



Black Mountain by Bike

A Plan for Bicyclists



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Acknowledgments

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- Kristina Solberg, NC Department of Transportation
- Mary Smith, Active Routes to School
- Julie White, Town of Black Mountain Greenway Commission and Blue Ridge Bicycle Club
- Jen Billstrom, Cycle to Farm/Velo Girl Rides
- John Vine-Hodge & Betsy Kane, NCDOT Division of Bicycle and Pedestrian Transportation
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With Support From Others:



Funding Provided by the NCDOT Division of Bicycle & Pedestrian Transportation & the Town of Black Mountain

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Chapter 1



Introduction, Context, and History





A Plan for People who Bike in Black Mountain

Black Mountain, North Carolina, is located in one of the most idyllic settings in the Southeast. Nestled against the backdrop of the Black Mountains and Mt. Mitchell, the community of 8,000 residents is also located in one of the most desirable areas for bicycling in the United States.

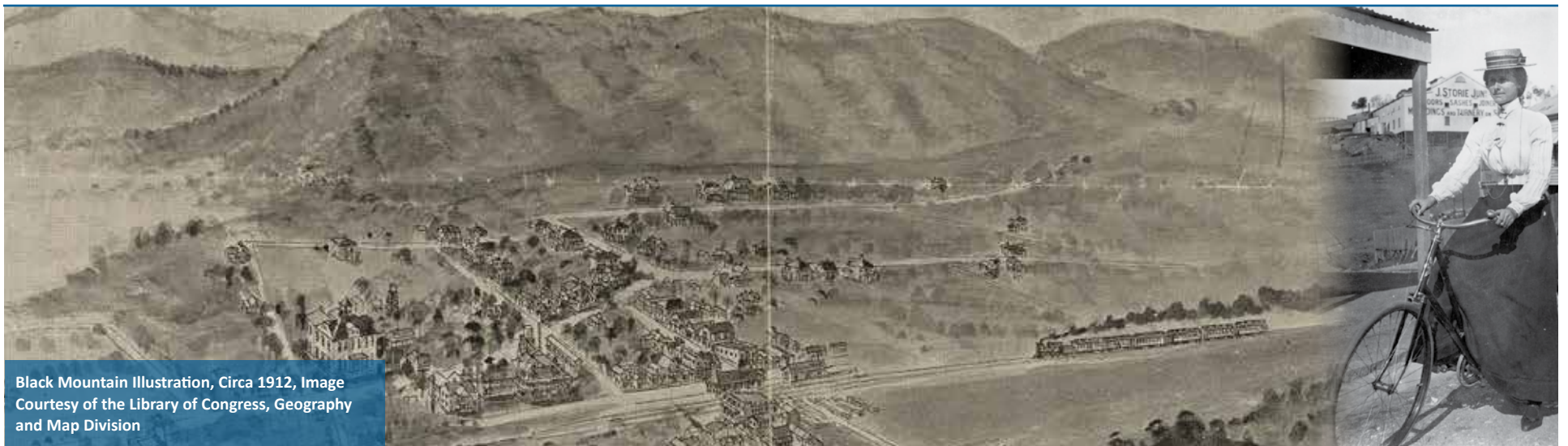
The town has a long-standing history of promoting quality of life and its past plans are filled with goals, objectives and action items intended to promote community connectivity and accessibility as well as convenient transportation choices for its residents and visitors.

These goals for better conditions for bicycling, as well as walking and overall community health are not new age or futuristic themes. They are strongly rooted in Black Mountain's history.

Bicycling was once the predominant mode of travel within small towns across the United States. Driving was for the privileged and was expensive. It was inconceivable for someone to crank up the automobile to make a one-mile trip to the store or to the park.

The bicycling movement of the late 1800s spawned the era of paved roads in the United States and North Carolina's claim to fame—being First in Flight—is grounded in the Wright Brothers' bicycle business. Black Mountain was incorporated in this same era in 1893 and historic photos of the Town indicate a strong bicycling presence.

This plan will help the Town, its residents, its businesses and partners to capture this history and continue its tradition by promoting a community that is safe and bicycle friendly. This is accomplished through a combination of projects, programs and policies that align with other community goals and endeavors that integrate bicycling into the day-to-day decision-making and business of the town.



Black Mountain Illustration, Circa 1912, Image
Courtesy of the Library of Congress, Geography
and Map Division

A COMPREHENSIVE PLAN FOR BICYCLING

In order to improve conditions for people who bike in Black Mountain and across North Carolina, the challenges faced by those who wish to bike must be solved by collectively addressing them through input from community members, business owners, planners, engineers, architects, law enforcement and many others.

Black Mountain by Bike is an effort funded by the Town of Black Mountain and the North Carolina Department of Transportation to assist the community in making a stronger connection between the features of the community that make it more bicycle friendly and the health of its current and future residents as well as visitors.

The goal of Black Mountain by Bike is to identify how the community can establish and enhance facilities within its boundaries to serve as physical activity and recreation hubs, create places where residents can access healthy food, and reconnect neighborhoods via multi-modal transportation infrastructure and additional programs.

Small towns face unique challenges today more than ever. Over the past 60 years Black Mountain has become more physically and socially disconnected due to highway expansion, increased traffic volumes, auto-centric investment priorities by public and private entities, and changes in overall retail markets. Funding the type of programs and projects to help overcome these recent influences remain the single biggest obstacle to overcome in making the town more bicycle friendly.

These influences have caused more traditional neighborhood businesses to move from downtown area areas to higher volume vehicular corridors. Those trends are reversing and Black Mountain is at the forefront of promoting what it means to be a healthy small town. The investment in the downtown area as well as more than a decade of progressive greenways planning and implementation leave the community poised to become a small town success story for bicycling.

A VISION FOR BICYCLING IN BLACK MOUNTAIN

Black Mountain has a number of plans that contain a vision or direction for bicycling or active transportation. When one views Black Mountain's plans, policies, programs, and activities as a complete body of work, it is clear that the town wants to become a place that contains a well-connected network for bicyclists--a town where residents can hop on their bike to ride to the grocery store, schools, parks, and downtown businesses. Working with the steering committee, the Black Mountain by Bike consultants collated the many bicycle

related themes in eleven different plans into one statement that encompasses the vision for bicycling in Black Mountain. The vision statement adopted by the steering committee at its May 2015 meeting states:

"A Vision for People who Bike" -- Black Mountain's Plan for Bicyclists envisions a complete transportation system that supports healthy living and an active community where bicycling is an integral part of daily life and a viable and popular travel choice that encourages people of all abilities to access the well connected, safe and convenient network.

While stating a desire or adopting a vision is a good starting place, a vision alone cannot create a connected and coordinated pedestrian network. A community needs good policies and implementation plans to transform its vision to on-the-ground bike paths, safe road crossings, and greenways. What follows is an evaluation of existing plan and policy efforts that will further Black Mountain's efforts to reach its vision for bicyclists.

CREATING A BICYCLING NETWORK FOR ALL

A cornerstone of the approach employed to develop Black Mountain by Bike is producing a plan for bicyclists by bicyclists. This is not a bicycle plan, as a bicycle is an inanimate object incapable of moving without human power. The bicyclist is a living, breathing human being that experiences the world through the use of sight, touch, feel and smell—all senses that are ignited by using a bicycle to get around.

Not all bicyclists are the same. They desire different routes, ride different types of bikes and take to their bike for a variety of reasons. Black Mountain by Bike addresses these different types of bicyclists through the lens of an emerging approach that categorizes bicyclists by their attitudes toward riding:

- **Strong and fearless bicyclists** are those that are confident riding in almost all situations, including high volume and high speed traffic situations. Accommodating them safely on streets and highways is important, and their choice to ride a bicycle is not dependent on having dedicated facilities such as bike lanes or greenways.
- **Enthusied and confident bicyclists** are comfortable in many on-road situations but prefer to ride in dedicated facilities like bike lanes. Accommodating them along high speed and high volume roadways requires special considerations to buffer them from traffic. They may choose greenways over on-road routes if greenways offer a convenient alternative.
- **Interested but concerned bicyclists** may be interested in riding a bicycle

but are reluctant to ride where they do not feel safe. They may already ride a bike on mountain bike trails or exclusively on greenways and can be encouraged to ride in other situations when given dedicated, safe facilities such as buffered or protected bike lanes.

- **No way, no how:** This group is not interested in bicycling due to lack of interest, inability to ride, or concerns about topography and safety. Communities should seek ways to introduce them to bicycling and build facilities where they feel safe so they can become interested in riding.

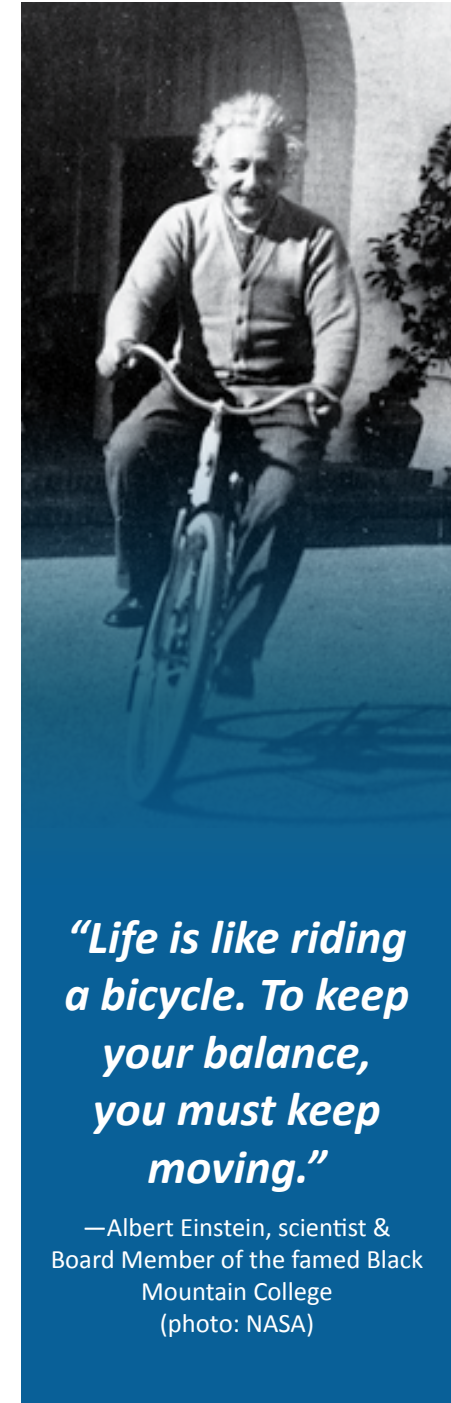
In developing a Comprehensive Bicycle Plan, as required by NCDOT, all of these riders types should be considered. However, the emphasis in developing project, program and policy recommendations lies in addressing the needs of the Enthused and Confident and Interested but Concerned bicyclists. The theory goes that addressing their needs benefits the Strong and Fearless

riders and helps encourage the No Way, No How crowd to give bicycling a try.

Bicyclist attitudes toward riding can also fluctuate among these groups. A person who is strong and fearless when riding a road bike on long weekend rides may become interested but concerned when riding with a child. The enthused and confident rider may have a no way, no how attitude when it comes to performing certain tasks on a bike that necessitate travel along routes that are intimidating, such as high speed highways.

Therefore, Black Mountain by Bike recommends various on-street and off-street network investments and programs aimed to serve existing riders well and increase ridership by creating the safest and most convenient system possible.

The following chapters contain a variety of project, program and policy recommendations generated through the planning process. They emerged through various inputs such as the public open houses, surveys, the steering committee and the consultant team’s perspective in pedaling around the community.



“Life is like riding a bicycle. To keep your balance, you must keep moving.”

—Albert Einstein, scientist & Board Member of the famed Black Mountain College
(photo: NASA)

Chapter 2



Building the Plan



Chapter 2



Building the Plan

Building a Plan for People who Bike

Those who bike Black Mountain, lead its community endeavors, and manage the Town’s business are the community’s experts and share a common goal for its success. Black Mountain by Bike was developed based on the many methods

of input from these community stakeholders. As a public good, bicycling facilities are collectively owned by the citizens. The consultant team used its professional perspective and experiences in Black Mountain to help transform the thoughts and ideas posed by Black Mountain’s stakeholders into a set of recommendations.

The efforts to build the plan consisted of a multi-pronged approach to spread awareness of the planning process and ensure a variety of local perspectives

Project Schedule and Process

	2015								
	April	May	June	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Project Start	Staff Kickoff	Steering Committee Meeting							
Public/ Stakeholder Outreach		Online survey & WikiMap Release	Open House	Cycle to Farm After Party	Online survey & WikiMap Ends	Open House 2			
Data Collection/ Fieldwork/ Research			Steering Committee Meeting Park Rhythms		Health Impact Assessment Workshop	Steering Committee Meeting			
Draft Plan Review								Advisor Board Review	
Final Plan Adoption									Town Board & NCDOT Adoption

were incorporated into the plan. Residents, key stakeholders, and town staff were engaged during the planning process through the following channels:

- Steering Committee Meetings;
- Public Meetings;
- Stakeholder Interviews;
- Public Events and Festivals; and
- Online Survey and Mapping Tool.

Building the Plan

The process for the Plan was a collaborative effort among staff, stakeholders, and residents. The outreach garnered community feedback and attention by many individuals through a variety of citizen engagement approaches.

Steering Committee and Public Workshop

Steering Committee

The Steering Committee was comprised of representatives from the Town, the French Broad River MPO, NCDOT, the Blue Ridge Bicycle Club, the business community, health advocacy organizations, and interested town residents. The Steering Committee convened on four separate occasions to provide input on bicycling issues and opportunities, serve as a sounding board for elements of the planning process, and review plan deliverables. The first Steering Committee meeting was held in May 2015 at the Carver Community Center.

Public Workshop

The second Steering Committee meeting was held concurrently with the Public

Workshop at the Carver Community Center in June 2015. Approximately 35 residents provided a diverse set of perspectives and suggestions to improve cycling in the Town. Meeting participants included area bicyclists, small business owners, recreational bicyclists, as well as Town and NCDOT staff.

This meeting was used to gather input from residents on locations for bicycle facility improvements to connect people with their destinations. The feedback from the workshop was incorporated into the plan development process. Some of the more popular responses include:

- Greenway connection from Black Mountain to Asheville;
- Greenways to connect schools, recreation parks, and existing greenways; and
- Safety improvements on Old Highway 70, NC 9, and US 70.

Survey, WikiMap, and Website

Public Input Survey

With feedback from the Steering Committee, the consulting team developed a public input survey. The objectives of the survey were to assess bicycling behaviors and priorities among residents in Black Mountain and to identify ways to make the Town more bicyclist-friendly. Online and print versions were developed, and each version contained a Reference Map to help users identify important locations for improvements.



Groups identified their destinations, needed bicycle lanes, greenways, and other route upgrades in each of the 6 groups.



The team encouraged parents to take the survey before and after they dropped their children off at school on Walk-Bike to School Day.



During the Park Rhythms event at Lake Tomahawk, the team set up a booth and encouraged survey participation by raffling off a prize donated to the project by the Swannanoa Valley Museum.

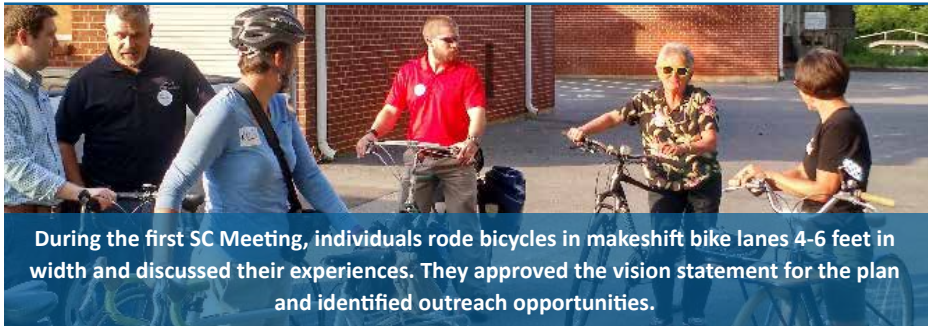


The team attended the after-party to gather input from both residents and visitors who choose Black Mountain as their travel destination.

Flyers with links to the survey were distributed to local businesses around town, including:

- Epic Cycles
- The Trail Head
- Carver Community Center
- Dynamite Coffee
- Merry Wine Market
- Library
- Lookout Brewing
- Fresh Wood-Fired Pizza

Other outreach events to gain survey input included a Walk/Bike-to-School day, Park Rhythms concerts, and the Cycle to Farm after-party. The previous pages contain photos and brief descriptions of the events.



Project Website

A dedicated website was developed to inform the public about the plan, to provide a forum for updates and events and to house draft materials. Links to the survey, existing plans and interactive mapping tool were included. See Figure 2 for a snapshot of the website.

Figure 2—Snapshot of the Project Website



Figure 1—Screenshot of Instructions for the WikiMap

Instructions	Existing Layers	Add a Route	Add a Point
Click & comment on Existing Layers	<ul style="list-style-type: none"> Destinations Proposed Trail Existing Trail 	<ul style="list-style-type: none"> Route I Bike Now Route I Would Bike Road Needing Bike Improvement My Proposed Trail 	<ul style="list-style-type: none"> My Destinations Bike Hazard / Challenge Intersection Improvement Bike Crash / Near Miss Ask Question
<p>Add a Route to identify roads & trails you want to ride</p> <p>Add a Point to identify bike destinations, hazards & crashes</p> <p>Click & comment on Routes and Points added by others</p> <p><i>(About & help > View Options > Turn On/Off Other People)</i></p>			

Above: Citizens could add a variety of existing and potential routes, as well as hazards and necessary improvements to the online map.

Right: Citizens could add a variety of existing and potential routes, as well as hazards and necessary improvements to the online map.



WikiMap

Residents were able to provide additional input on bicycling issues and opportunities in Black Mountain through an interactive online map launched in May 2015. This WikiMap (see Figure 4) tool gave residents the ability to identify routes and draw lines related to different parts of town and provide important place-specific input.

Example comments included:

- Old 70 needs bike lanes. Since the road is wide and it currently needs to be repaved, this should be a high priority improvement in the bike plan.
- There is an uncovered utility line in the middle of the drive leading to Bi-Lo. Bicyclists traveling north on Route 9 may be injured if they ride over the hazard.
- There are no signs to warn motorists of the presence of the Flat Creek Greenway. Since this is a main route for bike/walk commuting to school, a high priority should be placed on improving safety in this area.

Open House

In November 2015 the final Open House for the Plan was held at Carver Community Center. Approximately 27 residents dropped by during the evening to learn more about the Plan's findings and provide feedback on the final project recommendations. There were a total of five project stations set up throughout the room. After participants visited each, they were asked to rate their top three recommended implementation choices. The most popular choice was to adopt the Plan, followed (in priority order) by: identify resurfacing project for shoulder widening, consider budget for neighborhood greenways, and change policy to allow for bicycling on sidewalks outside the downtown area.

Community Ride

On Saturday, September 12, residents gathered at the parking lot in Town Square for a community bike ride. About 55 people came ranging in ages from 2 to 72 to take part in the event. The ride was a meeting in motion, where participants and the consultant team stopped at several stations along the route to discuss potential bicycling improvements. The enthusiasm from the group was high, and people had the opportunity to provide more input during this rolling meeting.

Survey

A total of 259 residents completed the survey. Among survey participants, a majority of residents live in 2-person households,

followed by three and four person households. Forty percent of households have children living in the home under the age of 18. There is a good spread of respondents from every major age group.

Key findings included the following:

- 80% of respondents would bicycle more often if there were more greenways
- 60% cycle at least once a month
- Over 83% bicycle for recreation or fitness, but only 43% bicycle for transportation to nearby destinations
- A surprisingly high 17% report commuting to work by bike. Demographic Questions reveal that 36% work in Black Mountain, and another 10% work within 10 miles of Black Mountain
- There are very few children of any age bicycling to school
- Over three fourths of respondents or their household members ride less due to the total lack of bicycle lanes or shoulders
- Bicycling events and activities would encourage 40% to bicycle more often

Figure 3 summarizes the most popular proposed greenway trails that would increase bicycling accessibility and ridership. Flat Creek Phase 2 to Montreat is the most popular, followed closely by Riverwalk/Dog Park to In-the Oaks Trail.

Figure 3—Which proposed greenway trails will do the most to promote bicycling in Black Mountain?

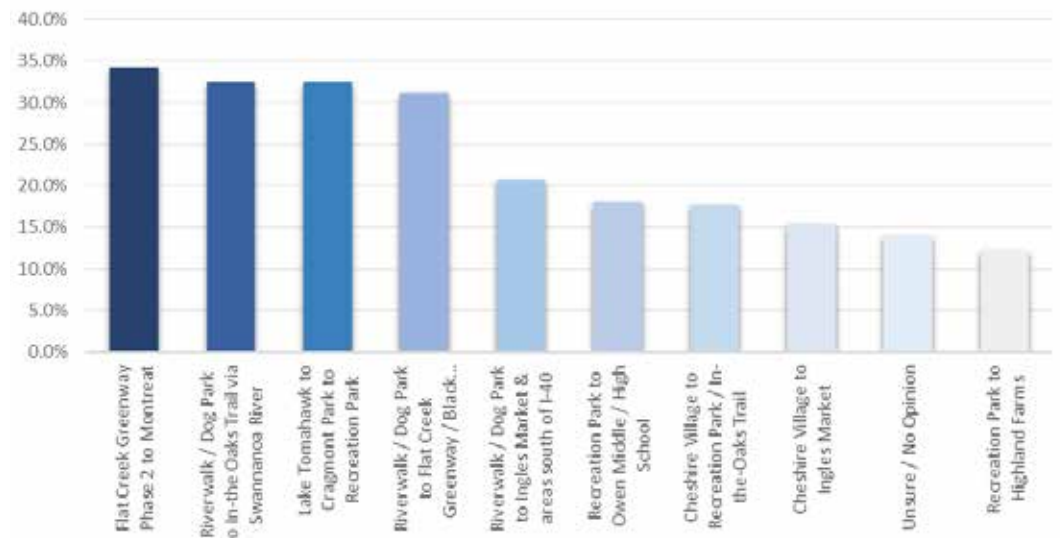
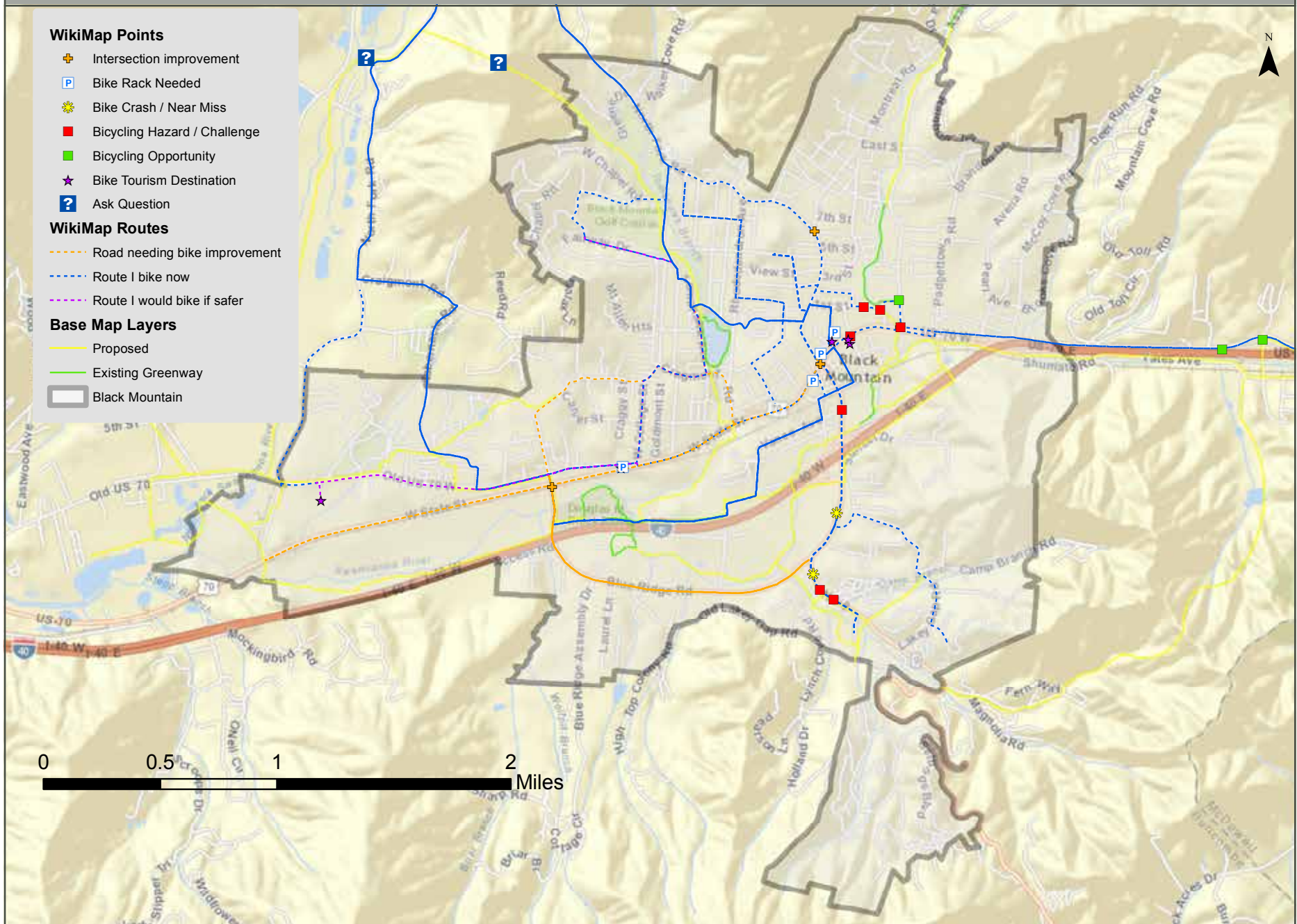


Figure 4—WikiMap Public Comments



US CENSUS & DEMOGRAPHIC DATA

It is important to examine a community's demographics as part of developing a plan for people who bike. Demographic information, available through the US Census and related survey instruments, provides valuable clues about travel behavior, preferences and can identify potential health-related concerns as they relate to the socioeconomic conditions in which someone is raised and/or lives.

Characteristics such as age, income, vehicle ownership, and commute time can suggest a population's potential for bicycling as a mode of transportation. This section provides a summary of the demographic analysis for Black Mountain. The Census data summarized in this section includes those datasets considered most relevant for a plan for people who bike.

According to 2010 U.S. Census data, Black Mountain's population tips slightly toward older adults age 60 and higher (Figure 5: Population Pyramid) when compared to North Carolina's overall demographics. This population cohort comprises 30.2 of the town's overall population compared to only 18.7 of the state's population in this age grouping.

More and more, older adults are seeking communities where they can bike and walk regularly because they want to lead an independent lifestyle as they approach retirement and ultimately retire. Older adults are concerned about their safety while bicycling in terms of self-defense and the risk of falling. The isolation that can come from being in a large, rural estate during retirement has been shown to have negative physical and mental health effects.

The youth dependent population percentage for Black Mountain is 20.2%, which is notably lower than the 26.8% of North Carolina's population that is age 19 years and younger. Youth seek to explore the world around them and express their free will during these years.

With increasing demands on the family and most households having both parental units in the workforce, youth are being asked to be more independent. Communities that are accessible by bike allow for this to occur in a safe environment.

The working population of Black Mountain is 49.6% of the population and is lower than North Carolina's proportion at 54.5%. The life of a working adult is complicated. They are seeking greater work/life balance while also considering the needs of the family, both elders and offspring. They want to be able to ride a bike to run errands in the evening, take shorts trips with the family, or enjoy a recreational ride on the weekends.

For other Census-related data, the American Community Survey is used for estimates for mode of transportation to work and travel time to work. The American Community Survey measures commute modes of transportation but has no metric to indicate number of bicycling trips. It does not account for transportation trips other than the trip to and from work.

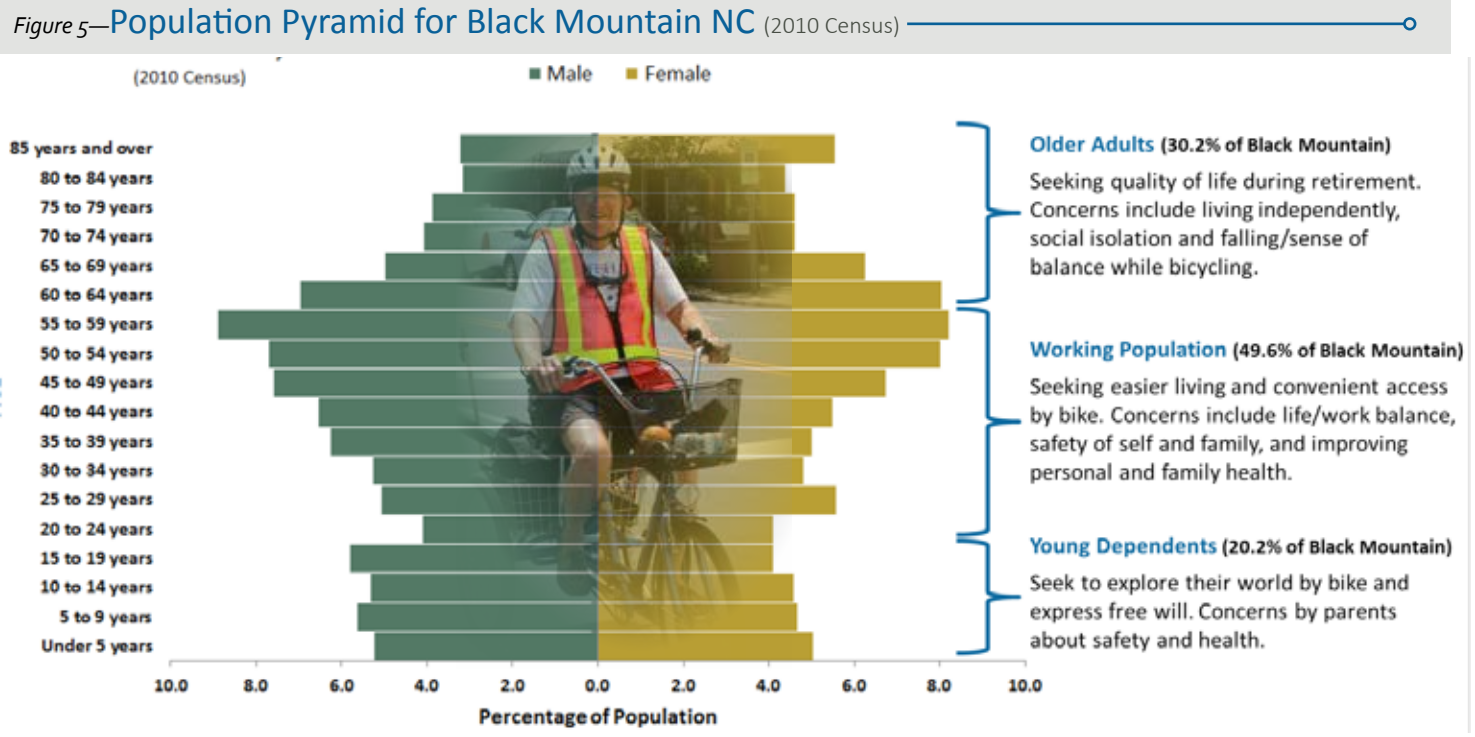


Figure 6 shows some select journey to work data for the estimated 3,588 workers age 16 years and older in Black Mountain. The mode to work share indicates up to 3.0% of workers 16 years and older in Black Mountain may ride a bike as a means of commuting (the margin of error is +/- 2.1% for that category of other means).

The American Community Survey indicates that the average travel time to work for Black Mountain’s residents is 18.9 minutes, which is lower than the NC average of 23.6 minutes.

It is also estimated that more than 10% of Black Mountain’s working age individuals have no access to a car (shown in Figure 7), meaning they rely on carpooling, walking, public transportation, taxicab, scooter or bicycle as their primary means of travel to work. Workers reporting only one vehicle available in a household is 41.3%. This could also indicate potential trips that can be taken by a mode other than the automobile.

Figure 6—Means for Commuting to Work in Black Mountain

Commuting to Work	Estimate (out of 3,588 workers age 16 and over)	%
Drove alone	2,536	70.7
Carpooled	528	14.7
Public Transportation	0	0.0
Walked	100	2.8
Other means (including bicycling)	107	3.0
Worked at home	317	8.8

Source: American Community Survey (2009-2013); margin of error +/- 1.0 to 8.4%

Figure 7—Access to Vehicles in Black Mountain

Vehicles Available	Estimate (out of 3,417 occupied housing units)	%
No vehicles available	357	10.4
1 vehicle available	1,410	41.3
2 vehicles available	1,041	30.5
3 or more vehicles available	609	17.8

Source: American Community Survey (2009-2013); margin of error +/- 3.8 to 5.8%

Chapter 3



Existing Plans, Policy, and Programs





Existing Plans, Policy, and Programs

For a town its size, Black Mountain has made great strides in building a network for bicyclists that includes an existing and planned greenway system, an active Safe Routes to School program, and town-sponsored programs that promote active transportation and healthy living. To realize fully its vision for bicyclists, Black Mountain needs to coordinate its existing bicyclist planning and policy efforts with future initiatives. What follows is a review of existing plans and policies that have influence on Black Mountain's bicycling environment.

Figure 8—List of Plans and Policies

Greenways Master Plan (2008)

Pedestrian Transportation Plan (2008)

Active Routes to School Plan (2012)

US 70 Corridor Study (2007)

Town Square Study (2011)

Comprehensive Plan Update (2014)

2035 FBRMPO Long Range Transportation Plan (2010)

Blue Ridge Bike Plan (2013)

FBRMPO Comprehensive Transportation Plan (2008)

GroWNC (2013)

2016-2025 NC State Transportation Improvement Program (STIP)

WalkBikeNC (2013)

EXISTING PLANS

Before evaluating Black Mountain's specific plans and policies, it is important to think about the difference between bicyclist networks where cyclists feel safe and comfortable and those where riders feel uncomfortable or are life-threatening. A comprehensive method to evaluate a community's network is to use the Five Es.



Engineering: Creating safe and convenient places to ride and park



Education: Giving people of all ages and abilities the skills and confidence to ride



Encouragement: Creating a strong bike culture that welcomes and celebrates bicycling



Enforcement: Ensuring safe roads for all users



Evaluation & Planning: Planning for bicycling as a safe and viable transportation option

This section of Black Mountain's Plan for Bicyclists identifies which of the 5E's the plan, policy or program addresses.

GUIDING PLANS

Black Mountain has numerous guiding plans that contain transportation and/or land use recommendations. Some plans, such as the *Greenways Master Plan*, directly address active transportation while some are tangential to or do not directly address active transportation but result in an improved bicyclist environment. This plan also reviews regional and statewide plans with some bearing on Black Mountain's bicyclist planning process. Where noted, the summary statement for the plan description is quoted from the *Black Mountain Comprehensive Plan Update (CPU)*.

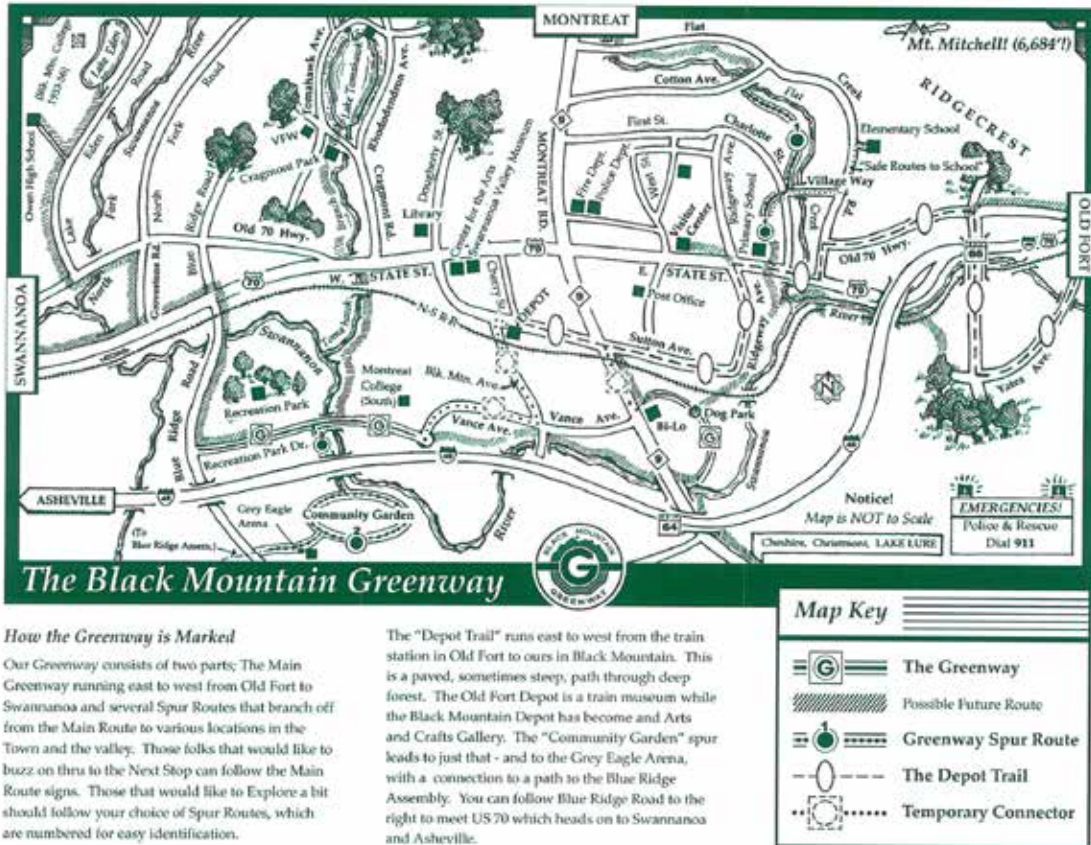
E's
Addressed



Greenways Master Plan (2008): The Greenways Commission developed this plan to highlight and prioritize the planning and construction of future greenway trails. (CPU)

Relevance to the Plan for Bicyclists: In many communities, Black Mountain included, a greenway system serves more than one purpose and user. Some users access greenways for health and recreation while others use the system as a roadway alternative to travel from one place to another. Black Mountain's Greenway Plan considers both types of users. When completed, bicyclists on the network will have the ability to travel throughout the town on the off-road system.

Illustration from Black Mountain Greenway Plan



Pedestrian Transportation Plan (2008): This plan identifies priority sidewalk and greenway projects and recommends policies and programs to facilitate the expansion and use of these networks. (CPU)

Relevance to the Plan for Bicyclists: *Black Mountain's Pedestrian Transportation Plan* is relevant to the Plan for Bicyclists in that it advocates for a well-connected pedestrian system that functions as a transportation network in addition to a place for recreation. In the Program and Policy Recommendation section, the Pedestrian Plan provides recommendations that benefit pedestrians and bicyclists. As sample of these recommendations include: Awareness Days/Events such as Strive Not to Drive Day and National Walk to School Day; Infrastructure improvements that include accommodations for pedestrians and bicyclists; and land use recommendations that promote a mix of land uses and connectivity.

Active Routes to School Plan (2012): This plan is a framework to address the 5Es of the Safe Routes to School program and includes recommendations and priorities for each of the 5Es. The focus of the plan is to create a safe environment where more students walk and bike to Black Mountain Primary and Black Mountain Elementary. The Plan recommends safety improvements, infrastructure facilities, specific recommendations for each school, and it includes recommendations related to education, encouragement, and enforcement.

Relevance to the Plan for Bicyclists: The Active Routes to School Plan dovetails nicely with the Plan for Bicyclists in that it contains 5E recommendations for the areas surrounding the schools. The plan points out and provides recommendations for the roadways and intersections that pose safety barriers for school-age bicyclists, particularly along State Street and Montreat Road. Like other plans, the Safe Routes to School Action Plan is not a specific bicyclist plan, but the recommendations improve the overall experience for bicyclists.

E's
Addressed



E's
Addressed



THE 5 E'S OF SAFE ROUTES TO SCHOOL



ENGINEERING

Engineering strategies can enable more bicycling and walking and also make these activities safer. Engineering can include: improving & installing sidewalks, crosswalks, signage, traffic signals and more.

ENCOURAGEMENT

Encouragement strategies are about having fun — they can provide ways for parents and children to discover that walking and bicycling are do-able and a lot of fun! Special events and contests can get kids excited to be a part of SRTS!



EDUCATION

Education activities teach pedestrian, bicycle and traffic safety, as well as create awareness of the benefits and goals of SRTS. Lessons can be incorporated into classroom activities or special events to teach skills. Also, parents, teachers, drivers and neighbors can all be a potential audience for SRTS's messages.



ENFORCEMENT

Enforcement through the SRTS program should involve a network of community members working together to ensure safe walking, bicycling and driving. It helps deter unsafe behaviors of drivers, pedestrians and bicyclists.



EVALUATION

Evaluation is about identifying issues, improving activities and understanding results. It is an important component of any SRTS program because it is used to determine if the goals of the strategies are being met and to assure that successful efforts are being recognized.



US 70 Corridor Study (2007): This study analyzed transportation and land use conditions along US 70 in Black Mountain and Swannanoa, and engaged local stakeholders in a planning process to develop a preferred transportation and land use vision for the corridor. The plan provides recommendations to enhance connectivity while preserving capacity along the corridor, capitalize on existing character and unique assets for redevelopment, create well-designed destinations along the corridor, and increase multi-modal opportunities. (CPU)

Relevance to the Plan for Bicyclists: The plan contains bicyclist recommendations for East, Central, and West Black Mountain. A selection of bicyclist related improvements include:

The **East Black Mountain recommendation** states, “the six lanes of US 70 and Old US 70 provide far more capacity than is needed in this corridor, based on analysis of 2030 forecasts.” While the plan does not outline a specific set of improvements for bicyclists, it notes that “a more appropriate design could provide an entrance that is safer and far more appealing, while freeing up a significant amount of land for development, landscaping, and/or bicycle and pedestrian paths.”

In **Central Black Mountain**, the proposed solutions center on how the town might address downtown congestion. Possible solutions that would reduce congestion and improve conditions for bicyclists include a connection between Vance Avenue and Flat Creek Road or Padgett Road using “one or two structures: that would “add a much-needed crossing of both these travel barriers (US 70, the railroad, and the Swannanoa River), while reducing traffic through downtown.” The plan notes that pedestrians and bicyclists would also benefit from a properly designed bridge at this location.”

In **West Black Mountain**, all of the recommendations—a railroad overpass at Goldmont Street and US 70; better connect the existing street network create a more complete grid system; and internal connectivity and shared parking to reduce traffic and conflicts on US 70—would also improve bicycle and pedestrian connectivity.

Town Square Study (2011): This small area study of the intersection of US 70 and NC 9 that provides recommendations to improve traffic safety in downtown Black Mountain; mitigate congestion at the intersection; and make better use of on-street parking. The Study also proposed a conceptual schematic design of the Black Mountain Town Square.

E's
Addressed



Relevance to the Plan for Bicyclists: This study’s intersection improvement recommendations results in an improved pedestrian and bicyclist environment. The one specific bicyclist recommendation is the east-west pedestrian/bicycle path south of Honeycutt Street. According to the plan, “this route will safely and conveniently connect Montreat Road with West Street, offer access to the Town Square site, and separate pedestrians from emergency response vehicles and other traffic associated with the Public Safety facility.”



Comprehensive Plan Update (2014): The 2014 *Comprehensive Plan* updates *Black Mountain’s 2010 Comprehensive Plan*. The 2014 Update remains true to the 2010 vision but updates the Town’s guiding policies, goals, and objectives. The plan is broad in scope; addressing planning topics such as land use, housing, infrastructure, parks and recreation, and economic development.

Relevance to the Plan for Bicyclists: The *Comprehensive Plan Update’s* Vision Statements support an on-road and off-road network for bicyclists and the plan catalogs elements of the existing pedestrian and bike networks including trip attractors, existing sidewalks and crossings, the existing greenway bicycling network as well as a listing of policies and programs. The Plan contains a set of maps that illustrate these items. The plan also outlines issues and opportunities, facilities, policies and programs, planning, and goals, strategies, and actions for Black Mountain’s Bicycle Network and Greenway Network. The goals, strategies, and actions are shown in Figure 9. The maps are shown as Figures 10 and 11.



REGIONAL PLANS AND FRENCH BROAD RIVER MPO PLANS

2035 Long Range Transportation Plan (LRTP): This plan, adopted by the French Broad MPO, includes transportation improvement projects to address mobility, maintenance and quality of life issues affected by the roadway network in the Asheville metro area within a twenty year planning horizon (CPU).

Relevance to the Plan for Bicyclists: The LRTP contains a Bicycle and Pedestrian Element that addresses the region’s bicycle and pedestrian environment. The only specific Black Mountain recommendation is a 1.2 mile sidewalk project along NC 9/ Montreat Road from 4th Street to the town limits. A portion of this project has been completed; the existing sidewalk ends across from Cotton Avenue, about one mile from the town limits.

Figure 9—2014 Comprehensive Plan Update Bike-related Goals, Strategies, and Actions

Bicycle Network Goals, Strategies and Actions

Goal	Strategy	#	Action Item
Share roadways with bikes	Develop bike-friendly streets and parking where appropriate	T-2.1.1	Develop a Town Bike Plan that identifies and prioritizes recommendations to improve Black Mountain’s bicycle infrastructure
		T-2.1.2	Install bicycle signage on roadways deemed suitable for bike travel
		T-2.1.3	Install bike lanes or paved shoulders on roadways with appropriate street width and traffic conditions
		T-2.1.4	Install bike racks at Town facilities with high existing or potential demand
		T-2.1.5	Incorporate bike racks into downtown streetscape improvements
	Promote biking as a form of transport and recreation	T-2.2.1	Provide up-to-date bike maps (regional and local) to the public
		T-2.2.2	Hold events to encourage biking along preferred roadways and to educate residents about bike safety
	Implement recommendations from Blue Ridge Bike Plan	T-2.3.1	Incorporate bike racks into downtown streetscape improvements
		T-2.3.2	Develop a Town Bike Plan that identifies and prioritizes recommendations to improve Black Mountain’s bicycle infrastructure.

Greenway Network Goals, Strategies and Actions

Goal	Strategy	#	Action Item
Expand the greenway network as a core component of the bike and pedestrian transportation system	Expand greenway network in accordance with the Greenways Master Plan and the Pedestrian Transportation Plan	T-3.1.1	Work with Greenways Commission to build Riverwalk Phase 2 trail
		T-3.1.2	Work with Greenways Commission to implement other priority trails, including the Owen Spur, Tomahawk Spur and Flat Creek Phase 2 trails
		T-3.1.3	Restart discussion with Norfolk Southern regarding Railroad Trestle Clean-up and Greenway examined in Stormwater Master Plan
		T-3.1.4	Continue discussions with NC DOT regarding use of culvert boxes under US70 and NC 9 as greenways
	Promote existing greenways through educational programs	T-3.2.1	Implement educational program recommendations in Pedestrian Transportation Plan including park literature, school outreach programs, environmental education programs, and guided nature walks
	Encourage development practices that support greenway development	T-3.3.1	Encourage utility corridor development practices that allow maximum compatibility with pedestrian and bikeway corridors

Figure 10—Black Mountain Pedestrian Network (2014 Black Mountain Comprehensive Plan Update)

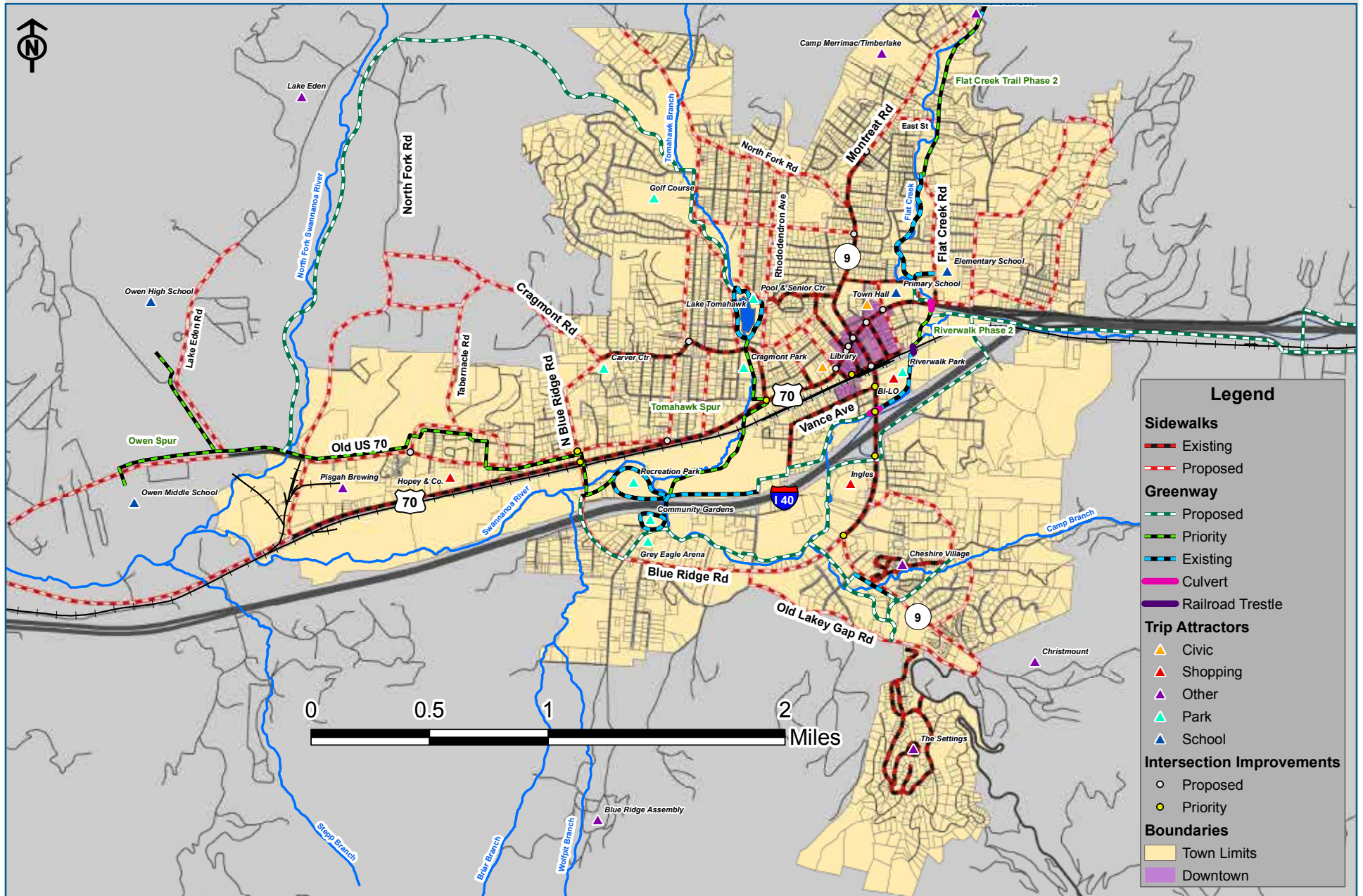
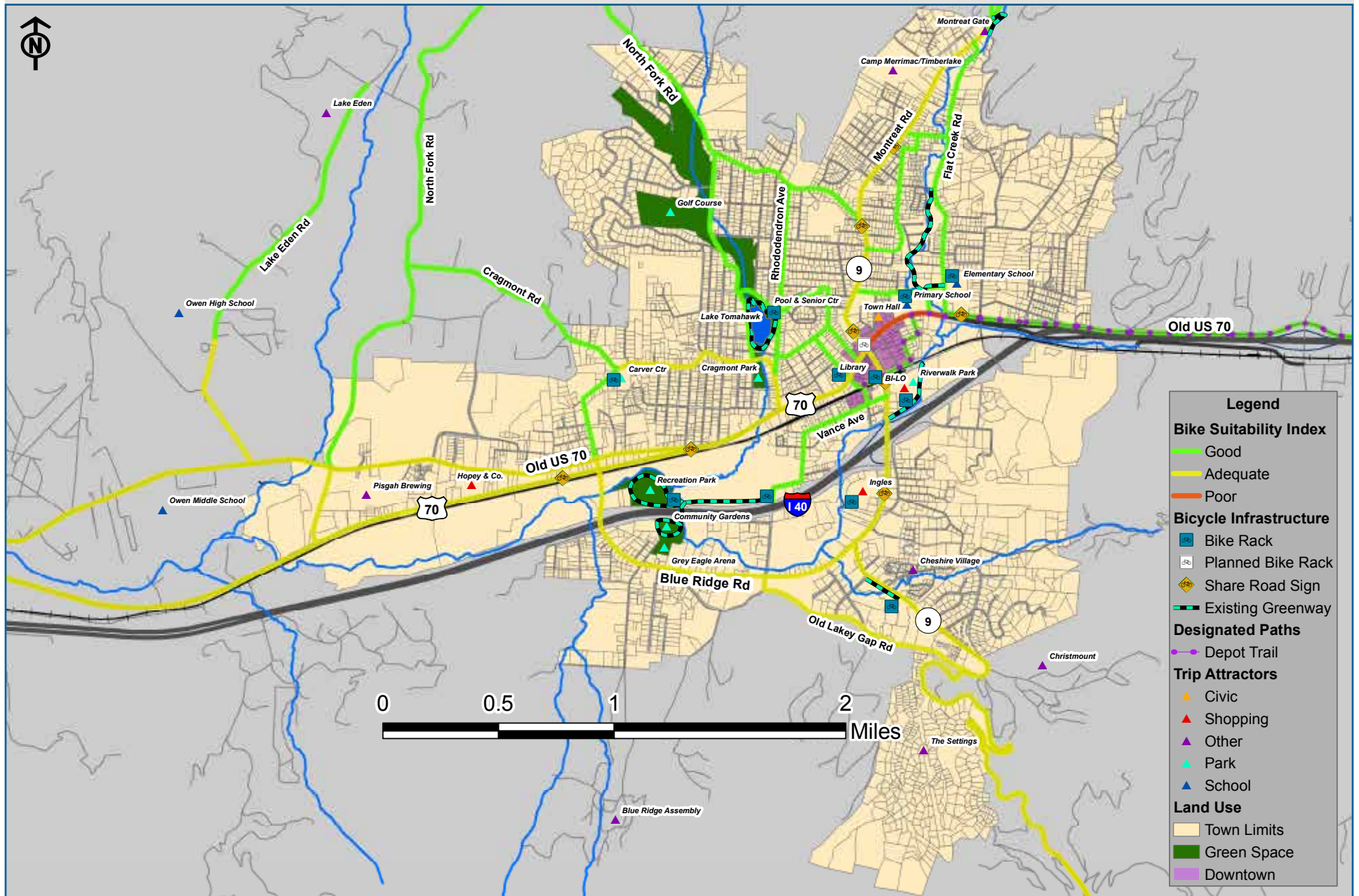


Figure 11—Black Mountain Bicycle Network (2014 Black Mountain Comprehensive Plan Update)



E's

Addressed



Blue Ridge Bike Plan (2013):

The FBR MPO and Land-of-Sky Regional Council led a planning process to assess regional issues and opportunities related to the expansion of the bicycle network in the Asheville metro area, identify priority corridors for improvement, and recommend facility and policy recommendations to be implemented locally and through partnerships at the

regional level (CPU).

Relevance to the Plan for Bicyclists: Even though the Blue Ridge Bike Plan's guiding goals aim to improve mobility, economic development, environment, health, and safety across the region, they have the opportunity to improve bicycling conditions in Black Mountain. The US 70 Corridor from Asheville to Black Mountain is one of the plan's eight regional priority corridors. The Blue Ridge Bike Plan describes this route as a "10-mile route [that] links Asheville to downtown Black Mountain via US Highway 70 and the Old US 70 route along the only non-Interstate east-west connection in eastern Buncombe County. The corridor recommendations include bikable shoulders and signage for the full distance."

The Blue Ridge Bike Plan also outlines the implementation responsibility of the FBRMPO.

- Prioritize roadway, transit, bicycle and pedestrian projects to be funded with STP-DA
- Prioritize bicycle and pedestrian projects to be funded with TA funds:
- Work through NCDOT SPOT prioritization process to recommend roadway, bicycle and pedestrian projects for inclusion in the TIP/STIP.
- Consider Blue Ridge Bike Plan recommendations when working on updates to the Comprehensive Transportation Plan

Figure 12—Blue Ridge Bike Plan (2013)

Regional Priority Corridor 7

US 70 FROM ASHEVILLE TO BLACK MOUNTAIN

This 10-mile route links Asheville to downtown Black Mountain via US Highway 70 and the Old US 70 route along the only non-Interstate east-west connection in eastern Buncombe County. The corridor recommendations include bikable shoulders and signage for the full distance. The corridor links the Tunnel Road/Mall area of Asheville to the Blue Ridge Parkway, the Swannanoa community and the town of Black Mountain. Nearby destinations include Warren Wilson College, Azalea Park and the VA Medical Center. Buncombe County has conducted a feasibility study for a parallel greenway along much of US 70 to link the Wilma Dykeman RiverWay to the Point Lookout Trail in McDowell County.

* For a feasibility study (US 70 at I-240 transition)

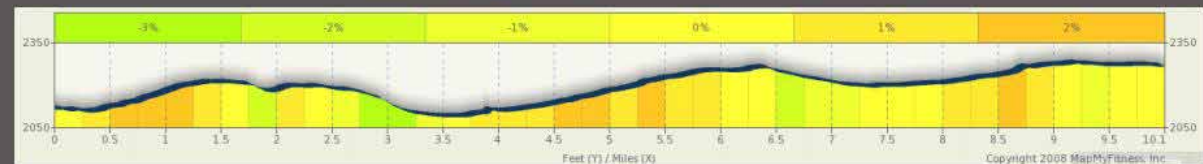


FEATURES:

Length: 9.96 miles
Cost: \$2.998 million
plus \$75*

COMMUNITIES:

Asheville
Black Mountain
Swannanoa



and the Metropolitan Transportation Plan (previously Long Range Transportation Plan)

- Support education and outreach initiatives to promote more bicycle-friendly facilities and policies in the region
- Provide an opportunity for public input as part of the regional transportation planning process

E's
Addressed







Comprehensive Transportation Plan (2008): The FBRMPO’s *Comprehensive Transportation Plan (CTP)* is “intended to ensure that the region’s transportation system is developed in a coordinated and efficient manner that anticipates future needs and minimizes negative impacts on communities, cultural resources, and the natural environment.” CTP planners consider all modes of transportation, including bicycling, in the plan.

Relevance to the Plan for Bicyclists: The bicycle maps contained in the Comprehensive Transportation Plan, “include recommended improvements needed to provide adequate, safe and desirable bicycle facilities.” The Black Mountain projects recommended in the CTP are shown in Figure 13.

GroWNC (2013): A 3-year regional planning initiative led by Land-of-Sky Regional Council to develop a framework of strategies to foster growth and economic prosperity that preserves the quality of life and the unique assets of the region that make it possible. The regional plan weaves together existing local and regional plans with extensive public input from meetings held throughout the region to develop a vision of preferred growth scenarios. (CPU)

E's
Addressed




Relevance to the Plan for Bicyclists: GroWNC contains many strategies in the areas of economic development, energy, health and wellness, housing, land use, cultural resources, natural resources, and transportation. The GroWNC document includes regional strategies that have a bearing on bicycling in the sections that deal with healthy communities, accessibility and connectivity, and land use.

Figure 13—CTP Bicycle Facilities Recommendations (2008 CTP)

ID	Facility	From	To	Description	Distance
A14	New Frontage Rd (S of I-40)	Blue Ridge Rd (SR 2500)	Patton Cove Rd (SR 2740)	Construct bike facilities in tandem with new roadway	3.7
A15	Patton Cove Rd (SR 2740)	US 70	New Frontage Rd	Upgrade with wide shoulder or striped lane & appropriate signage	0.5
A16	Blue Ridge Rd (SR 2500)	US 70	Sutton Ave	Upgrade with wide shoulder or striped lane & appropriate signage	2.3
--	Various	--	--	Construct greenways per Asheville & Black Mountain greenways plans	--

STATEWIDE PLANS

2016-2025 State Transportation Improvement Program (STIP):

The North Carolina Department of Transportation's STIP is NCDOT's data-driven, multi-year schedule for its transportation projects. A community's project(s) may be included in the STIP after the community scores projects against NCDOT goals. Projects in the STIP include highway, bridge, public transit, bike, pedestrian, railroad, and other improvements.

E's
Addressed

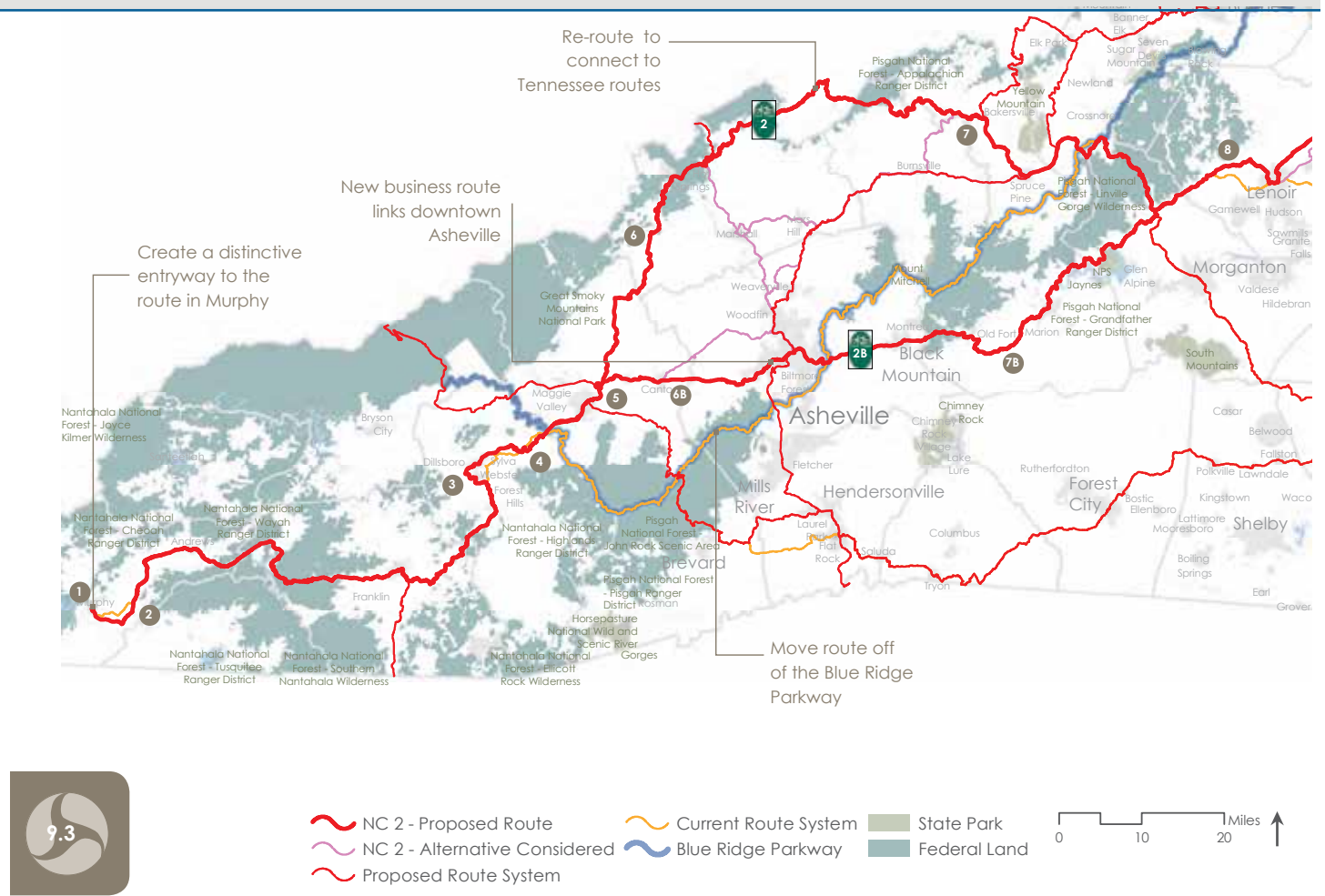
Relevance to the Plan for Bicyclists: A portion of the Flat Creek Greenway is the only Black Mountain bicycle/pedestrian project (Project EB-5547) in the current STIP. The STIP identifies the greenway as an engineering project scheduled to, "Construct new multi-use path from existing Flat Creek Greenway trailhead near State Street and Charlotte Street to existing Riverside Greenway near Riverside Park and extension west of NC 9 near existing culvert."

E's
Addressed

WalkBikeNC (2013):

North Carolina's Statewide Pedestrian and Bicycle Plan: WalkBikeNC is North Carolina's first statewide master plan to define a vision, goals, and strategies for improving walking and bicycling for residents and visitors. According to WalkBikeNC, the plan "identifies current conditions for walking and bicycling in North Carolina and serves as a guide for state agencies, local governments, and private sector interests to develop a

Figure 14—Mountains to Sea Reroute (WalkBikeNC)



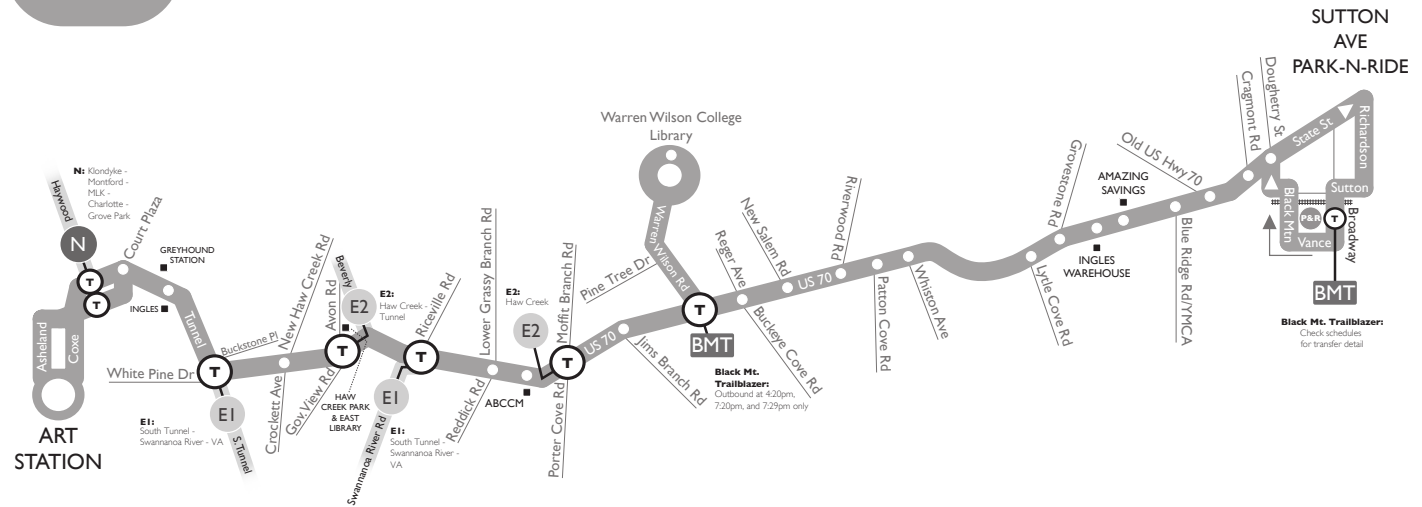
transportation system that safely and efficiently accommodates walking and bicycling." The plan groups its strategies in four pillars: improve mobility, promote safety, contribute to improved health, maximize economic competitiveness, and be good stewards of the environment.

Relevance to the Plan for Bicycling: The plan does not have specific city-by-city recommendations, however, the WalkBikeNC benefits Black Mountain in that it outlines the framework and policies for statewide bicycle planning. Additionally, the WalkBikeNC plan recommends changes to the state's bike

routes. The recommended changes (see Figure 14) to the Mountains to Sea Route reroutes bicyclists from the Blue Ridge Parkway to a more accommodating route that travels through Black Mountain.

170

ART STATION - TUNNEL RD - WARREN WILSON - SWANNANOVA - BLACK MOUNTAIN



EXISTING PROGRAMS

Public Transportation and Bicycling

Mountain Mobility, Buncombe County's public transportation system, operates the Black Mountain Trailblazer route. The Trailblazer vans are equipped with bicycle racks. In addition to serving many in-town locations, the Trailblazer offers connecting service to downtown Asheville via the Asheville Redefines Transit's 170 line. The Trailblazer connects with the 170 line in the Sutton Avenue Park-and-Ride lot.

The City of Asheville's public transportation system, Asheville Redefines Transit (A.R.T.), serves Black Mountain with bicycle rack equipped buses. The 170 line departs the A.R.T. Station every hour to arrive at the first Black Mountain stop approximately 30 minutes after the hour. The A.R.T. bus shelters in Black Mountain do not have bicycle racks.



EXISTING POLICIES

Town Staff Support

Pedestrian and Greenway Planning: Black Mountain does not have a dedicated bicycle/pedestrian/greenway planner; however the town's Health Service Programs Administrator some time to active transportation (pedestrian and bicycle) initiatives. Additionally, the Town provides support to the Black Mountain



Greenways Commission that meets on a regular basis.

The Police Department: The Town of Black Mountain’s police department has officers on bicycles patrolling during public events such as the Sourwood Festival and Bike/Walk to School Day. Officers on bike patrol are not available for education efforts. However, their presence promotes bicycle friendliness and sets an example for others.



Black Mountain Town Ordinance

Black Mountain’s existing enforcement measures encourage good bicyclist behavior; however, the Ordinance does not contain regulations that encourage good driver behavior (e.g. minimum passing distance). Black Mountain’s Code of Ordinances contains regulations related to bicyclist Operating and Protection

Standards including:

- Bicyclists must ride bikes with seats;
- Bicyclists and passengers (unless in an approved trailer) must wear a helmet on public rights-of-way;
- Children under four and/or weighing under 40 pounds can ride as a passenger in a seat that protects the passenger from the bicycle’s moving parts, or else astride a regular seat of a tandem bicycle;
- Prohibition of passengers riding on handlebars;
- Prohibition of riding a bicycle without hands, and
- Prohibition of riding a bicycle on a town sidewalk.

The Code of Black Mountain, Schedule II, Speed Limits (Sec. 47-183) sets speed limits for the Town’s roadway network. Speed limits throughout the town vary from 16 miles per hour to 55; 39% are 20 or below, 16% are at 25 mph, 30% are at 35 mph, and 5 % are 45 mph and above.

Land Use and Zoning to Promote Bicycling

Some land use policies that promote bicycling include:

- Greater integration of land use types;
- Large developments to provide for connectivity;

- A maximum setback distance for building entrances;
- Street connectivity for housing developments;
- Reducing the required number of car parking spaces in order to limit parking lot size; and
- Standards for bicycle parking accommodations at commercial and workplace destinations.

Black Mountain’s Land Development Code contains standards that are in line with the Active Transportation Alliance’s recommended land use policies to promote bicycling. Figure 15 on the following page provides a snapshot of these standards.

Figure 15—Black Mountain Development Code Provisions That Promotes Bicycling (WalkBikeNC)

<p>Greater integration of land use types</p>	<ul style="list-style-type: none"> • The urban residential district (UR-8 - Section 4.6.4) promotes housing variety and density in the more urbanized areas of town. • The neighborhood mixed use district (NMU-8 - Section 4.6.6) provides compatible goods and services to the neighboring residential areas. • The central business district (CB - Section 4.6.7.1), which includes downtown is designed to maintain the village-like community and small-town character of Black Mountain. • The Town’s traditional neighborhood development standards (Section 4.6.11) allow for the development of fully integrated, mixed-use pedestrian oriented neighborhoods. • The pedestrian master plan overlay (Section 4.7.6), is in place to make Black Mountain “one of the most walkable communities in the region.” • The US70 corridor overlay (Section 4.7.7) serves a variety of purposes, including promoting automobile, bicycle, and pedestrian safety along the US70 corridor.
<p>Require large developments to provide for connectivity</p>	<ul style="list-style-type: none"> • The Town’s Land Use Code promotes pedestrian circulation in major subdivisions (Section 3.5.5) by requiring a network of sidewalk or greenway trails to serve all occupiable lots. • The Town may require developers to place a portion of the sidewalk or greenway outside of the subdivision into the public right-of-way or easement (where there is an opportunity to improve connectivity to the subdivision under development). • The Town may require new collector roads within large development to be constructed with bicycling facilities, either bike lanes, cycle tracks or sidepaths (depending on context and existing or potential connectivity to nearby greenways). Make mandatory if identified in a plan. • The Town may require large developments to add bicycling facilities along roadways fronting the development.
<p>Require a maximum setback distance for building entrances</p>	<ul style="list-style-type: none"> • Black Mountain’s setbacks vary from a 30 ft. setback requirement in the Conservation Residential district to a 12 ft setback in central business district. The setbacks in the districts that do the most to promote bicycling, UR-8 @ 20ft, NMU-8 @ 25 ft, CB @ 12 ft, and TND @ variable, provide a reasonable travel distance from the street to the building entrance for pedestrians and bicyclists. The US70 Overlay District has a maximum 50 ft setback.
<p>Increase flexibility on the required number of car parking spaces in order to limit parking lot size.</p>	<ul style="list-style-type: none"> • Black Mountain allows developers to replace one automobile space with four bicycle parking spaces, up to a maximum of 16 bicycle parking spaces in place of four automobile spaces (Section 10.8.1 - B)
<p>Create minimum standards for bicycle parking accommodations at commercial and workplace destinations.</p>	<ul style="list-style-type: none"> • Black Mountain does not require bicycle parking. • Town can consider reduced minimum parking requirements according to best practices limiting excessive requirements for parking.

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Chapter 4



Building a System for People Who Bike





Building a System

Developing a list of projects to improve conditions for bicyclists in Black Mountain is not as simple as identifying where bike lanes and greenways exist and where they are missing. Identifying projects that promote bicycling is an exercise in identifying destinations or land uses that are most likely to generate bicycling trips if linked through a network of quality bicycling facilities and route upgrades.

The concept of “quality” bicycling facilities is critical to understand as bicyclists are not homogeneous users of the transportation system as this plan notes in identifying the different types of attitudes toward bicycling by people of all ages and abilities. Understanding what constitutes a quality of service for each user type will help identify the proper bicyclist facilities and corresponding dimensional requirements.

The project recommendations explored for Black Mountain by Bike are a mix of traditional treatments such as shared lane markings, bike lanes and greenways, along with ideas geared toward addressing the challenges in Black Mountain related to narrow, residential streets and limited opportunities to just widen the pavement to create a bike lane.

Figure 16 outlines the process by which projects were identified and ranked for the plan.

Figure 16—How Projects Were Ranked



EXISTING BICYCLIST INFRASTRUCTURE

Figure 17 illustrates the existing bicycling network in and around Black Mountain. The most prominent feature in the town’s existing network is the 1-½-miles of greenway. Currently there are no dedicated on-street bicycle lanes or shared lane markings within the community.

The signed Depot-to-Depot route through Black Mountain helps bicyclists find their way from the Old Train Depot to the Point Lookout trail, which is a 3.5-mile multi-use trail that begins near the Buncombe/McDowell County line and proceeds east to Old Fort along the old US 70 right-of-way. The town’s greenway system generally consists of 10-foot wide paved trails with soft shoulders or grass buffers between the trail’s edge and nearby trees or creeks.

Bicyclists are prohibited from riding the trails around Lake Tomahawk. Blue Ridge Road has wider-than-normal shoulders from NC 9 to the I-40 underpass. In some sections these shoulders may be considered bikeable, but they generally lack the adequate width (5-feet) to make them bikeable based on NCDOT’s design guidelines that note bikeable shoulders should be at least 5-feet wide when adjacent to vehicles along a route with a posted speed limit between 35 and 45 mph.

It appears these shoulders may have originally been 4-feet wide but have been overtaken by vegetation. A bicycle lane exists along Montreat Road just beyond the Black Mountain Town Limits. It is located on the “uphill” side of the route and was added in recent years as part of a resurfacing project along the street.

BICYCLIST LEVEL OF SERVICE MAP

The level of service designations contained in Figure 18 were generated through a project conducted by the Blue Ridge Bicycle Club and UNC Asheville to define a common level of suitability of on-street conditions for bicyclists throughout Buncombe County. The color-coded map illustrates where these conditions are viewed by what bicyclists feel as very good, good, fair and low. Local neighborhood roads were not evaluated.

The level of service thresholds are indicative of what an “enthused and confident” bicyclist is likely to feel. It is likely to feel of a lower standard to the “Interested but concerned” rider. They are considered a starting point for the evaluation of bicyclist needs in Black Mountain by Bike and will help inform project recommendations.

OVERALL RECOMMENDATIONS

The process of identifying projects for Black Mountain by Bike consisted of:

- Reviewing project recommendations in the many past transportation and active transportation plans as well as the Comprehensive Plan;
- Gathering feedback at the Steering Committee meetings, through public involvement efforts and through the community ride;
- Conducting field evaluation of bicycling conditions; and
- Identifying popular destinations and bicycling routes.

From this input, the projects recommendations contained in this chapter are developed at what is referred to as “planning level,” meaning that they were examined for their relative value and evaluated based on field observations. Detailed right-of-way analysis or design processes were not conducted as part of this Plan, rather those steps will follow as the Town, NCDOT and its partners work toward implementation.

The cost estimates contained in this Plan are based on this planning level evaluation and prevailing costs per mile of similar facilities at the time of Plan development.

Project Development

To become reality, projects may go through up to four phases depending on their level of complexity.

1. Feasibility studies may occur on projects like greenways or streetscape plans to gather more information. This could include a field review by Town staff;
2. Design is the next step in getting to construction and includes surveying, measuring and scoping of the project to produce a set of drawings to define the exact parameters of the projects and the manner in which it can be constructed;
3. Acquisition of land may then occur if the project design indicates additional land is needed; in some cases there may be existing right-of-way to accommodate the project; and
4. Construction begins once these preceding phases are complete.

A majority of the projects identified in Black Mountain by Bike are at a point they can move into either a design phase or a joint feasibility study / design phase. Greenways along US 70 have already been subject to feasibility studies.

All bicycling facility recommendations along or crossing NCDOT-maintained routes require review by NCDOT Highway Division 13 prior to implementation.

Wayfinding along the Depot-to-Depot Route



Figure 17— Existing Bicycle Infrastructure

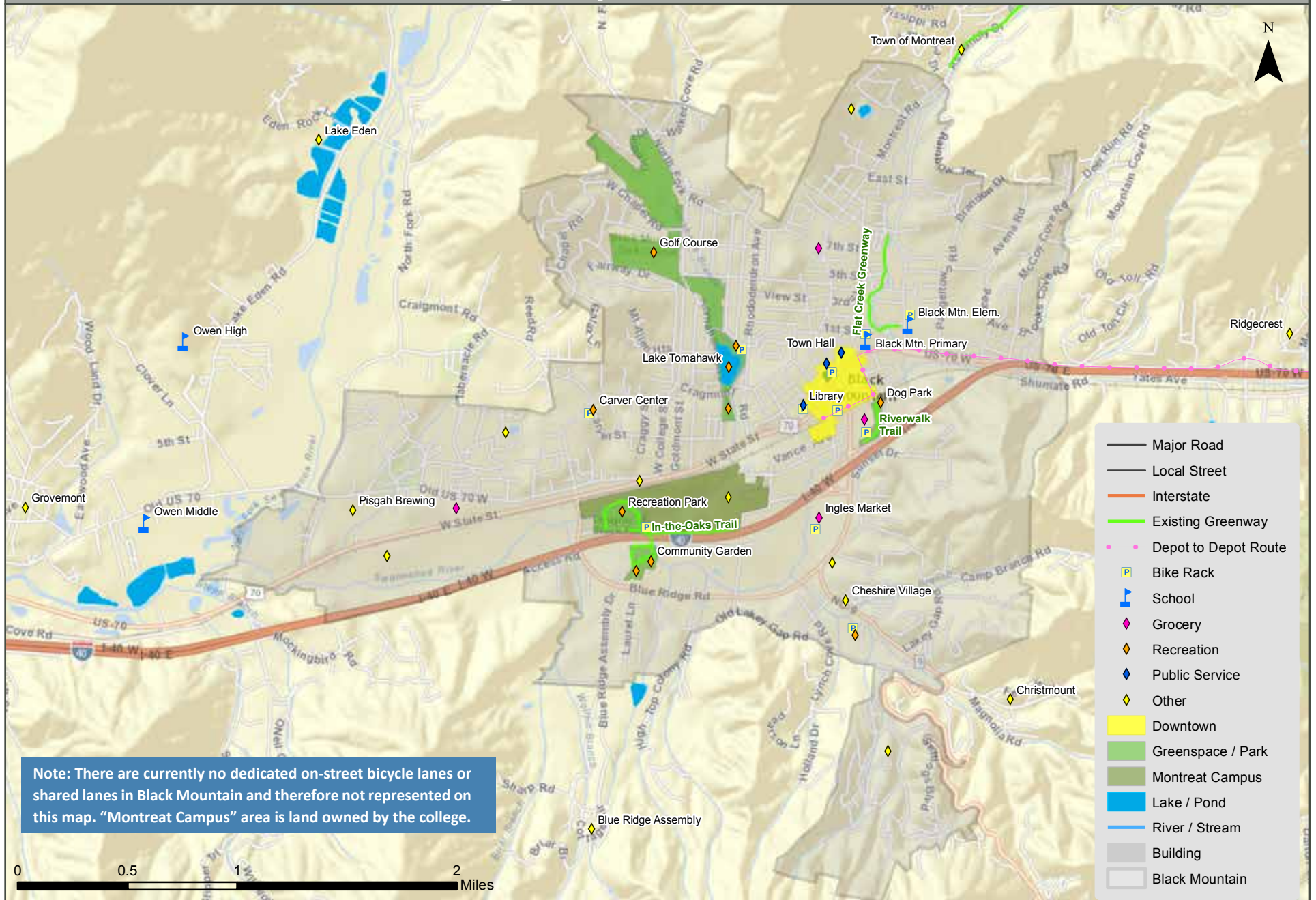
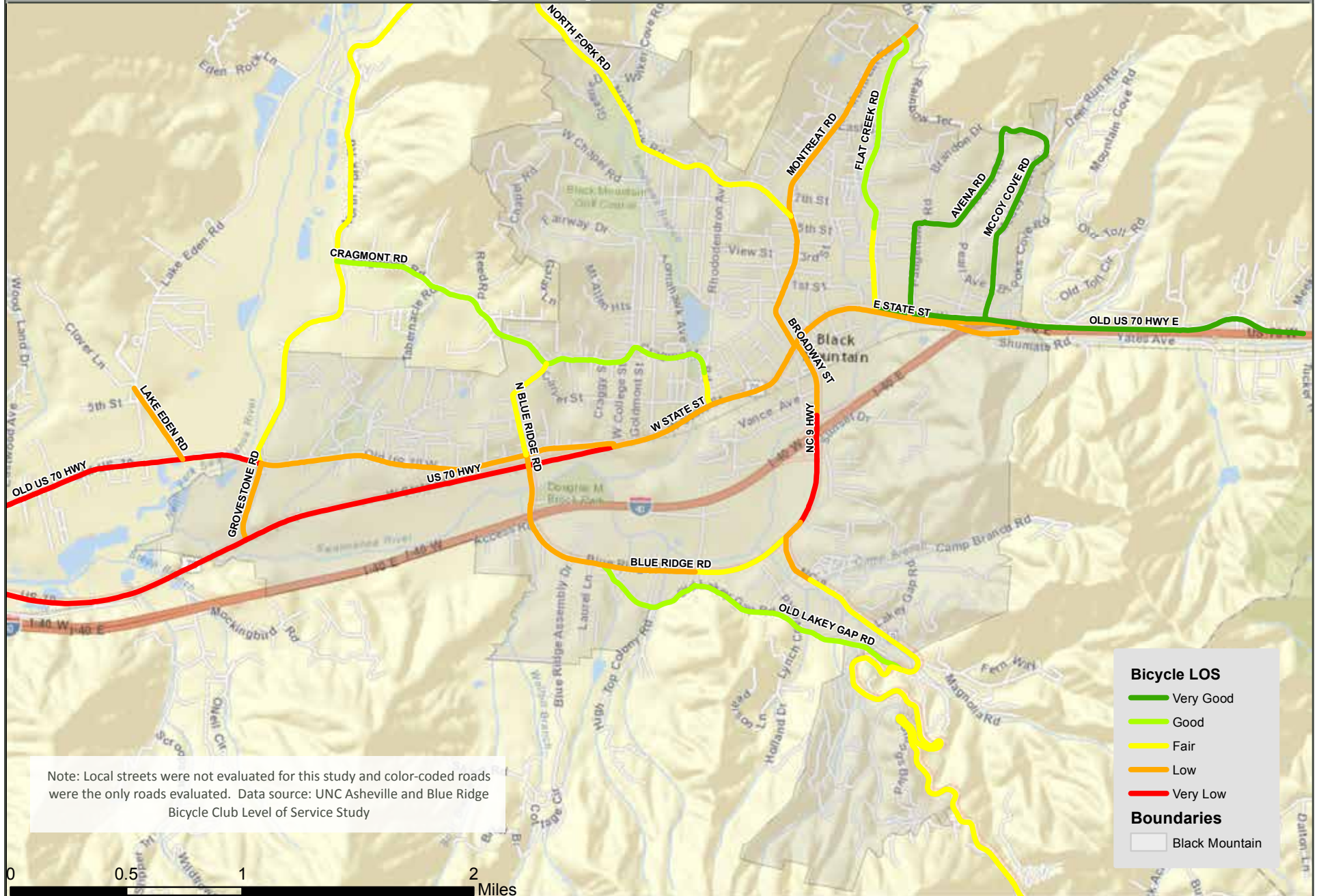


Figure 18— Existing Bicyclist Level of Service



Ranking Projects

The projects identified through the early stages of the plan were mapped for consideration by the Steering Committee and review by the public at the second Open House meeting. The Steering Committee was convened in August 2015 to identify the criteria by which they wanted to evaluate the projects in order to develop a priority list.

The criteria shown in Figure 19 illustrate how projects were scored. The maximum number of points available for each criteria (ranging from 5 points to 20 points) was identified by the Steering Committee. Individual committee members were asked to identify how they would score projects on a matrix of criteria. Their inputs were averaged to then identify the relative weight (reflective in the maximum number of points available) of each criterion.

Projects were scored based on this weighting. At the final Steering Committee meeting, the group was then allowed to assign committee points to projects

they saw as a priority or ones where they felt the criteria did not (and could not) address every factor for making it a priority. The consultant team used the outcomes of this ranking process (Figure 19) to identify the top-10 projects that constitute short-term priorities for Black Mountain.

Short-Term Project Priorities

The following pages contain more detailed project profiles for the top-10 projects identified through the project ranking. These top-10 projects are labeled as short term investments because they are the ones Black Mountain and its partners should seek funding options to implement them over the next one to 10 years.

A shortcoming of any project ranking method is that it cannot assign factors to deal with all project influences in terms of implementation realities related to budgeting, grant availability and unknown factors that can only be determined through project development or design. While Black Mountain should begin pursuing its top priorities it should not overlook opportunities that arise to fund projects ranked lower on the list of short-term improvements.

The Appendix contains the full project ranking with the top-10 projects identified as short-term improvements. Figure 20 is a map of recommended projects, both short- and long-term.

Figure 19—How Projects Were Ranked

Criteria	Description	Maximum Points Per Project (100 total)
Proximity to Downtown	Projects that directly link downtown to neighborhoods and other destinations receive more points (based on distance from downtown)	15
Proximity to Parks	Projects that directly link parks to neighborhoods and other destinations receive more points (based on distance from an existing park)	15
Safety	Points are based on how much the project separates bicyclists from high volume, high speed roadways.	10
Proximity to Schools	Projects that directly link existing schools to neighborhoods and other destinations receive more points (based on distance from a school)	10
Ease of Implementation	Points are based on the level of constraints (right-of-way or terrain) and challenges to overcome to put the project on the ground.	10
Access to Food	Projects that directly link food outlets such as grocery stores and community gardens to neighborhoods receive more points (based on distance from a food outlet)	10
Population in Need	Points are based on demographic data for the Census tract in which the project is located. The data includes Census data and information from the NC State Center for Health Statistics.	10
Parallel Route	Points are based on how well they provide a route for bicyclists that is parallel to a major highway but serves the same destination(s) as that highway.	5
Identified in Past Plans	Points are based on whether or not the project was identified in past pedestrian, greenway or comprehensive plans. The more plans, the more points it receives.	5
Fills Gap in the System	Points are based on how well the project fills a gap in the existing on-road bicycling network or greenway system.	5
Steering Committee Priority	The Steering Committee was given the option of assigning up to 5 points to individual projects to account for other measures or intangible features of the project.	5

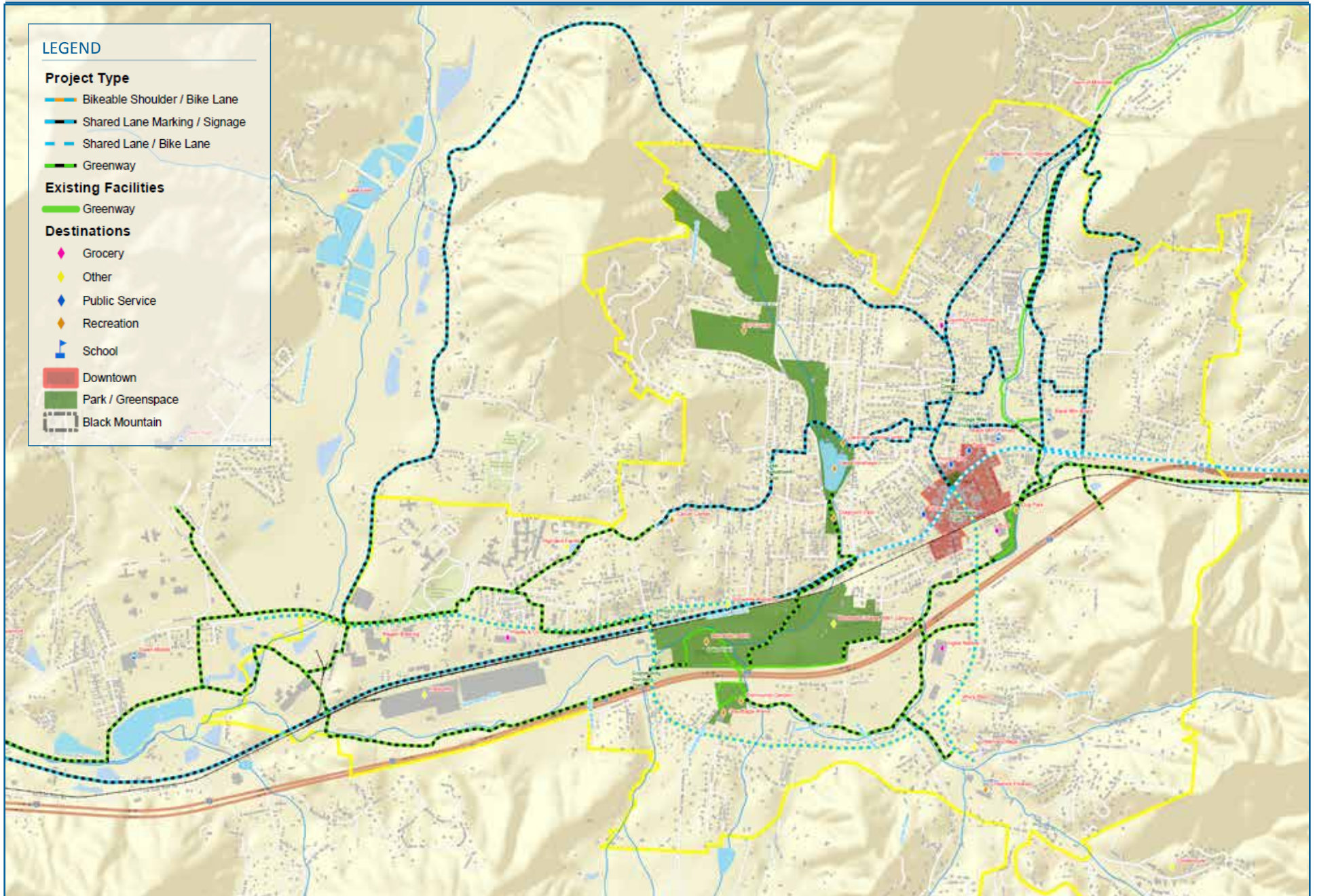
Figure 20—

**Projects
Ranked
By Score
(Near-Term)**



Rank	Project	Type of Improvement	Total Points (100 max.)
1	RiverWalk Greenway Phase 2, Flat Creek Greenway to River Walk Dog Park	Multi-Use Trail	89
2	RiverWalk Greenway Phase 3, Dog Park to In the Oaks Trail via Swannanoa River	Multi-Use Trail	79
3	Montreat Rd (NC 9) from State St (US 70) to Montreat limits	Shared Lane Marking/Signage	68
4	State St (US 70), from Cragmont Rd to Ridgeway Ave	Shared Lane/Bike Lane	68
5	State St (US 70), from west Town Limit to Cragmont Ave	Shared Lane Marking/Signage	67
6	State St (US 70), from Ridgeway Ave to East Town Limit	Shared Lane/Bike Lane	65
7	Tomahawk Lake to Carver Center Neighborhood Greenway (various streets)	Shared Lane Marking/Signage	63
8	Flat Creek Greenway Phase 2, Cotton Ave. to Town of Montreat limits	Multi-Use Trail	61
9	Flat Creek to Tomahawk Lake Neighborhood Greenway (various streets)	Shared Lane Marking/Signage	60
10	Owen Spur Greenway, Rec Park to Owen Middle/High School	Multi-Use Trail	60
11	Broadway Ave (NC 9) from State St (US 70) to Blue Ridge Rd	Bikeable Shoulder/Bike Lane	58
12	Tomahawk Branch Greenway, Lake Tomahawk to Rec Park via Cragmont Park	Multi-Use Trail	58
13	Old US 70, from State/College Intersection to Owen Middle School	Bikeable Shoulder/Bike Lane	51
14	Swannanoa River Greenway, Rec Park to RiverWalk Greenway	Multi-Use Trail	51
15	Ridgecrest Connector Greenway, from RiverWalk to Kitsuma	Multi-Use Trail	51
16	Blue Ridge Rd, from Old US 70 to Rec Park Entrance	Bikeable Shoulder/Bike Lane	46
17	Blue Ridge Rd, from Rec Park Entrance to NC 9	Bikeable Shoulder/Bike Lane	45
18	Carver to Highland Farms Greenway	Multi-Use Trail	44
19	Cheshire to Swannanoa River Greenway, via Camp Branch/Britton Creek	Multi-Use Trail	40
20	Flat Creek Rd/Padgettown Rd Neighborhood Greenway	Shared Lane Marking/Signage	39
21	North Fork Road, Montreat Rd (NC 9) to Old US 70	Shared Lane Marking/Signage	36

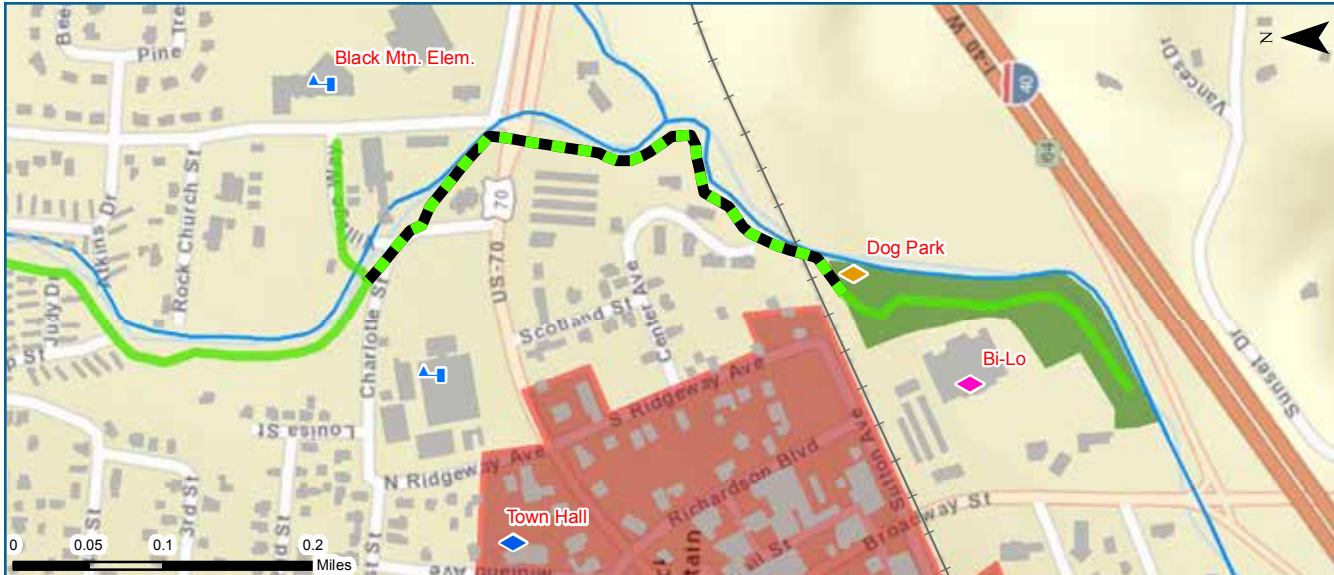
Figure 21—Proposed Projects



Project 1



Riverwalk Greenway (Phase 2) Flat Creek Greenway to Riverwalk Dog Park



PROJECT DESCRIPTION

One of the more challenging greenway sections within Black Mountain, Riverwalk Phase II will connect existing Flat Creek Greenway (at the North end) to the Bi-Lo Dog Park, and into an existing segment of the Riverwalk Greenway.

A feasibility and conceptual design phase has recently been completed. The next phase, which will include Norfolk Southern schematic review and landowner outreach is begun in 2015.

INFLUENCES:

- Existing Flat Creek Greenway
- Proximity to Downtown
- Access to Food

INTERSECTIONS:

- State Street (US 70): The greenway is planned to be routed underneath this road. During design, connections to sidewalks and planned bicycling facilities should be incorporated to connect the route and make it safe and easy for people biking on State Street to access the greenway. Wayfinding signage should be placed on this and other nearby streets, as well as signage for pedestrians wishing to access the greenway from downtown.

CONNECTIONS:

- Flat Creek Greenway
- Existing Riverwalk Greenway
- Serves as integral component to overall connectivity

CHALLENGES:

- Crossing the Swannanoa River twice
- Creating an underpass for a five lane highway (US Highway 70)
- Crossing under Norfolk Southern Railroad's rail line (and right of way).

COST ESTIMATE

\$1.2 Million

LENGTH

0.46 Miles

USERS (see page 4 for more info)



ECONOMIC POTENTIAL

Completing this greenway and updating signage raises Black Mountain's stature as an active living destination & makes businesses more accessible.

Project 1



Riverwalk Greenway (Phase 2) Flat Creek Greenway to Riverwalk Dog Park

Rendering of proposed greenway as it travels through an underpass



MAKING IT HEALTHIER

The proposed greenway links an existing greenway and neighborhoods it touches to a school, park and food outlets. It doesn't get much healthier than that. Greenways like this one help entice the "No Way, No How" riders to give it a try. Accent the greenway with other active living features such as community gardens and fix-it stations. The interface with the street should be designed to maximize safety of those using the route as this is typically overlooked during design with many interfaces defaulting to sidewalk-only templates instead of multi-use trail needs.

Potential Design Treatments & Accents



Mile markers are a useful feature along greenways to help orient users to their location and better understand how far they've biked, walked or jogged.

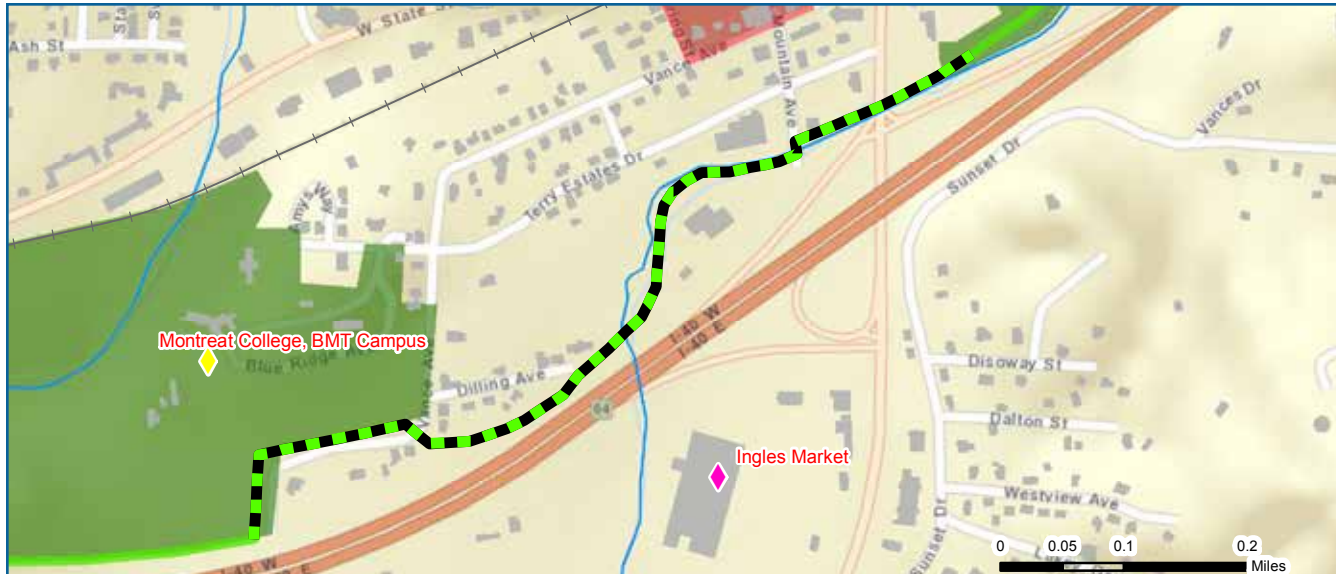


Trail Crossing warning sign in Asheville, NC.

Project 2



Riverwalk Greenway (Phase 3) Dog Park to In the Oaks Trail via Swannanoa River



PROJECT DESCRIPTION

Phase III will connect the existing segment of Riverwalk Greenway to the Oaks Trail, and the route has been preliminarily identified as following the Swannanoa River. Property acquisition is necessary along most of the route.

When combined with recommendations from the Swannanoa Flood Mitigation Study to create a wetland/impoundment, this section of greenway has potential to help create an interpretive greenway which can become an iconic destination and an ecological uplift for habitat.

INFLUENCES:

- Existing Riverwalk Greenway
- Proximity to Downtown
- Access to Food
- In the Oaks area and nearby neighborhoods.

INTERSECTIONS:

- Broadway Ave (NC 9): The greenway is plan to be routed underneath this road. Connections to sidewalks and planned bicycling facilities should be made to connect the route and make it safe and easy for people biking on NC 9 to access the greenway. Wayfinding signage should be placed on this and other nearby streets, as well as signage for pedestrians wishing to access the greenway from downtown.

CONNECTIONS:

- Oaks Trail
- Existing Riverwalk Greenway
- Serves as integral component to overall connectivity

CHALLENGES:

- NC 9 crossing.
- Constrained conditions due to building encroachment close to the Swannanoa River corridor and other private property limitations that limit achieving optimal design.

COST ESTIMATE

\$650,000

LENGTH

0.81 Miles

USERS (see page 4 for more info)



ECONOMIC POTENTIAL

Completing this greenway adds to the Depot to Depot trail and helps attract more visitors to the area.

Project 2



Riverwalk Greenway (Phase 3) Dog Park to In the Oaks Trail via Swannanoa River



MAKING IT HEALTHIER

Greenways like this one help entice the “No Way, No How” riders to give it a try. The nearby businesses and neighborhoods will be given a healthy, active transportation option.

At-grade crossings of major roads should be either avoided or substantially upgraded to maximize safety for users of all ages and abilities. A simple crosswalk will not suffice and have the desired effect on greenway use and safety as users do not feel adequately protected unless given a higher degree of design treatment (via signalization or grade-separated crossing).

Potential Design Treatments & Accents



Crossing of major roads at-grade require extra care and attention to make it safe for all users.



Walk [Your City] signs could be placed in downtown to alert visitors the presence of this and other greenways.

Project 3



Montreat Rd (NC 9), State St. to Montreat



PROJECT DESCRIPTION

The Montreat Road corridor from the Town Center to the Montreat gate is a popular route for confident bicyclists. The existing route is a narrow, two-lane road.

The short-term recommendation is to add shared lane markings and “Bikes May Use Full Lane” signage along the route to link Black Mountain to Montreat and the bike lane that starts past the Montreat gate.

A long-term recommendation is to add a northbound bike lane (climbing lane), but this will require further study for feasibility due to right-of-way challenges that may limit bike lane width.

INFLUENCES:

- Town Center
- Montreat
- Neighborhoods
- Flat Creek Greenway

INTERSECTIONS:

- State Street (US 70): Provide shared lane markings and wayfinding for bike routes starting from this intersection and town square.
- North Fork Road: The geometry of this intersection creates challenges for turning bicyclists and sight distance for motorists entering the road. Ensure foliage is trimmed to maximize sight distance and provide warning signs to watch for bicyclists.

CONNECTIONS:

- Montreat bike lane
- Recommended neighborhood greenways along several routes
- Future Flat Creek Greenway

CHALLENGES:

- Traffic volume and speed of pose challenges for bicyclists. An upgrade to include shared lane markings and signage helps position bicyclists in a safer position and reduce unsafe overtaking by motorists. Allow sidewalk riding if not able to mitigate.
- Right-of-way constraints limit possible bicycle lane options along the route. A northbound bike lane is recommended for further study as it would require movement of centerline to accommodate.

COST ESTIMATE

\$20,000 short-term (long-term unknown)

LENGTH

1.6 Miles

USERS (see page 4 for more info)

S&F

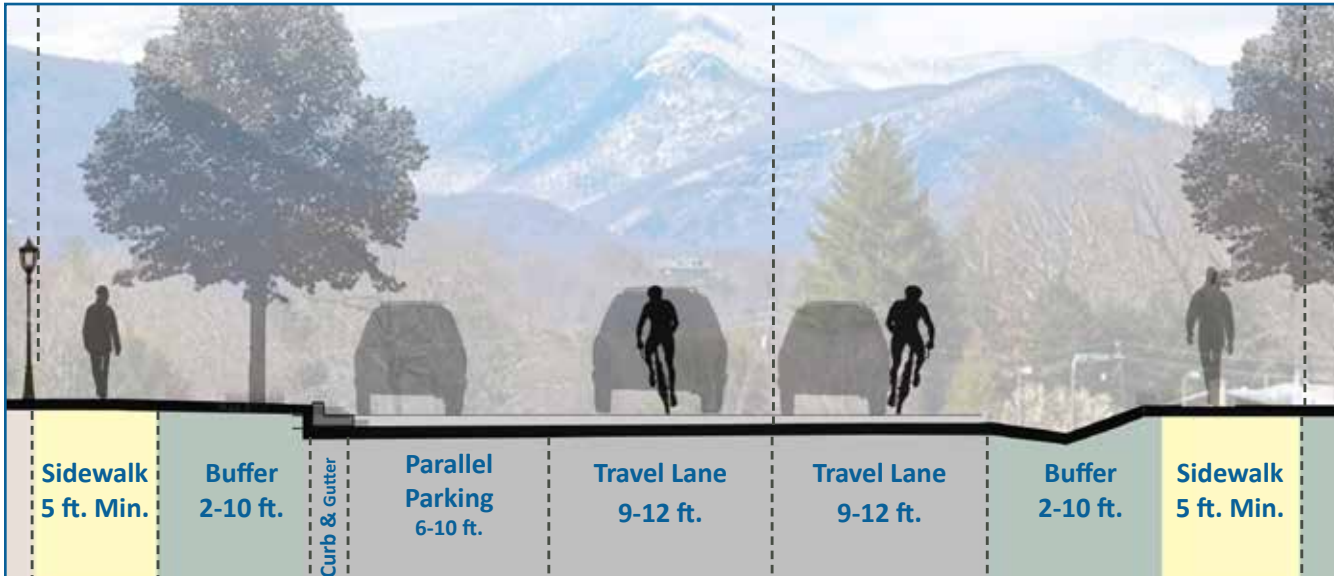
E&C

ECONOMIC POTENTIAL

Creates a stronger visitor/resident connection to Black Mountain, where bicyclists may spend more money within Black Mountain.

Project 3

Montreat Rd (NC 9), State St. to Montreat



MAKING IT HEALTHIER

The length of the route, connections to Montreat, and its location within Black Mountain make the Montreat Road corridor a popular route for pedestrians. It provides critical linkages to many destinations, including churches and nearby public facilities. Any effort to make the route more bicycle-friendly can also improve conditions for pedestrians. It will always be difficult to make the route conducive to use by children and older adults, unless they use the sidewalk.

Potential Design Treatments & Accents



Shared lane markings with May Use Full Lane signs on NCDOT-managed SR 2160 in Southern Pines, NC.



City bike routes in Burlington, Vermont.

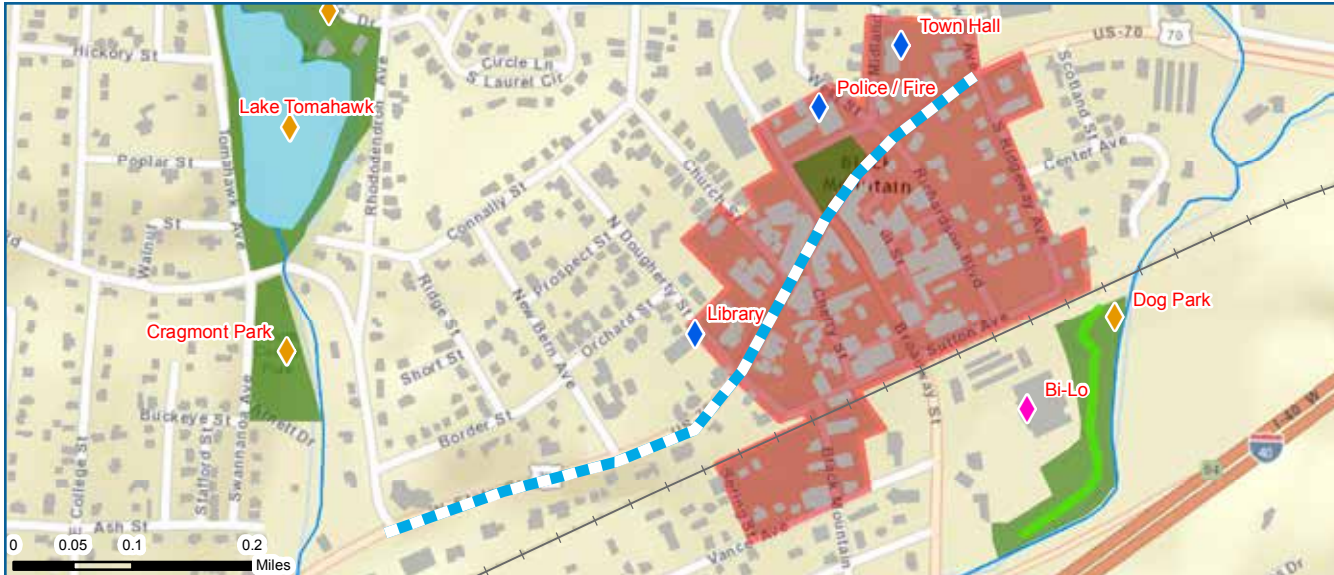


Bicycling wayfinding in Asheville, NC.

Project 4



State St (US 70), from Cragmont Rd to Ridgeway Ave



PROJECT DESCRIPTION

Bicycle markings can be provided on US 70, State Street, on the existing pavement, using Shared Use lane markings (“Sharrows”), Bike Lane markings, and appropriate signs. The existing route is a 3-lane and 4-lane section with curb and gutter near downtown.

The segment from Cragmont to Dougherty should be altered from existing 4-lane cross-section to 3 lanes with two-way left-turn lane and bicycle lanes on both sides. The segment from Dougherty to Ridgeway should have sharrows centered in the travel lanes.

INFLUENCES:

- Town Center
- Through Town Bike Route
- Commercial areas outside of downtown

INTERSECTIONS:

- Montreat Road (NC 9): Provide shared lane markings and wayfinding for bike routes starting from this intersection and town square.
- Ridgeway Street: Warning signs and wayfinding for transition to cycle track at elementary school (just east of project limits).
- Dougherty Street: Signs and markings to transition from shared lane to bicycle lanes at this point (approximately).

CONNECTIONS:

- Part of continuous route through and around Town
- Recreation Park
- Downtown

CHALLENGES:

- Traffic speeds are slow here but the volume of traffic poses challenges for bicyclists. Shared lane markings and signage helps position bicyclists in a safer position and reduce unsafe overtaking by motorists.
- Concurrence from NCDOT is needed to remove the turn lane and/or convert the 4-lane section to 3 lanes.

COST ESTIMATE

\$10,000 short-term (conversion costs unknown)

LENGTH

0.75 Miles

USERS (see page 4 for more info)

S&F

E&C

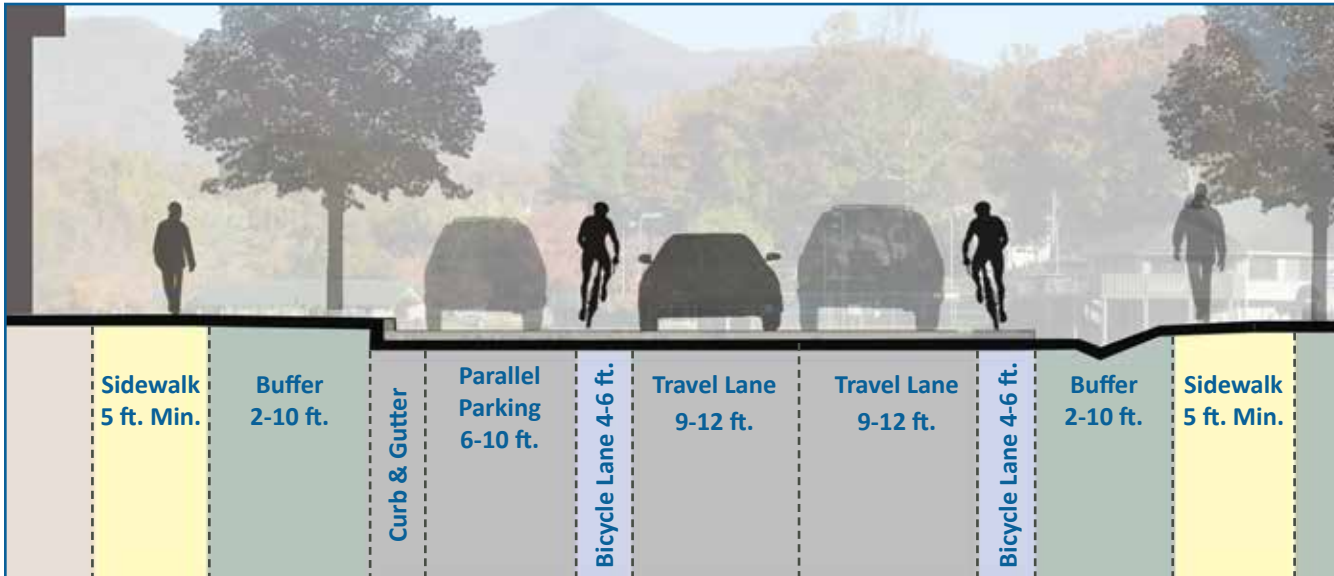
ECONOMIC POTENTIAL

Markings on major roads help promote the town as a bicycle friendly place and increase access to goods and services.

Project 4



State St (US 70), from Cragmont Rd to Ridgeway Ave



MAKING IT HEALTHIER

Downtown Black Mountain is the hub of community health and all options should be considered by the Town and NCDOT to ensure it is able to be accessed safely by those walking and bicycling as much as those driving.

Slow vehicular speeds should be encouraged through downtown and this can occur through reducing travel lane widths or removing a center turn lane. This improves physical, emotional, social and economic dimensions of health.

Potential Design Treatments & Accents



Placing sharrows outside the “door zone” is important in areas with on-street parking.

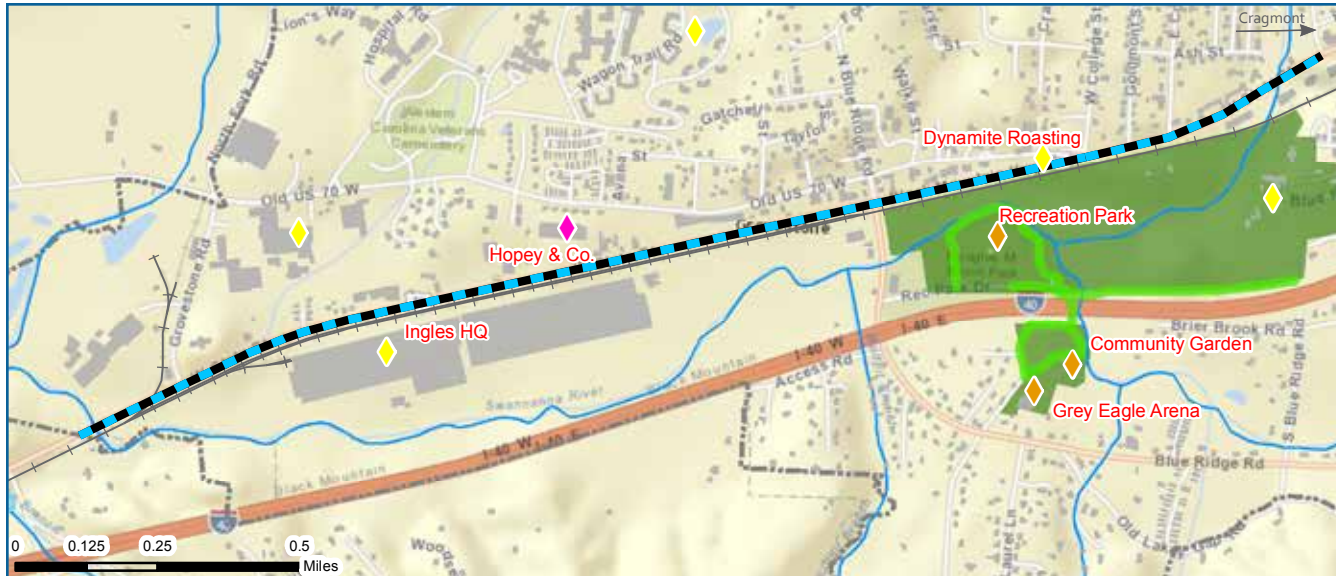


Sharrows can also be used to guide bicyclists in shared lanes through intersections to bike lanes.

Project 5



State St (US 70) from west Town Limit to Cragmont Ave



PROJECT DESCRIPTION

Provide pavement marking for bicyclists on US 70 (State Street) on existing pavement to include shared lane markings (“sharrows”) and “May Use Full Lane” signage. A cycle track should be considered as a long-term option.

From the west Town Limit to Blue Ridge Road would be signed with “May Use Full Lane” signs. From Blue Ridge Road to Cragmont Avenue the speed limit would be reduced to 35 mph and signs and sharrow markings would be installed.

INFLUENCES:

- Town Center
- Through Town Bike Route
- Commercial areas outside of downtown

INTERSECTIONS:

- Cragmont Avenue: Provide shared lane markings and wayfinding for transitioning to bike lanes east of this intersection.
- Blue Ridge Road: Warning signs and wayfinding for this busy intersection and transition from/to higher speed limit to the west.
- Old US 70: Signs to warn motorists entering bicycle route

CONNECTIONS:

- Recreation Park
- Downtown
- Neighborhoods in northwest

CHALLENGES:

- Traffic speeds and traffic volumes are high, which pose challenges for bicyclists. Sharrows are not appropriate in 45 mph zones; reduction to 35 mph needed to carry sharrows to road to Recreation Park.
- Conduct further study on road diet east of Blue Ridge Road with consideration for impacts of the new I-40 interchange.

COST ESTIMATE

\$30,000

LENGTH

2.30 Miles

USERS (see page 4 for more info)

S&F

ECONOMIC POTENTIAL

Redesigning the road to improve access to local business destinations helps employers, employees & customers.

Project 5



State St (US 70) from west Town Limit to Cragmont Ave

A shared lane marking on US 70 is a short-term option to raise the awareness to motorists to expect bicyclists.



MAKING IT HEALTHIER

High-volume, high-speed roadways will always be intimidating to most people who bike, even with bicycle lanes. Every attempt should be made to consider how better facilities can be provided in the long term on US 70 so people can access businesses and other destinations.

Crossing US 70 in this area also poses a safety challenge for those who walk and bike. More crossings should be evaluated by DOT and the Town at main intersections and future greenway crossings.

Potential Design Treatments & Accents



A cycletrack separated from the travel lanes can be a long-term goal for US 70 on the railroad track side.

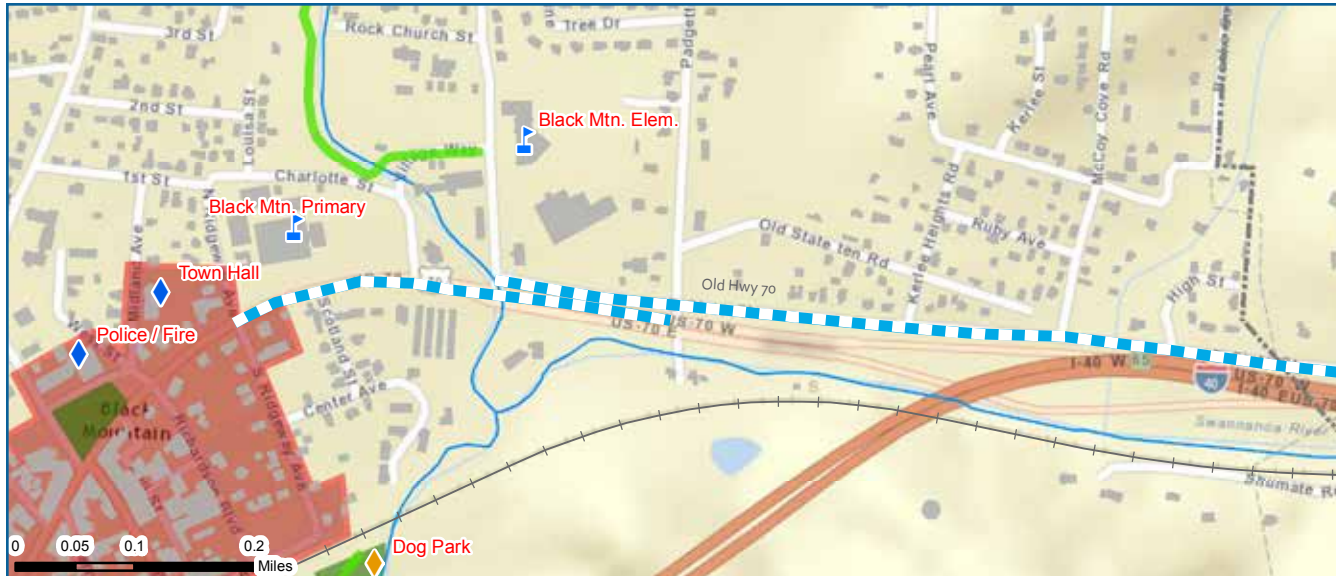


It can be tempting to try to mark any type of facility for bicyclists, but be careful. The gutter pan is not considered usable space for bicyclists, which is a concern with the facility shown at left.

Project 6



State St (US 70): Ridgeway Ave to the East Town Limits



PROJECT DESCRIPTION

Provide pavement markings for bicyclists on US 70, State Street, on the existing pavement, using shared lane markings (“Sharrows”).

A cycle track should be provided along the segment of State Street from Ridgeway or Scotland Avenue to Flat Creek Road in front of the elementary school if the turning lane can be removed. East of the turn lane, extra pavement width to the east can accommodate the cycle track with limited changes in traffic lanes.

INFLUENCES:

- Elementary School
- Through Town Bike Route
- Downtown

INTERSECTIONS:

- Charlotte Street: Cycle track will cross this intersection on north side. Place appropriate warning and wayfinding signs.
- Flat Creek Road: Cycle Track ends. Provide warning signs and wayfinding for transition from/to cycle track at elementary school.
- Ridgeway Avenue: Where the bike route enters from south, use signs and markings to direct bicyclists from/to cycle track, warn motorists of crossing

CONNECTIONS:

- Flat Creek Greenway
- Downtown

CHALLENGES:

- Traffic speeds are slow here but turning traffic movements and limited sight distance pose challenges for bicyclists. Warning and wayfinding signage will help bicyclists maneuver across and along State Street. Further analysis is needed to define locations and treatments.
- Concurrence from NCDOT is needed to remove a turn lane and reallocated space for a cycle track.

COST ESTIMATE

\$100,000

LENGTH

0.68 Miles

USERS (see page 4 for more info)

S&F

E&C

IBC

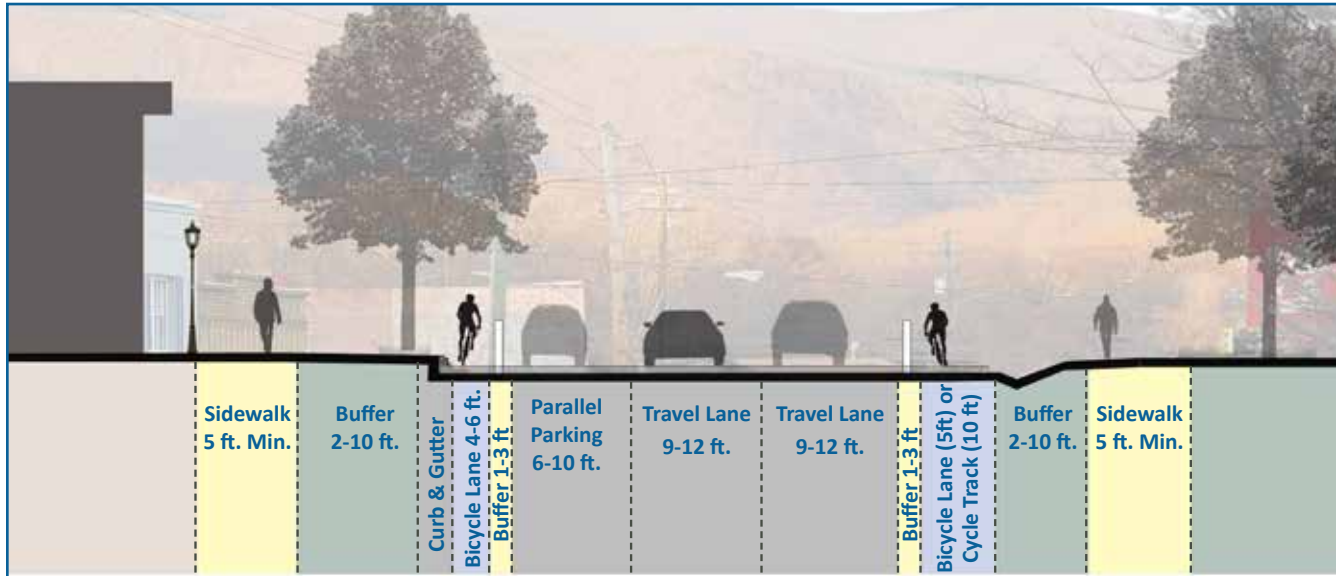
ECONOMIC POTENTIAL

A cycle track shows Black Mountain is a leader in bicycling in the Southeast and NC. Businesses and visitors will notice.

Project 6



State St (US 70): Ridgeway Ave to the East Town Limits



MAKING IT HEALTHIER

The health and safety of school children is the most obvious benefit of this project.

The influence of downtown, the Primary School, the Depot to Depot Trail, nearby parks and greenway, and the Elementary School make the east side of Black Mountain a vital lifeline for bicyclists. Making it safer and more attractive for all types of bicyclists to access this area has great promise for having a major impact on the health of residents.

Potential Design Treatments & Accents



A simple cycletrack can integrate plastic “candlesticks” to better delineate space on the street.

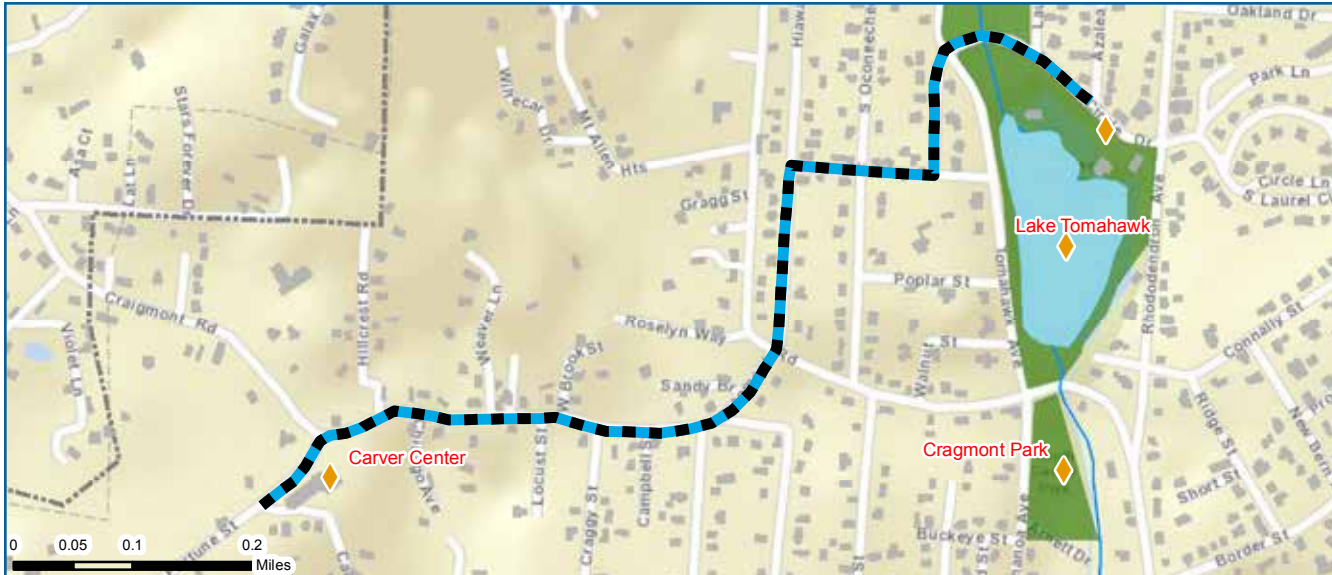


More elaborate cycletracks provide for greater separation from vehicular travel lanes.

Project 7



Tomahawk Lake to Carver Center Neighborhood Greenway



PROJECT DESCRIPTION

The Tomahawk Lake to Carver Center Neighborhood Greenway creates a bicycle boulevard on local residential streets in lieu of bike lanes or a greenway, which are not possible due to property and topographical constraints (see Challenges).

Following Laurel Circle, Cherokee or Tomahawk, 6th St., Hiwassee or Oconeechee, and Cragmont/Fortune, this route should make motorists aware of bicyclists of all abilities with the goal of slowing motorist speeds to allow for safe travel. Shared lane markings, signage and traffic calming accomplish these goals.

INFLUENCES:

- Tomahawk Lake
- Carver Center
- Neighborhoods
- Golf Course
- Future greenway connections

INTERSECTIONS:

- Cragmont & Hiwassee or Oconeechee: Provide shared lane markings and wayfinding for bike routes to ensure bicyclists know where to follow the route and alert motorists.
- Cragmont & Byrd: The geometry of this intersection creates challenges for turning bicyclists and sight distance for motorists entering the road. Ensure foliage is trimmed to maximize sight distance and provide warning signs to watch for bicyclists.

CONNECTIONS:

- Walking path around the lake
- Other recommended neighborhood greenways in this plan
- Future greenway to In the Oaks

CHALLENGES:

- Neighborhood greenways can start small with shared lane markings and signage. This will help users identify the route but does not address concerns over motorist speeds. More elaborate traffic calming measures, such as speed humps, chokers, chicanes and median islands at intersections will do more to slow traffic to speeds that make the route more suitable for riders of all ages and abilities. This requires more study.

COST ESTIMATE

\$40,000 (markings & signage)

LENGTH

1.3 miles

USERS (see page 4 for more info)

S&F

E&C

lbc

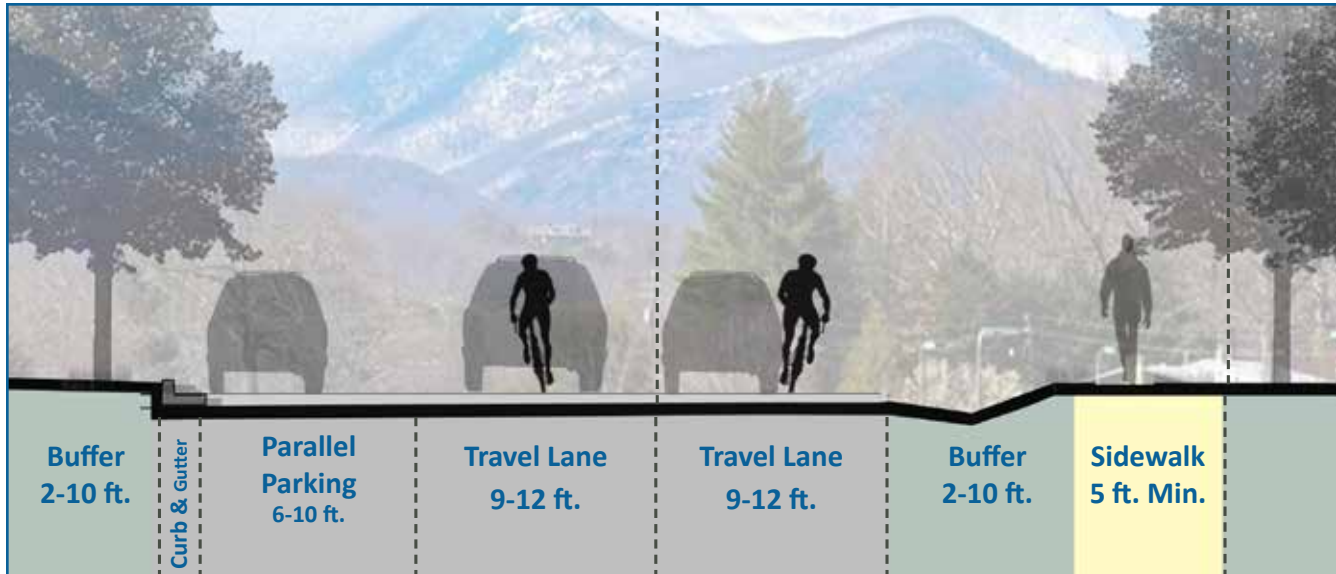
ECONOMIC POTENTIAL

Linking destinations via non-motorized modes helps residents save money.

Project 7



Tomahawk Lake to Carver Center Neighborhood Greenway



MAKING IT HEALTHIER

Linking destinations such as the Lake and Carver Center creates community cohesion and greater sense of belonging. Each has facilities to offer to increase physical activity.

On-street routes can be intimidating to novice riders, which is why eventually upgrading the route to include traffic calming is what will ultimately create the greatest health impacts of this route. Once this route is connected to others, there is a possibility to access all of the major destinations north of US 70 by bike.

Potential Design Treatments & Accents



On-street neighborhood greenway or bike boulevard in Wilmington, NC.



Sign topper designating on-street neighborhood greenway connector in Rehoboth, Delaware.

Project 8



Flat Creek Greenway Phase 2



PROJECT DESCRIPTION

The existing section of Flat Creek Greenway is likely the most utilized greenway in Black Mountain and runs north from Black Mountain Primary School to Cotton Avenue. Phase 2 will serve to connect Black Mountain to the Town of Montreat, which, by utilizing Montreat's trail infrastructure, will ultimately connect into Pisgah National Forest and beyond.

The greenway would be characterized by riparian forests and views from the valley floor, and will likely see high user traffic.

INFLUENCES:

- Extension of highly used greenway
- Corridor between towns
- Access to schools
- Flat Creek Greenway

INTERSECTIONS:

- Montreat Road terminus: Special design considerations should be given at the northern terminus of the greenway at Montreat Road or another local street. Ingress/egress ramps from the street should be designed to match the width of the greenway and special signage and pavement markings should be added to alert motorists to trail users.

CONNECTIONS:

- Montreat
- Existing Flat Creek Greenway
- Pisgah National Forest

CHALLENGES:

- Multiple land owners means buy-in is required from many people with diverse opinions.
- Constrained condition in section between river and roadway will make it difficult to build trail to ultimate desired with or with wide vegetated buffers.

COST ESTIMATE

\$750,000

LENGTH

0.79 Miles

USERS (see page 4 for more info)

S&F

E&C

IbC

ECONOMIC POTENTIAL

Completing this greenway makes Montreat more accessible to visitors and residents.

Project 8



Flat Creek Greenway Phase 2

Example of a greenway that might at times run parallel with Flat Creek Road



MAKING IT HEALTHIER

Managing the likely high volume of users and diverse types of bicyclists on this route due to challenges to constructing bike lanes on Montreat Road (parallel to greenway) is important. Proper bicycling etiquette should be advised so users are not intimidated by groups of bicyclists or high speed bicyclists. This should be a neighborhood-based facility where low speed walkers and bicyclists are a priority. Signage and the design of the greenway need to contribute to this prioritization of user types.

Potential Design Treatments & Accents



Signs encouraging bicyclists to call out “on your left” help build a greenway culture respectful of all users.

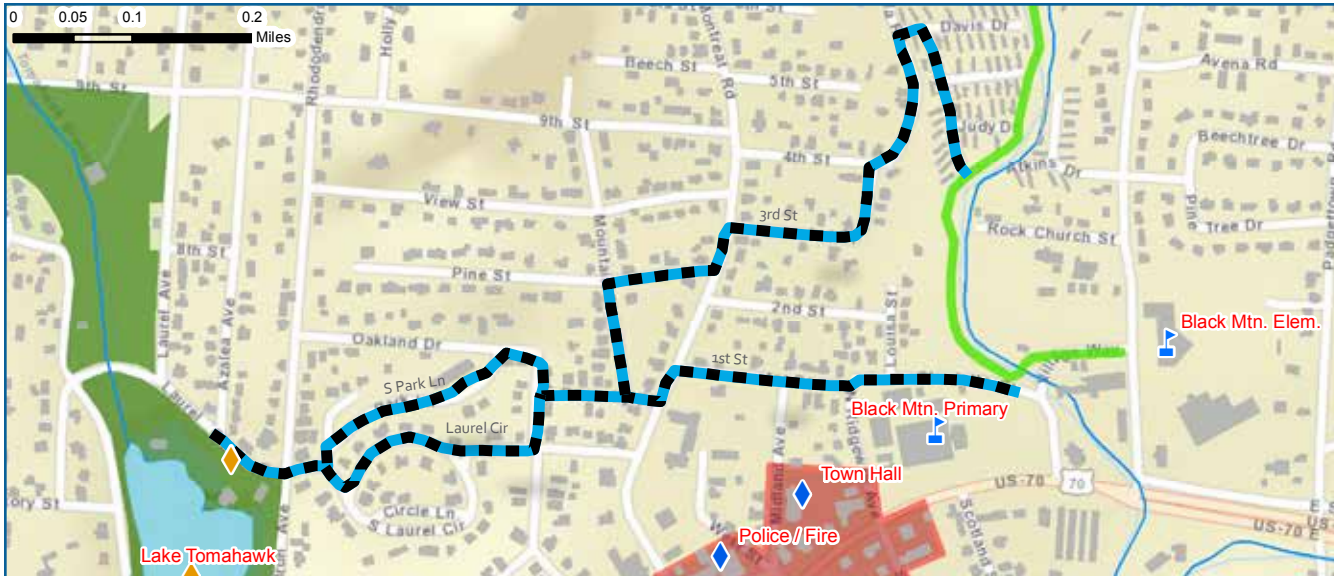


Suggesting speed reduction for bicyclists when pedestrians are present is positive messaging. Enforcing speed limits is difficult.

Project 9



Flat Creek to Tomahawk Lake Neighborhood Greenway



PROJECT DESCRIPTION

The Flat Creek Greenway to Tomahawk Lake Neighborhood Greenway creates a bicycle boulevard on local residential streets. This is recommended due to limited availability of right-of-way to build bike lanes or a greenway to link these destinations.

The route options include following Stepp, Portman Villa and 3rd St to reach Montreat Road. 1st Street from the Primary School is another route. The route then follows Pine, Connally Oakland/Park and Laurel Circle to reach Tomahawk Lake. A median with pedestrian refuge was recommended in the Safe Routes to School Action Plan for the NC-9 crossing and should be included in this project.

INFLUENCES:

- Flat Creek Greenway
- Tomahawk Lake
- Neighborhoods
- Black Mountain Primary School
- Future greenway connections

INTERSECTIONS:

- Montreat Road: Crossing Montreat Road by bike (and potentially traveling a short distance along it or the sidewalk) presents a safety concern and psychological barrier. Recommendations for increased markings and signage along Montreat Road will help. Push buttons need for signal.
- Laurel Circle: Intersections with Laurel Circle has some sight distance concerns. Improving signage and trimming foliage will help.

CONNECTIONS:

- Walking path around the lake
- Other connecting neighborhood greenways in this plan
- Future Flat Creek Greenway extension

CHALLENGES:

- Crossing Montreat Road remains the biggest challenge given that a short segment must be travelled along this route and poor LOS along the route. Signage and crossing treatments are needed to allow users to move safely. Full signals should be considered to allow for the short movement.

COST ESTIMATE

\$50,000

LENGTH

1.1 Miles

USERS (see page 4 for more info)

S&F

E&C

lbC

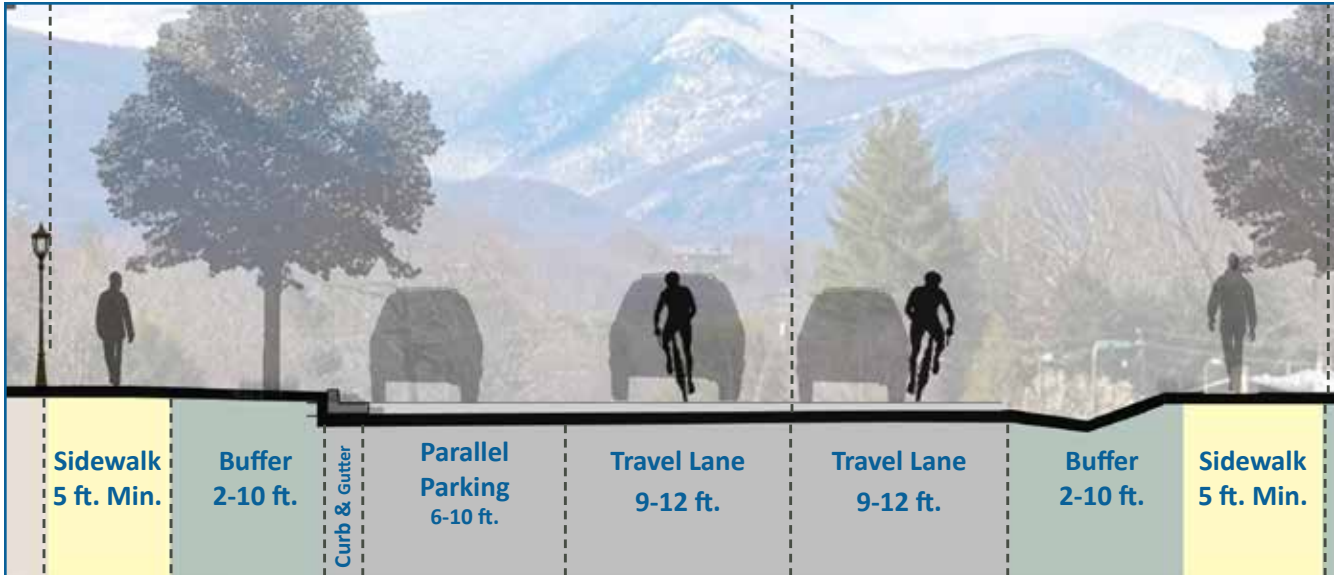
ECONOMIC POTENTIAL

Neighborhood greenways are visible indicators of community priorities and promote stable communities.

Project 9



Flat Creek to Tomahawk Lake Neighborhood Greenway



MAKING IT HEALTHIER

Linking destinations such as the Lake to the Greenway, thus the elementary and primary schools creates active transportation linkages for residents of all ages. It also improves the likelihood that low income residents can access these community assets more easily by bike, which improves overall physical and economic health.

On-street routes can be intimidating to novice riders, which is why eventually upgrading the route to include traffic calming is what will ultimately create the greatest health impacts of this route.

Potential Design Treatments & Accents



Neighborhood greenway signage and dual shared lane markings in Seattle (photo: Seattle Bike Blog)



Simple signs send a message to motorists on residential streets that pedestrian and bicyclists use the street and are a priority.

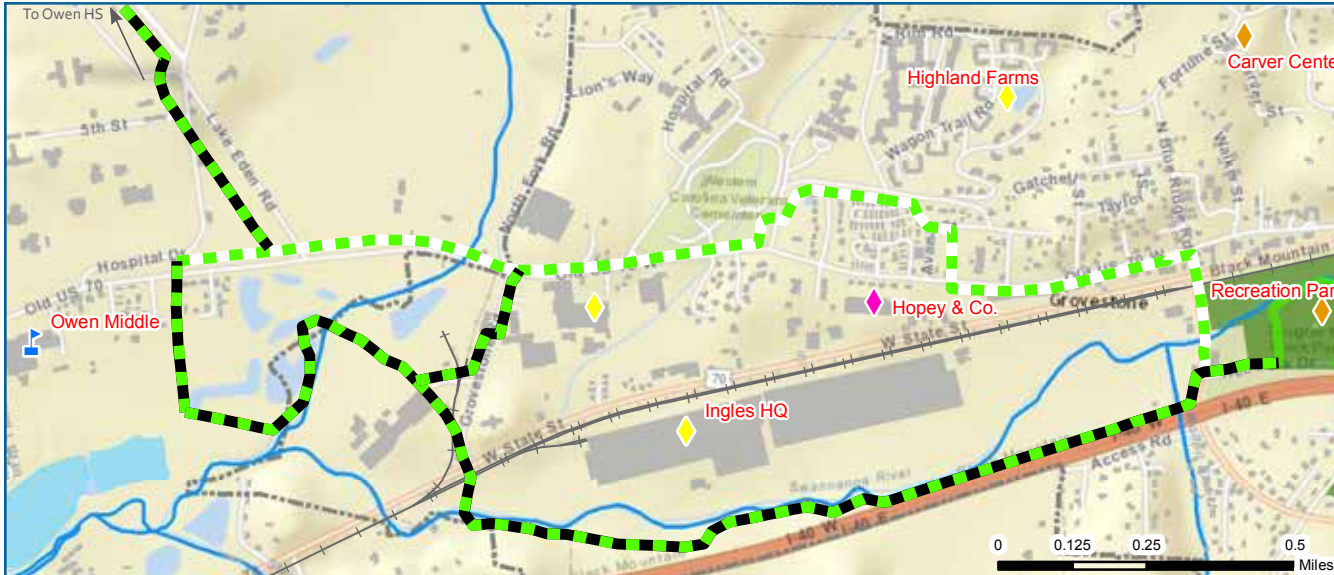


Special signage near an elementary school in Carrboro, NC, raises awareness of the presence of children.

Project 10



Owen Spur Greenway



PROJECT DESCRIPTION

Owen Middle School and High School are both located approximately 2 miles west of the Rec Park. The intent of the Owen Spur is to connect these schools into the greenway network. Two potential alignments have been identified to serve as this connection.

The more scenic and “off-line” (green/black) route involves natural and right of way constraints, but only involves a few landowners. The alternate route (green/white) would involve cooperation of multiple private land owners, buildings, and several roadway intersections. Further conceptual study is needed to determine which routes option is most feasible.

INFLUENCES:

- Access to Rec Park
- Access to existing greenway
- Access to schools

INTERSECTIONS:

- State Street (US 70): Provide dedicated crossing of this highway via a protected crosswalk, special signals and z-crossing (as shown in image on next page)
- Old US 70: Provide dedicated greenway crossing and signal at this street crossing.

CONNECTIONS:

- Oaks Trail/Rec Park
- Schools
- Serves to connect beyond Black Mountain to the West

CHALLENGES:

- Landowner willingness to engage in property acquisition or easement proceedings.
- Roadway intersections are numerous and will require special signalization.

COST ESTIMATE

\$2 Million

LENGTH

2+ Miles

USERS (see page 4 for more info)



ECONOMIC POTENTIAL

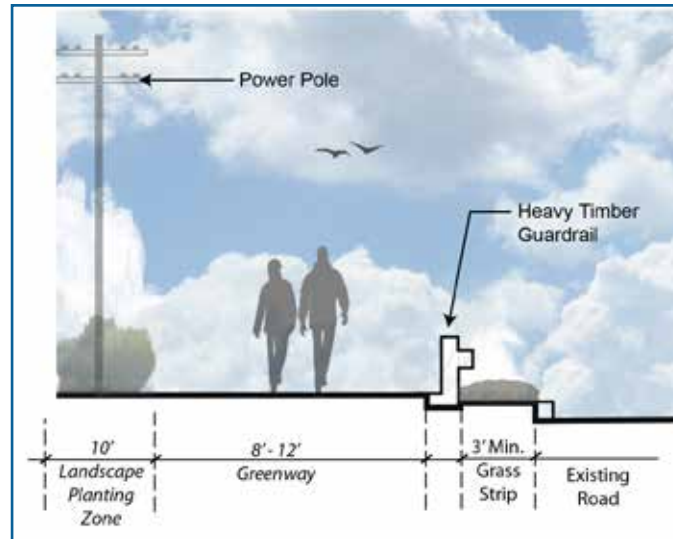
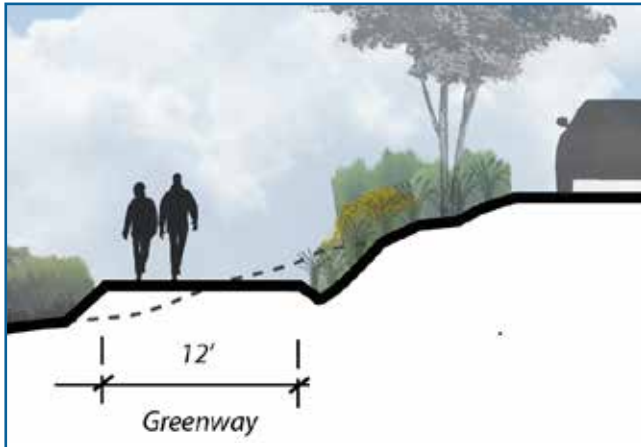
Connects to Asheville to Black Mountain planned greenway, which has incredible economic potential to attract bicycle tourism.

Project 10



Owen Spur Greenway

Options for the Owen Spur Greenway include a traditional greenway (left) or a sidepath alongside a road (right) that should be separated by a vertical rail if a 5-foot buffer from the top of the curb line is not feasible.



MAKING IT HEALTHIER

Linking the schools complex to the other parks and greenways provides an opportunity to promote lifelong healthy living habits for school-age children. A route that reduces street intersections is most preferred for safety and health reasons.

Such a greenway provides an opportunity for outdoor classrooms and more diverse learning experiences than are currently available at the school complex. Careful consideration must be given to highway crossings if this greenway is to be safe for users of all ages and abilities.

Potential Design Treatments & Accents



A z-crossing of a greenway through a major road prioritizes the safety of all users. Signals may be added.



Enhance the greenway near schools to increase opportunities for outdoor learning experiences.

Long-Term Project Priorities

Eleven (11) long-term projects were identified through the planning process in addition to the 10 short-term projects. These were identified as long-term due to their lower priority ranking and fiscal realities. It is generally anticipated these projects would be constructed beyond a 10-year timeframe, which is why more detail was not provided. It also allowed the planning effort to focus resources on the higher-priority, short-term projects. Many things can change, including design practices, development patterns and the needs of bicyclists, before these projects are considered.

In general these projects ranked lower because they were along routes with fewer influences or destinations and had other feasibility issues. Some projects are extensions of other short-term projects and would most likely not be constructed until after other short-term recommendations were completed.

Figure 22 on the next page includes a brief summary of these projects and cost estimates.

Black Mountain should continue to seek opportunities to construct these projects. The town should consider requiring any new development along these segments to construct or dedicated lanes for bicycling routes and greenways in anticipation of a future full-length project along these routes. The construction of other roadway projects, such as the Blue Ridge Road interchange, could impact the schedule (in terms of prioritization) and type of project.

Figure 22—Long-Term Projects

Project	Project Description	Length	Cost Estimate*
11. Broadway Ave (NC 9) from State St (US 70) to Blue Ridge Rd	Install shared lane markings and signage north of the railroad tracks. Narrow travel lanes or consider road diet to add bike lanes from the railroad tracks to south of I-40. Add bike lanes or bikeable shoulders from I-40 to Blue Ridge Road.	0.9 miles	\$100,000 (shared lane markings) to more than \$500,000 for bikeable shoulders
12. Tomahawk Branch Greenway, Lake Tomahawk to Rec Park via Cragmont Park	Construct a greenway along the creek, across State St (US 70) and the railroad to link the parks. A major crossing upgrade is required at State Street and a culvert or tunnel under the railroad would create the shortest route and not conflict with the tracks.	Up to 1 mile	Varies greatly based on tunnel and crossing feasibility
13. Old US 70, from State/ College Intersection to Owen Middle School	Construct a bikeable Shoulder or bike lane along the route. Right-of-way is a major challenge on the route and the addition of an additional 8- to 10-feet of pavement could have impacts to adjacent properties.	2.4 miles	Up to \$1 million (construction cost only; right-of-way cost unknown)
14. Swannanoa River Greenway, Rec Park to RiverWalk Greenway	Construct greenway along the north side of the river (preferred) to link the planned RiverWalk Greenway to the Rec Park. This roughly 2-mile route provides a greenway linkage south of I-40 to serve neighborhoods and future growth in that area.	2 miles	\$2 million
15. Ridgecrest Connector Greenway, from RiverWalk to Kitsuma	Construct greenway or sidepath to link Black Mountain to Ridgecrest and the Kitsuma Peak Trail head. This will require coordination and partnership with county and Ridgecrest officials but should be a long-term goal.	3.5 miles	\$3.5 million
16. Blue Ridge Rd, from Old US 70 to Rec Park Entrance	Construct a minimum 5-foot wide bikeable shoulder or bike lane. A more optimal solution is a sidepath or cycle track to better move people through the area if there is a future interchange. The 2000 Blue Ridge Road interchange feasibility stated no special accommodations were necessary. This should be changed when/if DOT analyzes the interchange in more detail or replaces the bridge.	0.2 miles	\$200,000
17. Blue Ridge Rd, from Rec Park Entrance to NC 9	Construct a minimum 5-foot wide bikeable shoulder or bike lane. The 2000 Blue Ridge Road interchange feasibility stated no special accommodations were necessary. This should be changed when/if DOT analyzes the interchange in more detail. Shoulder widening could be considered if the road is resurfaced.	1.3 miles	\$500,000
18. Carver to Highland Farms Greenway	Construct a greenway trail from the Carver Center to Highland Farms along the road or on a dedicated alignment to link the destinations and the planned neighborhood greenway.	1 mile	\$1,000,000
19. Cheshire to Swannanoa River Greenway, via Camp Branch/Britton Creek	Construct a greenway trail that link Cheshire to the planned Swannanoa River Greenway along the creeks.	0.6 miles	\$600,000
20. Flat Creek Rd/Padgettown Rd Neighborhood Greenway	Mark shared lanes and installed signage to create a neighborhood greenway along these routes and linking Flat Creek Rd to Padgettown Road on Avena Rd or Rainbow Lane. Based on success of other neighborhood greenways, consider other traffic calming treatments.	Up to 2.3 miles	Up to \$100,000
21. North Fork Road, Montreat Rd (NC 9) to Old US 70	Mark shared lanes and install signage along this route to raise awareness of the presence of bicyclists. Seek opportunities to create some type of shoulder in a future resurfacing project by NCDOT.	4.8 miles	Up to \$200,000

* Cost estimates are based on planning level figures for construction/implementation in 2015 dollars. Land acquisition costs are unknown at this time since more specific alignments and land impacts are also unknown. Assume additional 10-15% of the construction cost for design services (not included in project cost as it will require separate scoping).

Chapter
5



Designing for People
Who Bike





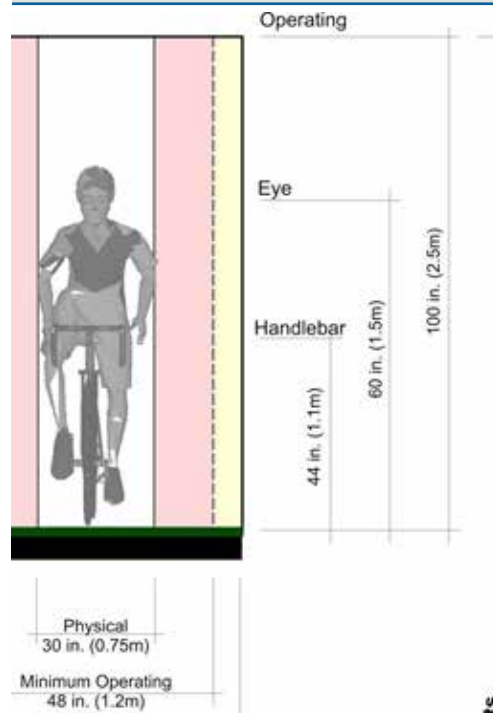
DESIGNING FOR PEOPLE WHO BIKE

Designing for bicyclists is very different than simply designing facilities for bikes. A bicycle is an inanimate object incapable of movement without human power. Properly designed facilities are constructed in a manner that indicates the designer understands what it is like to be a bicyclist moving through a space. Due to the physical exposure a bicyclist has when compared to a motorist, it is important to acknowledge the physical characteristics of a bicyclist. AASHTO notes that “understanding bicyclists’ operating characteristics is therefore essential to design facilities that minimize the likelihood of injury.”

For the same reasons that motor vehicle travel lanes are made wider when truck traffic is higher, the design for bicyclists should also reflect the type and volume of bicyclists. People for Bikes, a nationwide advocacy organization, unveiled a new approach to designing bicycling facilities in 2014 with their “Build it for Isabella” campaign. In traditional traffic engineering parlance, the “design vehicle” is what determines how a street is designed. “Isabella” is the design user for bicycling facilities. She is a 12-year old girl who is ready to explore her neighborhood by bike.

The “Build it for Isabella” approach builds upon the growing

Figure 23—Dimensions of a Bicyclist



knowledge based of bicyclist types, which acknowledges there are at least four distinct types of attitudes people have toward bicycling that were identified in an Oregon study. They are:

- **Strong & Fearless:** These bicyclists often ride regardless of roadway conditions and riding is a strong element of their identity.
- **Enthusied & Confident:** These riders are comfortable sharing the road with automobile traffic but prefer to do so while riding in their own facility (e.g. bike lanes).
- **Interested but Concerned:** They are curious about riding a bike but are reluctant to ride where they do not feel safe. They may already mountain bike or use greenways.
- **No Way, No How:** This group consists of people not interested in bicycling due to lack of interest, inability to ride, or concerns about topography and safety. How can we introduce them to bicycling?

Figure 24—The “Build It for Isabella” Approach

BUILD IT FOR ISABELLA
ISABELLA: 12 YEARS OLD AND READY TO RIDE

Isabella is ready to travel her world by bike, but is the network ready for her? What does Isabella need to ride safely around her world?

- ✦ Are we planning low-stress, connected networks that work for Isabella?
- ✦ What if every project was designed with Isabella in mind?
- ✦ If we build for Isabella, wouldn't it work beautifully for the rest of us too?

The planning team heard from each of these riding perspectives during the community bicycle ride for Black Mountain by Bike. Several riders expressed a desire to have facilities separated from motor vehicle traffic and even the most confident riders in the group expressed a desire for their own space on many of the roadways in the area due to traffic speeds and volumes.

It is imperative that we assess the needs of bicyclists from each of these four perspectives when considering how we design for Isabella. A safe bicycling network allows bicyclists in one category to potentially move up into a category of more confident riders. Some bicyclists' attitudes may float between these categories based on their unique situation. Bicyclists who are strong and fearless when riding by themselves may be interested but concerned at the prospects of riding a bicycle with their child.

Strong and fearless or enthused and confident riders may have a “no way, no how” attitude if it means they have to travel along a section of highway that is either off limits to bicyclists or where no facilities exist next to high speed traffic.

This does not mean that every facility on every street must accommodate

As bicyclist types are changing, so are the bicycles they are riding which means that a four-foot lane is barely adequate to accommodate a diverse range of bicyclists.



Isabella; rather we should strive to build a bicycling network that provides parallel routes to major streets where less confident riders can still feel safe. There will also be constraints and traffic conditions that inhibit a bicyclist's willingness to ride in certain situations.

As bicyclist types are changing, so are the bicycles they are riding, which means that a four-foot lane is barely adequate to accommodate a diverse range of bicyclists. A common design application in North Carolina is to default to a four-foot bicycle lane as a default, but current NCDOT accepted guidance generally sets a 5-foot minimum with adjustments for particular settings and characteristics (see Complete Streets Guidelines & AASHTO guide).

A 4-foot bike lane generally will not serve the need, comfort and safety of most riders. Bike lanes should be designed for the comfort of those who have less fearless attitudes about bicycling. Just as we would not build a new 9-foot wide vehicular travel lane (the AASHTO minimum width), design should not default to the minimum bike lane width .

APPLYING COMPLETE STREETS

Just because a street has sidewalks and bike lanes does not always mean it is “complete” from the perspective of safely accommodating all users of all ages and abilities. Careful consideration must be given to the needs of bicyclists and how they interact with traffic along different routes. Destinations along or near a proposed bicycle route will determine what user type of bicyclists is expected.

NCDOT's Complete Streets policies, related guidelines and practices mean that the state is likely to improve streets with bicycling facilities when they are part of other major roadway upgrades or changes in configuration. Given current land use constraints, it is unlikely that NCDOT will add capacity to streets like NC 9 and US 70 through Black Mountain.

The addition of bike lanes or bikeable shoulders is most likely to occur through resurfacing of the streets by NCDOT (in partnership with Black Mountain to add pavement width where possible) or through the Town independently pursuing federal or local funds to add these facilities to state-managed and other routes.

Given these realities, and as noted in the introduction to this chapter, the corridor-specific concepts contained in the recommendations chapter designate a short-term and long-term set of recommendations. The short-term recommendations tend to include pavement markings, signage and route designation while long-term recommendations reflect more substantial infrastructure upgrades. Many prioritization factors led to these designations.

The route recommendations also include major influences on the demand for bicycle traffic, the NCDOT Complete Streets cross section that best fits the existing corridor and a planning-level cost estimate. A planning-level bicycle quality of service (or level of service analysis) was conducted based on existing conditions.



While Complete Streets are being implemented by NCDOT, it is still imperative that Black Mountain and its residents remain diligent about how bicyclists and pedestrians are accommodated on projects. As noted earlier in this chapter the default design decision is often to build to the minimum, sometimes without much regard for local context and concerns for bicycling and walking along a route. Imagining only a four-foot wide bicycle lane on US 70, would that give enough room to allow bicyclists to feel safe next to the speed of existing traffic? Probably not.

Black Mountain should work closely with its local NCDOT Division office to articulate these needs during the project development process so proper input can be given to the designers, who are oftentimes housed in Raleigh and are not as familiar with local context. There are several positive examples across the state where this type of constant interaction has yielded safer design for bicyclists along state roadways.

NCDOT'S BICYCLE POLICY

In addition to the state's Complete Streets policy, NCDOT operates under an adopted Bicycle Policy that stems from the state's 1974 Bicycle and Bikeways Act. Some important elements of the bicycle policy for Black Mountain to remember when projects are pursued are:

- "Bicycle compatibility shall be a goal for state highways in order to provide reasonably safe bicycle use, except on fully-controlled access highways, where bicycle use is prohibited."
- "All bicycle facilities...shall conform with the (state) adopted Design Guidelines for Bicycle Facilities on state-funded projects, and also with guidelines published by the American Association of State Highway and Transportation Officials (AASHTO) on federal aid projects."
- "Paved shoulders shall be encouraged as appropriate along highways for the safety of all highway users, and should be designed to accommodate bicycle traffic."

DESIGN GUIDANCE FOR BICYCLING FACILITIES

As prescribed in NCDOT's Bicycle Policy, most of the prevailing guidance on the design of bicycling facilities stems from AASHTO. In 2012 the organization published its Guidelines for the Development of Bicycle Facilities, which serves as the foundation for the design guidance contained in this chapter. Black

Mountain should purchase this document to have on-hand for to ensure its application in project design.

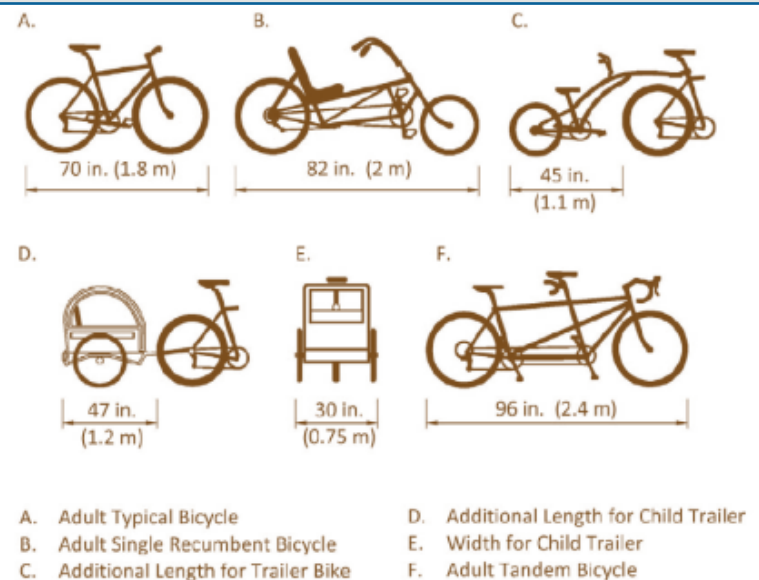
The other prevailing design guidance for transportation engineers is the Manual on Uniform Traffic Control Devices (MUTCD), which sets the standards for traffic control practices across the United States. The application of MUTCD is why speed limit signs look the same in most states and the striping and signage along highways and streets is consistent. The most recent MUTCD was adopted in 2009 and includes the most comprehensive set of considerations for signage and pavement markings for bicyclists. Engineers, in most cases, are hesitant to deviate from its guidance due to fears of litigation.

In some instances, NCDOT's own design guidelines have identified features that are more bicycle friendly, such as how to determine appropriate bikeable shoulder width based on the speed of adjacent motor vehicle traffic. Where appropriate, these design elements are incorporated below.

This section is intended to be a high-level primer on bicycle facility design as much more detailed information is available through AASHTO's guidance, the Manual on Uniform Traffic Control Devices and other state and federal publications.

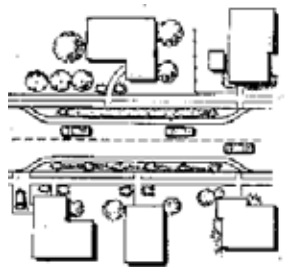
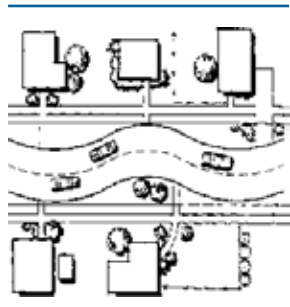
An important thing to note is that as the bicycling culture is changing in America, the design standards are also evolving rapidly and new guidance is updated regularly by various organizations. Webinars help designers understand changes.

Figure 25—Design Requirements for Different Bicycles



NEIGHBORHOOD GREENWAYS

A neighborhood greenway is a signed bicycle route on a slow-speed, low-traffic residential street. These routes always have bicycle route signing and may also include pavement marking “sharrows” and/or “Share the Road” or “Bikes May



Use Full Lane” signs to alert motorists to the presence of bicyclists. They are intended to prioritize bicycling movements.

Neighborhood bicycle routes and bicycle wayfinding are popular on streets where there is not the need for dedicated bicycling facilities. In the same manner that Black Mountain has signed and marked its greenway, the Town may pursue designating a neighborhood bicycle route or historic bicycle tour of Black Mountain through a system of pavement markings and/or signage.

Bicyclists can be given additional priority on these streets through other measures such as traffic calming via chicanes, chokers and dead end streets for cars that allow bicyclists to go through. Projects identified in this plan for this treatment include the Tomahawk Lake to Carver and Flat Creek to Tomahawk routes.

Figure 26—Traffic Calming and Bicycle Routes

Examples of a chicane (top diagram) and choker (above) and other traffic calming measures



Figure 27—Designing for Upright and Recumbent Bicyclists

Bicyclist Type	Feature	Value
Typical Upright Adult Bicyclist	Speed, paved level terrain	8-15 mph
	Speed, downhill	20-30 plus mph
	Speed, uphill	5-12 mph
	Perception reaction time	1.0-2.5 seconds
	Acceleration rate	1.5-5.0 feet per second
	Deceleration rate on dry level pavement	8.0-10.0 feet per second
Recumbent Bicyclist	Deceleration rate for wet conditions	2.0-5.0 feet per second
	Speed, level terrain	11-18 mph
	Acceleration rate	3.0-6.0 feet per second
	Deceleration rate	10.0-13.0 feet per second



Bike Route Signage

This bike route direction signing example is from the Lake Norman Bicycle Route in Davidson.



Shared lane marking

Note the marking is incorrectly placed in the travel lane as it does not direct the bicyclist to ride outside the door zone of parked vehicles.



Bicycle Lanes

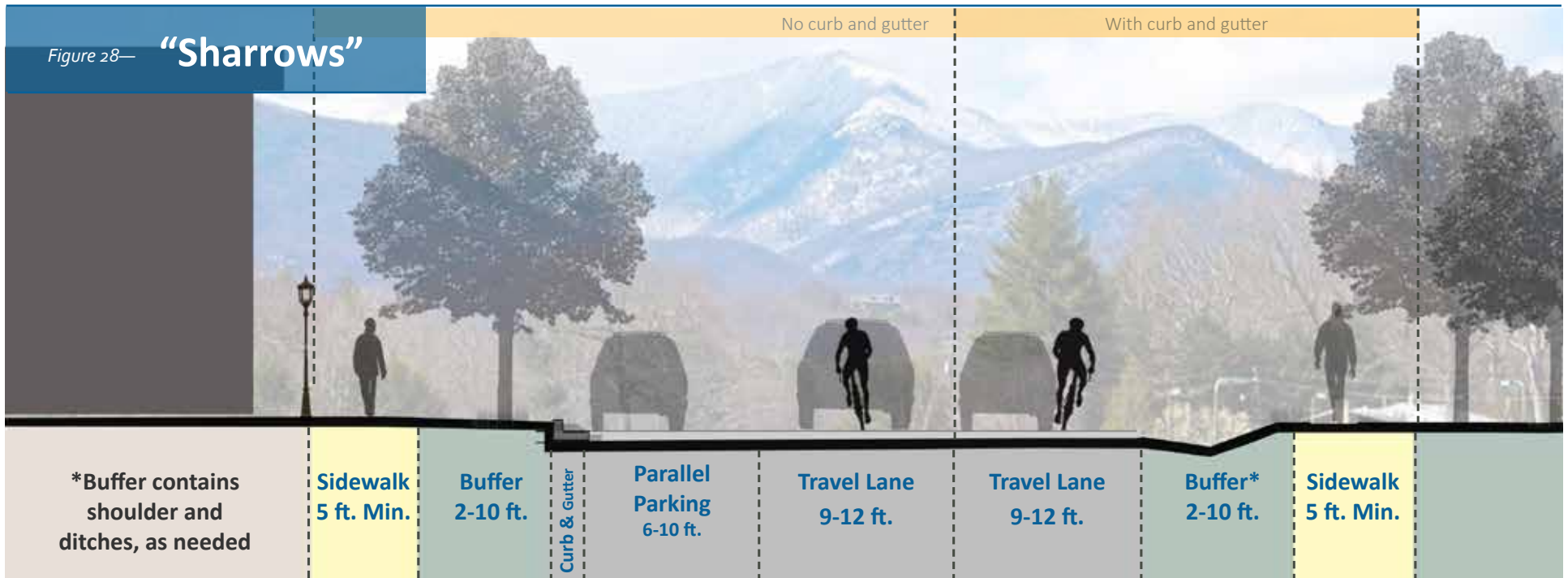
Bicycle lane marking on NC 107 in Cullowhee (Note the bike lane is only the minimum width of four feet whereas the travel lane is twelve feet wide and the speed limit is 55 mph.) A more accommodating treatment would have been to reduce the motor vehicle lane width to 11 feet to achieve a bike lane width of five feet.

SHARED LANE MARKINGS (OR SHARROWS)

The use of shared lane markings (see Figure 28) has become more popular on streets where adding a bicycle lane or shoulder is not feasible or planned. A shared lane marking is defined by AASHTO as a “pavement marking symbol that indicates an appropriate bicycle positioning in a shared lane, which is a lane of traveled way that is open to both bicycle and motor vehicle travel.”

Shared lane markings send other messages to bicyclists and motorists: 1) That a bicycle has a right to use the lane and the lane should be shared; 2) Positions a bicyclists in a travel lane with on-street parking in a location where they can avoid opening car doors; and 3) Positions a bicyclist in a travel lane without on-street parking in a location where they are not squeezed out or riding along the right edge of pavement.

Special care should be taken when marking a shared lane. MUTCD recommends a 10-foot or 11-foot distance from the center of the marking to the curb face when on-street parking is present. However, local conditions may vary and necessitate placing the marking further out into the travel lane or in the middle of the travel lane.



BICYCLE LANES

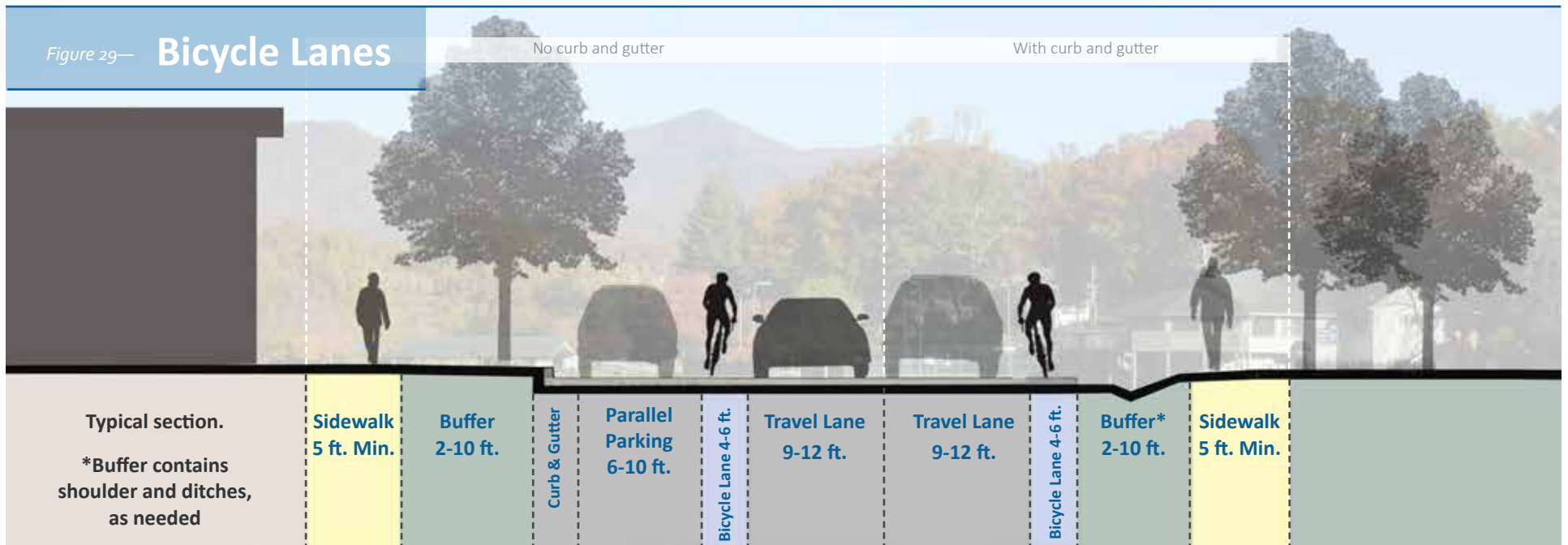
A bicycle lane is defined by AASHTO as a “portion of roadway that has been designated for preferential or exclusive use by bicyclists by pavement markings and signs. It is intended for one-way travel, usually in the same direction as the adjacent traffic lane.” See Figure 29 for a typical cross section recommended for bicycle lanes in Black Mountain, adaptable to specific context.

The bicycle lane is the most common application for dedicated bicycling facilities and typically ranges in width from four-feet to six-feet adjacent to a motor vehicle lane. This width does not include the width of the gutter pan as it is not usable space for a bicyclist.

AASHTO notes that bike lanes should be a minimum 5 feet in width. Four-foot wide lanes can be appropriate on low-speed streets such as collectors where there is not as much discrepancy in the speed of the bicyclist versus the speed of the motorist. Right-of-way constraints may also limit bike lane width on retrofit or shoulder widening projects. On higher speed facilities, the width should be greater (5 feet on 35 mph to 45 mph streets; 6 feet on streets with speed limits greater than 45 mph).

BIKEABLE SHOULDERS

Bikeable shoulders are similar to bike lanes except there is no curb and gutter and the shoulder may or may not be marked as a bike lane. While there are current guidelines provided by AASHTO, there is a very relevant and oftentimes overlooked piece of the 1994 The NC Bicycle Facilities Planning and Design Guide that should not be ignored. That Guide defines a shoulder as a “portion of roadway contiguous with the traveled way that accommodates stopped vehicles, emergency use and lateral support for the roadway surface. Of most importance in that guide is a statement that shoulders that are 4-foot (less than 35 mph speed limit) or 5-foot (35 mph to 45 mph speed limit) are considered bikeable because they are a width similar to a bike lane.” The speed of the adjacent travel lane helps dictate the appropriate width of the bike lane, for example, a 4-foot shoulder would not be considered bikeable beside a travel lane posted for greater than 35 mph. This design guidance is based, in part, on the aerodynamic forces caused by heavy motor vehicles passing bicyclists.



BUFFERED BICYCLE LANE & CYCLE TRACKS

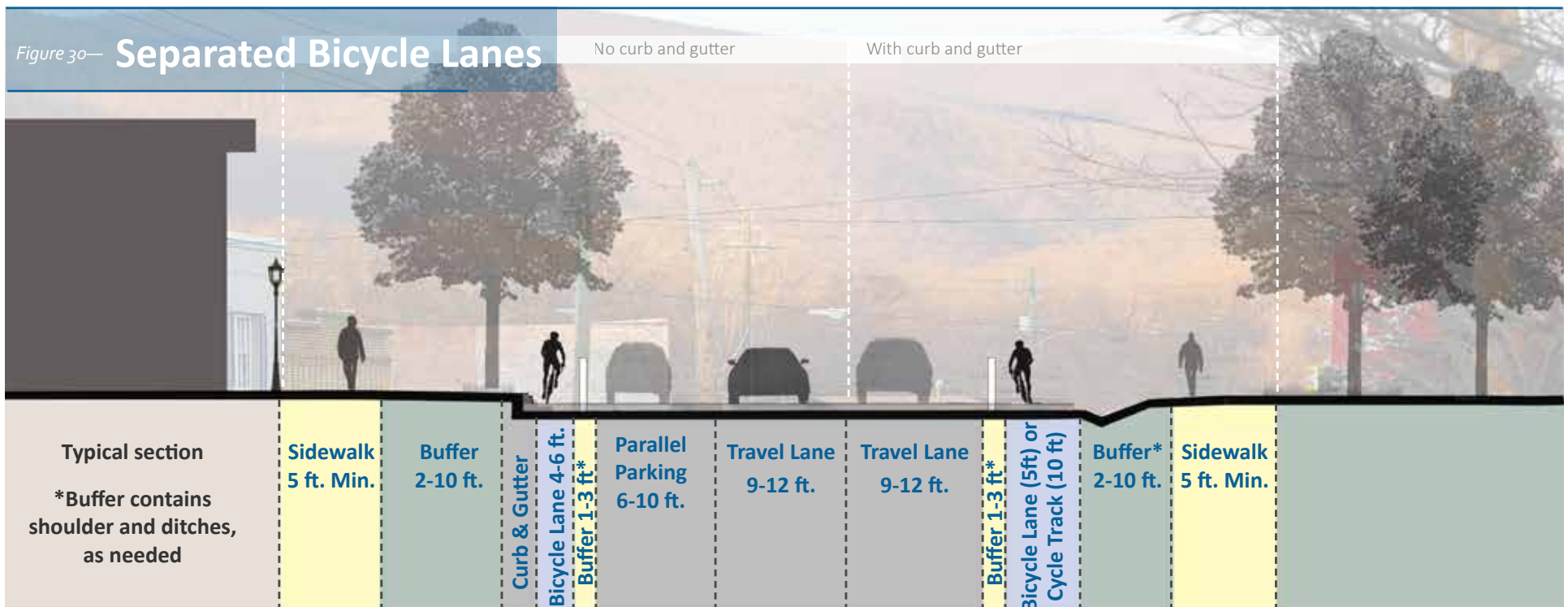
There is a special type of bike lane called a buffered lane (see Figure 30). These may be simple separation or what is called a cycle track. Buffered bike lanes are divided from the adjacent motor vehicle travel lane only by a painted or marked island, whereas cycle tracks (sometimes called separated bike lanes) have a vertical element such as a curb, a raised median or a row of delineator posts between the bicycle lane and the motor vehicle lane. Motor vehicle parking may even be used to separate the travel lane from the cycle track.

The application of cycle tracks is increasingly popular on urban streets. Cycle tracks are similar to multi-use trails except they are located within the street and intended only for bicyclists; a sidewalk is still needed for pedestrians. The only location where a cycle track may be possible in the future in Black Mountain would be if portions of the four-lane section of US 70 are subject to a road diet; then a cycle track could be considered on the south side of the street utilizing one of the travel lanes.

SHARED USE PATHWAYS/SIDEPATHS

These facilities are also commonly called multi-use paths or greenways (see Figure 31). Design principles for shared use pathways and sidepaths take both pedestrian and bicyclists' needs into account. Bicyclists need more space for two-way operation, especially when pedestrians also use the facility; this is why these paths are wider than standard sidewalks. A pathway that accommodates both types of users should be 10-feet wide at minimum (8-feet is allowed in short, constrained sections), but 12-foot or 14-foot wide pathways are preferred in high volume areas or near parks and schools.

A common response to building greenways is that some residents and officials feel that giving a bicyclist a separated trail will get them off the road. This may be true for less confident riders but a trail should not be seen as a substitute for on-road facilities as some bicyclists will prefer to be on the road in most situations and public roads and streets. Poor conditions for bicyclists on a roadway do not mean that bicyclists should be prohibited; rather it means that the roadway is a candidate for improvements to better accommodate bicyclists.



Some special considerations on shared pathways include:

- A firm and stable surface that can accommodate a wide variety of bicycle types. Narrow tires on road bikes can make travel unsafe on gravel or sand paths.
- Sidepaths should be placed in areas where there are few driveway cuts or low potential for future driveway cuts. Motorists do not expect two-way bicycle traffic on a pathway crossing a driveway.
- Curb ramps and crosswalks at intersections of greenways and other pathways should be a width that conforms to the width of the pathway. Oftentimes, since NCDOT does not have a greenway curb ramp design standard drawings, designers place a five-foot wide ramp at an intersection with a multi-use trail. This is not compliant with Americans with Disabilities Act requirements or AASHTO's design guidelines. Chapter 5 of the AASHTO guide includes specific on this topic.

Figure 31— **Shared Use Pathways/Sidepaths**

A sidepath along a state highway. The width of ramps where the path meets the street should be the same as the pathway, as shown.



OTHER TREATMENTS

Bicycle Boulevards. Bicycle boulevards are street segments, or a series of contiguous street segments, that are modified to accommodate through bicycle traffic and minimize through motor vehicle traffic. Bicycle boulevards are best suited for street sections that link major destinations like a park or school to a greenway or other major bicycling facility where a dedicated greenway connection is infeasible or a bicycle lane is not practical due to the low-speed, low-volume nature of the street. Bicycle boulevards typically consist of special signage and pavement markings denoting them as a space where bicyclist movement is prioritized. “Stop” signs and traffic signals along such a route should be oriented to favor bicycle traffic, a process that itself requires special analysis and procedure.

Green Lanes. Use of green pavement for all or sections of a bike lane is becoming a more popular treatment to help visually denote the bicyclist's presence in the roadway as a way to improve safety and visibility. The most common treatment of green lanes is applying the paint where a motorist must merge across a bicycle lane, either at an intersection to reach a right-turn only lane or at a freeway interchange. Green markings require special permission from the Federal Highway Administration as they are not yet universally accepted in prevailing design standards



Green Lanes

Green bicycle lanes are a way to accent a bike lane to raise the visibility of it for motorists.

OTHER BICYCLIST ACCOMMODATIONS

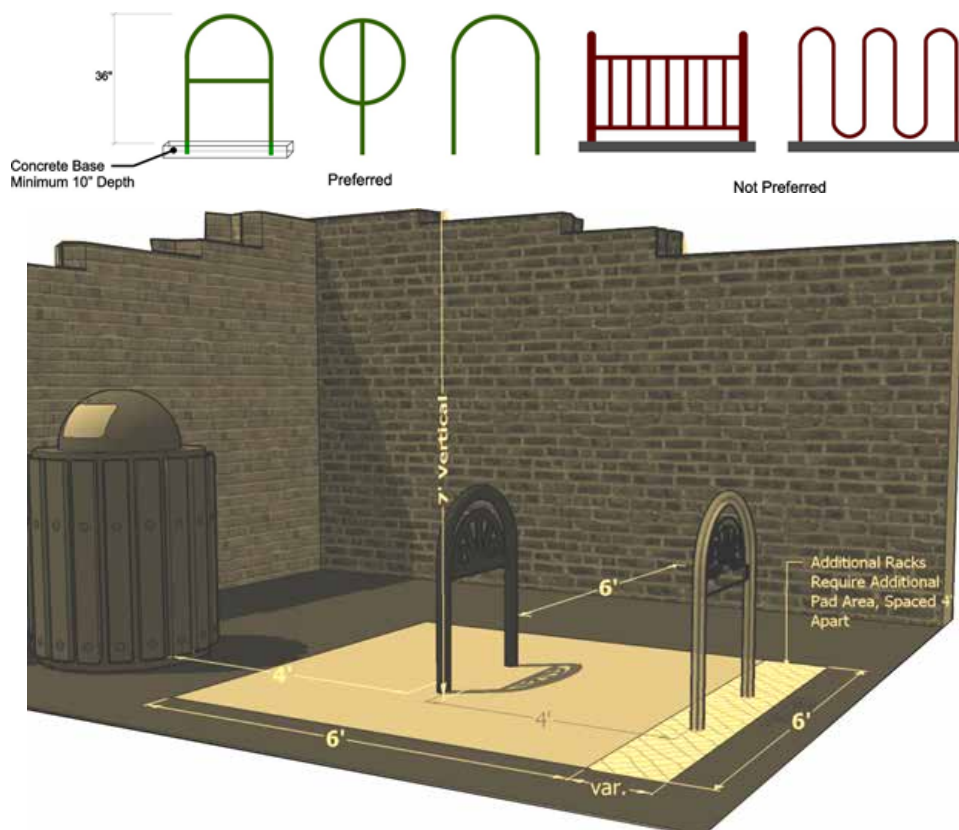
Parking lots and driveway entrances/exits are surprisingly hazardous for bicyclists. Motorists are not conditioned to notice bicyclists in these environments. Sometimes novice bicyclists will “cut through” parking areas to avoid perceived hazards on the road, and engage in bad practices such as cutting across parking aisles. Driveway entrances sometimes have channelized islands that allow motorists to make high-speed turns into a parking lot that can pose hazards for both bicyclists and pedestrians. Town design standards should require appropriate safe accommodation in these situations.

Bicycle parking. Bicycle parking racks can almost literally come in any shape or style you can imagine (see Figure 32), thanks to some vendors catering to special markets for event centers, universities with specific mascots, municipal icons, and artists. However, the basic rack styles are still a variant of the “post-and-loop” design like those shown in green at top. These styles are easily recognizable as usable bicycle racks instead of works of art and help prevent two bicycles rubbing up against each other.

In contrast, the popular “wave” rack style at far right generally only supports the bicycle at one point, as does the comb rack (second from right), often seen at public schools. Regardless of the specific style, a thick (10”) concrete base should be constructed for each bicycle parking station.

Note also that bicycle parking areas should have minimum 6’ horizontal clearances on all sides to ensure that each rack can be used properly, and at least a 7-foot vertical clearance (see graphic at bottom). A shorter horizontal

Figure 32— Bicycle Parking



clearance with a minimum of 4 feet, may be used behind the rack. Note that bicycles are to park parallel to the rack, not through them for post-and-loop designs. These standards can be adopted into various Town ordinances.

Crossing Railroad Tracks. Most railroad tracks and on-road bicycle paths will cross at a near-90 degree angle. Bicycles crossing tracks at a less than 45 degree angle should consider the treatment shown in Figure 33, which calls for a realignment of the bicycle path to create a more perpendicular approach angle.

Some communities have begun using shared-lane markings, or sharrows, to indicate to bicyclists the most suitable way to cross a railroad track that is within an urban street where improvements such as those shown at right are not feasible.

Drainage Grates & Utility Covers. Drainage grates can pose a serious hazard for bicyclists, particularly on older streets where the design and placement of drainage grates did not consider the potential use of bicyclists. Grates with openings that are parallel to the curb cause the wheels on bicycles, particularly those with narrow tires, to fall into the grates and result in a crash.

Figure 33—Preferred Method of Bicycles Crossing Railroads

Bicycle Path Crossing RR at Acute Angle (>45°)

Source: AASHTO Guide for the Development of Bicycle Facilities (Figure 27)



On new construction projects, grates should be placed only within the gutter pan of the street with grate openings that are perpendicular to the curb and direction of travel. On older streets, the jurisdiction in control of that street should be requested to retrofit the grates with new grates with openings that are perpendicular to the curb. Another retrofit treatment is the welding of straps across the grate perpendicular to the direction of travel, which narrows the opening of the grate to prevent the bicycle wheel from falling into the opening.

Grates and utility covers/manholes create different problems for bicyclists as roadways sink or are re-surfaced. Grates and utility covers should be flush with the roadway and should be replaced or reconfigured when NCDOT or a municipality resurfaces a street so they remain flush with the pavement.

Utility covers can pose problems on greenways as many of them are constructed along sewer easements. As with roadways, the utility covers should be flush with the trail surface and, where possible, outside of the travelway.

Rumble Strips. The addition of rumble strips along highway shoulders causes great concern among bicyclists due to the placing of rumble strips in the shoulder where the bicyclist operate. The placement is usually the only suitable location for bicyclists to travel due to the speed differential.

To account for the needs of bicyclists, rumble strips should be placed as close to the edge line or fog line of the highway to maximize the space available for the bicyclist along the highway. Design standards for most four-lane highways leave typically 5-foot or greater on the shoulder for bicyclists to operate outside the area of the rumble strips. Designers should reference AASHTO's bike guide (Section 4.5.2) for guidance on the design placement of rumble strips.

EMERGING TRENDS

Black Mountain by Bike is a document that emphasizes priorities over a ten-year timeframe. As noted earlier, the rapid evolution of bicycling culture is changing how design professionals consider bicyclists. It is likely that design guidance that is current as of late 2015 may be out-dated when some recommendations of this plan are implemented.

Prevailing design guidelines will always be a step or two behind the prevailing needs of bicyclists, and it is difficult for designers to justify treatments that are not part of adopted design guidelines due to liability concerns. This section summarizes some emerging trends in bicycle facility design and organizations that are addressing the emerging trends.

WalkBikeNC Implementation. There are several recommendations contained in North Carolina's statewide pedestrian and bicycle plan that could influence how NCDOT and other communities across the state implement future designs for bicycling facilities. Governor McCrory's Vision25 document on the state's future for transportation recommends implementation of WalkBikeNC.

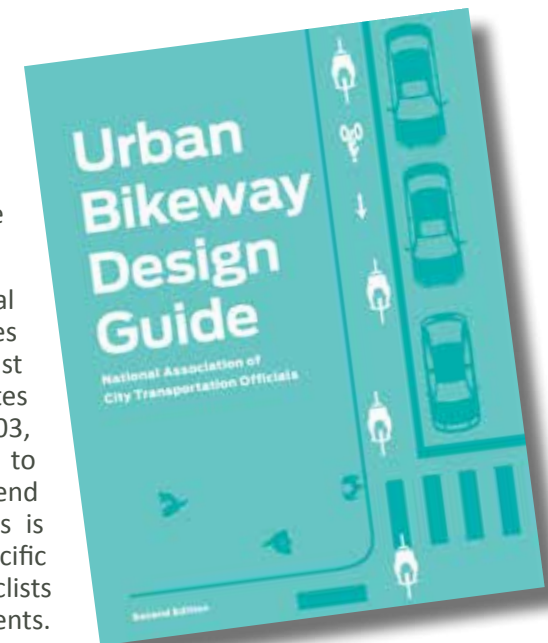
Black Mountain should keep track of the progress of this, in concert with the MPO, as well as subsequent updates to the state's Complete Streets Planning and Design Guidelines to ensure the most modern application of treatments for bicyclists is accommodated.

NACTO Urban Bikeway Design Guide. The National Association of City Transportation Officials (NACTO) has recognized that prevailing guidance from AASHTO is not always well-suited for bicycle mobility in urban settings. They developed this design guide as a way to account for those unique needs. The NACTO guide is available online for free and includes several innovative treatments, many of which are acceptable applications within what MUTCD allows.

Cycle tracks and colored bicycle lanes are prevalent in the Design Guide, as are various treatments for bicycle boulevards and how to accommodate bicyclists are intersections.

WalkBikeNC recommends NCDOT endorse this design guide so that communities and NCDOT are comfortable with applying some of its concepts. Many communities across the country, including Charlotte, have already endorsed it.

MUTCD Updates. The Manual on Uniform Traffic Control Devices is updated periodically and the last update was in 2009. Previous updates occurred in 1988, 2000 and 2003, therefore another update is likely to occur prior to 2020. The growing trend for more inclusive bicycling facilities is likely to lead to incorporate more specific guidance on accommodating bicyclists and changes to some existing treatments.



Chapter
6



Bicyclist Safety &
Enforcement





Enforcement

A community wishing to accommodate the many different types of bicyclists should also approach enforcement in diverse ways to ensure all types of users are safe. Capturing the interest of a Police Department can be a difficult task as its day-to-day responsibilities are so multi-faceted that focusing on bicycle-related enforcement efforts, particularly those not involving specific crashes, is difficult given department priorities, budgetary limitations and personnel constraints.

This should not become a deterrent to bicyclists or advocacy groups as there are several other methods of effectively addressing enforcement, including directed efforts with local law enforcement agencies.

LAW ENFORCEMENT SUPPORT

Creating partnerships with local law enforcement agencies should start with building upon existing relationships in Black Mountain. The existing support from the Police Department illustrates the agency's commitment to having a safe community for bicycling. The Black Mountain Police Department provides support for organized rides and participates in walk/bike to school events.

This type of involvement with enforcement agencies should continue to be supported through events and identification of new partnerships to help with enforcement. One such partnership should be the inclusion of an officer to teach the specific module of bicycle rodeos or other education-based efforts, such as the League of American Bicyclists Traffic Skills 101 course.

Other methods to engage law enforcement include:

- Send officers to training on laws that affect bicycling and help law enforcement officials understand them from the perspective of the bicyclist.
- Encourage your local law enforcement trainers to take the League's classes on bicycling laws so they can in turn train the rest of the department officers.

- Work with your local departments explaining the importance in having all officers trained in this area.
- Encourage the use of bike patrol officers for the greenways and parks in the community and then future bike lanes.
- Request a police liaison for advisory/advocacy groups.

SAFE PASSING

BikeWalkNC, the statewide advocacy organization for active transportation, has published its summary of safe passing of bicyclists. They note that narrow two-lane state roads are important travel routes for commuting and recreational bicyclists. Many of these exist in and around Black Mountain.

When there is little or no shoulder and the travel lane is narrow, competent drivers recognize that there isn't room to pass the bicyclist within the lane, and so they wait until the oncoming lane is clear of traffic for an adequate distance before moving into the next lane to pass.

In many places where this occurs, a solid yellow centerline is striped to discourage passing of other motor vehicles. Traffic engineers place this striping where there is not adequate distance to safely pass a motor vehicle that is traveling near the maximum posted speed limit. But drivers often recognize that the distance required to pass a slow-moving bicyclist is a small fraction of this distance, and ignore the striping in favor of weighing the safety and convenience of passing under the existing conditions. Drivers routinely cross solid centerlines to pass bicyclists safely, and police routinely ignore this as long as the passing driver does not create a danger for oncoming traffic.

Police in NC are in a difficult situation and frequently turn to the laws that govern driving around disabled vehicles and fallen trees to justify not ticketing prudent drivers. In North Carolina, this is § 20-146 (a)(2):

§ 20-146. Drive on right side of highway; exceptions.

(a) Upon all highways of sufficient width a vehicle shall be driven upon the right half of the highway except as follows:

- (1) When overtaking and passing another vehicle proceeding in the same direction under the rules governing such movement;
- (2) When an obstruction exists making it necessary to drive to the left of the center of the highway; provided, any person so doing shall yield the right-of-way to all vehicles traveling in the proper direction upon the unobstructed portion of the highway within such distance as to constitute an immediate hazard....

N.C. Highway Patrol 1st Sgt. Brian Gilbreath provided the following explanation quoted in the 8/19/2014 Asheville Citizen-Times:

“As long as you don’t affect the movement of oncoming traffic — that’s where common sense comes in—you’re allowed to go left of center to avoid hazards and obstructions in the roadways,” Gilbreath said. “Take for example if a farmer drops a bale of hay in the roadway, and you need to go around it. Even though you’re left of center, you have not violated the law. [...] An officer would have a hard time convincing a judge that you’re supposed to ride behind a bicyclist for 10-15 miles...”

Black Mountain law enforcement and other town officials should consider these issues when evaluating bicyclist safety and actions by motorists.

SIGNAGE

While partnerships are pursued with law enforcement agencies, advocates and municipalities can work with NCDOT and others to provide an effective enforcement component—signage in the public and private realm.

The most common method of signage-related enforcement is traffic signs along key corridors that promote good behavior by motorists and bicyclists. There are several types of signage that can be installed along roads and streets to highlight the presence of bicyclists or the designation of a bicycle route.

Most signs for this type of enforcement are contained in the Manual on Uniform Traffic Control Devices (MUTCD), which is a document developed at the Federal level to ensure consistent implementation of traffic control devices, such as signage, across the United States. NCDOT relies on this publication, updated in

Figure 35—Special signs help highlight the presence of bicyclists
 (Left: Special route signage for bikeways in Phoenix, Arizona. Center: Signs installed during construction for bicyclists in Boise, Idaho. Right: Special “Shared Route” imagery signs in with Share the Road signs in Moncton, New Brunswick, Canada.)



Figure 34—Common signs for bicyclists identified in the Manual on Uniform Traffic Control Devices

(MUTCD, Alpha-numeric titles in parentheses denote MUTCD reference number. 2009)
 Note: In general the type of signs installed are determined by a design engineer or other DOT official. These are appropriate for many projects identified in this plan, but should be selected when specific discussions occur.



2009, as a guide for their implementation methods. Signs included in MUTCD for bicycle-related enforcement are shown in Figure 34.

Signage does not have to be constrained to the types identified in MUTCD, as many communities have recognized that these signs are intended to be universal and utilitarian. Therefore, some communities supplement these signs with other specialized signs. Figure 35 (previous page) shows three such efforts—the designation of the Sonoran Bikeway in Phoenix, Arizona; construction signs in Boise, Idaho; and the use of special Shared Route signs to supplement Share the Road signs in Moncton, New Brunswick, Canada. Each of these signs showcases the presence of other users along the street and serves as a more artistic enforcement method in combination with regulatory signs.

TRAFFIC ENFORCEMENT

Many communities rely on a traffic enforcement unit of the local police department to conduct periodic ticketing and speed enforcement efforts on problem streets. Motor vehicle speeding, failure to yield to young bicyclists or pedestrians in a crosswalk, and rolling stops are often targets of traffic enforcement.

Because of the expense involved and staffing resources needed to conduct traffic enforcement, it is often used as a follow-up activity to educational and encouragement efforts, and/or as a last resort for addressing a problem location or issue. Other, effective passive enforcement options include active speed monitor signs and speed trailers that indicate the driver's speed as they pass.



Suggesting broad-reaching traffic enforcement efforts would be difficult for law enforcement agencies to process and adequately devote resources.

They simply can't cover every geographic area of a town or county with their resources, which is why advocacy groups and others can identify areas of the community where they receive the most complaints or data suggests there may be issues in the interaction of vehicular traffic and bicyclist traffic.

In identifying problem areas, it is much easier for law enforcement officials to focus traffic stings or install speed monitors in those locations.

HELMET USE

In North Carolina, children under the age of 16 are required to wear a helmet when riding a bicycle. The Town of Black Mountain requires all bicyclists to wear a helmet when riding in public spaces. This requirement is not a focus of most law enforcement efforts and many families simply do not have access to or cannot afford a helmet to comply with this law.

The enforcement of helmet laws can be conducted through passive enforcement campaigns and educational forums such as bicycle rodeos and Traffic Skills 101 courses. Blue Ridge Bicycle Club requires a helmet for those participating in its sanctioned rides. Along with its partners, municipal governments and law enforcement agencies, the Town may pursue grants or budget town funds to purchase helmets as giveaways for both children and adults.

AWARENESS OF CONTRIBUTORY NEGLIGENCE LAWS

North Carolina is one of only a few states with a contributory negligence law that can greatly impact the bicyclist's ability to receive compensation in the event of crash where the motorist is seen as at fault. Other states may require contribution, such as if the crash is 20% the fault of the bicyclist, then they get 80% of the judgment, otherwise known as comparative fault.

This approach to legal remedy has far-reaching consequences for bicyclists in North Carolina. A bicyclist struck by a drunk driver would have a much lower chance of receiving compensation for his or her injuries under the state's pure Contributory Negligence law, which bars the cyclist's recovery of damages if his or her fault is even 10%.

Although juries do tend to award zero negligence in cases where the plaintiff's role was slight in order to avoid this decision and provide some compensation, lawyers will frequently turn down tort liability cases where they believe that a protracted legal battle will provide no compensation to them or their clients.

The effect of this law generates some compelling personal stories that have to be weighed against an uncertain impact on economic situations. This included a cyclist that was hit from a behind by a speeding van and suffered eight months of recuperation from a broken pelvis and other injuries; a police report very favorable to the driver did not support the cyclist attempting to receive payment to cover her medical costs.

One of the issues that this law potentially raises is the perception that riding in the street is disproportionately dangerous; that bicyclists are simply “asking for it” when they ride as they should – with traffic and obeying all the laws.

Until a time when North Carolina’s laws are changed, it is vital for bicyclists to work with and educate law enforcement officials on the perspective of the bicyclist and what it means to be a bicyclist in and around Black Mountain.

CRASH DATA

Bicyclist Crashes

NCDOT records indicate eight bicyclist crashes in Black Mountain in a six-year period from 2007 through 2012, which is the latest available data. These crash locations are shown in Figure 37 and Figure 38. It is difficult to draw decisive conclusions from this data due to the small number of records and because there is no clustering of crashes. Some basic statistics from this data include:

- All 8 resulted in some type of injury to the bicyclist.
- 5 were at non-intersection locations.
- 5 were in situations where the bicyclist was in a travel lane.
- 4 were bicyclists age 11 to 15 while 2 were age 16-19.

Fortunately, there is a small dataset, no fatalities, and no recorded disabling injuries.

While there were only eight recorded crashes, there is data in Buncombe County that suggests that bicyclist crashes are underreported by a factor of 10. NCDOT crash data for Buncombe County from the agency’s annual Crash Facts report indicates an average of 20 bicyclist crashes per year across the county (2009-2013 5-year average from NCDOT’s 2013 North Carolina Traffic Crash Facts report).

Emergency Room admission data for Buncombe County (for the year starting in August 1, 2013 and ending July 31, 2014) indicated there were 226 bicyclist crashes across the county. Based on this data, there were 13 bicyclists admitted

to the ER that listed a Black Mountain zip code of residence. This seems to suggest the same rate of underreporting for Black Mountain as with the rest of the county. There were eight from the Swannanoa zip code.

Why is there such a discrepancy? Simply put, not all bicyclist crashes are reported or result in law enforcement filing a crash report. Many bicyclist crashes would be categorized as “single vehicle” crashes. If a person is driving a car, runs it into a ditch, and goes to the hospital, there is probably going to be a crash report filed through law enforcement and this is picked up through DOT’s data sources. When a bicyclist crashes into a ditch and goes to the hospital there is not the same likelihood that a crash will be filed. The bicyclist will probably find their own way to get to the hospital, but the crash of a bicycle in a single-vehicle crash is not going to result in the same crash reporting process or protocols as a single-vehicle motor vehicle crash.

The crash location data contained in Figure 36 and 37 show the locations and key information contained in the crash report. As noted, it is difficult to draw conclusions from a small dataset, which is why online input was sought for this plan to better understand where bicyclists feel there is a safety concern.



Figure 36—NCDOT Crash Bicycle Data (see Figure 37 For Crash Locations)

ID	Road	Crash Year	Crash Type	Crash Location	Bicyclists Position	Bicyclists Direction	Bicyclists Injury	Ambulance Response	Driver Estimated Speed (MPH)	Speed Limit (MPH)	Hit and Run?	Cyclist Age Group	Driver Age Group
1	NC 9	2008	Multiple Threat- Midblock	Non-Intersection	Unknown	Unknown	Possible Injury	Yes	6-10	20- 25	No	11 to 15	30-39
2	Vance St	2009	Unknown Approach Paths	Non-Intersection	Driveway Crossing	Not Applicable	Evident Injury	No	Unknown	30- 35	Yes	16 to 19	40-49
3	Portmanvilla Rd	2007	Bicyclist Lost Control- Other / Unknown	Non-Intersection	Travel Lane	With Traffic	Evident Injury	No	Unknown	20- 25	No	11 to 15	Unknown
4	US 70	2009	Motorist Overtaking- Other / Unknown	Non-Intersection	Travel Lane	With Traffic	Evident Injury	Yes	41-45	40- 45	No	50 to 59	50-59
5	Old US 70	2009	Non-Roadway	Non-Roadway	Travel Lane	Not Applicable	Evident Injury	Yes	Unknown	Unknown	No	16 to 19	25-29
6	Cornerstone Way	2007	Bicyclist Ride Through- Sign-Controlled Intersection	Intersection	Travel Lane	Facing Traffic	Evident Injury	No	16-20	Unknown	No	11 to 15	0-19
7	Yates Ave	2007	Bicyclist Ride Out- Residential Driveway	Non-Intersection	Driveway / Alley	Not Applicable	Evident Injury	Yes	26-30	30- 35	No	11 to 15	40-49
8	Burning Tree Ct	2007	Bicyclist Turning Error- Left Turn	Intersection-Related	Travel Lane	Unknown	Evident Injury	No	16-20	Unknown	No	6 to 10	40-49

Figure 37— Bicyclist Crash Locations

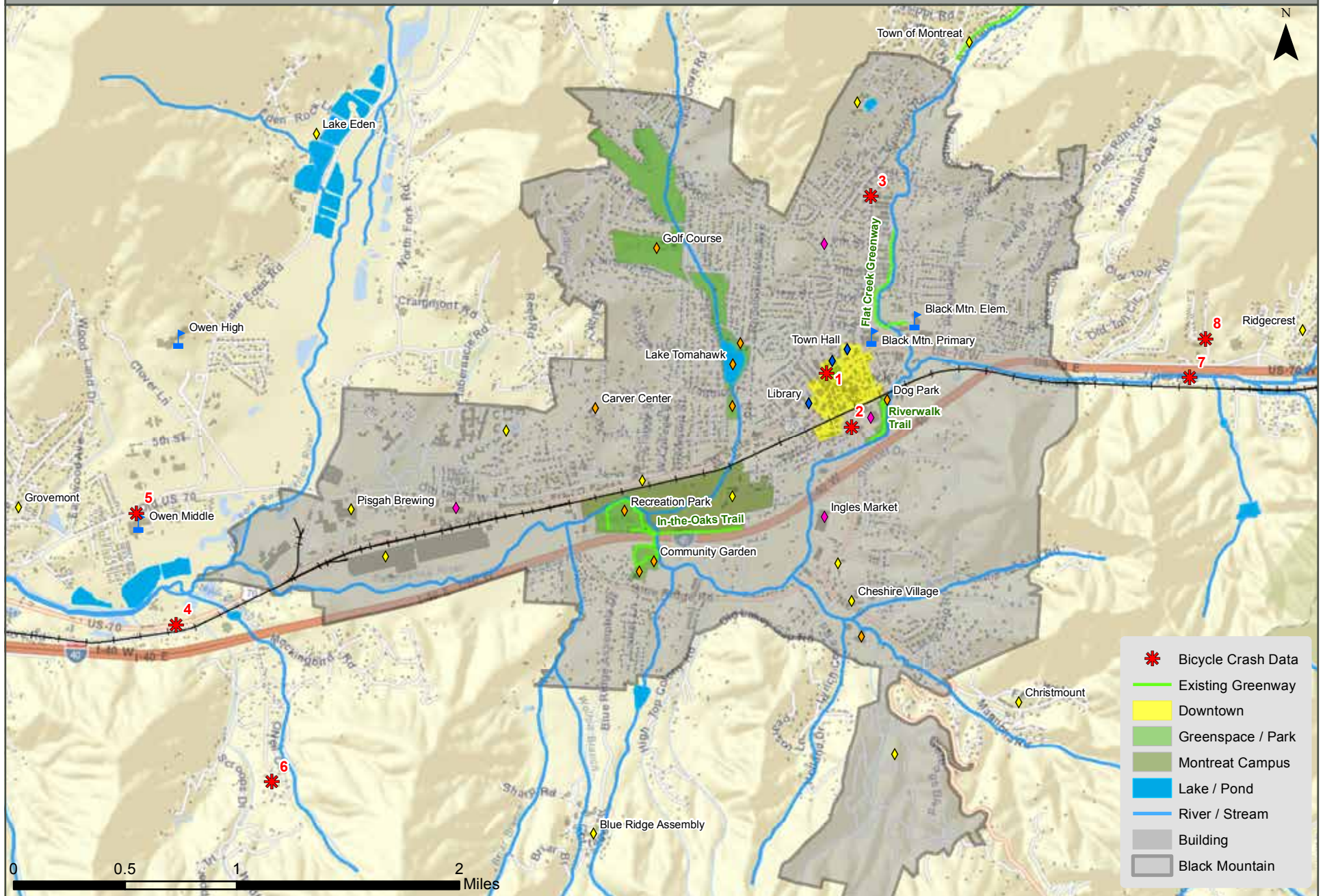
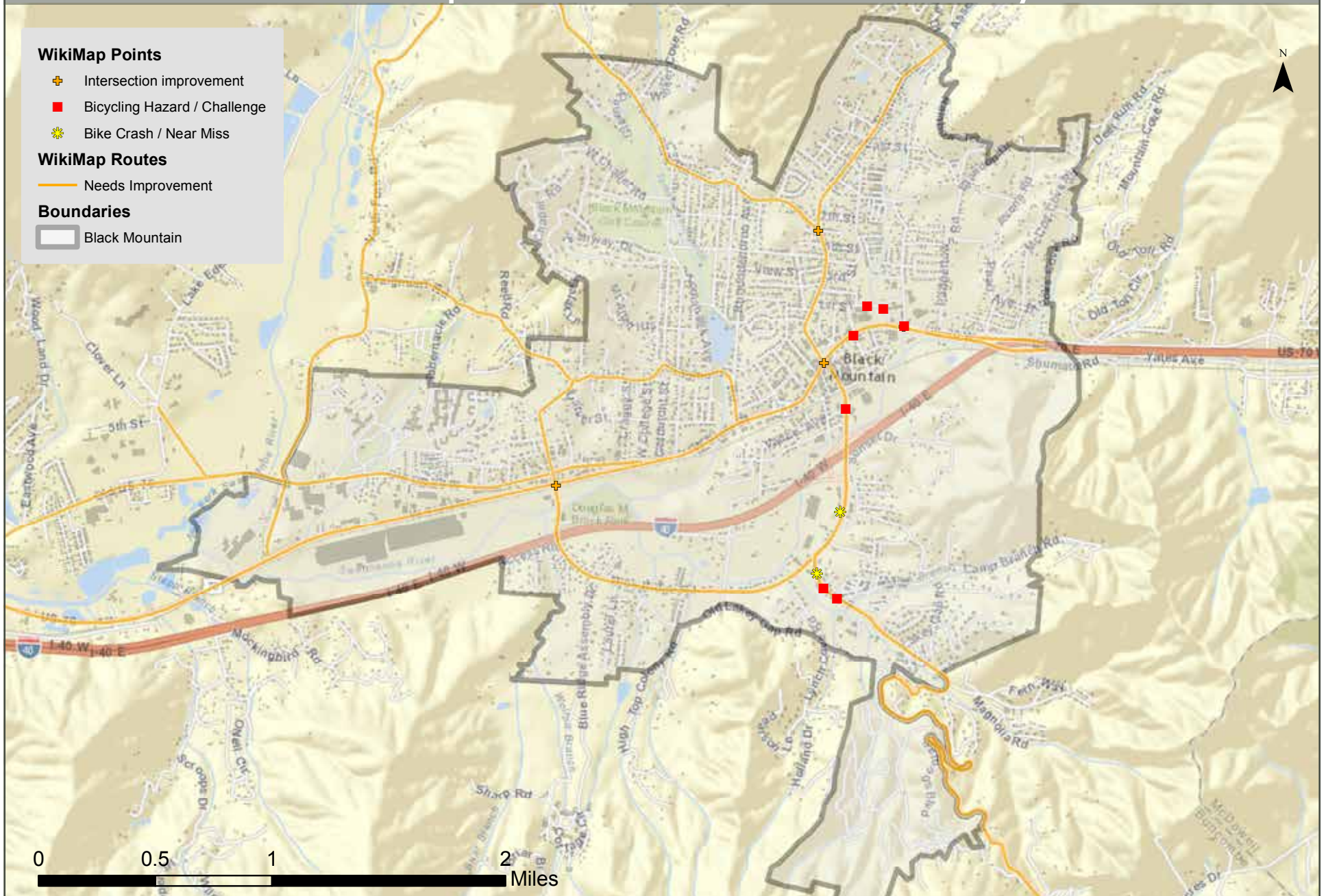


Figure 38— WikiMap Public Comments on Safety







ENCOURAGEMENT & EDUCATION

The type of educational and encouragement programs that should be offered to residents and visitors of Black Mountain can vary greatly by the intended audience, notably the ages and abilities of the bicyclists. The role education and encouragement plays in a safe bicycling community is critical in that it creates a sense of awareness among all users of on-street and off-road facilities of all ages and abilities.

Reaching out to adults helps build behavior patterns that can translate to children becoming more aware of bicycling. Teaching children also helps to develop safer drivers in the future and can serve as a motivating influence on parents.

The recommendations in this chapter are organized by user type based on age groups and type of bicyclist to help Black Mountain and its partners orient efforts to the appropriate rider type.

They are based on ideas and recommendations available as of 2015. It is important to note that resources provided by the NCDOT Bicycle and Pedestrian Transportation Division, the state’s Active Routes to School program, the League of American Bicyclists, the Safe Routes to Schools National Partnership, the National Highway Traffic Safety Administration (NHTSA), BikeWalk NC and others are constantly evolving. Online tools will serve as a better long-term source for education and encouragement efforts. This is why these recommendations are succinct.

Black Mountain should work to engage other local and regional groups to implement these programs, as not all are suited for municipal leadership. Groups such as the Blue Ridge Bicycle Club, the Buncombe Bicycle Education Network, regional health organizations, local businesses, event organizers, Friends of Connect Buncombe, Buncombe County and nearby municipalities can help implement these programs.

Figure 39 shows which programs are most appropriate for different bicyclists, based on four categories of attitudes toward bicycling. Programs geared toward motorists are included in the “No Way, No How” category. Messaging and promotion can be tailored toward these groups and any impact on less-influenced groups is always a positive thing.

Figure 39—Programs for Bicyclists

Strategies	Strong & Fearless	Enthused & Confident	Interested but Concerned	No Way, No How
Encouragement				
Safe Routes to School Programs		✓	✓	✓
Themed & Fundraising Rides	✓	✓	✓	
Kidical Mass Ride		✓	✓	
Bike Fairies			✓	✓
Ciclovia or Streets Alive!	✓	✓	✓	✓
Healthy Living Initiative		✓	✓	✓
Bike to Work Day		✓	✓	
Bike/Walk to School Days		✓	✓	✓
Active Routes to School Programs		✓	✓	✓
Bike Corrals		✓	✓	
Education				
Motorist Education	✓	✓	✓	✓
Watch for Me NC	✓	✓	✓	✓
Let’s Go NC!			✓	
League Cycling Instructor Courses		✓	✓	
Bicycle Wayfinding & Route Maps		✓	✓	✓

ENCOURAGEMENT

Developing encouragement programs to complement educational efforts and engineering investments helps promote usage of the system and makes people feel safer when they decide to try bicycling. Making it easy and fun to ride for transportation can increase bicycle mode share. Blue Ridge Bicycle Club, the Buncombe Bicycle Education Network and Black Mountain Elementary School have already established a track record for encouragement activities, most notably through organized weekly rides and Safe Routes to School events.

Building upon these encouragement programs is critical to building awareness of bicycling. Encouragement efforts can also provide a highly visible outreach mechanism to showcase the accomplishments of Black Mountain, the County and local advocates as they pursue more long-range facilities investments.

This section outlines some major encouragement programs and recommendations. Note that many recommendations also include a pedestrian element as many programs are designed to promote active living through bicycling and walking, which are combined on greenways.



SAFE ROUTES TO SCHOOL

In 1969 about half of all students walked or bicycled to school. Today, however, more than half of all children arrive at school in private automobiles and only 15 percent of school trips are made by walking or bicycling. Black Mountain has a Safe Routes to School program and has utilized federal funds to build sidewalks for to help promote more walking and bicycling to school.

Designed to address these dramatic statistics, the Safe Routes to School Program was organized to create and promote safe walking and

bicycling in order to improve safety near schools, promote active lifestyles, and reduce pollution and congestion caused by school traffic during arrival and departure times.

These programs can help engage children in safe walking behaviors and encourage more bicycling and healthier lifestyles. Common steps to creating a successful program are to kick-off with an event on International Walk-to-School Day, then subsequently work with PTA members, teachers and students to identify needs and program ideas while incorporating encouragement measures and education into the school curriculum for students to learn safe walking and bicycling skills and the benefits of an active lifestyle.

The Safe Routes to School program at Black Mountain Elementary School is already a strong program that encourages students to walk or bike to school. The advancement of the area's greenway network can only serve to strengthen this program, along with proper education and enforcement efforts.

THEMED & FUNDRAISING RIDES

The concept of organizing themed rides can be a fun experience and add to the comfort factor of riding bicycles. Options for Black Mountain and the area include organizing some type of bicycle-based history or culinary tour. This could be organized in cooperation with restaurants throughout the area who offer bite size samples of their food in exchange for a small promotional fee.

Similar rides to coffee shops or other popular destinations could be incorporated into the ride. Holding group rides where participants dress in costumes or celebrate special days such as St. Patrick's Day or Halloween can develop group camaraderie and encourage riders to enjoy the spirit of riding. Given the history of the area, a special ride devoted to touring and learning about places of historical significance would be another option.

Encouragement strategies generate excitement about walking and bicycling, whether it's for recreation, transportation or safely to school. They promote walking and bicycling through activities, program, contests and incentives. Encouragement strategies can often be started relatively easily with little cost and a focus on fun.

KIDICAL MASS RIDE

The concept of a Kidical Mass ride arose in Oregon in 2008 as a way to provide a legal and safe experience for kids to have fun while riding their bicycles in their community and promoting the idea that “kids are traffic, too!” These family-oriented rides are intended to be a short ride from a common community space such as a school or park to a fun destination such as an ice cream shop, pool or a special event.

The most notable Kidical Mass effort in North Carolina is in Carrboro (pop. 20,000) where they’ve had more than 300 participants in rides the past several years. The ride starts at the Elementary School and in 2014 the local bike coalition gave away kids bicycles as part of an event raffle.

BIKE FAIRIES

Another innovation practiced in Carrboro is a bike fairies program that focuses on alleviating the degree of negativity between motorists and bicyclists. Local bike coalition members look out for motorists and bicyclists doing the right thing while in traffic and reward them with gift cards from local businesses.

Other communities integrate the bike fairies theme into encouragement programs at schools to reward kids who frequently bike or ride scooters

to school. Raffle tickets are placed on the bikes and scooters and there are drawings for helmets, locks, tune-ups and gift certificates to local fun places for kids (e.g. skating rink, Fun Depot).

CICLOVIA OR OPEN STREETS

Black Mountain seems ripe for a Ciclovía or Open Street event. Ciclovía translates to “bike path” in Spanish and the events by this name involve the temporary closure of streets to automobile to provide safe space for walking, bicycling and other social events. According to Project for Public Spaces, there are 46 Ciclovía events throughout the United States.

Communities use them to celebrate active transportation or provide a very visible demonstration for projects or concepts that are planned. For example, “pop-up bike lanes” or “pop-up cycle tracks” are a common feature at these events. Using temporary materials such as spray chalk, hay bales and cones, towns can show citizens and businesses what the facilities look like. Black Mountain could close a side street downtown on a weekend to have this type of festival and showcase potential improvements for walking and bicycling. It could promote bicycling during a shoulder season weekend to build business support. For more information visit www.openstreetsproject.org

HEALTHY LIVING INITIATIVE

One of the major characteristics of a bicycle-friendly community is to have a body of citizens, municipal staff and elected leaders who are engaged in and educated about the economic, health, and general quality of life benefits of a bicycle-friendly community.

Additionally, educational activities could be held at the Carver Center or Town Square such as presentations on pedestrian- and bicycle-friendliness to learn about the projects, programs, and policies that can encourage a more bicycle- and pedestrian-friendly city. Several organizations, such as the National Center for Bicycling and Walking (www.bikewalk.org), Walkable Communities, Inc., and Complete Streets (www.completestreets.org), provide resources such as speakers, handouts, guides, and publications, which can be used for the education and encouragement component



of the event. Local businesses might be asked to encourage employee participation in workplace walking clubs and events, along with the promotion of a local walking route.

This program could also be promoted in local schools, health centers and at City/County events. A “Fitness Challenge” event and/or regular senior cycling/walking program could also be incorporated.

BIKE TO WORK DAY

Bike month is each May and National Bike to Work Day is usually held the 3rd Friday of May. The League of American Bicyclists has a packet to assist in starting a bike to work event and businesses can have a workplace challenge for bike commuters. This can be accessed through their web site www.bikeleague.org.

Encouragement programs can build locally separate from the national events. Some local contests in North Carolina provide awards like the Golden Sneaker (for walkers), Golden Spoke (for bicyclists) and Golden Wheel (for carpoolers and bus riders) who choose non-single occupancy vehicle rides. Programming usually includes breakfast stations with free coffee and treats on the specific day and education classes to give people more confidence to try a new travel mode that day. Some communities have awards for the most creative commute and most decorated bicycle.

BIKE AND WALK TO SCHOOL DAYS

October is International Walk & Bike to School Month. The premise of this program is to encourage children to walk and bike to school as a way to increase physical activity, help children develop an understanding of their environment and to become more healthy and independent. When it is safe to walk and bike to school this is an encouragement program; when it is not already safe it is important to hold a safety workshop and audit with a variety of community leaders, school officials and parents to develop an understanding of the needs, concerns, challenges and opportunities to make it safe. Bike to School Day is in May of each year and Walk to School Day is in October.

WORK WITH ACTIVE ROUTES TO SCHOOL

NCDOT organized the Active Routes to School program with public health partners to coordinate and train professionals that can assist with active routes to school events. The encouragement programs for the children once the facilities are in and around the school. These programs develop enthusiasm and encouragement for the kids and they want to participate.

BIKE CORRALS

Valet parking through bike corrals (large, designated bicycle parking areas) at community festivals is a way to develop secure parking, education about your programs, and provide a way to get feedback from the general public. It also adds a fun element to the festival. Besides providing the service, this allows an opportunity to educate the public about your programs and collect email addresses. Make colorful posters and have them laminated for durability. It is also important to document how many bikes are parking each time this service is provided and how many volunteers have worked, including their hours.

DOCUMENTATION

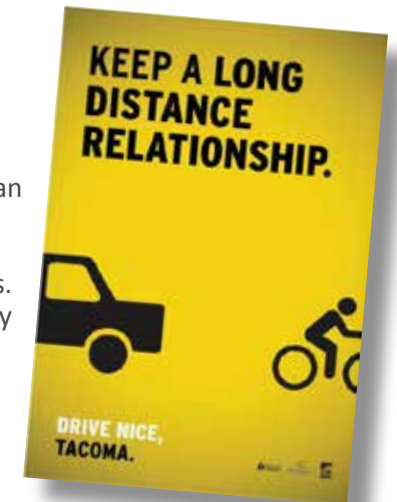
An important component of any of these programs is documenting how many people are served through them. Tallying comments as to why people participate, what works and what doesn't are all important to expand bicycle-related encouragement programs. Knowing how groups and individuals achieve their goals helps understand the community from a bicycling perspective and can help groups like Blue Ridge Bicycle Club and other partners determine how effective it has been. Documentation also helps with future funding pursuits as many communities do not document their progress. The Town can work with the Bicycle Club and agencies by the French Broad River MPO to document these outcomes.

EDUCATION

Education programs are primarily aimed at promoting safe driving, bicycling and walking habits. Educational examples include pedestrian and bicycle safety workshops, personal safety training and brochures advising parents on correct pick-up/drop-off procedures at schools. Educational programs are most effective if they are ongoing, rather than a one-time event.

MOTORISTS

It is almost impossible to change the behaviors of motor vehicle drivers once they have been behind the wheel for a few years. Even in the most advanced bicycling cultures in the United States, there is a still a challenge posed to bicyclists by motorists who feel that they are more entitled to the roadway than other users.



The increased use of mobile phones for purposes other than making phone calls has created a new set of problems for bicyclists. North Carolina banned texting while driving in 2009 but it remains a problem and a concern for bicyclists.

The most influential way to have an impact is to reach new drivers through driver's education classes. The present driver's education programs do not spend much time on bicycle and pedestrian safety or how to maneuver a car with other roadway users. Many of the driver education teachers in North Carolina are under contract through an independent company and not the Department of Education or Department of Transportation.

Involvement from the law enforcement community can also contribute to advanced education of motorists and bicyclists. Involving law enforcement officers in Traffic Skills 101 courses to review applicable traffic laws and teach participants of nuances in North Carolina laws can be more effective than an instructor simply reciting state code.

WATCH FOR ME NC

Watch for Me NC is a program, developed by NCDOT and deployed partnership with local communities, aimed at reducing the number of pedestrians and bicyclists hit and injured in crashes with vehicles. According to NCDOT, Watch for Me NC involves two key elements:

- Safety and educational messages directed toward drivers, pedestrians and bicyclists, and
- Enforcement efforts by area police to crack down on some of the violations of traffic safety laws.

Local programs are typically led by municipal, county, or regional government staff with the involvement of many others, including pedestrian and bicycle advocates, city planners, law enforcement agencies, engineers, public health professionals, elected officials, and others. NCDOT piloted the program in Wake, Durham, and Orange counties (Triangle Area) in 2012. In 2014 and 2015, communities were asked to apply for Watch for Me NC funding to become partner communities, including nearby Asheville and Marion. Any community is allowed to use the materials developed for the program, which are available at www.watchformenc.org.

LET'S GO NC!

The Let's Go NC program is an educational curriculum intended for school-age children to teach them how to walk and bike safely. The program is intended to give children essential skills they need to enjoy a healthy and active lifestyle.

Let's Go NC! A Pedestrian and Bicycle Safety Skills Program for Healthy, Active Children provides teachers, parents and PTAs an all-in-one package of lesson plans, materials, activities and instructional videos that encourages children to learn about and practice fundamental skills that build safe habits.

This program, developed for NCDOT's Division of Bicycle and Pedestrian Transportation Division and Safe Routes to School Program by NC State University, is a free program with materials and videos available online.

LEAGUE CYCLING INSTRUCTORS (LCI)

The cycling community in Black Mountain and Buncombe County should consider development of a bicycle education program for children and adults that is similar to programs already in place in places like Buncombe County, NC. For example, there are 10 individuals in Buncombe County certified by the League to teach bicycle training courses. Having individuals with this certification gives a community many advantages, the first being a first-rate curriculum from the League of American Bicyclists that has been tested across the United States and provides materials that are age appropriate.



Another important component of this certification is insurance coverage provided to LCIs through the League. Participants in traffic skills classes and parents whose children are taking part in a bicycle rodeo are concerned about safety during the event and organizers are concerned about liability.

BICYCLE WAYFINDING SYSTEMS AND ROUTE MAPS

More and more communities are using pedestrian and bicycle wayfinding systems to provide visitors and residents with directional and distance information to major landmarks, parks and other local attractions. Given Black Mountain's attractions, cultural destinations and parks, a similar system would be very useful.

Depending on the distances between attractions, it is advisable to combine bicycle and pedestrian wayfinding systems, recognizing that some bicycle-based destinations may only be accessed from on-street routes and may then have to be combined with auto-oriented wayfinding.

Bicycle and pedestrian wayfinding signs should be at a height of at least 7 feet, with a font and orientation appropriate for viewing by those traveling at the speed of a pedestrian or bicyclist. Distance information should be provided in blocks or miles and kiosks with a map can be useful for visitors. Such a system could incorporate local themes, allowing area artists an opportunity to design sign templates. Opportunities for private-public partnerships exist, such as working with area retailers or B&B's along the route to sponsor signage and/or complementary brochures in exchange for a mention in the guide.

BY AGE GROUP

Young Children. It is important that any educational program takes into consideration the cognitive ability of children as young children are unable to determine the speed of a vehicle. Children below the age of eight operate their bicycles on sidewalks, greenways or on low volume streets, therefore their actions are most similar to those of pedestrians. They do not always understand how to determine when or where it is safe to cross the roadway and their height is such that motorists may not see them until it is too late.

Children younger than 3rd grade age are best served learning to always dismount their bike and hold hands with an adult to cross the road. The most common crashes involving young children occur because they dart out into the roadway without looking. This usually happens because they are concentrating on an object they have an interest in, such as a dog. Children of this age may not think they are entering a roadway and don't sense or understand the dangers.

Learning to come to the edge of the roadway, then stop and look about before entering the road is a very important lesson. Young children need to learn where to safely bike and walk along a road as well as how to share the sidewalk with others.

When dealing with bike skills the target should be on awareness that driveways are where cars travel. They need to stop and look both ways for cars entering and exiting the drive before proceeding.

Educational methods to target children of this age group include:

- Joint parent/child programs to teach proper skills;
- Instructional videos, such as Willie Whistle, which is available from the National Highway Traffic Safety Administration (NHTSA);
- Participation in Safe Routes to Schools programs such as bicycle trains and walking school buses;
- Coloring books designed specifically for bicycle education of young riders; and
- How-to booklets on proper bicycling sizing and learning to ride on two wheels.



Third Grade through Fifth Grade Children. By the time children are in third, fourth, or fifth grade, their cognitive skills have developed to where they can begin to determine when it is safe to dismount their bicycle and cross the street without holding an adult's hand. This age group still needs to be reminded about looking both ways as there is still a tendency to dart into the roadway. This occurs because they assume that it is safe to enter the street because the first person in the group made it through. They forget to look for themselves.

Children of this age who are self-taught or have spent most of their time riding in their driveway or on residential streets are more likely to ride facing traffic; either because their parents told them to do so or they confuse the walking against traffic rule with the bicycle rules that specify riding with the flow of traffic. Parents and children falsely believe if they see the cars eye-to-eye they can get out of the way to avoid a crash; however, the motorist has no time to wait until it is clear to pass them and must react more quickly. This is the key message for children of this age as they can now begin to judge speed and understand dangers before they occur.

Children at this age should begin making judgment as to the proper way to maneuver on the street. Therefore, this is the age where they should be learning hand signals, bike handling skills such as starting and stopping under control and making turns. Children at this age can be perfecting their balance and avoiding hazards. Riding a bike on a quiet road with a parent is acceptable and a parent may want to begin talking with this child about what they are doing and observing while driving to begin the understanding of cause and affect and how traffic rules are applied.

Educational methods to target children of this age group should include:

- Riding skills as taught as part of the educational curriculum in elementary schools;
- Bicycle rodeos at the schools or as part of special events;
- More advanced videos, such as "Ride Smart: It's Time to Start", available through NHTSA; and
- Participation in Safe Routes to Schools programs such as Bicycle Trains and Walking School Buses.

Middle School Age Children. By the time a child has reached middle school age the parent should be taking advantage when driving with the kids in the car and talk about what they are doing while driving, what they see as problems that could occur on the road and what decisions they are making. This provides children with a foundation for understanding the rules of the road, share the road concepts and how to handle various situations.

Children are great observers of their parent's behavior. This age is when kids begin to think about doing things on their own; they crave independence and are willing to travel anywhere and everywhere they can on their bicycle. With that, they need good judgment and the experience to understand how their behavior and what they do will affect what happens on the road. This is also when kids become more courageous about riding at night or at dusk, which necessitates lights, reflectors, and reflective clothing for safety.

They need experiences in a safe environment to practice their skills and to perfect them as they build upon skills learned at the elementary school level and increased cognitive abilities to make judgments about potentially hazardous situations. Specific on-road skills such as signaling before turns and gazing behind you before turning, while practicing on a simulated streetscape, along with opportunities to interact with other types of traffic, will give them more experience so they can be safe. It will also prepare them for being good drivers who know how to interact safely on the street.

At this stage, specific educational opportunities should include:

- Full-length bicycle rodeos;
- Reading and writing assignments related to bicycle safety;
- Poster contests;
- Use of more advanced instructional videos such as "Bike Safe. Bike Smart.";
- Traffic Skills 101 courses with adults or parents for more advanced or experienced riders; and
- After school riding clubs.

Education for Adults. Once children have progressed beyond middle school age, they can be included in many adult-specific educational and outreach modules. Most adult bicyclists have not had any training in appropriate riding behaviors, even though most have had driver's education training and possess a driver's license.

Providing training for adults is important because their fears often keep them from trying to use a bicycle for transportation or recreation. The most common behaviors for adults are riding too close to the road edge, not being predictable, or not letting others know their intentions. Some adults still adhere to the “ride against traffic” dictum from their childhood. They may also be riding on sidewalks or not watching where they are going when operating in mixed traffic or along a greenway.

The most direct method of adult education is the Traffic Skills 101 course developed by the League of American Bicyclists. The course, along with associated Traffic Skills 201 and Commuter Skills courses, are taught by certified League Cycling Instructors to give adults the skills and confidence needed to ride comfortably in traffic.

Offering these classes should be part of any total education program. Courses typically last six hours and include classroom discussion, parking lot skills and a short ride on the road. Discussions include how the rules of the road apply to bicyclists, how and where to ride in specific traffic situations, how to be predictable and skill practice in avoiding collisions. There is also a video developed by the League of American Bicyclists for adults and it is available through the League or a NHTSA video “Bicycle Safety Tips for Adults.”

Other adult-specific educational programs should include:

- Organized rides for novice riders, such as those provided by Velo Girl and the Blue Ridge Bicycle Club;
- Integration of bicycle-related questions on driver’s license exams;
- Take-home handouts to children who participate in bicycle rodeos or other programs;
- Parent-specific outreach while their children are participating in bicycle rodeos;
- “Silver Wheels” programs to encourage older adults to ride their bicycles;
- Educational outreach with law enforcement officials;
- Outreach at community events such as downtown or music festivals; and
- Promotion of safe riding skills through materials distributed as part of organized rides or special event rides, such as the Cycle to Farm ride.

DOCUMENTATION

Documenting the education and encouragement work done by the Town and its partners will help improve programming, justify future funding and assist in grant applications, and provide a barometer by which progress is made in creating a bicycling culture in Black Mountain and Buncombe County. Simply documenting the number of children and adults engaged in these educational programs also provides government staff and elected officials with justification for continued support throughout the community.

It is also important to develop pre- and post-tests when conducting classes in the public schools to help gauge student retention and improve the program. Test questions need to be the same to determine what has been learned as well as asking what the children remember from the class. It is also important to document how many children and what age children are involved with educational programs. This information is also essential when applying for Bicycle Friendly Community status through the League of American Bicyclists.



Chapter 8



Health Impacts of Bicycling





Health Impacts of Bicycling

A health assessment was conducted as part of the plan to determine potential health-related outcomes—both positive and negative—of increasing investment and promotion in active transportation facilities.

A community must create an environment where people feel safe enjoying those modes for recreation and transportation in order to encourage healthy living through bicycling and walking. Bicyclists will choose whether or not to take a trip by bike based on the worst segment or worst conditions they have to overcome. An uncomfortable segment of a ride as short as a few hundred yards can be a deterrent to the “interested but concerned” riders that are the primary emphasis for promoting increased bicycling.

Motorist also have a major influence. Drivers are not always accustomed to driving through areas with significant bicyclist and pedestrian traffic in combination with more vehicular turning movements and other distractions. Drivers passing through Black Mountain or its neighborhoods may see the presence of bicyclists and/or pedestrian traffic as an inconvenience.

Buncombe County’s 2014 State of the County Health report (SOTCH) identified Healthy Living as one of the county’s top 4 health priorities. This included a goal to “Increase daily physical activity through policy and environment changes to support active transportation.” The first strategy is Complete Streets, specifically organizational environments and community support for active transportation. Black Mountain’s Complete Streets policy was cited as a highlight of this goal.

“NCDOT may have opportunities to support positive health outcomes by considering public health implications in our decision-making across all transportation modes, programs, policies, projects, and services, and through all stages of the life of a transportation project from planning to project development, construction, operations, and maintenance.”

- NCDOT’s Transportation & Public Health Policy, adopted 2012

Black Mountain Health Conditions

Specific health data for Black Mountain is available through mapping conducted by the North Carolina State Center for Health Statistics (SCHS), which tracks heart disease mortality rates, stroke mortality rates and lung/bronchus incidence rates at the Census tract level. By combining these factors with other Census data related to race, income and access to healthcare (also known as social determinants of health) we can compare Black Mountain to other nearby geographies such as Swannanoa and Ridgecrest to better understand health conditions.

The Health Impact Assessment conducted as part of the Buncombe County Greenways & Trails Master Plan (2012) categorized Census tracts across the county based on these datasets (Figure 40). Black Mountain is located within tracts 31.02, 31.03 and 31.04.

Figure 40—Buncombe County Greenways & Trails Plan: Health Impact Assessment

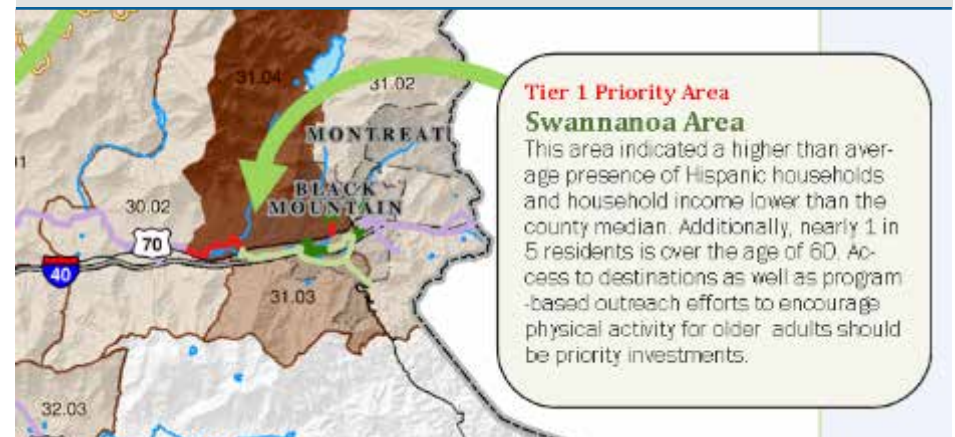


Figure 41—Prevalence of Obesity in Buncombe County (CHA 2012)

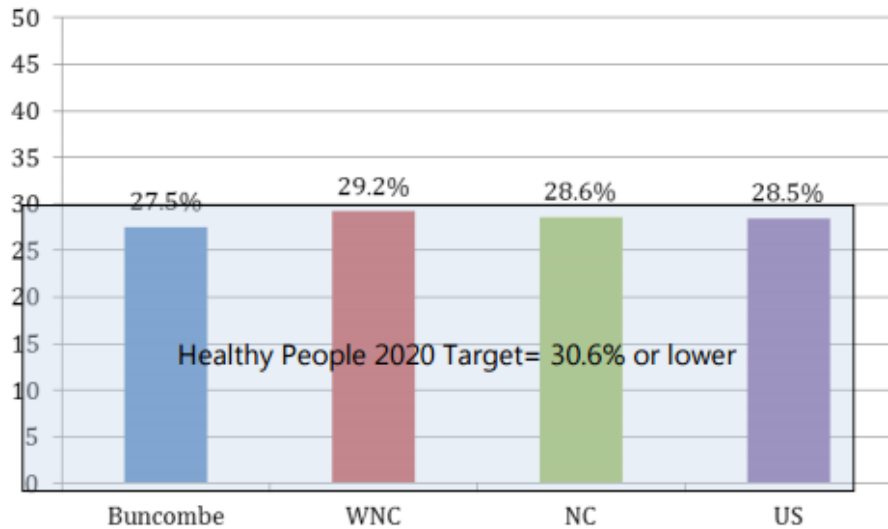
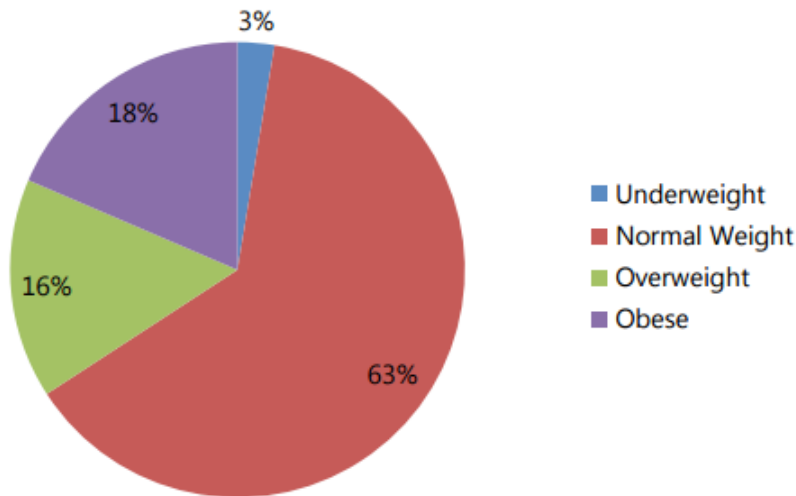


Figure 42—Buncombe County Weight Status Among K-5 Students (CHA 2012)



The Census tract containing northwest areas of Black Mountain and the Swannanoa community (31.04) ranked as one area three health “hot spots” in the county, indicating they have a high prevalence of poor health conditions. Heart disease and stroke mortality rates contributed to this ranking for this area of Black Mountain and Swannanoa. The area consisting of northeast Black Mountain, Montreat and Ridgecrest (Tract 31.02) ranked high for stroke mortality rates.

Due to these conditions, the Greenways & Trails Plan Health Impact Assessment ranked the US 70 Greenway and the Flat Creek Greenway as top tier priority greenway corridors based on the likelihood they would contribute to positive health outcomes in two areas of the county with the highest need.

BUNCOMBE COUNTY HEALTH INDICATORS

Beyond SCHS data, countywide surveys led by the Buncombe County Health Department reveal common trends in the region. The Health Department’s Community Health Assessment (2012) summarizes health conditions among Buncombe County’s population and recommends focal points of intervention to address these findings. This data is used to inform the SOTCH.

Emerging issues in Buncombe County related to the potential for increased biking and walking include:

1. More than 62% of the county’s adult population has a Body Mass Index of greater than 25, (meaning they are overweight) or 30 (obese);
2. More than 12% of Buncombe County residents report they have no leisure time for physical activity.
3. More than 60% of respondents meet physical activity recommendations, a rate higher than the rest of Western NC.
4. Adult incidence of diagnosed obesity has risen from 21.7% of persons age 20 and older in 2005 to 24% by 2009.

There is a clear link between physical activity (e.g. walking and bicycling) and the role activity plays in maintaining a healthy weight. Furthermore, maintaining a healthy weight and lifestyle has direct and indirect consequences on chronic diseases that are also of acute interest to the community.

For children, 34% of Buncombe County’s Kindergarten through 5th grade students are either overweight or obese. This stresses the importance of continued greenway investment and safe routes to school efforts. The trend in prevalence of overweight and obese children show it is in slight decline, as the county rate was more than 36% in 2004.

While Black Mountain-specific information is not available, by using demographic factors related to “social determinants of health,” we can identify themes that indicate where the health impacts of bicycling and walking could be most needed for Black Mountain’s population. According to the Centers for Disease Control and Prevention (CDC), the social determinants of health are “the circumstances in which people are born, grow up, live, work, and age, as well as the systems put in place to deal with illness. These circumstances are in turn shaped by a wider set of forces: economics, social policies, and politics.”

From a social determinants of health perspective, the following demographic details compiled via the 2010 US Census for Black Mountain point to potential vulnerable populations when compared to findings from the Buncombe County Community Health Assessment:

- 18.2% of Black Mountain’s population is below the poverty level (17.1% Buncombe Co.);
- The Non-White population total is 11.3% (approximately 900 of Black Mountain’s approximately 8,000 residents);
- 22.7% of Black Mountain’s population is over the age of 65, a percentage notably higher than 15.9% of Buncombe County’s population;
- More than 33% of Black Mountain residents rent their house or apartment (31.2% in Buncombe Co.); and
- 69.7% of persons age 25 or over have not obtained a Bachelor’s (or higher) degree (66.2% in Buncombe Co.)

Persons who are part of these social cohorts are those most likely to experience negative impacts to their health as a result of these attributes. Conditions that exist today, however, can be improved to try and mitigate negative impacts on particular cohorts through infrastructure investment. Infrastructure in the form of pedestrian and bicycle facilities has afforded people legitimate transportation options, improved roadway safety for all users and increased the efficiency of the overall network. By making such investments, rates for active transportation rise through increased participation; this participation impacts health. Increased bicycling and walking is shown to increase several aspects of a person’s life, as shown in Figure 43.

In Black Mountain, projects aimed at increasing walking and bicycling fall under three principal categories: bicycling facilities, greenways, and pedestrian facilities. To provide insight into what each recommendation is and to describe the positive and possible negative health consequences of constructing them, the following table is provided:

Figure 43—Health Outcomes of Increased Walking and Bicycling

Health Outcome/ Determinant	Anticipated Benefits	Likelihood	Distribution	Quality of Evidence
Stress reduction	▲▲	Likely	Effect linked to green/ natural spaces	***
Exposure to nature	▲▲	Likely	Residents within 1.5 miles of greenways/ trails	*
Fewer cars on local roads	▲▲	Likely	Bicycle commuters	
Housing values	▲▲▲	Likely	Homes within 3200 ft. of trails	***
Business attraction	▲▲	Likely	Depends on industry	***
Retail access	▲▲	Likely	Related industry (i.e. bike shops)	**
Physical Activity	▲▲▲	Likely	Residents living in neighborhoods with complete and extensive sidewalk network/ bicycle facilities	***
Physical activity with increased street and pedestrian connectivity	▲▲▲	Likely	Not specified	***

Figure 44 provides an overview of the common health impacts, both positive and negative, of various bicycling facilities and practices related to building and maintaining them. Overall, these facilities have a much greater positive effect on health than they do negative effects (red text) as they are encouraging people to move via active modes. The likely negative effects relate primarily to specific design, construction or maintenance practices that can reduce accessibility to some users.

Figure 44—Health Benefits of Walking and Bicycling Investments

Facility Type	Description	Broad Health Benefits	Facility Type	Description	Broad Health Benefits				
Greenway			Greenway						
Complete Streets	A “complete street” is one designed, considered, and given appropriate space for all users including motorists, bicyclists and pedestrians. In addition, a street is deemed “Complete” if it adequately considers and optimizes adjacent land uses, is designed for a context sensitive travel speed, and provides ample buffer space between uses.	<ul style="list-style-type: none"> ↑ Gives ample space for pedestrians and bicyclists, fostering and promoting active modes. ↑ An attractive and vibrant street can attract more use and users ↑ Buffer space and design limits high vehicle speeds, conflicts with defenseless users ↓ All elements of the street need to be maintained to ensure continued intentions 	Shared Lane Markings/ (Sharrows)	Shared lane markings or “sharrows” are painted stencils placed on streets at regular intervals to align bicyclists in the appropriate location and to heighten the awareness of motorists as to the high probability of bicyclists presence. Share lane marking are generally used on medium volume streets, with on-street parking, or when bicycle lanes cannot be adequately used due to space limitations.	<ul style="list-style-type: none"> ↑ Help to increase bicyclist profile on a street segment ↑ Promote bicyclists alignment away from “door zone” ↑ Gives some assurance to bicyclists that they are welcome to use street space ↓ Doesn’t provide true separation from vehicles ↓ If not maintained, can fade eliminating effectiveness 				
		<ul style="list-style-type: none"> ↑ Separates users from road hazards ↑ Dedicated pedestrian/bicyclist space ↑ Connects land uses other than by roadway ↑ Provides stable walking surface ↓ If isolated, perception of danger heightened ↓ User type variability could lead to bike/pedestrian, or bike/bike crashes ↓ If outside of peripheral vision of motorists, crashes rates at intersection increase 			Bike Lanes	Bicycle lanes are painted lanes placed on streets to define a dedicated area for bicyclists to ride. Bike lanes are often used on streets with higher speeds or on streets with heavier traffic volumes.	<ul style="list-style-type: none"> ↑ Provide a dedicated on-street space for bicyclists ↑ Can help “calm” traffic by narrowing through way ↑ Accommodates multiple bicycle types ↓ Doesn’t provide a true separation from vehicles ↓ If street widths vary and bike lane width not maintained to a safe width, use can be diminished ↓ If not maintained, can fade eliminating effectiveness 		
		<ul style="list-style-type: none"> ↑ Separates users from road hazards ↑ Dedicated pedestrian/bicyclist space ↑ Immerses users in a natural setting ↑ Lower cost to construct ↓ Surface can become unpredictable or unstable without normal maintenance ↓ Can be limited due to weather events such as flooding or soiling 					New Sidewalks	Constructing new sidewalks compliant with ADA standards where they currently do not exist is a cornerstone of a walkable and active community. New sidewalk will vary in width where pedestrian use is higher and should be built with adequate roadway buffer space where warranted.	<ul style="list-style-type: none"> ↑ Provides stable and predictable walking surface ↑ Heightens profile and presence of pedestrians to motorists ↑ Can be usable space for providing street furniture, signage, vegetation ↑ Is not prone to flooding, roadway debris, or rutting like gravel or dirt surfaces ↓ Initial construction can generate noise, dust, and potential stress
		<ul style="list-style-type: none"> ↑ Help to increase bicyclist profile on a street segment ↑ Promote bicyclists alignment away from “door zone” ↑ Gives some assurance to bicyclists that they are welcome to use street space ↓ Do not provide true separation from vehicles ↓ If not maintained, can fade eliminating effectiveness 							Crosswalks
<ul style="list-style-type: none"> ↑ Separates users from road hazards ↑ Dedicated pedestrian/bicyclist space ↑ Immerses users in a natural setting ↑ Lower cost to construct ↓ Surface can become unpredictable or unstable without normal maintenance ↓ Can be limited due to weather events such as flooding or soiling 	Natural path	A natural path is one that is without a paved or artificial surface and can be used by pedestrians and bicyclists. Natural paths are generally built with minimal enhancements, and can be near roads or streets or in natural landscape settings like hills, or river or lake shorelines.	<ul style="list-style-type: none"> ↑ Shared lane markings or “sharrows” are painted stencils placed on streets at regular intervals to align bicyclists in the appropriate location and to heighten the awareness of motorists as to the high probability of bicyclists presence. Shared lane marking are generally used on medium volume streets, with on-street parking, or when bicycle lanes cannot be adequately used due to space limitations. 						

THE 7 DIMENSIONS OF HEALTH AND WELLNESS

When we think about *health*, whether individual or public, we often limit our associations with the term to general topics such as healthcare, physical activity, and nutrition. We think about the common mantras from our peers and healthcare professionals - *Don't forget your annual checkup. Run this many miles per day. Eat this, not that.* We often forget, or perhaps never even realize, that true and complete health is about so much more.

According to the World Health Organization, health is “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.” Meaning that achieving complete health entails much more than merely reaching optimal physical health.

In other words, health is holistic. It is made up of many interconnected components that must all be achieved individually in order to obtain overall health. These components can be easily organized into what is known as *The Seven Dimensions of Health*: physical; social; economic and occupational; environmental; spiritual; emotional; and intellectual. These dimensions are interrelated and each has the ability to strongly influence the others. Further,

walking and bicycling have impacts that extend beyond the physical dimension of health, as illustrated in this section.

The implementation of active transportation methods, specifically walking and biking, has been proven to help both individuals and communities thrive in each of these seven dimensions and ultimately achieve total health. Figure 46 denotes the definitions of the dimensions of health and the implication of bicycling and walking on health.

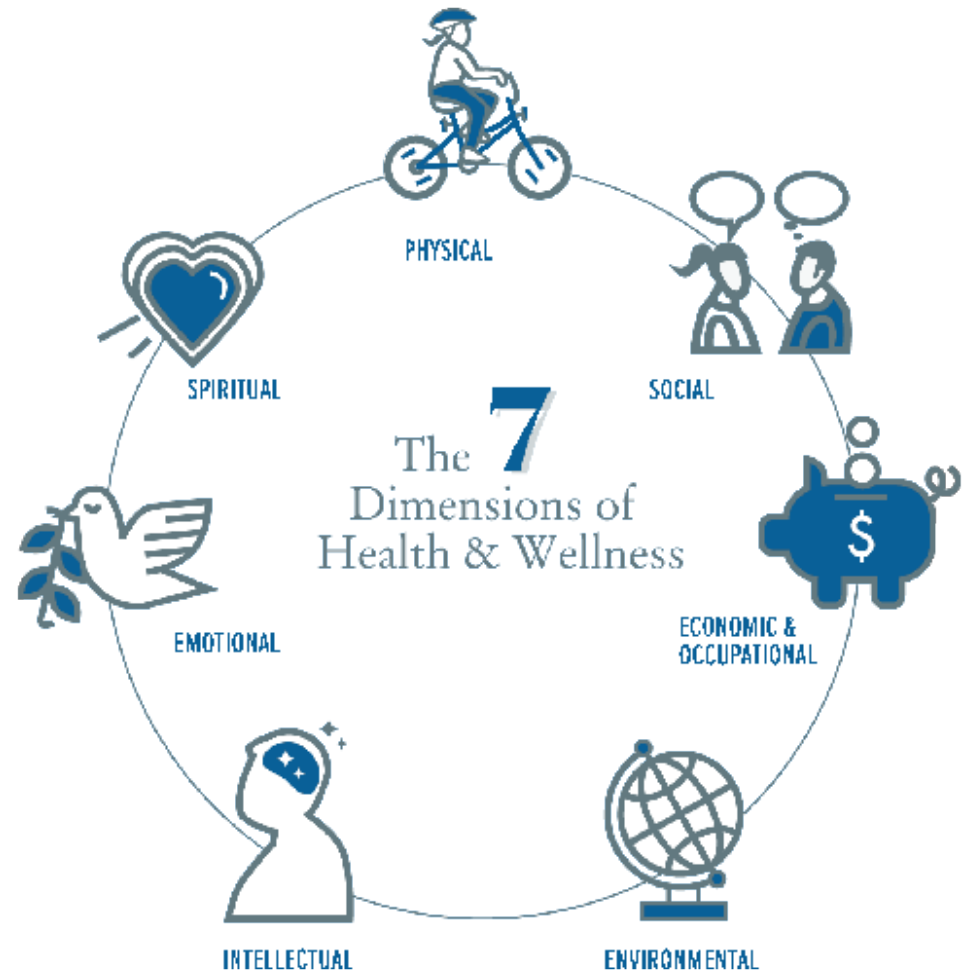
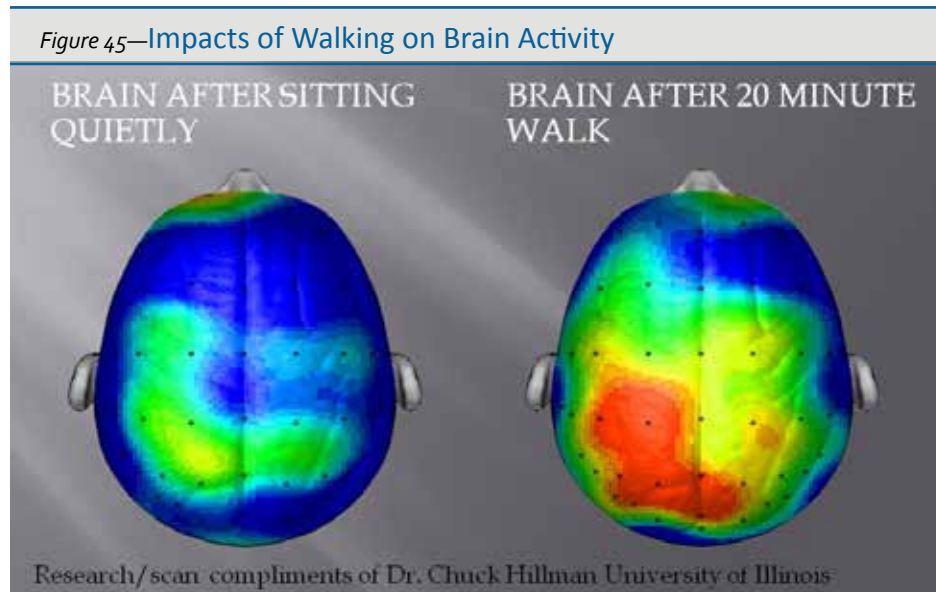









Figure 46—Dimensions of Health & Wellness and Implications for Bicycling & Walking in Black Mountain

Dimensions	Definition	Implications of Bicycling & Walking
Physical	 <p>The ability to maintain a healthy quality of life that allows us to get through our daily activities without undue fatigue or physical stress. The ability to recognize that our behaviors have a significant impact on our wellness and adopting healthful habits (routine check ups, a balanced diet, exercise, etc.) while avoiding destructive habits (tobacco, drugs, alcohol, etc.) will lead to optimal Physical Health and Wellness.</p>	<ul style="list-style-type: none"> • Low-impact and easy way to improve physical health that can be enjoyed by people of all ages. • Gives your heart, blood vessels and lungs a good workout, as well as increased cardiovascular fitness; increased strength and flexibility; improved joint mobility; improved posture and coordination; and decreased body fat. • One of the best ways to reduce the risk of health problems such as stroke, heart disease, some cancers, diabetes and arthritis. • 30 minutes of moderate walking per day five days a week can help ensure a longer, healthier and happier life. • One hour of walking may increase your life expectancy by two hours.
Social	 <p>The ability to relate to and connect with other people in our world. Our ability to establish and maintain positive relationships with family, friends and co-workers contributes to our Social Health and Wellness.</p>	<ul style="list-style-type: none"> • Creates shared sense of community by making an activity that is also transportation a social event. • Provides mobility to members of a community who may not have access to a private vehicle. • People who live in walkable areas with less traffic statistically have more friends than those who live in areas with heavy traffic. • Every few members of a community are excluded from its benefits.
Economic/ Occupational	 <p>The ability to get fulfillment from our jobs or career fields while still maintaining balance in our lives. Our desire to contribute in our careers to make a positive impact on the organizations we work in and to society as a whole.</p>	<ul style="list-style-type: none"> • Physically active people save an average of \$500 per year on healthcare costs. • Walkable and bikable communities are becoming more valuable and stimulating economies through increased property values, job creation, local spending, and tourist spending. • Improves an employee’s attitude and work ethic and increases motivation and productivity. • People who walk or bike regularly are overall mentally and physically healthier, and therefore enjoy their jobs more and work more efficiently, contributing to an overall increase in occupational health.
Environmental	 <p>The ability to recognize our own responsibility for the quality of the air, the water and the land that surrounds us. The ability to make a positive impact on the quality of our environment, be it our homes, our communities or our planet.</p>	<ul style="list-style-type: none"> • Pollution-free modes of transportation with reduction of carbon emissions, noise pollution and water pollution. • Walking and bicycling facilities are an efficient use of space. Over 20 times as many people can travel in the same space when walking as compared to in a car. • Significantly reduces an individuals’ ecological footprint • Leads to greater appreciation for being in contact with nature and recognizing personal effects on the quality of the environment.
Emotional	 <p>The ability to understand ourselves and cope with the challenges life can bring. The ability to acknowledge and share feelings of anger, fear, sadness or stress; hope, love, joy and happiness in a productive manner.</p>	<ul style="list-style-type: none"> • Physical activity has also been proven to benefit the emotional and mental well-being of individuals. Americans identify “relaxation and peace” (stress reduction) as the 2nd most prevalent benefit they experience from physical exercise. • Walking specifically has been shown to reduce the decline of cognitive performance among the elderly • Promotes a good night’s sleep – an essential element of maintaining good emotional health – more effectively than many other popular physical activities
Intellectual	 <p>The ability to open our minds to new ideas and experiences that can be applied to personal decisions, group interaction and community betterment. The desire to learn new concepts, improve skills and seek challenges in pursuit of lifelong learning.</p>	<ul style="list-style-type: none"> • Associated with better cognitive performance by children in school. • Gives people a chance to slow down and step away from their stress, their to-do lists, and their TVs and clear their mind so they can think about other things in life. • Linked to improving the cognitive functions of adults, and decreasing the rate of cognitive decline among the elderly. • Improves intellectual health simply through the challenge of making it a part of their regular daily activity.
Spiritual	 <p>The ability to establish peace and harmony in our lives. The ability to develop congruency between values and actions and to realize a common purpose that binds creation together.</p>	<ul style="list-style-type: none"> • Relaxing recreational activities are linked to spiritual wellness. • Natural environments have a great spiritual meaning and represent a strong sense of place, typically associated with memories of special times spent outdoors. • Can strengthen a person’s identity and help them define who they are by allowing them to be themselves and express their personality – a very important aspect of spiritual health





Bicycle Tourism in Black Mountain

As the popularity of cycling continues to grow, so does the number of tourists looking to bring their bikes to Western North Carolina, creating an opportunity for Black Mountain to position itself as a bicycle tourism destination. The rural mountain roads and trails around Black Mountain are already attracting a growing number of road cyclists, mountain bikers and event cyclists every year. Proposed greenways can tap an even larger market of visitors that are looking for a more casual outdoor experience. The economic impact of these bicycle tourists can be seen at local restaurants and breweries, lodging establishments, and shops. Those businesses most popular with bicycle tourists tend to offer authentic products or services that are unique to the area and often cater directly to the needs of bicyclists.

BIKE TOURISM SPENDING

Bicycling and the Tourism Economy

Tourism has been a factor of local commerce in Black Mountain and the greater Asheville Area since the arrival of the railroad. A 2012 study of tourism in the Asheville Area estimated that approximately 9.1 million visitors¹ come to the area each year, generating \$1.5 billion in local expenditures and supporting nearly 15,800 jobs.²

Based on local tourism expenditure data and visitor profiles for the Asheville Area, it is estimated that bicycle travel could currently account for 2% of total trips to the area. Based

¹ Tourists are typically defined as visitors that travel a distance of 50 miles or greater to the destination in question. The most common residences of overnight visitors to the Asheville area include Charlotte (10%), Atlanta (8%), Raleigh-Durham (8%), Greenville (7%), and Greensboro-Winston Salem (5%). Visitors on day trips to the Asheville area most common travel from Charlotte (22%), Greenville (22%), Raleigh-Durham (10%), the Tri-Cities area (8%), and the Greensboro-Winston-Salem area (7%).

² Longwoods USA. Asheville, NC 2012 Visitor Final Report. 2013.

Figure 47—Estimated Bicycle Tourism Impacts in the Asheville Area, 2012

2012 Tourism Impacts for the Asheville Area		Visitors	Expenditures	Jobs Supported	Personal Income
		9.1 Million	\$1.5 Billion	15,783	\$383.5 Million
Percent of Visitors to WNC that cite bicycling as a purpose for their trip	1.5%	136,500	\$22,500,000	237	\$5,752,500
	2%	182,000	\$30,000,000	316	\$7,670,000
	2.5%	227,500	\$37,500,000	395	\$9,587,500

Source: The Economic Impact of Tourism in Asheville, North Carolina, 2012 Analysis; 2013 North Carolina Regional Visitor Profile



on 2012 visitor estimates this would represent over 180,000 visitors each year. If we assume that spending by visitors on bicycle related trips is at least equal to spending by the average visitor to the Asheville Area, bicycle tourism to the area could generate annual expenditures of \$30,000,000 and support over 300 local jobs. The impact may even larger, given that an increasing number of bicycle tourism studies have documented above average incomes among bicycle tourists and higher travel spending per person.

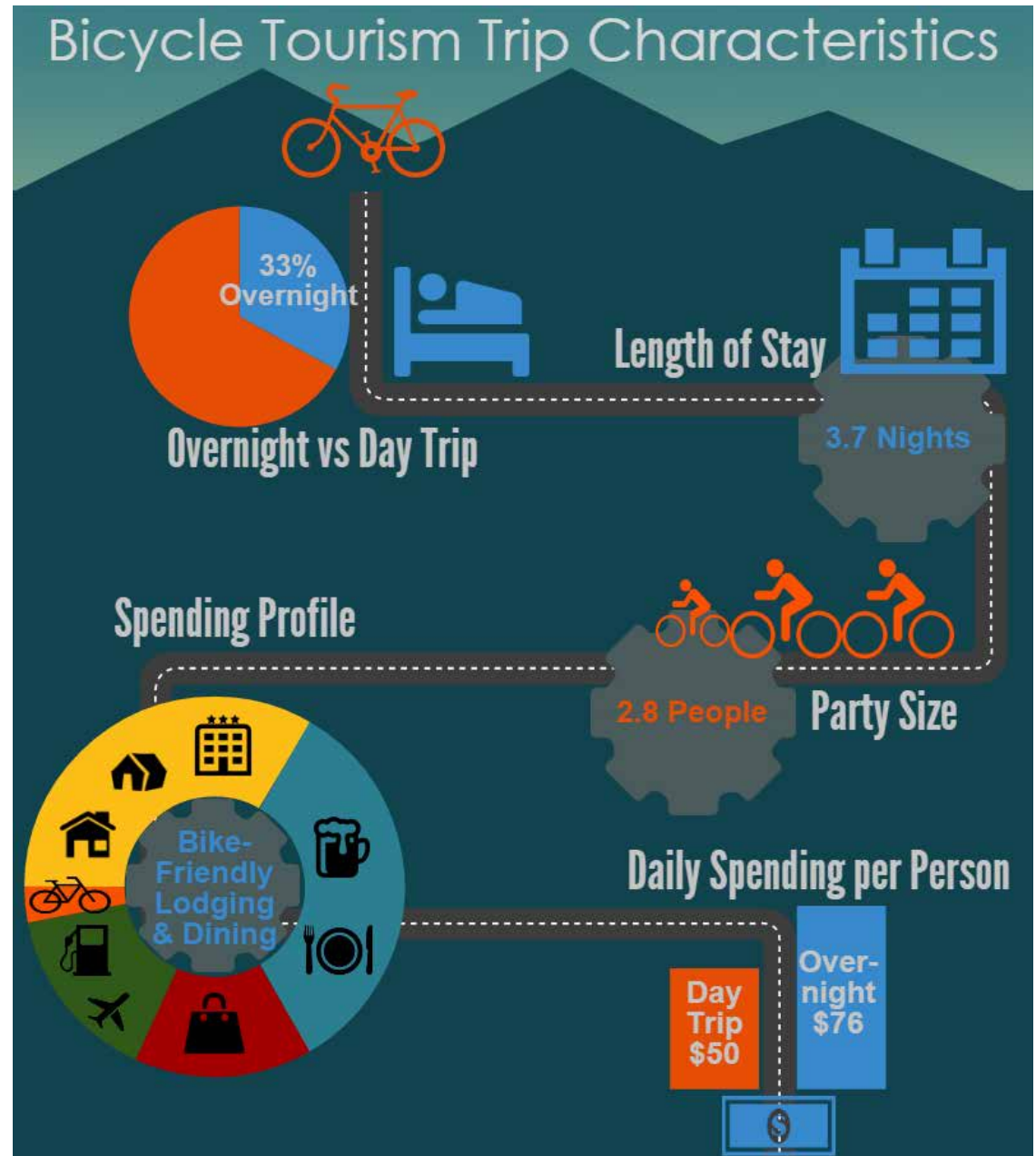
Estimating the share of expenditures that take place in Black Mountain is difficult. It is likely that the large majority of current expenditures by bicyclists take place in Asheville, but small towns like Black Mountain have their own unique charm and bicycling attractions that can lure the growing number of tourists looking for bicycle-related vacations. The share of spending that occurs in Black Mountain is influenced by the quality of nearby cycling attractions and the relative appeal of local dining, entertainment and lodging options.

BICYCLE TOURISM TRIP CHARACTERISTICS

A meta-analysis of bicycle tourism studies from across the country was conducted to identify bicycle tourism trip characteristics such as share of overnight trips, length of stay, party size, spending profiles and daily spending per person.³ These findings suggest that the average bicycle tourist stays longer and spends more on vacation than general tourists to Western North Carolina.

- Travel statistics for general tourism to Western North Carolina indicate that roughly a third of trips to the region are overnight trips. Recent research into bicycle-related travel indicates a very similar split between overnight trips and day trips.
- Overnight bicycle-related trips across 28 studies had an average length of 3.7 nights. In comparison, the average

3 Kostelec Planning. Bikes in Beds. 2015



length of stay for general tourism trips to Western North Carolina is 2.7 nights.⁴

- The average party size for bicycle related trips was 2.8 people. The average party size for trips to Western North Carolina is 2.0 people.
- Bicycle tourism spending and tourism spending in general varies greatly depending on whether visitors are on overnight or day trips. Overnight bicycle related trips across 28 studies average a daily expenditure of \$76 per person.⁵ In comparison, average expenditures on bicycle-related day trips reached just \$50 per person.
- Based on these statistics, the average overnight bicycle-related trip would result in a total expenditure of \$787.
- The largest share of spending by bicycle tourists often goes to lodging and restaurant, as well as food & beverage, which both make up a third of average trip expenditures. The remaining share of spending goes to retail purchases, transportation, and recreation & entertainment. This spending profile for the average bicycle tourist is described in detail below for each expenditure category. Popular local places where bicyclists eat, socialize, shop, or find lodging before, after or during rides are also highlighted below.

4 NC Department of Commerce. 2013 North Carolina Overnight Visitor Profile. 2014.

5 There is a wide variation in spending per person across bike tourism studies. Respondents to the survey conducted, at part of the 2005 study of bicycle tourism on the NC Outerbanks, reported average daily expenditures of \$150 per person.

BICYCLE TOURIST SPENDING PROFILE

Lodging

Lodging often makes up a third of total expenditures for overnight bicycle tourism trips, except in cases where private lodging is used. Lodging expenditures often make up a similar share of spending for most types of overnight trips in Western North Carolina and across the country.

Popular lodging options for bicycle tourists staying in Black Mountain include the Monte Vista Hotel, Inn Around the Corner, and a variety of rentals offered through Greybeard Rentals, AirBnB, or VRBO. The Monte Vista Hotel is the host hotel for Cycle-to-Farm Black Mountain.

Restaurant, Food & Beverage

Restaurant, food and beverage expenditures can also make up a third of total expenditures and often exceed spending on lodging. Many bicyclists are looking for unique local dining, food and beverages. There is also a preference for healthy meals and large portions that will fuel bicyclists during rides and satisfy large appetites afterwards.

Restaurants and cafés in Black Mountain that are popular with bicyclists include Fresh Wood Fired Pizza, Roots & Fruits, Trailhead, Dynamite Roasting, The Dripolator, Artisan, and La Guingette. Pisgah Brewing is a very popular post-ride destination for drinks, socializing and entertainment. Pisgah Brewing often hosts cyclo-cross events and has even constructed a pump track. Lookout Brewing, located on the Depot-to-Depot route, is also a popular watering hole



for local and visiting bicyclists. Food and beverage purchases are also quite common at popular destinations along local cycling routes, such as Hickory Nut Gap Farm and the Straightaway Café.

Retail

Retail expenditures often make up 15% to 20% of expenditures on overnight bicycle related trips. Bicycle tourism studies from Oregon have found that bicycle-related clothing and gear make up 15% of total expenditures for overnight visitors.

Local retailers that benefit most directly from bicycle tourists include Epic Cycles and Take-A-Hike. According to VeloGirl Rides, bicyclists and the non-riders who travel with them to Cycle-to-Farm visit a wide variety of local shops while in Black Mountain.

Recreation/Entertainment

Compared with the average tourist in Western North Carolina, bicycle tourists tend to spend more on food and less on recreation, unless they are participating in an event or on a guided tour. Given that the bicycle ride itself is the main attraction, there is less desire to seek out additional recreation. Much of the spending in this category represents post-ride entertainment, such as live music.

The most popular venues in Black Mountain for live music and entertainment are Pisgah Brewing and the White Horse.

Transportation

Transportation expenditures, which average 15% to 20% of spending on bicycle-related trips, include spending on gasoline at local gas stations, as well as spending related to airfare, taxis or services such as Uber. There is also an emerging opportunity for shuttle service to trailheads and cycling routes at higher elevations, such as the Blue Ridge Parkway. This service could be provided by hotels, guide services or other businesses looking to attract the bike tourism dollar.

BIKE TOURISM TYPES

Bicycle tourist types are profiled below, followed by assessments of existing and potential assets in the Black Mountain area that can grow the size and spending of each group.

Recreational Road Cycling

Recreational road bicyclists typically enjoy 30 to 100 mile loops on scenic rural

roads with low traffic volume. Recreational day rides are often organized with a partner or group of friends as part of day trips or overnight trips. Road bicyclists often visit Western North Carolina to take advantage of the sweeping views, challenging climbs and exciting descents offered on the rural mountain roads in the region.

Local Road Cycling Routes

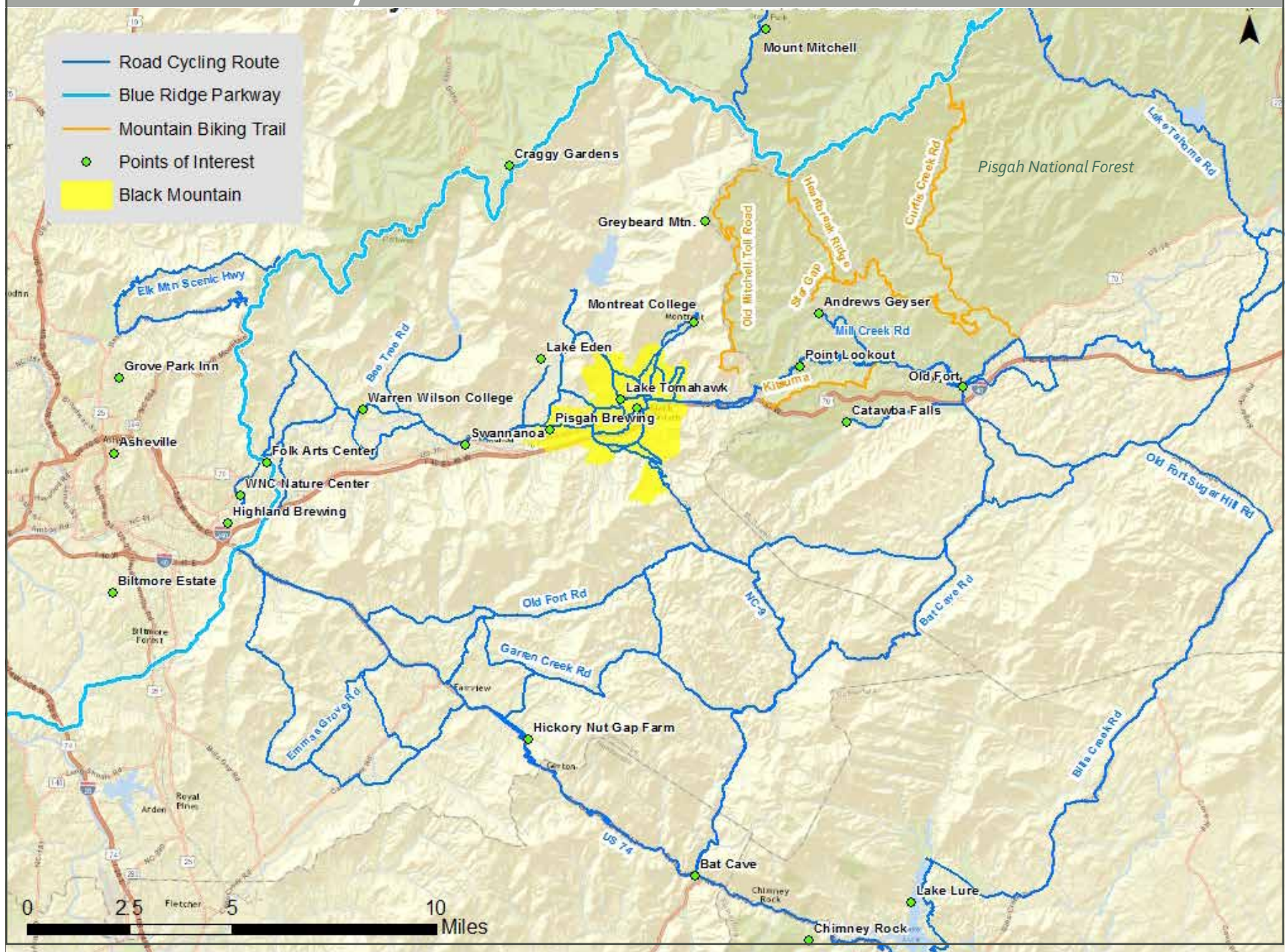
Road bicyclists may make up the largest or at least the most visible group of bicycle tourists that pass through Black Mountain. There is a large network of road cycling routes around Black Mountain that attract recreational cyclists looking for scenic rural loops with challenging climbs, speedy descents and unique local destinations along the way.⁶

- Climbing south on NC 9 over the Swannanoa Mountains connects bicyclists with an extensive network of high quality road cycling. Traveling southeast connects riders with the scenic farmland of Fairview and destinations such as Hickory Nut Gap Farm. Cyclists can also continue south along the Broad River to destinations in the Hickory Nut Gorge, such as Lake Lure and Chimney Rock. This network of rural roads to the south of Black Mountain is also a feature of local cycling events, including Cycle-to-Farm Black Mountain and the Bookwalter Binge.
- Rural roads traveling west through the Swannanoa Valley provide popular connections to the Blue Ridge Parkway, Warren Wilson and destinations in and around Asheville.

⁶ During the planning process for the Black Mountain by Bike Plan, recreational road cycling routes were identified with the help of input from local cyclists and other online resources such as MapMyRide.com and Strava Heat Maps.



Figure 48— Bicycle Tourism Around Black Mountain



- The Depot-to-Depot route is a designated bicycle route between Black Mountain and Old Fort that features a paved multi-use path through Pisgah National Forest to Point Lookout and down the mountain to the Old Fort Depot. The Depot-to-Depot route is also used to form much larger loops with the Blue Ridge Parkway and destinations such as Mountain Mitchell and Craggy Gardens.
- North Fork Road and other rural roads in Swannanoa are also popular for shorter rides around Black Mountain and to nearby destinations.

The greatest hurdle to attracting more road cyclists to the Black Mountain area are narrow travel lanes and the lack of paved shoulders, which can often make riding with traffic stressful, especially in areas where drivers have limited experience passing cyclists.

BICYCLE TOURING

Bicycle touring involves multi-day trips on scenic routes, riding from point to point for several hundred miles. Bicycle touring can take place as part of a guided tour or independently in a small group. Organized group tours generally include a larger number of participants than independent tours. When planning bicycle tours, visitors and guides are often in search of unique destinations with a sense of place. Cyclists may spend \$2,000 to \$3,000 on guided tours, in addition to personal spending on alcohol, shopping and entertainment.

Local Bicycle Touring Routes

Although there are many popular loops for day rides around Black Mountain, there are few road routes through Town to attract touring cyclists looking for multi-day point-to-point rides. While the Blue Ridge Parkway is a very popular route for multi-day tours, the overwhelming majority of these bicyclists will skip Black Mountain and stay in Asheville, where it is more convenient to resupply, dine and find lodging. The majority of bicyclists that do tour the Blue Ridge Parkway are part of independent, self-supported parties, rather than part of guided tours. There are only a few commercial guiding companies that have a permit to guide cycling tours on the Blue Ridge Parkway.

The construction of the Swannanoa Greenway between Black Mountain and Asheville could encourage more touring bicyclists to make Black Mountain a stop on their tour. This greenway proposed along the length of the Swannanoa River could provide connections with the

existing Depot-to-Depot trail, offering bicyclists a separated cycling path all the way from Old Fort to Asheville and the Blue Ridge Parkway.⁷

Mountain Biking

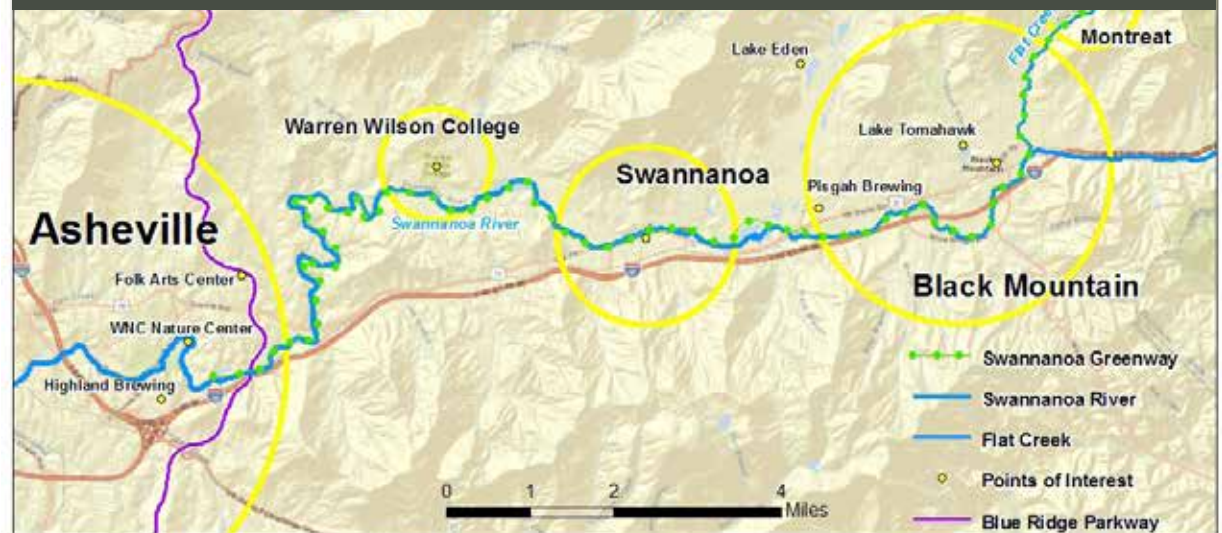
Off-road bicyclists include mountain bikers as well as cyclo-cross riders and a growing subset of other cyclists that are taking their bikes to gravel roads and other unpaved paths. Off-road cycling can take place on single track mountain bike courses, multi-use trails, gravel roads, or some combination of these facilities. Mountain bikers generally reach their destination by automobile and ride for several hours at a time on mountain bike loops. These activities may be part of day trips or overnight trips.

Local Mountain Bike Trails

While there is little data on the number of mountain bikers attracted to the Black Mountain area, the popularity of nearby trails suggests that off-road bicycling may rival road cycling in terms of visitors attracted to the area. In addition, the fact that Old Fort is a dry city often makes Black Mountain the default choice for mountain bikers in search of nearby beer, dining and lodging.

⁷ While there are several existing roads in the Swannanoa Valley that are popular with cyclists, the connections they provide between Asheville and Black Mountain are indirect at best; the most direct routes along US 70 and Old US 70 have high traffic volumes and limited appeal for visitors.

Figure 49—Areas Most Impacted by Bicycle Tourism in Asheville Area, 2012



Yellow Circles indicate size of bike tourism market

There are several high quality mountain biking trails just east of Black Mountain in Pisgah National Forest that offer exciting descents, challenging climbs and great views from the ridgeline (Figure 48). The two trails that attract the largest number of mountain bikers are Kitsuma Trail and Heartbreak Ridge. Other trails and gravel roads shown in Figure 48 are used by riders to form loops back to parking areas.

- Kitsuma Trail begins by climbing a series of technical switchbacks to reach a sustained 3 mile section of downhill single track. The Kitsuma trailhead can be reached by heading east on Old US 70 past Ridgecrest.
- Heartbreak Ridge features great views and a speedy 2,000 foot descent on single track for nearly four miles. The Heartbreak Ridge trailhead, located just off the Blue Ridge Parkway, can be approached by climbing up the Old Mitchell Toll Road that begins in Montreat, or from Old Fort along Curtis Creek Road, a gravel Forest Service road with a reputation for strenuous climbing.

These trails also support events such as the Off-Road Assault on Mount Mitchell.

While these trails and loops make for very high quality riding the strenuous climbing and technical descents can deter less advanced riders, these bicyclists often opt for more casual rides found in other nearby mountain biking destinations such as Bent Creek and DuPont State Forest.



Cycle-to-Farm
Event, Image
courtesy of Larry
Pierson

BICYCLING EVENTS

Bicycling events attract all types of on- and off-road bicyclists. Popular types of bicycle events include road races, gravel grinders, cyclo-cross events, greenway challenges, and triathlons. Many visitors stay overnight to make preparations for the event and attend related events such as award ceremonies, dinners and other activities outside the actual competition. Events can also attract spectators that come with participants or on their own, depending on the size of the event. Bike-related events also serve a marketing function by featuring cycling routes that attract participants back to a region for recreational road rides or tours. In comparison with other types of bicycle related travel, event participants may spend more money at their destination on recreation in the form of event fees and related expenses.

Local Bicycling Events

There are several major cycling events that attract hundreds of road cyclists and mountain bikers to the Black Mountain area each year in the summer and fall.

Cycle-to-Farm

Cycle-to-Farm (C2F) Black Mountain is an annual bicycle ride organized by VeloGirl Rides that leads cyclists on a scenic 60 mile route featuring local farms and foods. The Town of Black Mountain Recreation and Parks Department has helped to organize and promote these events. In recent years the event has been capped at under 250 participants. Since Cycle-to-Farm Black Mountain began in 2012 there have been nearly 1,000 total participants and direct expenditures of over \$252,000 in the local economy. Over the past four years there was an average expenditure of \$270 per participant. Not included in these figures is spending by other members of each travel party that did not participate in the event.

Cycle-to-Farm and other events also act as a type of marketing that attracts visitors back to the region by featuring lesser known cycling routes, farms, and other related attractions. Participant survey data indicates that over a fourth of participants at C2F 2015 had never visited Black Mountain. A number of other CTF riders have returned to the area to ride with the Velo Girl Rides company on custom cycling tours.

Bookwalter Binge

The Bookwalter Binge Gran Fondo is a road cycling event organized every October in Black Mountain that offers participants the opportunity to ride and converse with current and former cycling celebrities that join the ride as guests and guides. The event features 83, 62 and 30 mile courses through the

mountains and rural farmland south of Black Mountain. Participants are also attracted to the event by the fall foliage and the opportunity to contribute to a popular local non-profit. In 2015 all proceeds will go towards the Southern Appalachian Highlands Conservancy. The event is organized by the professional cyclists Brent and Jamie Bookwalter through the BB Grand Fondo Charity. Based on recent event results, there were over 150 participants in 2015.

Off-Road Assault on Mount Mitchell

The Off Road Assault on Mt. Mitchell (ORAMM) is a 60 mile off-road bicycle event organized by Blue Ridge Adventures that climbs 10,500 feet through Pisgah National Forest from Old Fort to the Blue Ridge Parkway and Mt. Mitchell. The route features challenging climbs up gravel roads and exciting downhill single track sections of Kitsuma and Heartbreak Ridge. The event is capped at 500 participants each year. Based on overall results the event attracts 350 to 400 participants each year. Since 2008 the event has attracted nearly 2,800 participants. A large but unknown number of spectators also attend the event and inject money into the local economy. Many ORAMM participants also visit the area in the months prior to the race to practice on the actual course.

Although the Off Road Assault on Mount Mitchell is based in Old Fort, a large share of spending by event participants occurs in Black Mountain. The availability of beer and unique local dining options makes Black Mountain an attractive location when participants are deciding where to find dinner, drinks, entertainment and lodging.

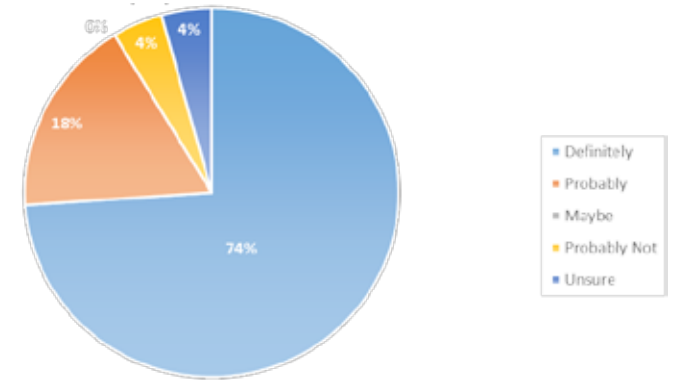
LOW-STRESS OR FAMILY BICYCLING

Low-stress and family bicycling involves slower paced bicycling on loops or point-to-point rides of 10 to 30 miles using greenways, rail trails and on-road facilities with low traffic and limited climbing. These less strenuous routes have a broad appeal that can attract more casual bicyclists looking for a relaxing or family-friendly outdoor activity. This type of bicycling may also be one of several activities for visitors vacationing in the area. Popular examples low-stress bicycling include multi-day rides on rail trails such as the Virginia Creeper Trail and short bicycling day rides on greenways that take place on larger vacations, such as trips to the beach.

Low-Stress and Family Cycling Facilities

The existing sections of the Black Mountain Greenway do offer low-stress or family bicycling opportunities for residents, but are currently too small and fragmented to be considered an attraction for visitors. Local examples of low stress / family cycling destinations popular with visitors include the Biltmore Estate, the French Broad Greenway in Asheville, and the North Carolina

Would you bicycle in the Asheville area more often if there were a greenway along the Swannanoa River connecting Asheville with Black Mountain, Swannanoa, Warren Wilson & other popular destinations?



Arboretum. Visitors to the Biltmore Estate, for example, can now rent bicycles from the Biltmore's Bike Barn or bring their own bicycle to explore miles of pathways that stretch across the 8,000 acre estate.

Although Low Stress and Family Cycling currently has a small presence in Black Mountain, proposed greenways in and around Black Mountain have the potential to attract a wide range of visitors looking for casual cycling excursions, perhaps as part of a larger trip. The proposed Swannanoa Greenway connecting Asheville to Warren Wilson to Black Mountain would have a broad appeal for casual bicyclists and families visiting the area that want to avoid strenuous climbing and vehicle traffic. Extending greenway connections to nearby destinations such as Montreat and Ridgecrest would further increase the popularity of cycling through Black Mountain. A recent survey of Cycle-to-Farm participants found that nearly 90% of respondents would definitely (67%) or probably (22%) bicycle in the Asheville area more often if there were a greenway constructed along the Swannanoa River.

The likelihood that these casual bicycle tourists will actually stop and spend money in Black Mountain will depend on the convenience and safety of connections to local businesses and the extent to which these businesses cater to bicycle-based customers. Zoning and incentives can be used to encourage commercial development and connecting spurs near greenway corridors to bolster bicycling-supportive businesses and vice versa. Wayfinding signage and trail maps can also be used to entice bicyclists to make stops at local businesses in Town.





Action Steps for Implementation

Adoption of Black Mountain by Bike is only one step in creating a bicycle-friendly community. The implementation of the Plan will require a coordinated effort amongst Town officials, leaders, and citizen volunteers as well as follow-up plans and studies on more specific improvements as has been done in the past on various greenways. This chapter provides a series of actions steps for moving forward with the recommendations of the Plan, as well as potential funding sources and partners for proposed projects.

A major emphasis of Black Mountain by Bike is aligning recommendations with how bicyclist view themselves in four categories: strong and fearless, enthused and confident, interested but concerned, and no way/no how.

Each of these attitudes towards bicycling are addressed to some degree within Black Mountain by Bike but the “enthused and confident” and “interested but concerned” riders are the focus. This understanding helps stakeholders articulate to local, regional and state leaders that implementation of this Plan is aimed at optimizing investments for the largest number of potential riders.

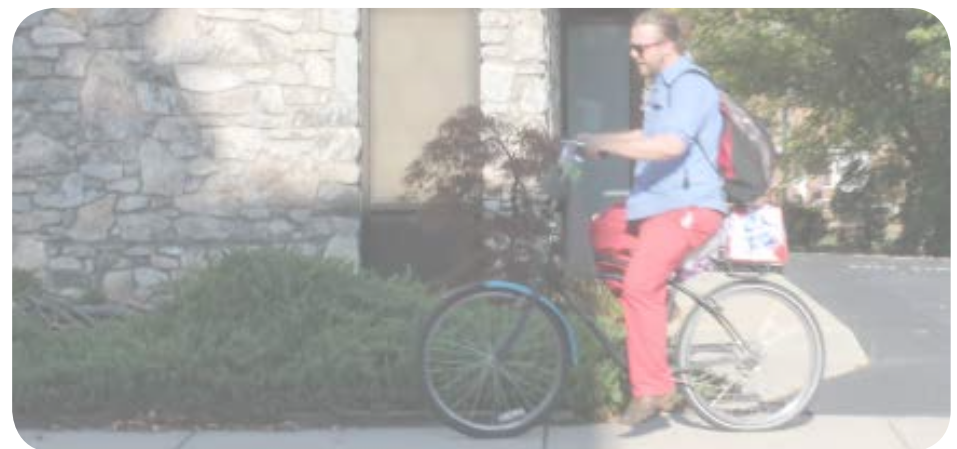
Black Mountain by Bike’s implementation strategies are closely aligned with the Bicycle and Pedestrian Safety Strategies in North Carolina’s statewide WalkBikeNC plan that were developed through a series of statewide summits.

The major action initiatives identified through those the WalkBikeNC plan to help guide NCDOT and other state agencies through the next decade are:

- Fully implement Complete Streets;
- Address multi-modal funding;
- Retrofit existing facilities;
- Require more from all road users;
- Increase public awareness through education;
- Connect transportation and land use; and
- Improve law and strengthen enforcement.

Completing the action steps listed below helps guide development of the proposed bicycling network and creates a supportive program and policy environment for a more bicycle-friendly Black Mountain. These steps will be crucial in moving forward with the overall recommendations of Black Mountain by Bike.

Priority	Action	Partner(s)	Timeframe
1	Adopt the Plan	Town of Black Mountain, NCDOT, French Broad River MPO for consideration when their local plans are updated.	Immediately



Priority	Action	Partner(s)	Timeframe
2 Change Policy to Allow Bicycling on Sidewalks Outside Downtown Area	Modify the ordinance that restricts bicycling on sidewalks on all streets. Amend the ordinance to allow bicycling on sidewalks outside downtown, combined with education on etiquette and safety.	Town of Black Mountain	Immediately
3 Consider Budget Allocation for Neighborhood Greenways	With completed plans in place and several low-cost neighborhood greenways (or bicycle boulevards) identified, the Town can consider dedicating funds toward implementation of at least one neighborhood greenway linkage.	Town of Black Mountain, NCDOT, Blue Ridge Bicycle Club.	Fiscal Year 2016-2017
4 Identify Resurfacing Projects for Potential Shoulder Widening	NCDOT resurfacing projects offer an opportunity to add bikeable shoulders to corridors identified in the plan. Black Mountain should communicate regularly with NCDOT Division staff to determine when routes will be subject to resurfacing. Black Mountain may be required to contribute funding as a partner to these projects based on state policy limitations.	Town of Black Mountain, NCDOT, French Broad River MPO	Review NCDOT's 3-year online resurfacing list or request area updates from NCDOT. This can be done annually.

Priority	Action	Partner(s)	Timeframe
5 Continue to Emphasize Complete Streets	Now that Black Mountain has a bicycle plan to go along with its Greenway Plan and Comprehensive Pedestrian Plan, the community can work in a more focused manner on implementing the town's Complete Streets Resolution. Promote bicycle tourism and define new opportunities to grow businesses in Black Mountain. Request the MPO to update its Complete Streets lists in the CTP, TIP and MTP to include those identified in this plan.	Town of Black Mountain, NCDOT, Velo Girl Rides, Blue Ridge Bicycle Club, and Local Businesses	Regularly. Start by aligning the projects in this plan with the MPO's Complete Streets designation in the CTP, TIP and MTP.
6 Develop Supportive Education and Enforcement Program	Bicycle facilities alone will not lead to a bicycle-friendly community. The town should implement programs and policy priorities identified in this plan. The community should recognize that programs such as installing signage or wayfinding can occur several years before major infrastructure improvements are made.	Town of Black Mountain, Buncombe County, Buncombe County Health Department, Local Schools, Blue Ridge Bicycle Club, Active Route to School, NCDOT	One to three years, Town should review online three-year resurfacing plan annually. Work with ARTS to identify short-term school needs.

Priority	Action	Partner(s)	Timeframe
7 Become a Bike Tourism Hub for Western NC	The access to trails and road rides, combined with small town charm, make Black Mountain a tourism magnet for bicycling. Promote Black Mountain in national publications and through local marketing. Incorporate improvements such as bicycle corrals and other visible bicycle parking to complement promotion.	Town of Black Mountain, Local Businesses, Blue Ridge Bicycle Club, Velo Girl Rides, Tourism Development Authority	Immediately and Ongoing.

8 Conduct Special Events & Themed Rides to Promote Bicycling	Organize themed community rides, Kidical Mass and Ciclovía events to encourage more people to bike Black Mountain.	Town of Black Mountain, County Health Dept., Blue Ridge Bicycle Club, Velo Girl Rides, Schools	Immediately and Periodic.
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Priority	Action	Partner(s)	Timeframe
9 Measure Performance	This chapter identifies methods by which Black Mountain, FBRMPO, Blue Ridge Bicycle Club and others can track the performance in implementation of the Plan, which can help justify funding pursuits and strengthen the ability of the community to gain funding from various sources. These efforts include regular surveys, counting users along popular bicycling routes and greenways, and participation in Safe Routes to School events.	Town of Black Mountain, Local Schools, Buncombe County Health Department, Blue Ridge Bicycle Club.	Ongoing. Schedule periodic data collection with partners.

10 Complete the Bicycle Friendly Community Application	Within a year following adoption of the Plan, the community should form a committee to complete and submit a Bicycle Friendly Community application to the League of American Bicyclists. The application requires input from a variety of data sources, many of which are included in this Plan. Even if the community does not receive designation on its first attempt, the feedback from the League and potential for Honorable Mention status can inspire local leaders to implement other Plan recommendations. The League will reach out to local members to provide input and the Blue Ridge Bicycle Club could help the community complete the application. FBRMPO has assisted other area communities in compiling bicycle route and demographics data for the application.	Town of Black Mountain, FBRMPO, Blue Ridge Bicycle Club	2016 or 2017
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Evaluation

Transportation-based projects, programs and policies are some of the most measurable aspects of the built environment in that an organization or municipality can track the progress of investments and policy changes. Given the economic uncertainty in many communities and within funding sources, non-profits, towns, MPOs and DOTs are finding value in tracking the performance of a variety of actions. For communities like Black Mountain, methods of tracking the performance of projects, programs and policies can not only lead to ready material to include in a Bicycle Friendly Community application, but communities that show measurable progress in the implementation of their plans can also find themselves in a more strategic position to receive funding from grants or other pursuits.

Performance should not be confused with prioritization, as performance is measured as a change over a period of time, not a ranking of strategies. Performance for bicycling and related endeavors can fall into many categories, each of which is in turn measured by some criterion.

Figure 50 below depicts several performance areas that Black Mountain and its partners could consider to measure and document performance of itself, NCDOT’s investments in the town, and outreach efforts.

Figure 50—Performance Measures For This Plan

Performance Measure	Frequency (Every 1 or 2 years)
Percentage of Bicycle Facilities Addressed from Plan	2
Miles of Designated Routes, Shoulders/Lane, Greenways	2
Number of Bicycle Racks	2
Signage Added along Routes	2
Participants in Bike to Work and Bike to School Rides	1
Participants in Themed Rides	1
Number of Bicycle Route Maps Distributed	1
Number of Crashes (by level / total)	2
Bicycle Counts	1 to 2
Funding allocated to bicycle-related projects and programs	1

Funding

Facilities for people who bike are constructed – and therefore funded – through a number of avenues, and there are even more funding sources to pursue for programmatic implementation measures. Funding is generally divided into five categories of sources: local, state, federal, non-profit and private funding. The following sections describe some of the more prominent sources in each category that Black Mountain could tap for implementation of this plan. As shown in the illustration on the next page, there is a strong economic/job creation argument to be made.

Local Funding. Black Mountain can establish an annual budget line item specifically for bicycling and walking improvements. A specific budget item is the most direct way to ensure that funding for such facilities is available, but sometimes a municipality’s budget may be too limited to finance this work. Bicycling facilities can also be built in conjunction with any new projects or improvements, such as parks and recreation facilities, libraries, schools, and new roads. In addition, future private development should be reviewed for adequate bicycling access, connections and parking, along with incorporation of changes to land use policy to encourage this.

Municipalities often plan for the funding of bicycling and greenway facilities or improvements through development of Capital Improvement Programs (CIP). Typical capital funding mechanisms include the following: capital reserve fund, capital protection ordinances, municipal service district, tax increment financing, taxes, fees, and bonds. This section highlights common sources of funding; however, these can change abruptly due to transportation funding discussions occurring at the state and federal levels. FBRMPO and NCDOT are able to provide the latest information on these funding options.

State and Federal Funding. NCDOT is restricted from expending state funds on standalone bicycling projects, even when those projects or upgrades are essential along state-managed roads. This limitation makes it difficult for implementation of North Carolina’s Complete Streets policy to occur without local contributions. However, bicycling-related upgrades may occur along state-maintained roads when major investments are made, such as highway or intersection widening. The MPO’s STP-Direct Allocation funding is a regular source that is used by communities in the region. It is open most years to new proposed projects.

It is important to track changes or adjustments in these programs through the MPO, as funding allocations and programs can change on a regular basis and are partially driven by the status of the Federal government’s transportation funding acts.

Transportation Alternatives Program (TAP). North Carolina receives an annual allocation of TAP funds from the federal government. Bicycling and greenway improvements are eligible expenses under this program. Due to state restrictions, the full 20% match required on these funds must be borne by the municipality. Black Mountain should work through the MPO and with other regional municipalities to develop strategies to help the state utilize these funds. Locally, the MPO receives direct TAP funds for selection of projects.

Powell Bill Funds. Annually, NCDOT allocates state street-aid (Powell Bill) funds to incorporated municipalities. This program is a state grant to municipalities for the purposes of maintaining, repairing, constructing, reconstructing or widening of local streets that are the responsibility of the municipalities or for planning, construction, and maintenance of bikeways or sidewalks along public streets and highways. New sidewalks or replacement of existing sidewalks are an eligible expense for these funds.

Recreational Trails Program. The Recreational Trails Program (RTP) is a grant program funded by Congress with money from the federal gas taxes paid on fuel used by off-highway vehicles. This program’s intent is to meet the trail and trail-related recreational needs identified by the Statewide Comprehensive Outdoor Recreation Plan.

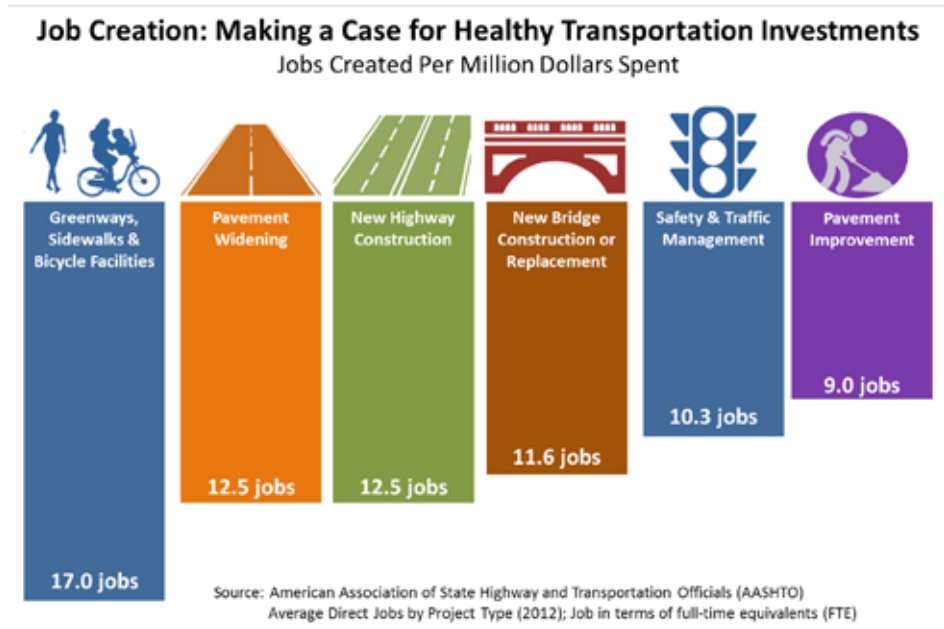
North Carolina Parks and Recreation Trust Fund (PARTF). The fund was established in 1994 by the North Carolina General Assembly and is administered by the Parks and Recreation Authority. Through this program, several million dollars each year are available to local governments to fund the acquisition, development and renovation of recreational areas. PARTF funds are allocated through the North Carolina Trails Program to help fund beach accesses, state trail systems, and local trail construction efforts. The projects in this plan that create connections to parks, particularly the greenways and neighborhood greenway routes, are a good match for PARTF funds.

Non-Profit / Private Funding. Another method of funding sidewalks and greenways is to partner with public agencies, private companies, the hospital or hospital foundation, and/or not-for-profit organizations. Most private funding sources offer limited grants and public-private partnerships engender a spirit of cooperation, civic pride and community participation.

The key to the involvement of non-profit and private partners is to make a compelling argument for their participation. Major employers and developers could be identified and provided with a “Benefits of Walking, Bicycling and Greenways” handout for themselves and their employees. Very specific routes that make critical connections to place of business would be targeted for private partners’ monetary support following a successful master planning effort.

Potential partners include major employers located along or accessible to sidewalks, bicycle routes or greenways. Name recognition for corporate partnerships could be accomplished through trailhead signage or interpretive signage along greenway systems. Utilities often make good partners and many trails now share corridors with them. Money raised from providing an easement to utilities can help defray the costs of maintenance. It is important to have legal counsel review the agreement and verify ownership of the subsurface, surface or air rights in order to enter into an agreement.

Volunteer Work. It is expected that many citizens will be excited about the continued development of Black Mountain’s bicycling and greenway system and this is already evident in the energy level of those involved with this Plan. Individual volunteers from the community can be brought together with groups of volunteers from church groups, civic groups, scout troops and environmental groups to work on route and greenway development on special community work days. Volunteers can also be used for fund-raising, maintenance, and programming needs. This requires a lead entity or agency to help organize these efforts. Blue Ridge Bicycle Club and Connect Buncombe are two possible partners.

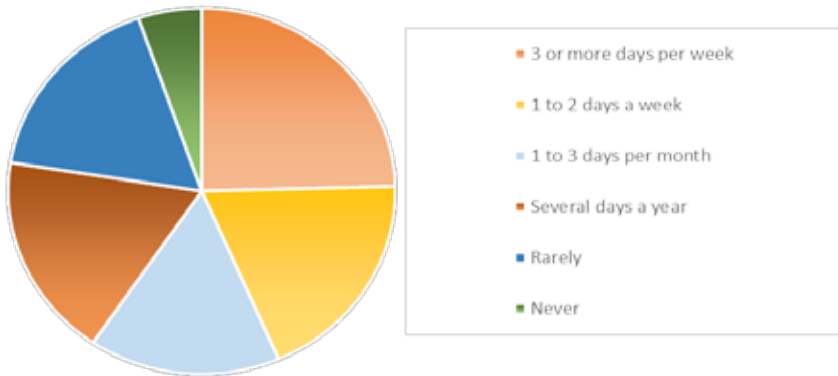


Appendix A

Survey Summary

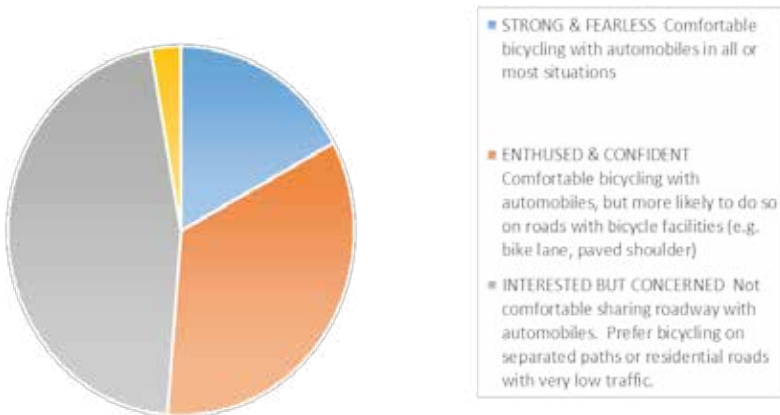
Question 1: How frequently do you bicycle?

How frequently do you bicycle?



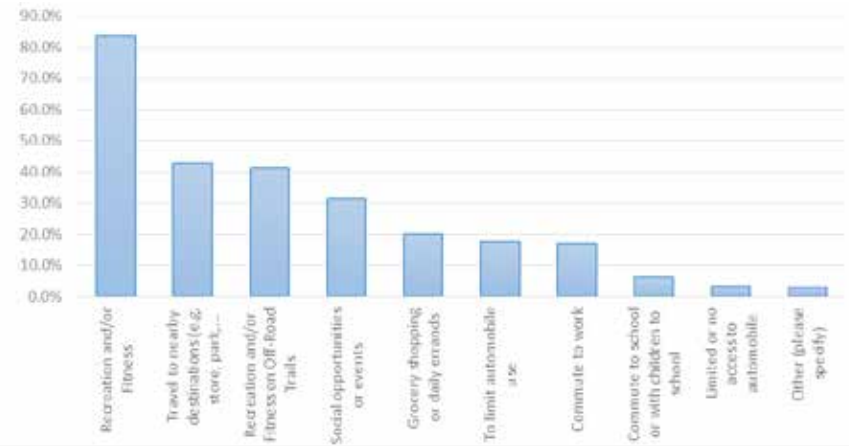
- Sixty percent of respondents bicycle at least once a month.

Question 2: Which statement best describes your level of comfort on a bicycle?



- Interested but Concerned make up almost half of respondents.
- There is a high percentage of Enthusied and Confident respondents.

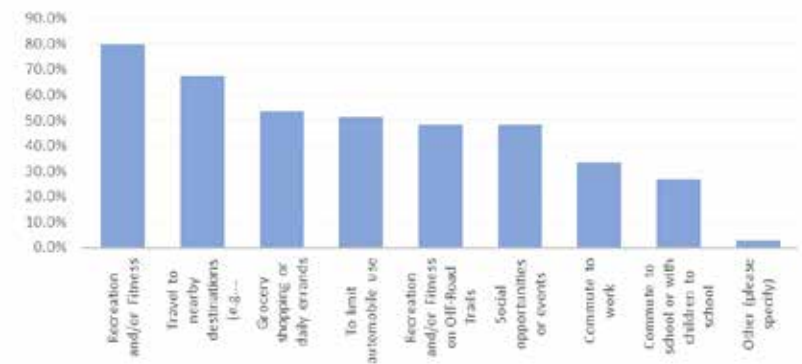
Question 3: For what purposes do you or members of your household currently bicycle?



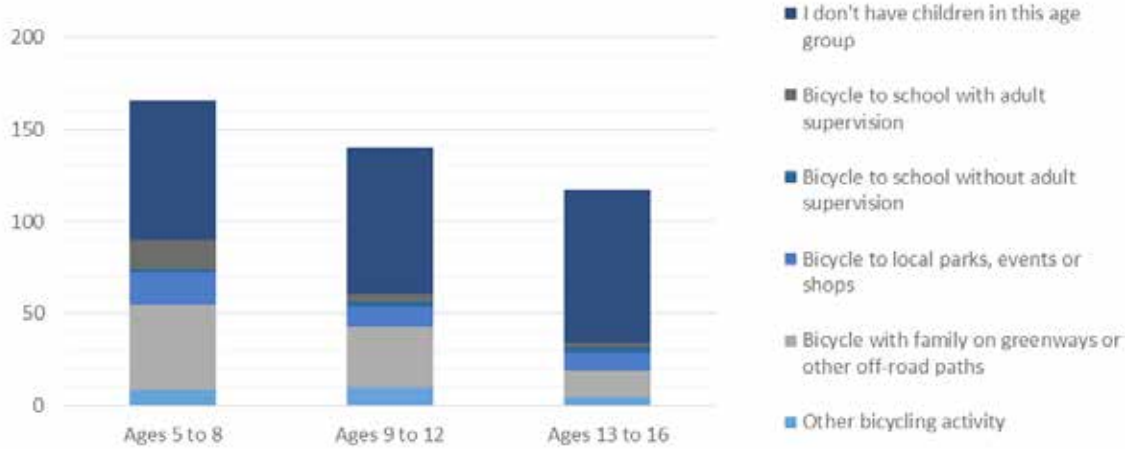
- Over 83% bicycle for recreation or fitness, but only 43% bicycle for transportation to nearby destinations.
- A surprisingly high 17% report commuting to work by bike. Demographic Qs reveal that 36% work in Black Mountain, and another 10% work within 10 miles of Black Mountain.

Question 4: For what purposes would you or members of your household bicycle if it were safer and more convenient to do so?

- Two thirds of respondents would bicycle to reach nearby destinations if it were safer / convenient.
- Half would bicycle for grocery shopping, errands, or social opportunities / events.

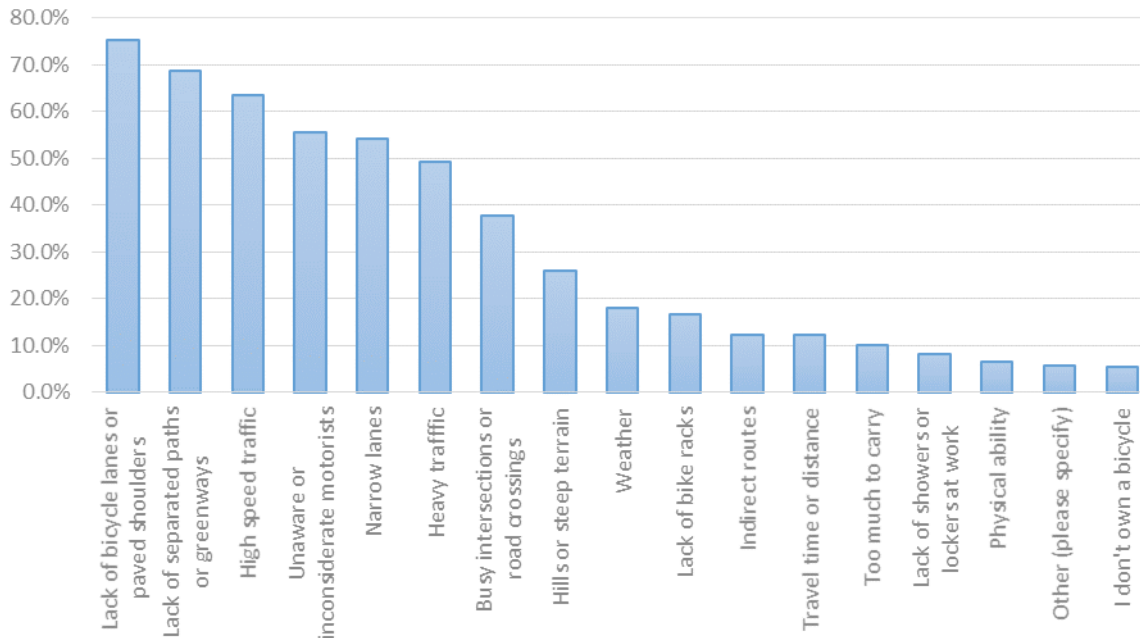


Question 5: If you have children between the ages of 5 and 16, please identify bicycling activities that they frequently participate in. (Select all that apply)



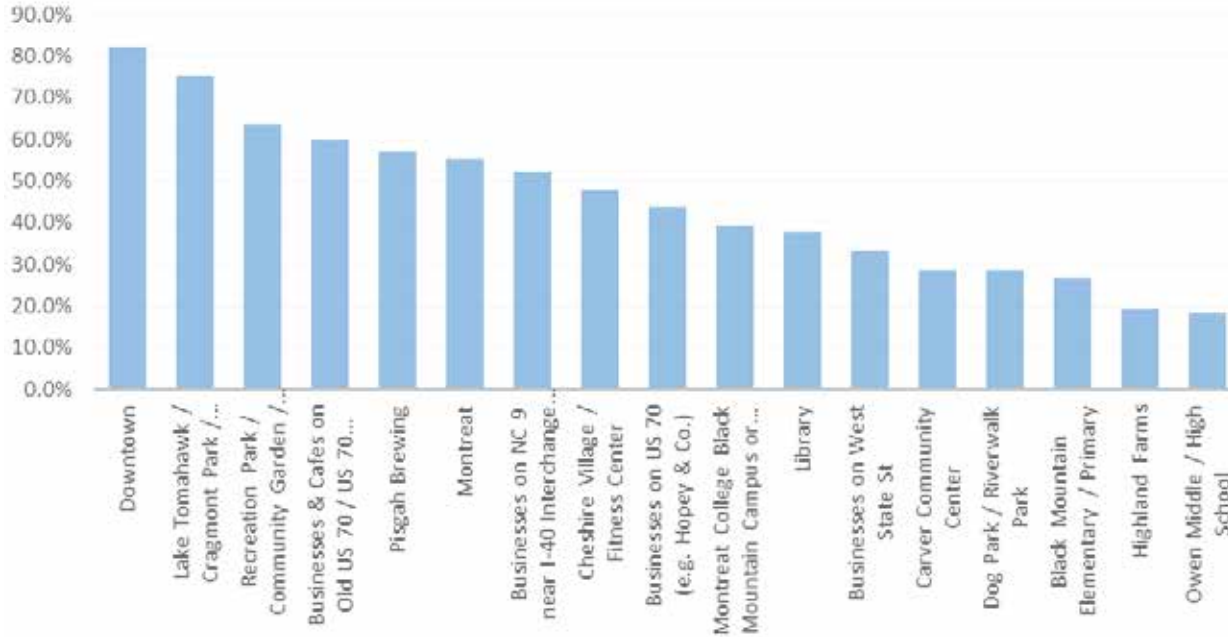
- There are very few children of any age bicycling to school.
- Elementary schools are close but children are often deemed too young to ride alone on roads in Black Mountain.
- Once kids are old enough to ride on their own they must bicycle much further to reach Owen Middle and Owen High, and use some of the more dangerous roads and intersections in Town (Old US 70, US 70 & Blue Ridge Rd).

Question 6: What factors discourage you or members of your household from bicycling more often?



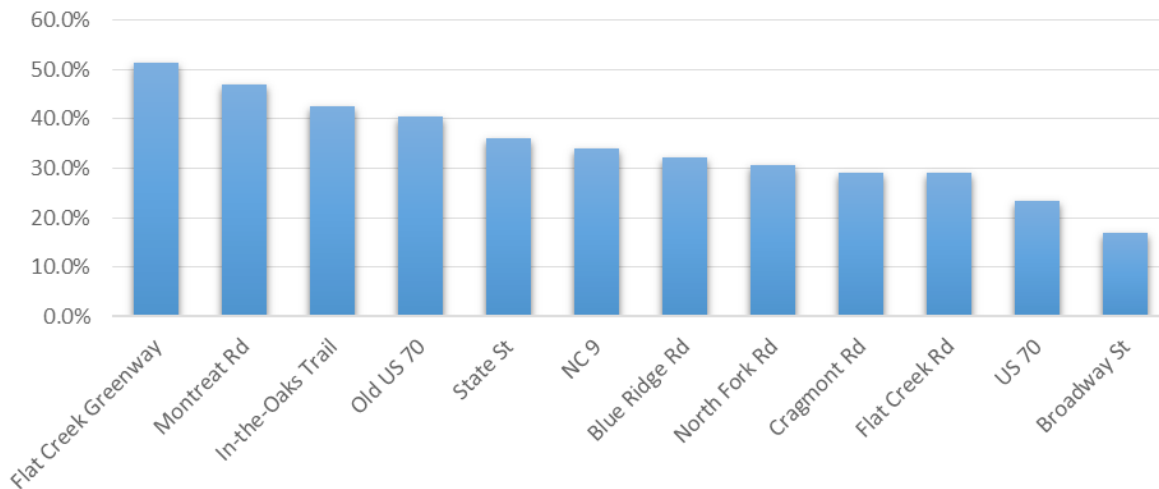
- Over three fourths of respondents or their household members ride less due to the total lack of bicycle lanes or shoulders.

Question 7: What destinations in and around Black Mountain would you or members of your household like to access by bicycle? (Select all that apply, including current bicycling destinations)



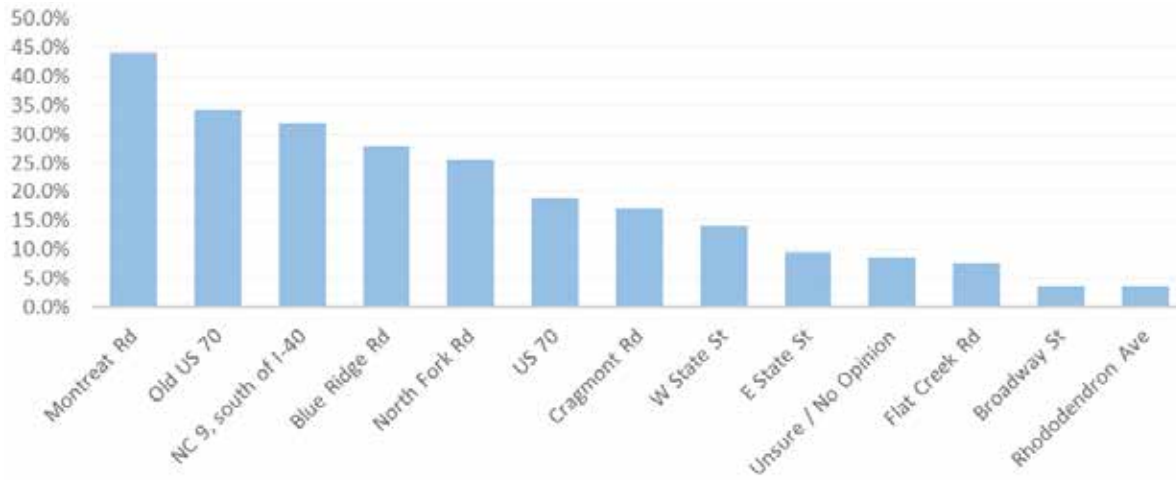
- 82% of respondents would like to be able to access Downtown by bike; 60% would also like to be able to access the businesses between Old US 70 and US 70 (e.g. Dynamite Coffee).
- Lake Tomahawk (75%) the Recreation Park (63%) were the second and third most popular bicycling destinations.
- A majority of respondents also listed Pisgah Brewing and Montreat as bicycling destinations.

Question 8: Which roads or trails do you currently bicycle on in and around Black Mountain? (Select all that apply)



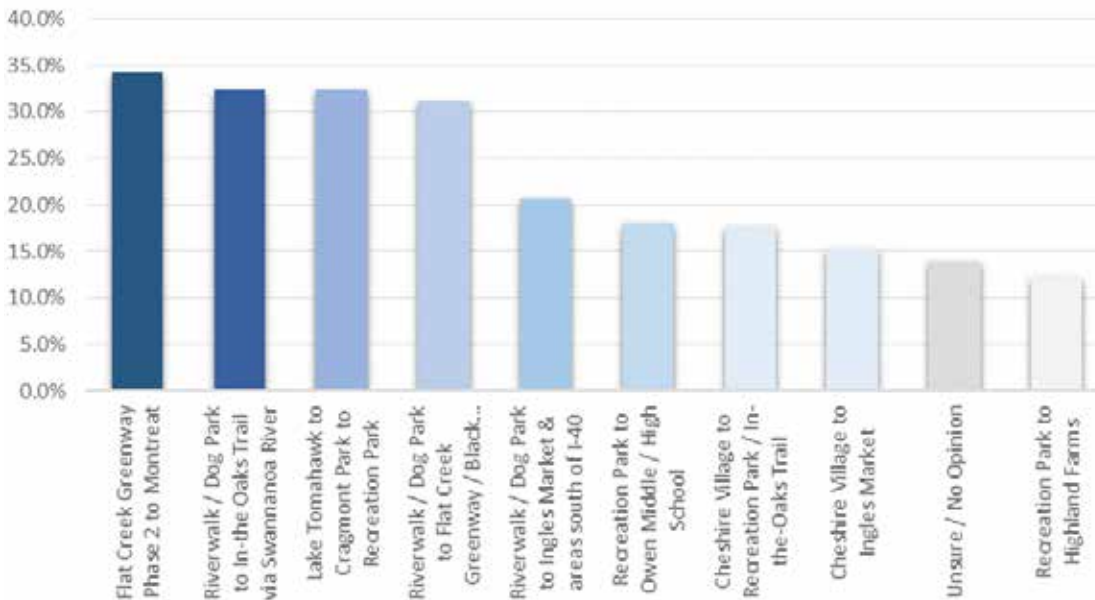
- Half of respondents bicycle on local greenways.
- Almost half of all respondents bicycle on Montreat Road.
- Less than a fourth bicycle on US 70.
- 40% bicycle on Old US 70.
- Around a third bicycle on other major roads in Town.

Question 9: Which roads are most in need of improvements for bicyclists? (Select up to 3)



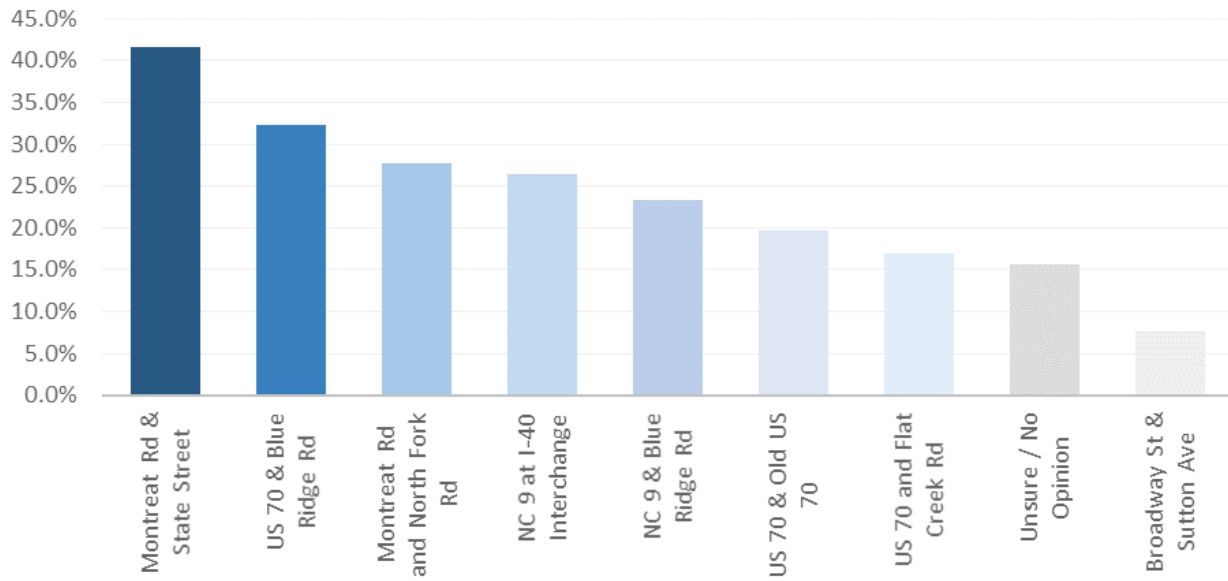
- The roads most commonly flagged for bicycle improvements tended to be those roads most commonly used by respondents (See Q8).
- Montreat Rd was the most commonly listed road in need of improvements for bicycles (44%). This is not surprising given that half of respondents reported bicycling on this road.
- Similarly, Old US 70, another popular route among respondents, was the second most common road (34%).
- Nearly a third of respondents also identified NC 9 south of I-40 as a road in need of improvements for bicycles.
- Less than 20% identified US 70 as a road in need of improvements for bicycles.

Question 10: Which proposed greenway trails will do the most to promote bicycling in Black Mountain? (Select up to 3).



- Riverwalk Dog Park to In-the-Oaks via Swannanoa River as cited by about a third of respondents. However, it requires getting under NC 9, which is probably more important than the rest of the connection since Vance Ave is already very inviting to bicycles.
- Riverwalk Dog Park to Flat Creek Greenway was identified as a priority greenway connection by a third of residents. It requires getting under a railroad trestle & US 70 Culvert.
- Riverwalk Dog Park to Ingles Market & areas south of I-40. This is important because there is no alternative to NC 9 (highest AADT of any road in town) and requires getting under I-40 culverts behind Ingles Market. It would also require getting under NC 9, so there is some overlap with this connection Lake Tomahawk (see below).
- Lake Tomahawk to Cragmont to Recreation Park—This connection scored high, but the connection to the Rec Park is near impossible as depicted in the layer from the pedestrian plan because you would have to build a tunnel or bridge over the Railroad.
- Rec Park to Owen Middle High was selected by 18% of respondents and is also a priority in the Greenways Master Plan

Question 11: Which intersections are most in need of improvements for bicycling? (Select up to 3)



- Montreat Rd and State Street was the top intersection identified for improvements, even though this intersection can be easily avoided by cyclists.
- Crossing US 70 at Blue Ridge Rd is necessary for a variety of trips around Town. It was a highly rated intersection in need of improvement.
- Montreat Rd and North Fork is a dangerous fork in the road at the Country Food Store. Some cars cut through the parking lot.
- NC at I-40 interchange is dangerous due to the very high traffic volumes from the highway, Ingles, and many other businesses with individual entrances off NC 9.

Question 12: Are there any specific locations in Black Mountain where there are hazards or other barriers that make bicycling feel unsafe or inconvenient?

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The most common open-ended comments focused on North Fork Road, Old US 70, US 70, and Highway 9. Specific comments include the following:

“Old 70, 70, and Cragmont are some areas where speeding is common and motorists are not always bike-friendly. Old 70 and Blue Ridge Rd (north and south) would both benefit greatly from a bike lane. The roads are narrow and traffic is heavy- it is hard to bike safely or walk on these roads.”

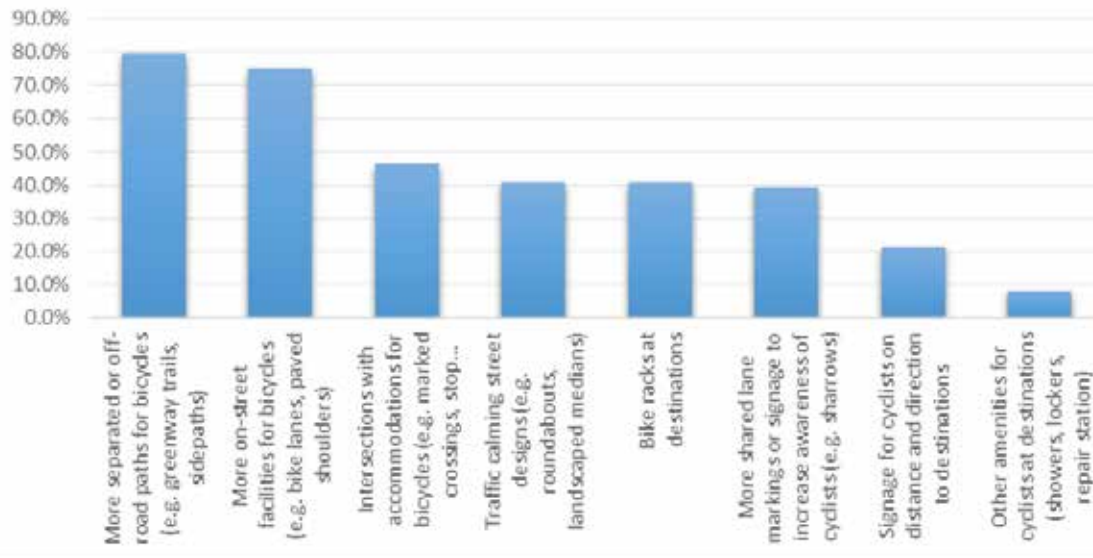
“The narrow section of Blue Ridge Road, nearest Recreation Park is dangerous.”

“I feel most unsafe down stretches of road where motorists go fast and visibility is low, such as Old US 70 and North Fork Road.”

“The intersection NC 9 at I-40 Interchange. It is difficult to time getting across the intersection with stop light traffic and cars coming off the highway. It is much harder to go towards town than towards Ingles. This is partially due to the barrier island for cars turning on to the highway.”

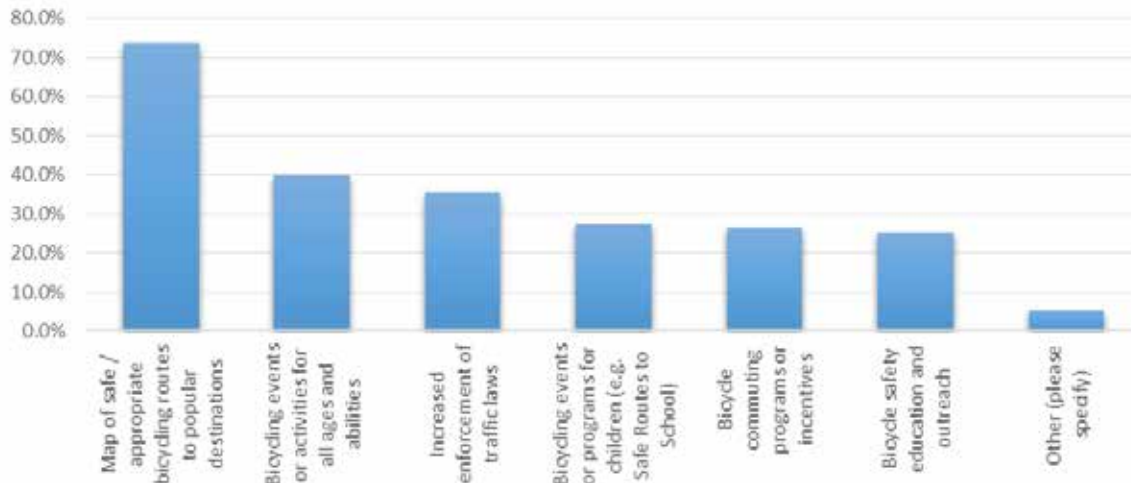
“Crossing Montreat Road is dangerous throughout. A safe crossing somewhere between State Street and Ninth Street would connect neighborhoods and schools better.”

Question 13: What facility improvements would encourage you or members of your household to bicycle more often? (Select all the apply).



- 80% of respondents would bicycle more often if there were more greenways.
- Three fourths of respondents would bicycle more often if there were more bike lanes and shoulders.
- Intersection improvements would encourage nearly half of respondents to bicycle more often.
- Shared lane markings and sharrows would encourage about 40% of respondents to bicycle more often.
- A similar number would bicycle more often if more streets included traffic calming designs.

Question 14: What types of program/policy actions would encourage you or members of your household to bicycle more often? (Select all that apply)

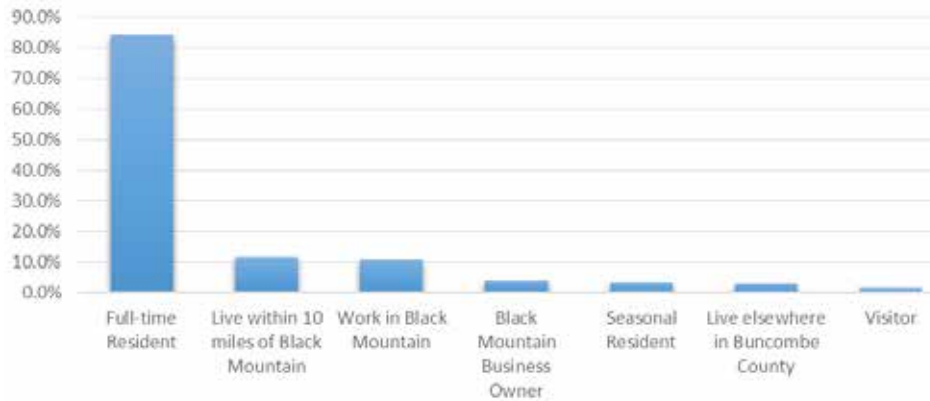


- Three fourths of respondents would bicycle more often if there were a map of safe / appropriate bicycling routes to popular destinations.
- Bicycling events and activities would encourage 40% to bicycle more often.

Question 15: Do you have any additional comments regarding bicycling in Black Mountain?

In the additional comments section of the survey, all participants provided some form of support to encourage bicycling safety and accessibility, among other improvements. Many participants suggested greenway enhancements, including a new greenway that goes to Asheville. Several participants believe that improving bicycling opportunities will lead to an improved economy and healthier community.

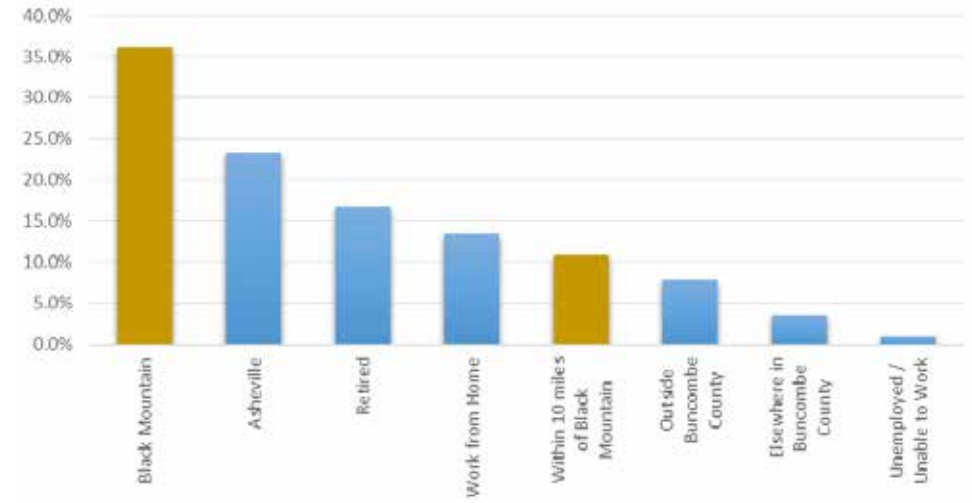
Question 16: Which category best describes your relationship to Black Mountain?



Question 17: What is the intersection closest to your residence?

183 respondents identified the intersection closest to their residence.

Question 18: Where do you work?

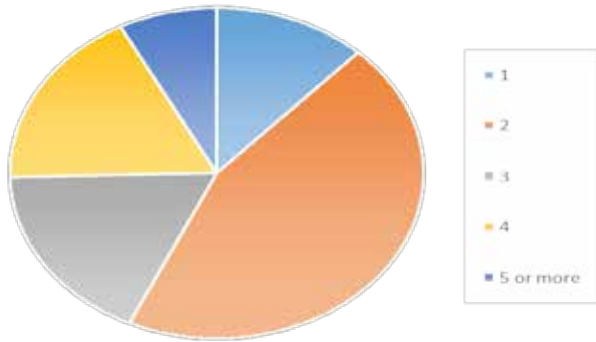


- Over a third of respondents work in Black Mountain
- Another 11% work within 10 miles of Black Mountain.

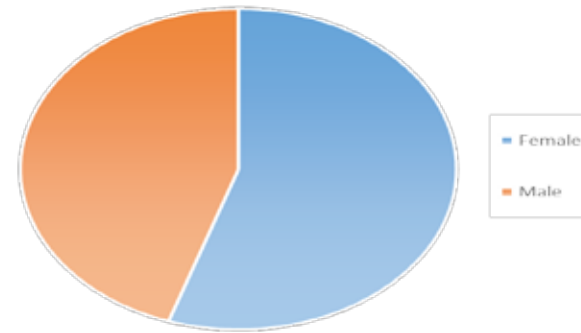
Question 19: Email address

Residents who wanted to learn about updates to the plan provided an email address.

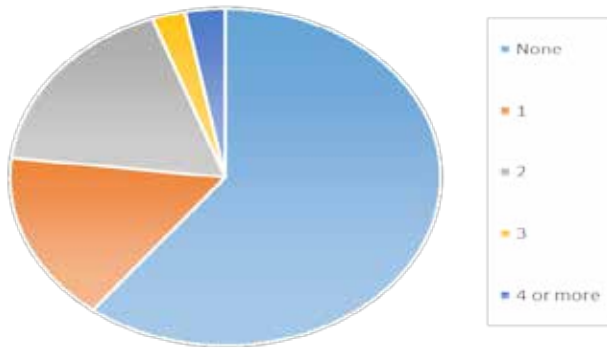
Question 20: How many people currently live in your household?



Question 23: What is your gender?



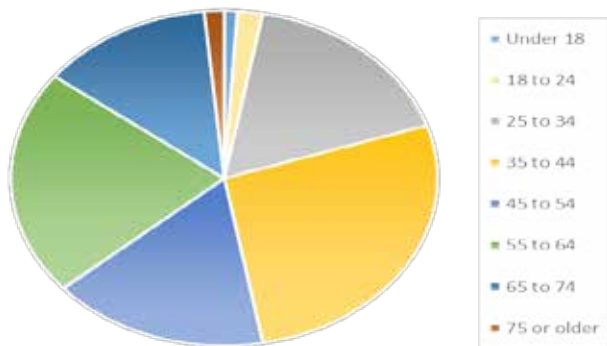
Question 21: How many members of your household are under the age of 18?



55% of respondents are female.

• 40% of respondents have household members under 18

Question 22: What is your age?



There is a good number of respondents from all major age groups.

Appendix B

Cost Estimates

Cost estimates for projects contained in this plan were derived from “planning level” estimating techniques. Due to the scope and resources available for this plan, planning level estimates are used to generalize costs for projects due to the high variability and unknown factors involved. They are based on prevailing construction costs on a per unit (per mile in this case) estimate of general project features, including: asphalt paving per linear foot (shoulders and bike lanes); shared lane markings and signage (on a markings or signs per mile); greenways or multi-use trails. Little is known about available right-of-way due to limitations of GIS data and lack of documented right-of-way along many NC highways. Any greater level of specificity on estimates would imply a level of known detail or level of field work that is not commensurate with a bicycle plan of this type. A feasibility study or detailed design is needed to obtain more detailed estimates. Design costs are typically 10-15% of construction costs. The topography, existing cross-section, and drainage requirements could slightly lessen or greatly increase these values.

Type of Improvement	Unit	Cost
New Paved Shoulders or Bike Lanes on new pavement		
• One side of a street (no curb and gutter to remove or replace) - Easy grading (level grass shoulders)	Per shoulder mile	\$125,00
• One side of a street (no curb and gutter to remove or replace) - Moderate grading required	Per shoulder mile	\$175,00
• One side of a street (no curb and gutter to remove or replace) - Major grading required	Per shoulder mile	\$225,00
• Remove and reset curb and gutter, cover old drainage structures, build new drainage structures	Per shoulder mile plus X per drainage structure	\$150,00 \$250
Bike Facilities on Existing Pavement; or add to above for cost on new pavement		
Signing and marking for Bicycle Lanes on Existing Pavement	Per Mile (Both directions)	\$15,00
Signing and marking for Shared Lanes on Existing Pavement	Per Mile (Both directions)	\$30,00
Upgrade to Buffered Bicycle Lane (Pavement Markings Only)	Per Mile (Both directions)	\$12,00
Upgrade to Separated Bicycle Lane (Channelizing Devices only, add to Buffered Bicycle Lane Upgrade, above)	Per Mile (Both directions)	\$40,00
Paved Multi-Use Trail or Greenway (assume 10-feet in width, asphalt)		
• Multi-use trail along existing railbed (prepped)	Per mile	\$600,00
• Multi-use trail along waterway (creek or stream)- Placeholder for needed bridges, tunnels (Cost will vary)	Per mile Per Each	\$1,000,00 \$1/2 Millio
Major Intersection Upgrades		
• Includes installation of pedestrian signals, audible pedestrian buttons, curb ramp upgrades and crosswalk striping	Per each	\$15,00