for each recommendation, the project team considered both qualitative and quantitative inputs, including feedback from the steering committee and the public, land use context and nearby destinations, motor vehicle traffic volumes and speeds, crash statistics, existing pavement widths and conditions, shoulder treatments, and structural and environmental constraints. The draft bicycle facility plan then underwent a series of reviews by the steering committee and was presented at a public open house. The facility planning process is shown in the series of maps on page 32. The final recommended bicycle facility plan is shown in the map on page 33.

BALANCING BIKE LANE VISION PROJECTS WITH THE DEMAND FOR ON-STREET PARKING

On-street bicycle lanes are generally implemented in one of two ways: as part of new roadways or striped within the existing pavement width. The latter strategy can be coordinated with existing street resurfacing programs to reduce implementation costs. However, restriping a street to include bike lanes where bike lanes did not previously exist can sometimes result in the loss of travel lanes or on-street parking lanes.

On the surface, business owners may have the most to lose when on-street parking is considered for reallocation for the creation of bike lanes. Every on-street parking space is valuable because it is an opportunity for a customer to park their vehicle. Not being able to find convenient parking may turn customers away from patronizing the business. However, several case studies investigating the economic impact of converting on-street parking into bike lanes show net gains in sales revenue or no change at all.¹³ While bicyclists can’t carry as much as motorists and thus, don’t spend as much money during each shopping trip, bicyclists tend to make more trips and spend more money overall.

The City of Hendersonville recognizes the value of on-street parking and should make every effort to communicate and collaborate with those who may be impacted by the potential modification of on-street parking due to recommended bike lanes. Where existing on-street parking and proposed bike lanes vie for the same cross-sectional space, the City of Hendersonville and its partners should develop a committee of key stakeholders and City staff to consider preferred outcomes. The City of Hendersonville has a successful history of convening Blue Ribbon Committees for the purposes of community collaboration. The committee will weigh the community-wide impacts and benefits of restriping to include bicycle facilities and will investigate mitigation measures where appropriate.

FIGURE 7: BICYCLE FACILITY TOOLKIT

SHARED FACILITIES WITH MOTOR VEHICLE TRAFFIC

Bike routes

- Bicycle routes are delineated using numbered signs and are generally meant to guide skilled bicyclists during long-distance trips.

Wayfinding

- Signage directing bicyclists to nearby destinations can provide a means of wayfinding for bicyclists and remind motorists to expect bicyclists traveling in the street.

Shared lane markings

- Also known as sharrows, a portmanteau of share and arrows, shared lane markings indicate where bicyclists should travel in the roadway to increase bicyclist conspicuity, mitigate bicyclist collisions with opening parked vehicle doors, and reinforce the presence of bicyclists.

Bicycle boulevards

- Bicycle boulevards, neighborhood greenways, or neighborhood bikeways, utilize traffic calming measures, signage, and design elements that prioritize bicycle travel on low-speed and low-traffic streets.



DEDICATED FACILITIES

Conventional bike lanes

- Bike lanes dedicate exclusive space for bicyclists in the roadway. In contrast to buffered or separated bike lanes, conventional bike lanes do not provide any vertical separation or additional horizontal separation from travel lanes.

Buffered bike lanes

- Buffered bike lanes provide a painted buffer between bike lanes and travel lanes or parking lanes, increasing comfort for both motorists and bicyclists.

Separated bike lanes

- Separated bike lanes, also known as protected bike lanes or cycle tracks, separate bike lanes from travel lanes using vertical elements such as plastic posts, planters, and medians, reducing the likelihood of motor vehicle encroachment.



SHARED FACILITIES WITH PEDESTRIANS (GREENWAYS)

Shared use paths

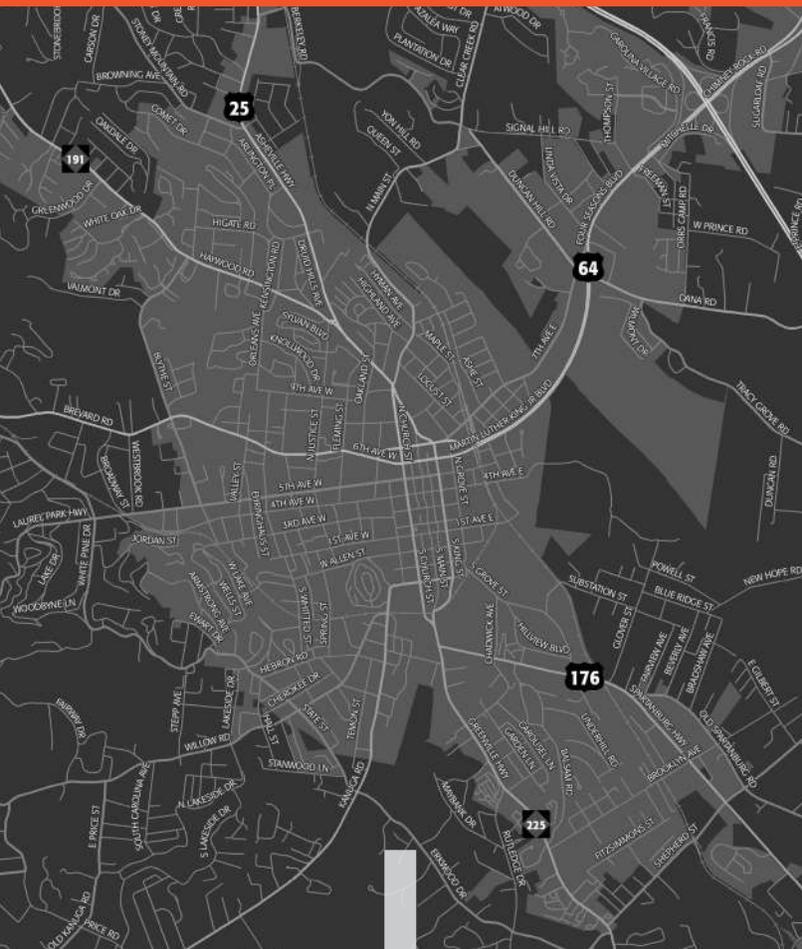
- Shared use paths, also known as multi-use paths or greenways, are paved trails located away from street rights-of-way and are intended only for non-motorized forms of transportation, including bicycling and walking.

Side paths

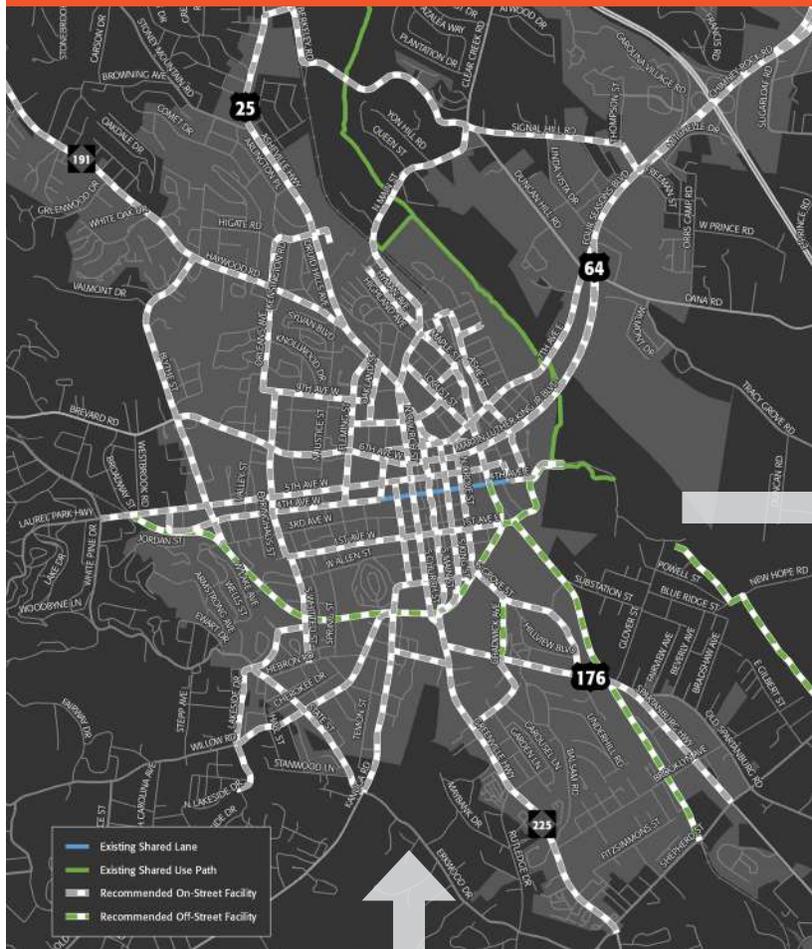
- Side paths are paved trails that are located adjacent to the roadway and can be used by both bicyclists and pedestrians.



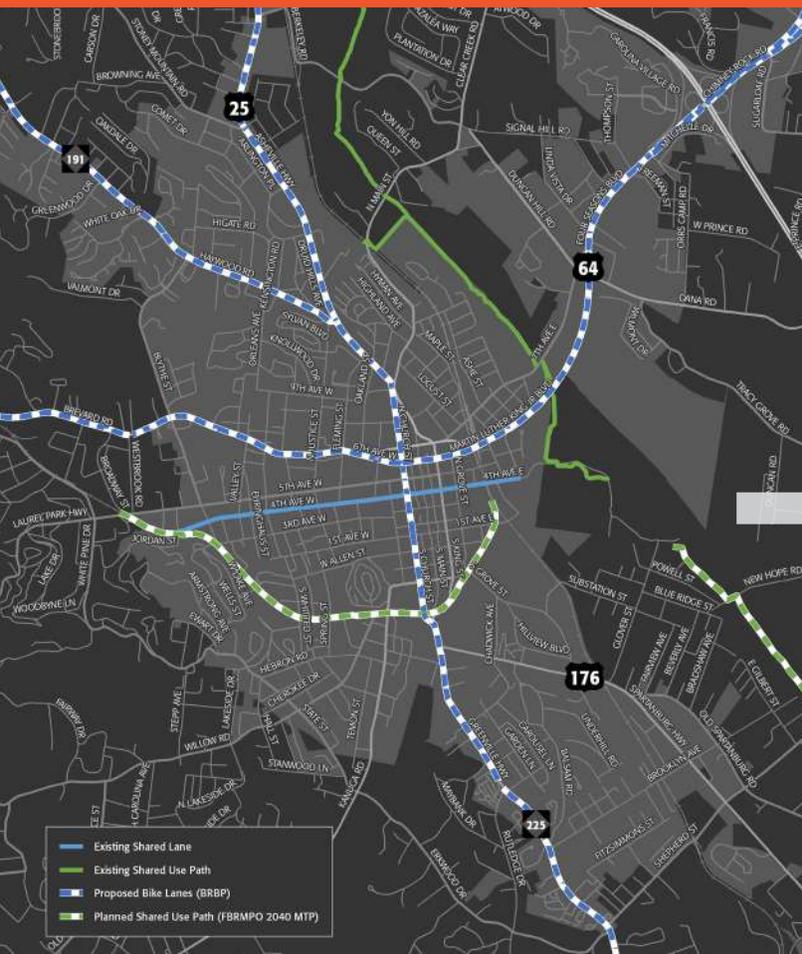
MAP 9: HENDERSONVILLE



MAP 12: STREETS RECOMMENDED FOR IMPROVEMENT

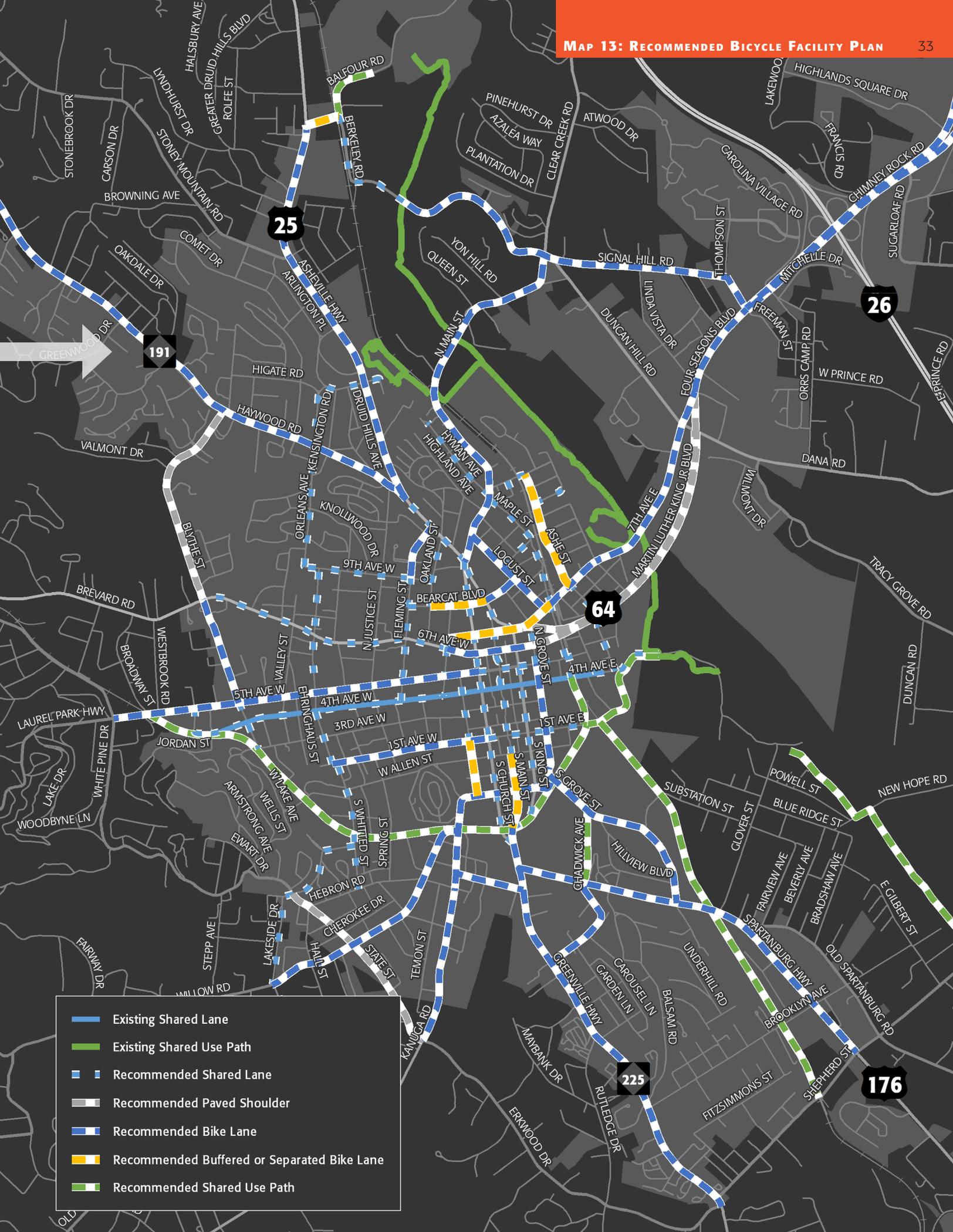


MAP 10: INVENTORY OF EXISTING & PLANNED FACILITIES



MAP 11: CRITICAL DESTINATIONS





- Existing Shared Lane
- Existing Shared Use Path
- Recommended Shared Lane
- Recommended Paved Shoulder
- Recommended Bike Lane
- Recommended Buffered or Separated Bike Lane
- Recommended Shared Use Path

PRIORITY PROJECTS

To guide the development of the implementation plan, the project team solicited feedback from the steering committee and the public to identify ten priority projects. Of the entire list of recommended bikeway projects, these ten are the most important and should be considered for design and construction in the next 10 years.

The priority projects and their planning-level cost estimates are shown in the table below and in the map on the next page. The cost estimates do not include utility relocation, acquisition of right-of-way, or sidewalk construction or reconstruction.

TABLE 3: PRIORITY PROJECTS

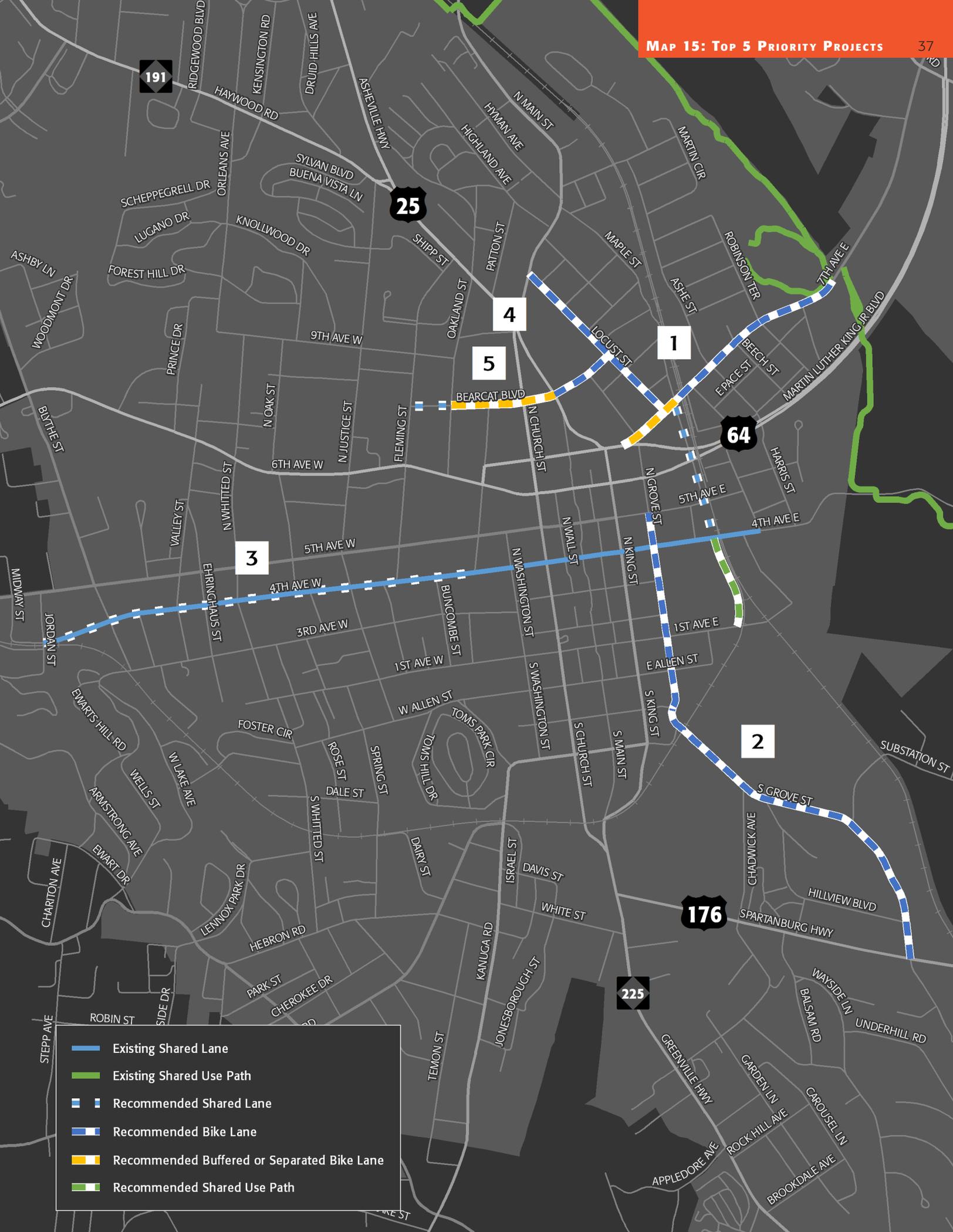
STREET	START	END	OWNER	TYPE	IMPLEMENTATION	LENGTH (MI)	COST ESTIMATE
4 th Avenue	Jordan Street	Buncombe Street	City of Hendersonville	Bicycle Boulevard (Upgrade)	Traffic Calming	0.8	\$51,000
7 th Avenue	North Grove Street	Oklawaha Greenway	City of Hendersonville	Buffered Bike Lanes (west of Maple Street) Bike Lanes (east of Maple Street)	Restriping	0.5	\$230,000
Ashe Street	7 th Avenue	Oriole Drive	City of Hendersonville	Two-Way Separated Bike Lane	Restriping	0.4	\$100,000
Bearcat Boulevard	Fleming Street	Locust Street	City of Hendersonville	Shared Lane Markings (west of Oakland Street) Buffered Bike Lanes (between Oakland Street and North Main Street) Bike Lanes (east of North Main Street)	Marking and Restriping	0.4	\$208,000
Fleming Street	4 th Avenue	9 th Avenue	City of Hendersonville	Shared Lane Markings	Marking	0.4	\$14,000
Grove Street	Spartanburg Highway	5 th Avenue	City of Hendersonville (north of Barnwell St.) NCDOT (south of Barnwell St.)	Bike Lanes	Road Widening	1.1	\$3,416,000
Locust Street/Maple Street	1 st Avenue	North Main Street	City of Hendersonville	Bike Lanes (Locust Street) Shared Lane Markings (Maple Street) Shared Use Path (between 4 th Avenue and 1 st Avenue)	Restriping, Marking, and New Shared Use Path	0.6	\$286,000
Washington Street	Kanuga Road	5 th Avenue	City of Hendersonville	Buffered Bike Lanes (south of 1 st Avenue) Shared Lane Markings (north of 1 st Avenue)	Marking and Restriping	0.4	\$136,000
Whitted Street	Hebron Road	9 th Avenue	City of Hendersonville	Bicycle Boulevard	Marking, Signing, and Traffic Calming	1.2	\$145,000

The primary objective of defining a list of priority projects is to score and rank the projects. The top five priority projects are included in the City's short-term implementation plan. The remaining five projects will make up the mid-term implementation plan. Weighted equally, three major categories of input informed the scoring process—steering committee input, public input, and quantitative data (nearby activity centers, population served, percent population in poverty, and percent households with no access to motor vehicles). The following pages include a map of the top five priority projects and project profiles comprising descriptions, concept illustrations, and typical cross-sections.

As the City of Hendersonville makes progress in implementing the facility recommendations of the Bicycle Plan, the list of priorities should change to reflect the City's renewed direction. The City's street grid presents an opportunity to make strategic decisions about north-south and east-west connections. For example, 4th Avenue and 5th Avenue both run east-west through the center of Hendersonville. Investment in improving 4th Avenue as a bicycle boulevard may mean that the City can shift its energy from improving 5th Avenue to improving other more critical streets. The priorities defined in this Bicycle Plan are expected to shift and change as individual streets are improved for bicyclists.

TABLE 4: TOP 5 PRIORITY PROJECTS

PRIORITY	STREET	START	END	TYPE	IMPLEMENTATION	LENGTH (MI)	COST ESTIMATE
1	7 th Avenue	North Grove Street	Oklawaha Greenway	Buffered Bike Lanes (west of Maple Street) Bike Lanes (east of Maple Street)	Restriping	0.5	\$230,000
2	Grove Street	Spartanburg Highway	5 th Avenue	Bike Lanes	Road Widening	1.1	\$3,416,000
3	4 th Avenue	Jordan Street	Buncombe Street	Bicycle Boulevard (Upgrade)	Traffic Calming	0.8	\$51,000
4	Locust Street/ Maple Street	1 st Avenue	North Main Street	Bike Lanes (Locust Street) Shared Lane Markings (Maple Street) Shared Use Path (between 4 th Avenue and 1 st Avenue)	Restriping, Marking, and New Shared Use Path	0.6	\$286,000
5	Bearcat Boulevard	Fleming Street	Locust Street	Shared Lane Markings (west of Oakland Street) Buffered Bike Lanes (between Oakland Street and North Main Street) Bike Lanes (east of North Main Street)	Marking and Restriping	0.4	\$208,000



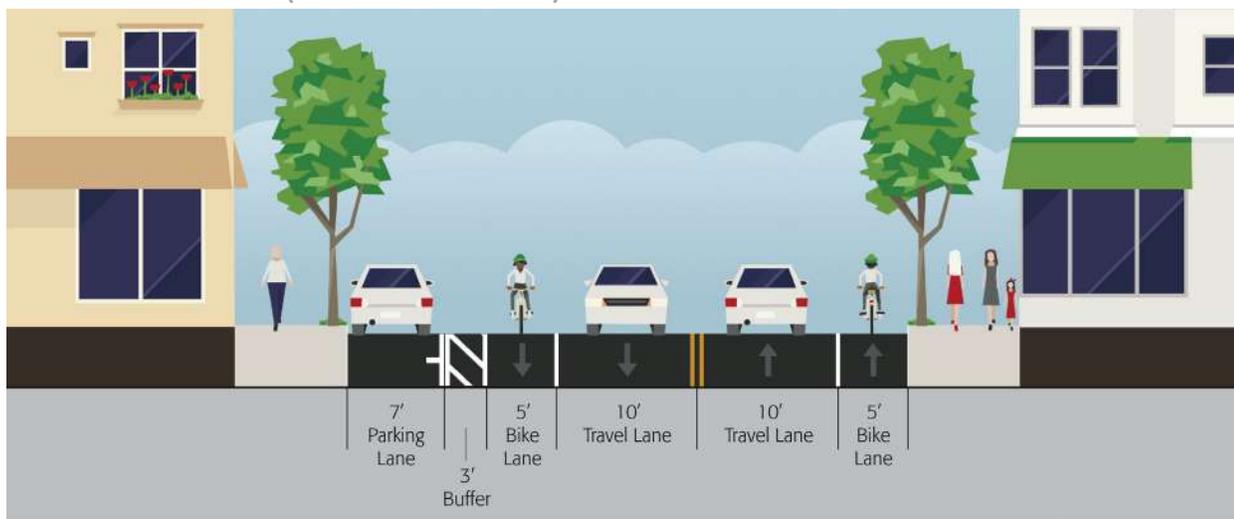
- Existing Shared Lane
- Existing Shared Use Path
- Recommended Shared Lane
- Recommended Bike Lane
- Recommended Buffered or Separated Bike Lane
- Recommended Shared Use Path

PRIORITY PROJECT #1 — 7TH AVENUE CORRIDOR



EXTENTS	Between North Grove Street and Oklawaha Greenway
BACKGROUND	This segment of 7 th Avenue is the primary street in Hendersonville's Historic 7 th Avenue District and connects the Historic Downtown District to the Oklawaha Greenway to the east. This area is poised for revitalization into a vibrant commercial area. Destinations along this street include businesses, the Hendersonville Train Depot, and William H. King Memorial Park, which can be accessed via the Oklawaha Greenway. 7 th Avenue parallels US 64 and serves as a slower street with greater accessibility to retail and residences.
PROJECT DESCRIPTION	<p>West of Maple Street, this vision project would take advantage of the extra space allocated to on-street parking and narrow the travel lanes to provide bike lanes. Three-foot buffers on the on-street parking side would be installed to mitigate the likelihood of collisions with opening car doors. East of Maple Street, on-street parking would be consolidated to one side to provide bike lanes in both directions. The addition of bike lanes would provide a key connection for bicyclists between the Historic 7th Avenue District and the Oklawaha Greenway. This design requires consistent maintenance to keep the gutter clear of debris for bicyclist safety. As of 2017 there is a daily street sweeper on 7th Avenue.</p> <p>Implementation of this vision project would require modification to existing on-street parking. Rather than make such modifications in haste, it is recommended that the City convene a Blue Ribbon Committee to reach agreement about potential modifications to 7th Avenue. Suggested committee members include downtown business leaders, bicycle advocates, and City of Hendersonville Public Works.</p> <p>An alternative to modifying on-street parking on one side of the street to provide bike lanes on both sides is alternating the side of the street from which on-street parking is removed. This design would reduce the impact of on-street parking loss, calm motor vehicle traffic, and maintain bike lanes in both directions. The City could also consider restriping 7th Avenue to provide a bike lane in the uphill direction (westbound) and shared lane markings in the downhill direction (eastbound).</p>
LENGTH	0.5 miles
COST ESTIMATE	\$230,000

VISION CROSS-SECTION (EAST OF MAPLE STREET)





7TH AVENUE — EXISTING

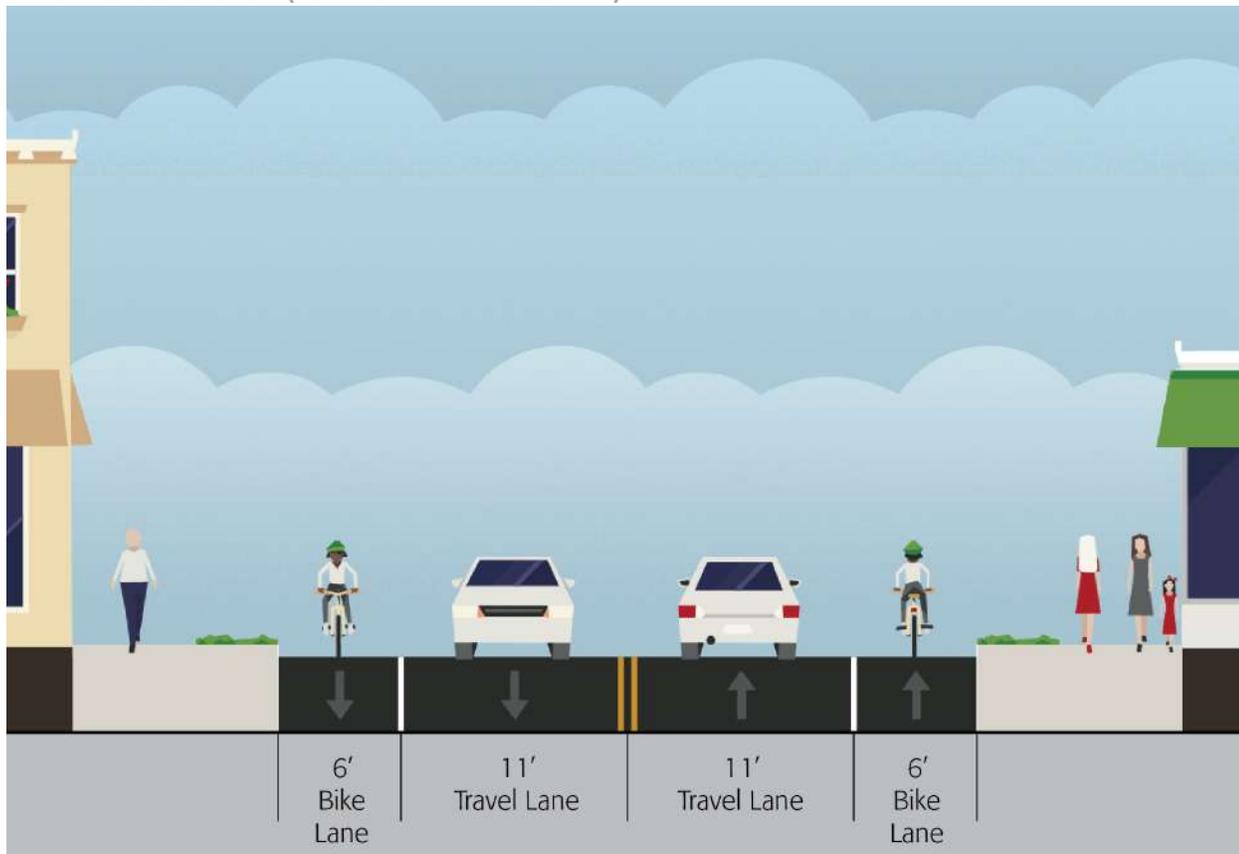


7TH AVENUE — CONCEPTUAL

PRIORITY PROJECT #2 — GROVE STREET BICYCLE LANES

EXTENTS	Between Spartanburg Highway and 5 th Avenue
BACKGROUND	Grove Street extends from Spartanburg Highway to US 64 and is the primary connection between downtown Hendersonville and the residential area around Substation Street in unincorporated Henderson County. North Grove Street provides access to the Henderson County Courthouse, the Henderson County Sheriff’s Office, Dr. MLK Jr. Memorial Park, retail locations, and an Apple Country Transit bus stop. Along South Grove Street are several businesses, including a major grocery store, and residential areas.
PROJECT DESCRIPTION	Due to the length, cost, and impact of this project, it would likely be constructed in two phases: the section from Spartanburg Highway to East Barnwell Street would be Phase 1, and the section from East Barnwell Street to 5 th Avenue would be Phase 2. The existing pavement width varies from 20 to 33 feet, and roadway widening would be required to provide dedicated bike lanes along the entire length of Grove Street. This project should be included in a larger effort to improve Grove Street by burying utility lines, constructing sidewalks, and beautifying the street.
LENGTH	Phase 1: 0.7 miles, Phase 2: 0.4 miles
COST ESTIMATE	Phase 1: \$2,240,000, Phase 2: \$1,176,000

TYPICAL CROSS-SECTION (NORTH OF BARNWELL STREET)





GROVE STREET — EXISTING

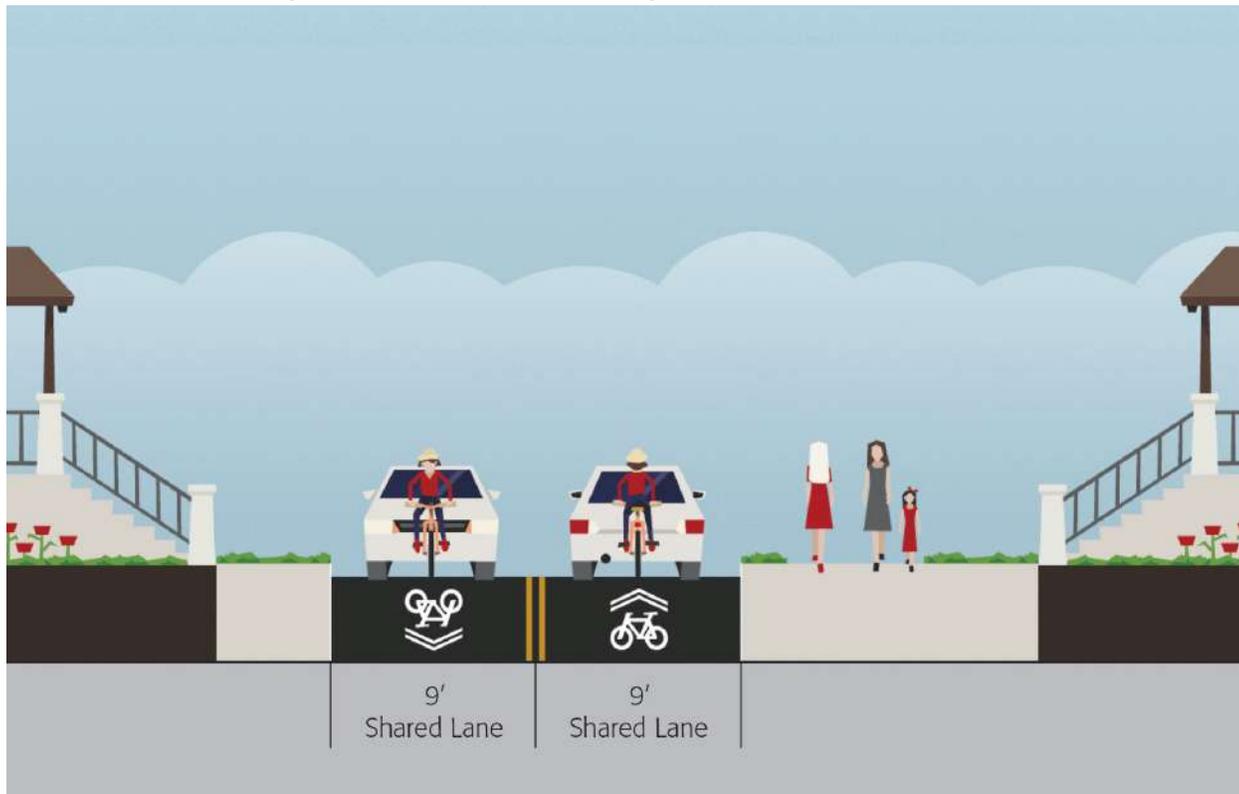


GROVE STREET — CONCEPTUAL

PRIORITY PROJECT #3 — 4TH AVENUE BICYCLE BOULEVARD UPGRADE

EXTENTS	Between Jordan Street and Buncombe Street
BACKGROUND	The section of 4 th Avenue between Jordan Street and Buncombe Street is almost entirely residential. To the east of Buncombe Street, beyond the project’s extents, 4 th Avenue connects downtown Hendersonville to Jackson Park and the Oklawaha Greenway. In 2014, the City of Hendersonville installed shared lane markings and wayfinding signage along 4 th Avenue, though additional traffic calming improvements could further emphasize 4 th Avenue’s identity as a bicycle boulevard, a low-stress street that is comfortable and convenient for bicyclists.
PROJECT DESCRIPTION	A bicycle boulevard upgrade along 4 th Avenue would slow motorists, divert motor vehicle traffic, attract bicycle traffic, and enhance 4 th Avenue’s attractiveness as a residential street. Traffic calming features would be installed according to the City of Hendersonville’s traffic calming policy and would likely include speed cushions, which would not impede emergency vehicle or bicyclist access, but would slow passenger cars. Additional traffic calming features for consideration include intersection diverters, mini traffic circles, and raised crosswalks. The City of Hendersonville should also consider lowering the posted speed limit on 4th Avenue from 25 mph to 20 mph. The addition of traffic calming measures may provide the opportunity to remove stop signs on 4th Avenue, which would make east-west bicycle travel more efficient.
LENGTH	0.8 miles
COST ESTIMATE	\$51,000

TYPICAL CROSS-SECTION (WEST OF NORTH JUSTICE STREET)





4TH STREET — EXISTING

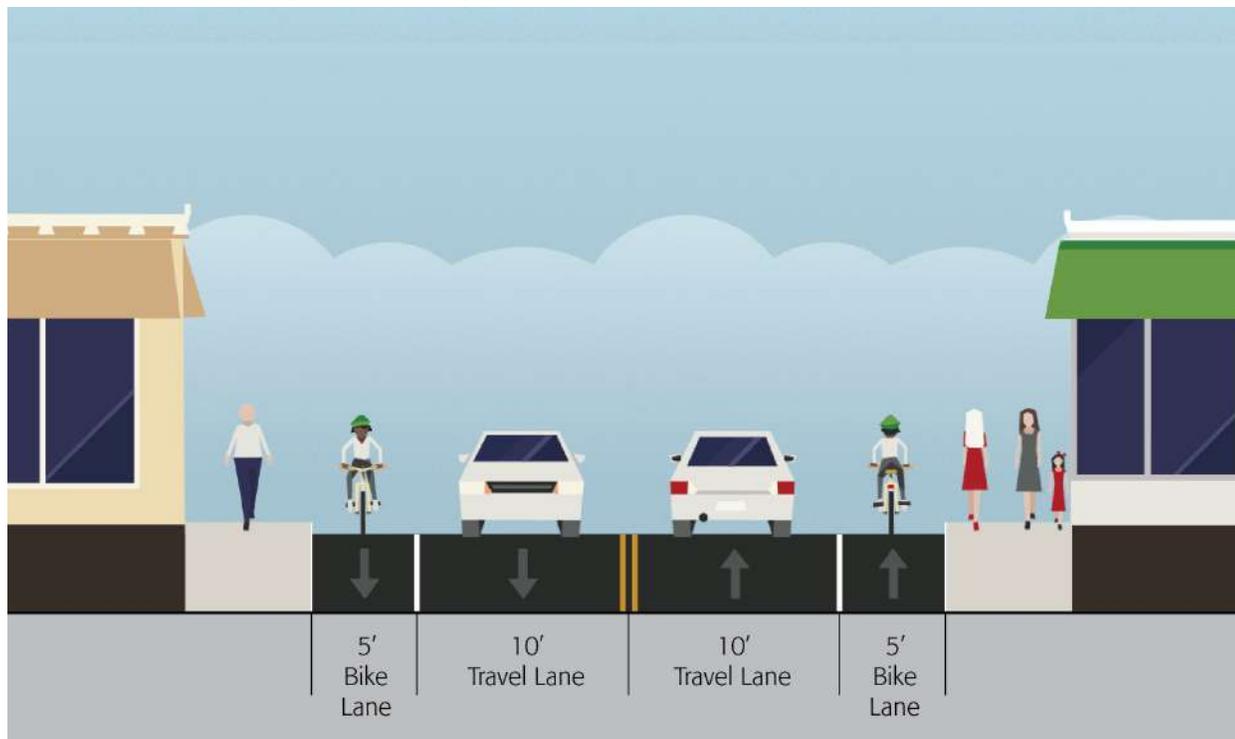


4TH STREET — CONCEPTUAL

PRIORITY PROJECT #4 — LOCUST STREET/MAPLE STREET CORRIDOR

EXTENTS	Between 1 st Avenue and North Main Street
BACKGROUND	Locust Street is part of Hendersonville’s Historic 7 th Avenue District and connects North Main Street to 7 th Avenue. Residences and businesses line the street, and Bruce Drysdale Elementary can also be accessed via Locust Street. Maple Street is a gravel road between 5 th Avenue and 4 th Avenue that parallels the railroad. Land uses along Maple Street are primarily industrial, and the street serves the Hendersonville Train Depot, which is located at its intersection with 7 th Avenue. This project would provide a low-stress north-south connection between 1 st Avenue and the Historic 7 th Avenue District.
PROJECT DESCRIPTION	<p>The project would connect residences and Bruce Drysdale Elementary School to downtown Hendersonville and 4th Avenue, which provides access to the Oklawaha Greenway and Jackson Park. Locust Street would be restriped to provide bike lanes in each direction, and shared lane markings would be added to Maple Street. A double-yellow centerline on Maple Street would further organize traffic, and there is potential to construct a shared use path along the west side of the rail line between 4th Avenue and 1st Avenue. This connection would provide access to the proposed Ecusta Trail Phase 1 trailhead.</p> <p>Instead of bike lanes on Locust Street, the project could consider the construction of a side-path on the west side north of 9th Avenue and shared lane markings south of 9th Avenue. Maple Street would have to be widened to provide bike lanes. (See page 30 for a discussion of the tradeoffs to consider when balancing bike lane vision projects with the demand for on-street parking.)</p>
LENGTH	0.6 miles
COST ESTIMATE	Locust Street Bicycle Lanes: \$73,800 Maple Street Shared Lane: \$13,100 New Shared Use Path: \$199,000

TYPICAL CROSS-SECTION (LOCUST STREET)





MAPLE STREET — EXISTING



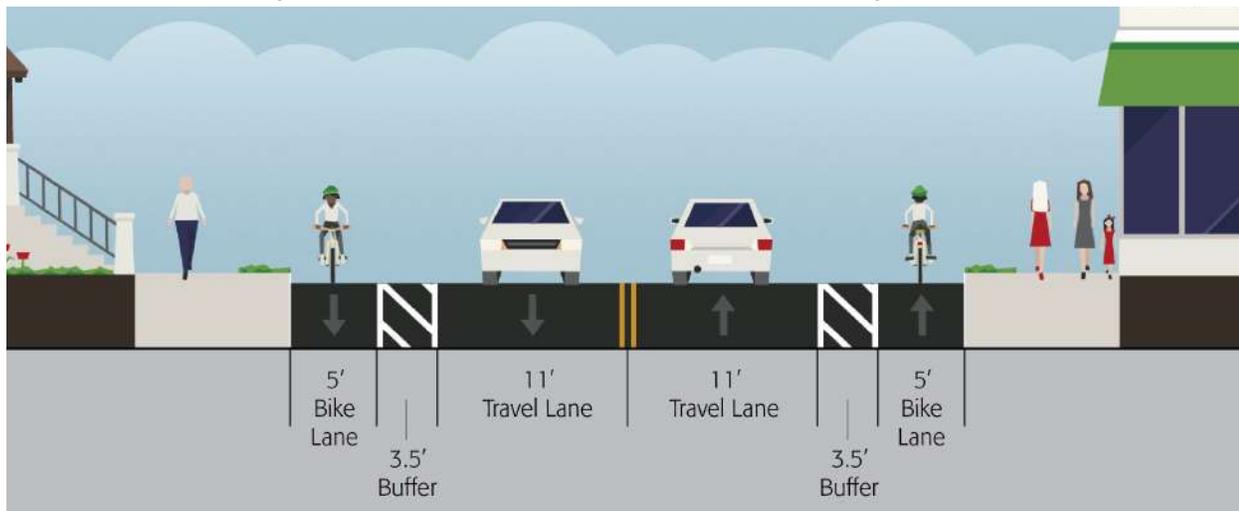
MAPLE STREET — CONCEPTUAL

PRIORITY PROJECT #5 — BEARCAT BOULEVARD CORRIDOR



EXTENTS	Between Fleming Street and Locust Street
BACKGROUND	<p>Bearcat Boulevard, named for Hendersonville High School’s mascot, begins at Fleming Street near Pardee Hospital and ends at Locust Street in the Historic 7th Avenue District. In addition to the hospital and the Historic 7th Avenue District, the street connects Hendersonville High School, several small businesses, St. James Episcopal Church, and Bruce Drysdale Elementary School. The section of Bearcat Boulevard between Oakland Street and North Church Street has recently been resurfaced and includes on-street parking lanes on both sides, several high-visibility crosswalks, and wayfinding markings in the shape of bearcat paws.</p>
PROJECT DESCRIPTION	<p>This vision project includes installing shared lane markings between Fleming Street and Oakland Street, restriping to provide buffered bike lanes between Oakland Street and North Main Street, and restriping to provide bike lanes between North Main Street and Locust Street. The installation of buffered bike lanes along Bearcat Boulevard would provide a comfortable bicycle facility for travelers, including Hendersonville High and Bruce Drysdale Elementary students.</p> <p>Relocating on-street parking to the forthcoming school expansion to the north should be investigated and considered. Given the impacts of this potential shift, it is recommended that the City establish a Blue Ribbon Committee to reach consensus to balance bicycling and parking needs on Bearcat Boulevard. Participants in the committee should include representatives of Hendersonville High School, Pardee Hospital, and EMS; bicycle advocates; and City of Hendersonville Public Works.</p> <p>Alternatively, the project could maintain on-street parking on one side and include bike lanes in both directions. The cross-section would include two 11-foot travel lanes, two 5-foot bike lanes, and a 7-foot on-street parking lane. The sidewalk on the north side of Bearcat Boulevard could also be widened to provide a side-path, a paved path wide enough to accommodate both bicyclists and pedestrians. (See page 30 for a discussion of the tradeoffs to consider when balancing bike lane vision projects with the demand for on-street parking.)</p>
LENGTH	0.4 miles
COST ESTIMATE	\$208,000

VISION CROSS-SECTION (BETWEEN OAKLAND STREET AND NORTH MAIN STREET)





BEARCAT BOULEVARD — EXISTING



BEARCAT BOULEVARD — CONCEPTUAL

PROGRAMS & POLICIES

Beyond the facility recommendations included in the previous section, the City of Hendersonville and other local groups can undertake programmatic efforts to improve bicycling conditions. These efforts can include creating programs or putting on events to promote and encourage bicycling; educating motorists, pedestrians, and bicyclists about how to safely and legally navigate the City together; and creating policies that ensure that bicycling is treated as a valid mode of transportation. The project team in coordination with City of Hendersonville staff created a series of program and policy recommendations. The table below describes each recommendation.

TABLE 5: POLICY & PROGRAM RECOMMENDATIONS

RECOMMENDATION	DESCRIPTION
Create a Bicycle/Pedestrian Advisory Commission.	A Bicycle/Pedestrian Advisory Commission consists of volunteers who provide guidance and leadership concerning bicycle and pedestrian issues to City staff. The Bicycle/Pedestrian Advisory Commission would meet regularly to discuss strategies to improve bicycling and walking conditions in Hendersonville.
Permit bicycling on the sidewalk except in downtown Hendersonville.	Riding a bike on any sidewalk in Hendersonville is illegal as of 2017, which leaves younger and less-skilled bicyclists no comfortable options for traveling along major roadways. Reducing the restriction to downtown sidewalks would maintain pedestrian safety in downtown while accommodating bicycle travel elsewhere in the City.
Incorporate bicycling safety into driver education and training courses.	Including bicycling safety in the curriculum of driver education and traffic school courses will increase motorist awareness about laws pertaining to bicyclists and teach motorists how to safely share the roadway with bicyclists.
Adopt a local Complete Streets policy.	Complete Streets policies establish a process which requires planning and designing for all roadway users, including pedestrians, bicyclists, transit users, and motorists. A local Complete Streets policy would supplement NCDOT's Complete Streets policy and would be specifically applicable to City-owned streets.
Require new developments to include bicycle facilities and parking.	As of 2017, Hendersonville's zoning and subdivision ordinances include sidewalk requirements for new developments. Adding bicycle facility and parking requirements would leverage the opportunity of new development to expand the City's bicycle network.
Establish a local Safe Routes to School program.	Safe Routes to School programs promote safe walking and bicycling to and from schools to improve the health and well-being of school children. North Carolina's statewide Safe Routes to School program created a project called Active Routes to School, which provides resources and guidance through Regional Coordinators.
Identify and prioritize locations for bicycle rack installation.	Properly installed and conveniently-located bicycle racks encourage bicyclists to park their bicycles in secure and convenient locations. Adequate bicycle parking also reduces the likelihood of damage that may result from locking bicycles to trees, sign posts, or other objects.
Become a League of American Bicyclists Bicycle Friendly Community.	The League of American Bicyclists awards varying levels of the Bicycle Friendly Community designation to applying communities. Bicycle Friendly Communities have demonstrated progress in making bicycling a safe and convenient means of transportation and recreation.
Regularly update local street design standards to reflect national best practices.	Local street design standards dictate how roadways can be built according to the local Complete Streets policy. Road design guidelines often control the inclusion and design of bicycle infrastructure.

RECOMMENDATION	DESCRIPTION
Require bicycle education in schools.	Introducing bicycle education into school curriculum provides students with the knowledge and skills to ride a bicycle safely, while also establishing bicycling as a social norm. Early education can instill bicycling confidence in youth before they learn how to operate motor vehicles.
Deploy bicycle patrols.	Bicycle patrols provide officers with more opportunities for positive interaction with the public, while also normalizing bicycling as a form of transportation. Bicycle officers can employ reverse ticketing campaigns where they provide information or safety equipment to bicyclists instead of ticketing.
Plan and execute Open Streets events.	Open Streets events temporarily close streets to motor vehicular traffic allowing the street to be used for a variety of pedestrian, bicyclist, and recreation activities. These events build community while celebrating the use of non-motorized transportations.
Create a Bicycle Pedestrian Program and hire a Program Coordinator.	The role of a local Bicycle Pedestrian Program and the Program Coordinator is to promote bicycling and walking through encouragement, engineering, and design. The Program Coordinator is also responsible for advocating for bicycling and walking in transportation planning processes.
Create events to promote National Bike Month and Bike to Work Day.	National Bike Month takes place in May and can include planned events such as group rides, educational classes, and local bike challenges. National Bike to Work Day occurs in the same month and encourages commuters to ride bicycles to work, which can be incentivized by employers and other City events.
Become a Watch for Me NC partner community.	Watch for Me NC, a collaborative effort between NCDOT and local communities, endeavors to reduce the number of bicyclists and pedestrians injured in crashes with vehicles through public education and police enforcement. Partner communities receive additional support and training from NCDOT.
Regularly update the City's traffic calming policy.	Traffic calming policies enable jurisdictions to retrofit streets with physical and visual features that reduce travel speeds and, in turn, make streets safer and more comfortable environments for bicyclists.
Distribute bike lights, helmets, and bells.	Bike lights, helmets, and bells are important features of safe bicycling. Distribution of safety equipment will promote responsible bicycling behavior and create safer conditions for both bicyclists and motorists sharing the roadways.
Create a local Bicycle Benefits program.	Bicycle Benefits is a program designed to reward individuals and businesses alike for their commitment to creating a more livable and sustainable community. Bicyclists benefit by receiving discounts from participating businesses, and businesses benefit from increased customer traffic.
Conduct police training on bicycle safety.	Police departments should provide officers with training to improve their understanding of bicyclists' rights and responsibilities. Increased knowledge will allow officers to properly enforce laws that prevent crashes and enhance safety for all road users.
Conduct regular bicycle counts.	Regular bicycle counts can guide planning and funding decisions. Counts can also be used to quantify the benefits of investments in bicycle infrastructure.

CHAPTER 5: IMPLEMENTATION



IMPLEMENTATION

INTRODUCTION

The implementation plan provides a framework of actionable steps for achieving the vision of the Hendersonville Bicycle Plan. The implementation plan is categorized by short-term, mid-term, and long-term strategies and indicates who will be responsible for championing them. This chapter also offers guidance for securing funding, establishing design standards, and evaluating performance measures.

ORGANIZATIONAL FRAMEWORK

The organizational framework represents the roles and responsibilities of local, regional, and statewide organizations in implementing the recommendations of the Hendersonville Bicycle Plan. From setting policy to constructing facilities, from coordinating with other governmental agencies to partnering with bicycle advocacy organizations, the City of Hendersonville will need external support and resources to achieve a more bicycle-friendly city.

FIGURE 8: ORGANIZATIONAL FRAMEWORK



IMPLEMENTATION PLAN

TABLE 6: IMPLEMENTATION PLAN

ACTION & DESCRIPTION	LEAD ORGANIZATION	PARTNERS
SHORT-TERM		
<p>Submit the Bicycle Plan for NCDOT-DBPT approval. The project team will submit the Hendersonville Bicycle Plan for review and approval by the NCDOT Division of Bicycle and Pedestrian Transportation. The project team will address NCDOT-DBPT's comments before finalizing the Bicycle Plan to present to Hendersonville City Council.</p>	Project Team	NCDOT-DBPT
<p>Present the Bicycle Plan for City Council adoption. Following NCDOT-DBPT approval, the project team will present the Bicycle Plan to City Council for their adoption. Adoption of the Bicycle Plan will communicate to all City departments and partner agencies that the City of Hendersonville supports the recommendations of the Plan. Having an adopted Bicycle Plan clarifies expectations for bike facilities on the streets in Hendersonville and aids in securing funding.</p>	Project Team	Development Assistance Department
<p>Create a Bicycle/Pedestrian Advisory Commission. Bicycle/Pedestrian Advisory Commissions (BPAC) consist of members of the community who volunteer their time to be formal citizen liaisons to City staff. Meeting once a month with City staff, Bicycle/Pedestrian Advisory Commissions create committees, task forces, and programs to address bicycling and waling issues and serve as a review board for local projects and initiatives.</p>	City Council	Development Assistance Department
<p>Publicize, promote, and present the Bicycle Plan. The Bicycle Plan should be made available online and publicized using the City's website and social media outlets. Additionally, the Bicycle Plan and its recommendations should be presented to partner agencies including the French Broad River MPO and NCDOT Division 14.</p>	Development Assistance Department	Blue Ridge Bicycle Club FBRMPO NCDOT
<p>Create Blue Ribbon Committees to reach consensus on bike lane vision projects. Short-term committees of key stakeholders will be established to investigate the impacts and benefits of bike lane installation on streets where on-street parking may be affected (see pages 38 and 46 for more detail).</p>	Development Assistance Department	Public Works Business Owners BPAC Blue Ridge Bicycle Club
<p>Coordinate roadway maintenance with NCDOT Division 14. City staff should send an official letter to NCDOT Division 14 to request that the Division coordinates with the City when resurfacing state-maintained roadways. This communication will help the City take advantage of opportunities to continue implementing the facility recommendations of the Bicycle Plan.</p>	Public Works	NCDOT Division 14 Development Assistance Department Engineering

ACTION & DESCRIPTION	LEAD ORGANIZATION	PARTNERS
<p>Schedule quarterly coordination meetings between the Development Assistance Department, Public Works, and Engineering. Ongoing coordination between City departments will streamline the construction of facility recommendations and implementation of programs and policies. Quarterly meetings will provide the opportunity for City staff to calibrate their respective efforts. Using mapping tools, such as Geographic Information Systems (GIS), City departments can share information on projects that may be opportunities to advance the Bicycle Plan.</p>	Development Assistance Department	Public Works Engineering
<p>Change City code of ordinances to allow sidewalk bicycling. Although rarely enforced, sidewalk bicycling is prohibited on all sidewalks in Hendersonville as of 2017. This results in bicyclists having to break the law when choosing to ride on the sidewalk along high-volume and high-speed streets. Instead, the City code of ordinances should be updated to only prohibit sidewalk bicycling on Main Street between Allen Street and 7th Avenue.</p>	City Council	Police Department
<p>Create and adopt a local Complete Streets policy. Complete Streets policies require that all street projects provide safe accommodations for all modes, including bicycling, walking, taking transit, and driving. To supplement NCDOT’s Complete Streets policy which only covers state-maintained roadways, the City of Hendersonville should consider creating and adopting a local Complete Streets policy.</p>	City Council	Development Assistance Department Public Works Engineering
<p>Strengthen zoning and subdivision ordinances to require provisions for bicyclists. The current ordinances require that new developments include sidewalks but make no mention of bicycle facilities or bicycle parking. Language should be added to the zoning and subdivision ordinances specifying the type, location, and amount of bicycle infrastructure for new developments.</p>	Development Assistance Department	Private Developers
<p>Become a Watch for Me NC partner community. Watch for Me NC is a statewide bicycle and pedestrian safety campaign. Partner communities are provided with materials including bumper stickers, promotional posters, and informational brochures. The City of Hendersonville can take advantage of existing resources to improve bicycle safety by applying to become a Watch for Me NC partner community.</p>	Development Assistance Department	Police Department BPAC
<p>Include curriculum about bicycling law and safety in driver education courses. There are several driver education providers serving western North Carolina that could enhance their curriculum by educating both new and experienced motorists on how to safely navigate the streets with bicyclists. This effort will require the creation of curriculum and reaching out to driver education providers.</p>	Bicycle/ Pedestrian Advisory Commission	BikeWalk NC

ACTION & DESCRIPTION	LEAD ORGANIZATION	PARTNERS
<p>Form local Safe Routes to Schools programs. Safe Routes to School (SRTS) seeks to make bicycling and walking to school safer for school children. The statewide program supports local SRTS programs by providing resources such as “An event planning guide for Walk to School Day and Bike to School Day”¹⁴ and partner with the North Carolina Division of Public Health to create a project called “Active Routes to School.” The ARTS program is facilitated by regional coordinators who work with their communities to create SRTS events and programs.</p>	Henderson County Public Schools	Active Routes to School Region 2
<p>Include bicycling safety curriculum in schools. The City of Hendersonville would benefit from the introduction of bicycle curriculum to public school curriculum. Equipping youth with bicycle skills will support the growth of a culture of safe, confident bicyclists.</p>	Henderson County Public Schools	Active Routes to School Region 2
<p>Plan and install a bike facility pilot project. Bike facility pilot projects are temporary installations of bike lanes or traffic-calming measures to demonstrate their efficacy in improving comfort, mobility, and safety. Pilot projects can be implemented quickly because of their temporary nature, and may be installed in isolation or as part of a larger community event. Successful pilot projects are often converted to permanent facilities. Streets that may be candidates for pilot projects are 7th Avenue and Ashe Street.</p>	Development Assistance Department	Public Works Engineering BPAC
<p>Design and install two of the ten priority projects. Based on feasibility of construction, available funding, and public support, the City of Hendersonville should identify two of the ten priority projects to progress into design and installation. With exception to the Grove Street bike lanes and shared use path south of Maple Street, the ten priority projects don’t require roadway widening or construction of new facilities. Successfully implementing two of the priority projects in the short term will validate the Bicycle Plan and its recommendations.</p>	Development Assistance Department	Public Works Engineering BPAC
MID-TERM		
<p>Identify regional projects to submit to FBRMPO for prioritization for state funding. The French Broad River MPO submits projects to NCDOT for prioritization for state funding representing the MPO’s transportation priorities for the region. The City of Hendersonville should coordinate with FBRMPO to identify which of the Bicycle Plan’s facility recommendations have the greatest likelihood of success in securing state funding. (See https://www.ncdot.gov/performance/reform/prioritization/ for information regarding the statewide prioritization process.)</p>	Development Assistance Department	FBRMPO
<p>Create a bike rack installation prioritization program. The identification of potential locations for bike rack installation should be formalized to consider potential demand, space availability, and maintenance. In partnership with property and business owners, City staff should inventory and evaluate these locations to determine where bike racks should be installed first.</p>	Public Works	Business Owners

ACTION & DESCRIPTION	LEAD ORGANIZATION	PARTNERS
<p>Complete additional priority projects. Beyond installation of two priority projects in the short-term, the City of Hendersonville should aim to complete three or more additional priority projects in the mid-term. The top five projects detailed in the Recommendations chapter should be given heavy consideration, since they perform well both quantitatively and qualitatively.</p>	Development Assistance Department	Public Works Engineering BPAC
<p>Apply to become a Bicycle Friendly Community. The League of American Bicyclists awards the designation of Bicycle Friendly Community to municipalities that have demonstrated success in making their communities more bicycle friendly. Following the completion of the short-term and mid-term actions of the implementation plan, the City of Hendersonville should be in a prime position to apply for and be awarded a Bicycle Friendly Community designation.</p>	Development Assistance Department	BPAC Blue Ridge Bicycle Club
LONG-TERM		
<p>Coordinate land acquisition for off-street shared use paths. Studied by the Ecusta Rail Trail Planning Study & Economic Impact Analysis, Phase 1 of the Ecusta Trail, which extends from 1st Avenue on the east side of Hendersonville clockwise to 5th Avenue near the boundary between Laurel Park and Hendersonville, represents a significant rail-to-trail opportunity that would be a boon for the region. Additionally, the north-south rail corridor between Shepherd Street and 1st Avenue could be studied for installation of an adjacent trail.</p>	Development Assistance Department	Friends of the Ecusta Trail Blue Ridge Bicycle Club Henderson County Property Owners
<p>Update Bicycle Plan. Successful implementation of the Bicycle Plan will necessitate an update in five to ten years. The Bicycle Plan’s recommendations will need to be revisited, revised, and augmented to keep pace with Hendersonville’s progress toward a more bicycle friendly community. Municipalities with bicycle plans that are older than five years are eligible to apply for NCDOT Division of Bicycle and Pedestrian Transportation planning grants.</p>	Development Assistance Department	BPAC

FUNDING SOURCES

Implementation requires taking advantage of federal, state, local, and private funding opportunities. As a municipality in a metropolitan planning organization area in North Carolina, the City of Hendersonville can use federal and state funding that has been allocated to NCDOT Division 14 or to the French Broad River Metropolitan Planning Organization (FBRMPO). The City's capital improvement program and private entities are other sources that can be used to implement the recommendations of the Bicycle Plan. These funding sources are summarized in the sections below.

FIXING AMERICA'S SURFACE TRANSPORTATION

The most recent surface transportation legislation, Fixing America's Surface Transportation (FAST Act), was passed in December 2015. It restructured several of the funding programs that were active in the previous legislation, Moving Ahead for Progress in the 21st Century (MAP-21). For the programs described below, the City of Hendersonville would apply to the FBRMPO for funding and provide a 20% local match.

Surface Transportation Block Grant Program

MAP-21's Surface Transportation Program-Direct Attributable (STPDA) was changed to the Surface Transportation Block Grant Program¹⁵ (STBG) in the FAST Act. Municipalities within metropolitan planning organization (MPO) study areas, e.g., the FBRMPO area, can submit projects for STBG funding through the MPO. Eligible projects include roadways, transit (operations excluded), bike facilities, pedestrian facilities, truck parking areas, and intelligent transportation systems (ITS) improvements.

Transportation Alternatives

What was once the Transportation Alternatives Program (TAP) is now a set-aside under STBG called Transportation Alternatives¹⁶ (TA). Eligible projects include pedestrian and bicycle facilities, recreational trails, and Safe Routes to School projects. Municipalities can apply for TA funding in the same way they would apply for STBG funding.

Metropolitan Planning

The FAST Act maintains MAP-21's metropolitan planning funding program.¹⁷ Jurisdictions that are members of an MPO can apply for this funding for planning studies. Localities must provide a 20% local match and can only use the funding on planning studies. This funding mechanism was used to fund the Ecusta Rail-Trail Study.

NCDOT STRATEGIC MOBILITY FORMULA

NCDOT receives and allocates federal funding using their Strategic Mobility Formula, established by the Strategic Transportation Investments¹⁸ law passed in 2013. The Strategic Mobility Formula is a data-driven and performance-based process of prioritizing projects for federal and state funding, and it updates NCDOT's 10-Year State Transportation Improvement Program (STIP) every two years. Projects in the first five years of the STIP have been committed for funding and construction, while projects in the last five years of the STIP are reevaluated every two years using the Strategic Mobility Formula. In the Strategic Mobility Formula, transportation projects are grouped into three separate funding categories: division needs, regional impact, and statewide mobility. All bicycle projects are considered division needs and are only eligible for funding that has been allocated for division needs projects.

The City of Hendersonville can coordinate with FBRMPO to submit bicycle facility projects for prioritization for funding. Projects identified in this Bicycle Plan would be eligible for Strategic Mobility Formula funding.

POWELL BILL FUNDS

North Carolina's State street-aid program,¹⁹ also known as the Powell Bill program, provides funding allocations for eligible municipalities based on population and mileage of locally-maintained roadways. The primary function of the Powell Bill program is to assist municipalities in funding resurfacing local streets, but the funds may also be used for planning, constructing, and maintaining bikeways, greenways, and sidewalks. Powell Bill funds could be pursued as a match for future updates to this Plan. The City of Hendersonville received \$386,360 in Powell Bill funds in 2015.

CAPITAL IMPROVEMENT PROGRAM

The City of Hendersonville's annual budget includes a little over \$1 million for the street department. Approximately \$35,000 is allocated for resurfacing and patching, and \$25,000 is allocated for sidewalk maintenance. Unfortunately, these amounts are not expected to increase in the short-term. The City of Hendersonville cites that funding for sidewalk repairs, street resurfacing, and street sweeping equipment is not on pace with demand. The City's current capital improvement program only includes water line and sewer projects, but could include transportation projects in the future.

TRANSPORTATION BONDS

Transportation bonds generate revenue from a tax increase on property values. In North Carolina, bond referendums must be approved by the local council and then included on the ballot to be voted on by residents. Transportation bonds can include roadway, bicycle facility, and sidewalk projects.

PRIVATE DEVELOPMENTS

Updating the City's zoning and subdivision ordinances to require private developers to include bicycle infrastructure in their site plans will help the City build out the Bicycle Plan's facility recommendations. Bicycle infrastructure requirements can include on-street and off-street facilities as well as bicycle parking.

NON-PROFIT ORGANIZATIONS

Non-profit organizations, such as the Blue Ridge Bicycle Club and PeopleForBikes, are potential sources of funding for bicycle facilities. For example, the Blue Ridge Bicycle Club partnered with the City of Hendersonville to install two bike repair stations, one in Patton Park and one in Berkeley Mills Park. The Blue Ridge Bicycle Club also worked with the City of Hendersonville to install shared lane markings and wayfinding signage on 4th Avenue. PeopleForBikes awards grants through their Community Grant Program.²⁰ Grant amounts can be up to \$10,000 per project, can't be more than 50% of the project cost, and can be awarded to local governments or non-profit organizations.

PERFORMANCE MEASURES

Beyond completing the action steps in the implementation plan, the City of Hendersonville should consider evaluating its progress in achieving the vision of the Bicycle Plan. Some of the ways to track this progress are listed below:

FIGURE 9: SUGGESTED PERFORMANCE MEASURES



DESIGN GUIDELINES

Several guidance documents exist for the planning and design of bicycle facilities. Updated versions of the *Manual on Uniform Traffic Control Devices* (MUTCD) and *Guide for the Development of Bicycle Facilities* are expected to be published in 2018. The guidance documents that the City of Hendersonville should reference when implementing the facility recommendations of the Plan are summarized below. NCDOT’s Division of Bicycle and Pedestrian Transportation web page (<https://www.ncdot.gov/bikeped/Design-Prioritization-Funding/>) also contains a library of links to helpful design guidelines and policies.

TABLE 7: BICYCLE FACILITY DESIGN GUIDANCE REFERENCES

RESOURCE	AUTHOR	DATE	DESCRIPTION
Manual on Uniform Traffic Control Devices ²¹	FHWA	May 2012	Part 9 of the MUTCD provides guidance for bicyclist traffic control devices, including signs, traffic signals, and pavement markings, on roadways and shared use paths. The document discusses the recommended application, placement, size, colors, and proper maintenance of these devices as they relate to bicyclist traffic. The MUTCD is used by public and private planners and engineers, law enforcement personnel, traffic control device designers and manufacturers, and many professional and safety organizations.
Guide for the Development of Bicycle Facilities, 4 th Edition ²²	AASHTO	February 2013	Originally published in 1999, AASHTO’s current <i>Guide for the Development of Bicycle Facilities</i> encourages context-sensitive design and multimodal travel by providing ranges of design values where flexibility is permissible. It also provides suggested minimum dimensions for the design of safe bicycle facilities. The 2018 update will likely include design guidelines for separated bike lanes.
Urban Bikeway Design Guide, Second Edition ²³	NACTO	March 2014	The <i>Urban Bikeway Design Guide</i> delineates required, recommended, and optional guidelines for bike lanes, cycle tracks, intersection treatments, bicycle signals, bikeway signing and marking, and bicycle boulevards. These guidelines are based on literature reviews, implementations in top bicycling cities worldwide, and collaboration with a panel of bike planning professionals in NACTO member cities.
Separated Bike Lane Planning and Design Guide ²⁴	FHWA	May 2015	The <i>Separated Bike Lane Planning and Design Guide</i> is a collection of best practices for the design and implementation of separated bike lanes. It provides a list of key factors when considering the installation of a separated bike lane and a menu of forms of separation from motorists, such as vertical delineators or parking stops. The design guide also explains funding, maintenance, and outreach strategies in the context of case studies in cities like New York, Seattle, and Austin. It also provides recommendations regarding interaction between bike lanes and other modal elements, like transit stops, loading zones, and accessible parking.
Achieving Multimodal Networks ²⁵	FHWA	August 2016	<i>Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts</i> discusses strategies to achieve connected multimodal networks with minimal conflicts. The study uses case studies to give designers a greater practical awareness of where flexibility exists in national design standards, and how existing infrastructure can be retrofitted to better accommodate bicyclists and pedestrians.

CHAPTER 6: APPENDIX



APPENDIX

ENDNOTES

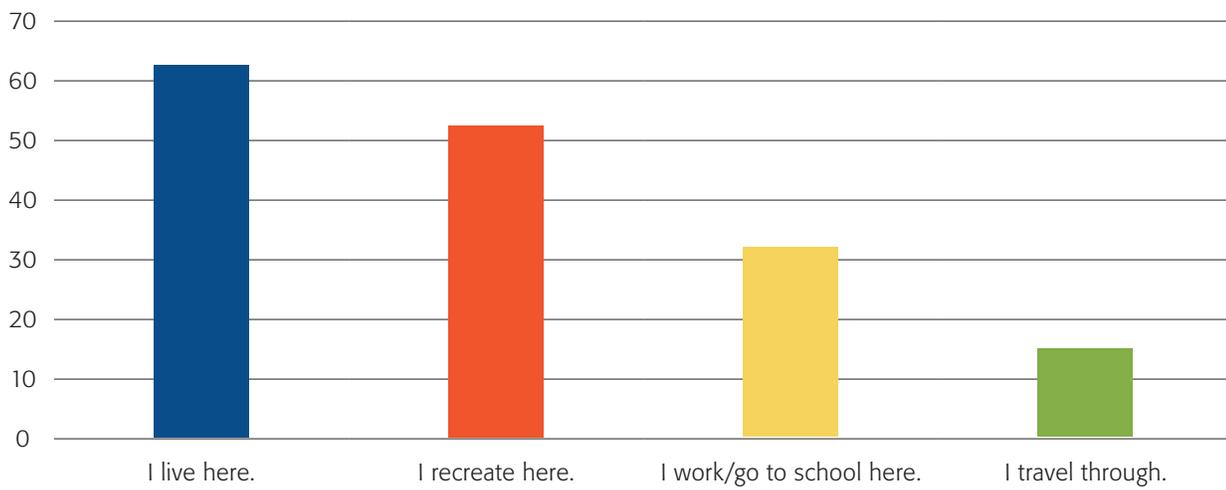
1. 2014 American Community Survey 5-Year Estimates, U.S. Census Bureau
2. 2012 National Survey of Bicyclist and Pedestrian Attitudes and Behavior, NHTSA, 2012
3. Bikenomics: How Cycling Can Save The Economy, Elly Blue, 2013
4. 2014 American Community Survey 5-Year Estimates, U.S. Census Bureau
5. Pursuing Equity in Pedestrian and Bicycle Planning, Pedestrian and Bicycle Information Center, 2016
6. 2012 National Survey of Bicyclist and Pedestrian Attitudes and Behavior, NHTSA, 2012
7. Hendersonville, NC Code of Ordinances Sec. 46-83
8. Hendersonville 2030 Comprehensive Plan, 2009
9. Land of Sky Regional Council 2013 Blue Ridge Bicycle Plan
10. French Broad River Metropolitan Transportation Plan, 2015
11. NCDOT State Transportation Improvement Program, Connect NCDOT, 2016
12. "Four Types of Cyclists? Testing a Typology to Better Understand Bicycling Behavior and Potential," http://web.pdx.edu/~jdill/Types_of_Cyclists_PSUWorkingPaper.pdf
13. "The Complete Business Case for Converting Street Parking Into Bike Lanes," <http://www.citylab.com/cityfixer/2015/03/the-complete-business-case-for-converting-street-parking-into-bike-lanes/387595/>
14. Promoting walking and bicycling to school: An event planning guide for Walk to School Day and Bike to School Day, Safe Routes to School North Carolina
15. "Fixing America's Surface Transportation Act or 'FAST Act': Surface Transportation Block Grant Program," USDOT FHWA, 2016, <https://www.fhwa.dot.gov/fastact/factsheets/stbgfs.cfm>
16. "Fixing America's Surface Transportation Act or 'FAST Act': Transportation Alternatives," USDOT FHWA, 2016, <https://www.fhwa.dot.gov/fastact/factsheets/transportationalternativesfs.cfm>
17. "Fixing America's Surface Transportation Act or 'FAST Act': Metropolitan Planning," USDOT FHWA, 2016, <https://www.fhwa.dot.gov/fastact/factsheets/metropolitanplanningfs.cfm>
18. "Strategic Transportation Investments," NCDOT, <https://www.ncdot.gov/strategictransportationinvestments/>
19. "State Street-Aid (Powell Bill) Program," Connect NCDOT, <https://connect.ncdot.gov/municipalities/State-Street-Aid/Pages/default.aspx>
20. "Community Grants," PeopleForBikes, <http://www.peopleforbikes.org/pages/community-grants>
21. Manual on Uniform Traffic Control Devices: 2009 Edition with Revision Numbers 1 and 2 incorporated, dated May 2012 (PDF), USDOT FHWA, 2015
22. Guide for the Development of Bicycle Facilities, 4th Edition, 2012
23. Urban Bikeway Design Guide, National Association of City Transportation Officials
24. Separated Bike Lane Planning and Design Guide, USDOT FHWA, 2015
25. Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts, USDOT FHWA, 2016

ONLINE SURVEY RESULTS

What is your relationship to Hendersonville? [check all that apply]

- I live here.
- I recreate here.
- I work/go to school here.
- I travel through.

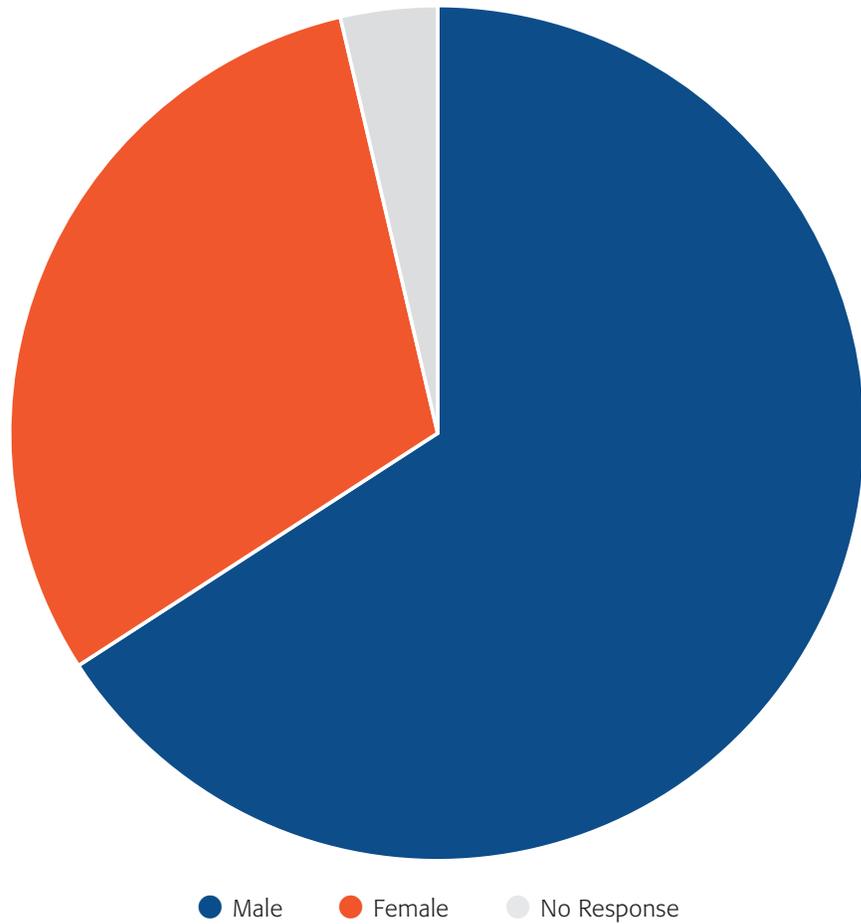
SURVEY PARTICIPANTS' RELATIONSHIP TO HENDERSONVILLE



What is your gender?

- Male
- Female

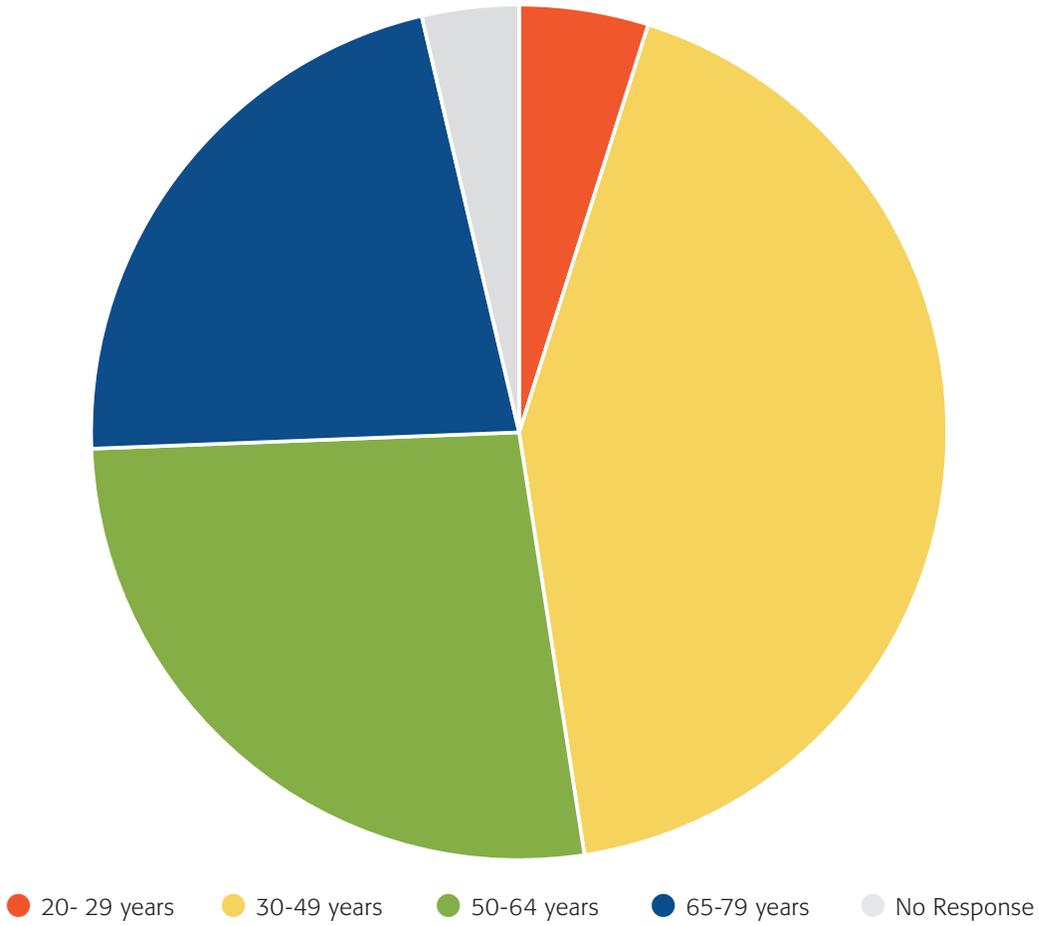
SURVEY PARTICIPANTS' GENDER SPLIT



What is your age group?

- 20- 29 years
- 30-49 years
- 50-64 years
- 65-79 years

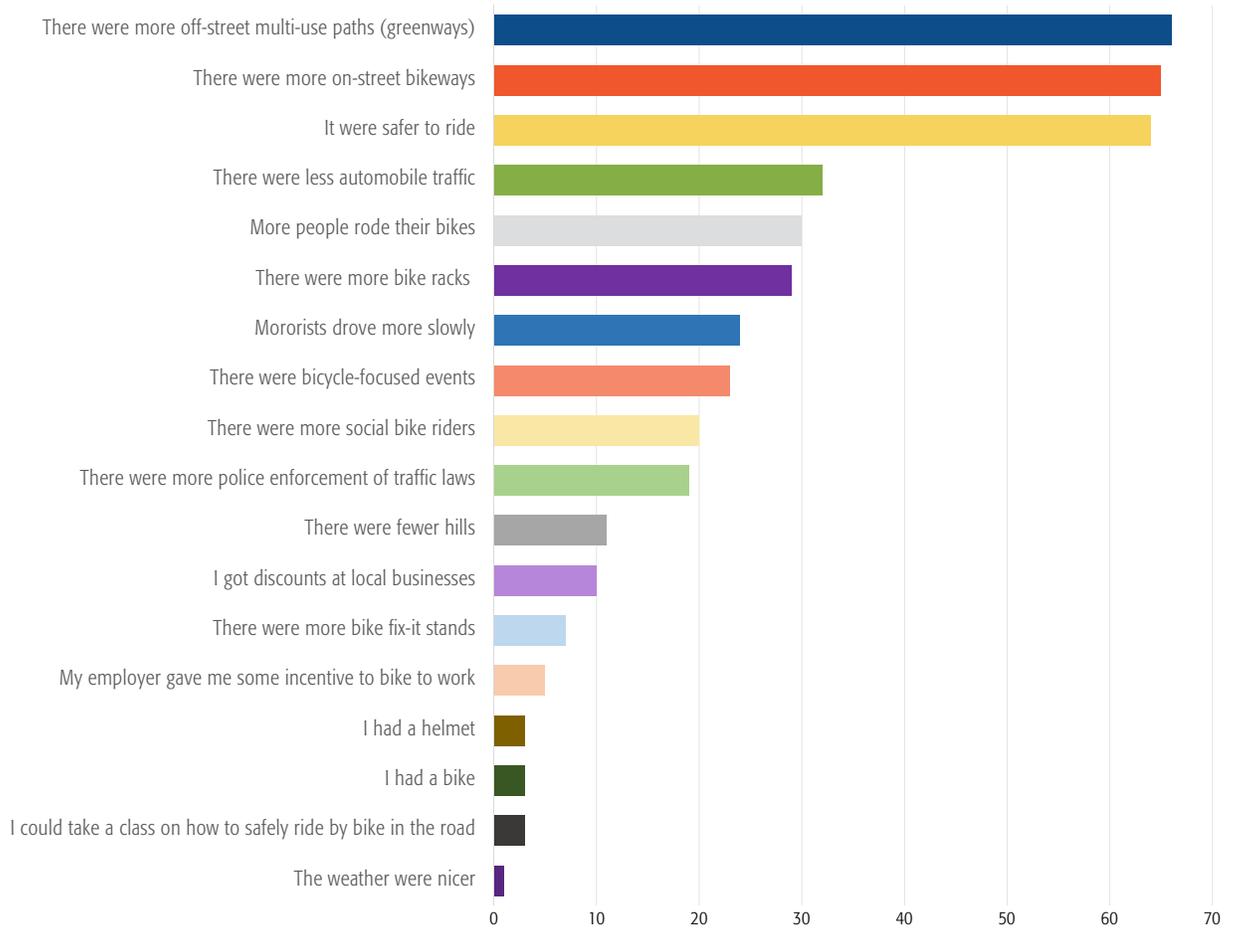
SURVEY PARTICIPANTS' AGE DEMOGRAPHICS



I might ride my bike more if...

- The weather were nicer
- I could take a class on how to safely ride my bike in the road
- I had a bike
- I had a helmet
- My employer gave me some incentive to bike to work
- There were more bike-fix it stands
- I got discounts at local businesses
- There were fewer hills
- There were more police enforcement of traffic laws
- There were more social bike riders
- There were bicycle-focused events
- Motorists drove more slowly
- There were more bike racks
- More people rode their bikes
- There were less automobile traffic
- It were safer to ride
- There were more on-street bikeways
- There were more off-street multi-use paths (greenways)

I MIGHT RIDE MY BIKE MORE IF...



Additional comments submitted by respondents through the online survey are shown below.

Do you have any general comments about bicycling in Hendersonville?

Looking forward to it!!!!
Wish the Ecusta Trail would happen. (Love riding on Swamp Rabbit Trail, but wish I did not have to drive there.) Would also love to have a greenway to Asheville.
I would ride more if there was some separation between myself and vehicles. Separation could be defined as a bike lane or off road path.
We typically ride from Patton Park or HWY 191 into Hendersonville to eat on Main Street or on 7 th Avenue.
Generally nice routes to and through the City except from the north (BR US 25 or NC 191).
Motorist in general do not recognize me as a vehicle. They see me as a nuisance. I have had items thrown at me and I have had motorist get as close as possible to me even though there was plenty of room to pass on my left. It is surprising and refreshing when a motorist does acknowledge me and smile.
We need bike lanes.
Drivers need to be more aware of bicyclists and the drivers need to slow down.
Overall my cycling experience has been great in Hendersonville, but it could be better. Still too many mean and crazy car drivers.
If the edges of the road, where cyclists ride, were kept cleaner. Cars and trucks push trash, stone, glass and all to the edge of the road.
New section of the Oklawaha to Berkeley Park is the best yet, with excellent landscaping.
It's a disgrace that we have no bike lanes ANYWHERE including our 4 th Ave. "bike route." There should be designated bike lanes on all major through routes like 64, Spartanburg Highway, Greenville Highway, Kanuga Road, and Main Street, King, and Church.
I have to ride on Route 191 to get downtown and feel this is the most dangerous part of my ride. It would be nice if the road shoulder was wider.
Knowing how to safely ride a bike in traffic is important but so is how to drive a vehicle in mixed traffic. Those who propel large steel boxes with little abandon should be more empathetic when it comes to the other vehicle types, especially bicycles that they share the road with. I find the few I'm able to stop when they've passed too close or ran me off the road had no idea they were making me feel unsafe by the way they drove. Usually disaster is just narrowly avoided when a car or 18 wheeler (I've had both unfortunately) want to get past and there are cars coming the other way. Sometimes perhaps pressed by time they try to squeeze by endangering all involved in the passing just so they may arrive at their destination a few seconds sooner. Most Hendersonville drivers though are courteous, but if one rides on the side of the road enough there will inevitably be close calls and hopefully not a cyclist fatality. So education is one thing but when there are few to no bike lanes marked it seems cyclists are begrudgingly tolerated on the road by some drivers and often actually think that bicycles have no place using the same roadways as them. I am hopeful for more bike lanes to keep cyclists safe and to let drivers know that the roadway is used by more than just the ubiquitous automobile. One huge improvement would be to add bike lanes to connecting major roads like Asheville Hwy for those who would like to do more in Hendersonville on a bicycle. When I do venture out to a store on my bike, I have found a distinct lack of bike racks at most businesses like Ingles or Lowes. In summary, it seems the first step is to make the population more aware that the joys and utility of cycling are available to everyone, and your wonderful forum is a good start in initiating that process. I look forward to attending your meetings next Monday and Tuesday, and to the cycling friendly future of our awesome city.
Currently, riding a bicycle in, around, and near Hendersonville is absolutely dangerous for the bike rider and the car or vehicle driver. The roads are narrow and winding. If I ride a bike there is the constant danger of a vehicle trying to pass me on a curve or even a straight away with unassured clear distance. This is compounded even more with vehicles pulling oversized trailers trying to pass. If there is a safe solution for BOTH bike riders and vehicle drivers I would love to see it.
When I have ridden, motorists are mostly considerate. Bike lanes would be wonderful.

Better bike paths and greenways with comprehensive planning can make this a bike community
Love to ride, but sometimes it seems to be taking my life in my hands, especially on major feeder roads like Hwy 191.
In general, Hendersonville itself is already very bike- and pedestrian-friendly. However, it is sometimes hard to find bike-friendly routes for some of the outlying neighborhoods. Route maps with bike-friendly streets highlighted, marked routes (like 4 th Avenue now), bike lanes and bike paths to areas like Flat Rock, Spartanburg Highway, Asheville Highway, and the east side of freeway Exit 53 (where Wal-Mart and a variety of other shopping areas are) would increase the number of places I could bike for daily errands and events.
Thanks for working to create a bike-friendly community! I really appreciate the bike routes that have been created already and the excellent bike racks downtown and near the municipal buildings.
I feel the sidewalks of the less walked part of town should be opened to bikes especially children and less experienced bikers. This would be far safer than riding in the road. Bicycles should yield to pedestrians no matter the situation.
Great place to ride—road, BMX, trail, or to recreate. Like most places, my concerns are generally focused on law enforcement seemingly negative, or not positive, attitude towards cyclists resulting in not taking their concerns—whether general or specific, active incidents—sincerely; and disparate enforcement of laws to cyclists as opposed to motorists. I think motorists know this, and those wanting to get angry or exhibit aggressive behavior feel free to do so as there is no fear of consequence. By way of example, the magic words seem to be “I didn’t see him/her,” which seems to qualify it as an accident rather than negligent or reckless driving resulting in any form of manslaughter charge. As a driver, your job is to look where you are driving and use reasonable care as conditions dictate.
Many of the induction loop type traffic signals in the area are not bicycle friendly. For example, at the intersection on Asheville Hwy when exiting Patton Park the saw-cuts on the pavement, where the induction loop sensor lies, have been paved over, making it impossible to know where to position a bicycle to trigger the traffic signal. Other cities have solved this problem by marking a bicycle symbol to indicate the “sweet spot” at this type of intersection.
I would like to bike from my home, but Hwy 191/Haywood Road is not safe for cyclists. A bike lane into Hendersonville on Hwy 191 or Hwy 25 would give a lot better access.
I appreciate you asking cyclists to participate in this survey.
Too many compromised seniors in cars causing too many accidents. I can visualize a future with dedicated streets and shared bikes, including three wheelers. Better health, safer streets.
I would like to see bicycling promoted more as a fun way to travel that reduces emissions and is good exercise. I wish we had a bikeway. Turning unused railways into a bikeway would be wonderful.
Nothing particular.
I would love to ride my bike to work however, 191 and Spartanburg Highway are very difficult with traffic as there is no room for bikes safely.
The more the better.
As an avid cyclist living in Weaverville, I have only rode in Hendersonville a few times from Laurel Park to downtown. It was a fairly good experience but would love to see greenways and or bike lanes and racks. The more of these you can offer the more inclined I will be to visit and frequent the shops and restaurants.
I hope this plan will extend to out of the City limits and into the rest of the County.
There is a definite lack of bike lanes here in Hendersonville. I’m much happier and confident riding in large cities that have infrastructure for bikes. For example, NYC is much less daunting.
Except for 4 th Ave, there are really no other roads. I would like to see it be possible to ride bikes on 191 and then Church Street to get downtown. Of course the Ecusta Trail would be also great.
Would like to be able to safely ride my bike to the grocery store.
We need more greenways and bike lanes, please.
More people ride when there are other riders on scheduled rides...they not only find safety in numbers, but also get a warm social experience with caring, helpful participants.

In 1999, I participated in "Bike to School Day." My route was 8 miles down Hwy 176 and into town. Some other students rode from their house less than .5 miles away. Folks thought I was crazy. I live in Carrboro, NC now and see the difference the "bicycle-friendly" designation makes to a community. It's awesome to see a focus on bicycle facilities in the less privileged areas of town.

To create an effective cycling culture in Hendersonville, there needs to be a network of connected bike routes that go to useful points of interest.

We bicycle to bridge and back and sometimes downtown.

Biking on most roads is cramped and dangerous.

More trail systems linking downtown with other areas and parks would be great!

Traffic is horrible. I walked from my office to the Post Office and almost got hit twice. One car ran a red light and another made a left hand turn as I was stepping out in the street to cross.

Hendersonville has the potential to be a vibrant biking community. I would like to see more greenways and paths connecting people to parts of town without the need for a car.

I bike recreationally in Hendersonville and stick to roads I feel safe on but I don't ride to work, shopping, etc., because those roads are not user friendly.

We need some real, well demarcated bike lanes on main streets and highways-25, 176, 191, and 64. It won't happen unless there are actual shoulders with room for cyclists added to our roads (which invariably have low, soft shoulders if any do exist). They need paving and bright markings. Of course this would be very expensive and the chances of our legislators or DOT spending the required funds are in about the 5% range....A more realistic alternative is the actual realization of the Ecusta Trail west and extension of the Oklawaha Trail way past Beverly Mills north.

Safe biking in Henderson County and Hendersonville is very important to me. The advent of the Ecusta Trail was one of the specific reasons we bought our home here and it will be the reason we move and sell or convert our home to rental property if the railway is reactivated. I have increased my biking since moving here and find motorists to be very respectful increasing my sense of safety. I am 68 years old and my health and fitness is probably better now than while in my 40s. We often ride downtown for lunch and dinner and I would do my shopping at Ingles and Fresh Market by bike if I could do so safely. Greenway development IS Economic Development. In the simplest terms, quality of life and recreation is why people visit Hendersonville and in our case, move to Hendersonville.

Bicycle racks in downtown are hard to find. Riding on the serpentine Main Street is dangerous, but necessary if a biker goes downtown.

PRIORITY PROJECT SCORING

Priority Project Scoring

Project	Activity Centers	People per Mile	Percent in Poverty	Percent Zero Vehicle Households	Steering Committee Ranking	Public Ranking	Weighted Average	Priority
<i>Weight</i>	8.3%	8.3%	8.3%	8.3%	33.3%	33.3%		
4th Ave	9	5	9	9	5	3	5.3	4
5th Ave	3	6	10	10	2	4	4.4	3
7th Ave	6	4	1	1	3	2	2.7	1
Ashe St	5	1	1	1	8	10	6.7	8
Bearcat Blvd	1	10	4	3	8	6	6.2	6
Fleming St	7	2	6	5	6	8	6.3	7
Grove St	4	8	8	6	1	1	2.8	2
Locust St/Maple St	2	7	3	4	4	9	5.7	5
Washington St	8	9	5	7	6	7	6.7	9
Whitted St	10	3	7	8	10	5	7.3	10

PUBLIC RECOMMENDATION RANKINGS

INFRASTRUCTURE

RANK	LOCATION	FACILITY TYPE
1	Grove Street	Bike Lane
2	7 th Avenue	Bike Lane
3	4 th Avenue	Bicycle Boulevard
4	5 th Avenue	Buffered Bike Lane
5	Whitted Street	Bicycle Boulevard
6	Bearcat Boulevard	Separated Bike Lane
7	Washington Street	Separated Bike Lane
8	Fleming Street	Bicycle Boulevard
9	Locust Street/Maple Street	Facility Type Varies
10	Ashe Street	Separated Bike Lane

PROGRAMS & POLICIES

RANK	RECOMMENDATION
1	Permit bicycling on sidewalks except in downtown Hendersonville.
2	Incorporate bicycling safety into driver education and training courses.
3	Create a Bicycle Pedestrian Advisory Commission.
4	Require new developments to include bicycle facilities and parking.
4	Adopt a local Complete Streets policy.
6	Establish a local Safe Routes to School program.
7	Identify and prioritize locations for bicycle rack installation.
8	Become a League of American Bicyclists Bicycle Friendly Community.
9	Regularly update local street design standards to reflect national best practices.
10	Require bicycle education in schools.
11	Deploy bicycle patrols.
12	Plan and execute an Open Streets event.
13	Create a Bicycle Pedestrian Program and hire a Program Coordinator.
14	Create events to promote National Bike Month and Bike to Work Day.
15	Become a Watch for Me NC partner community.
16	Regularly update the City's traffic calming policy.
17	Distribute bike lights, helmets, and bells.
18	Create a local Bicycle Benefits program.
19	Conduct police training on bicycle safety.
20	Conduct regular bicycle counts.

