Robbinsville Pedestrian Connectivity Plan & Health Impact Assessment

July 2013

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Robbinsville Pedestrian Connectivity Plan

Table of Contents

Page

Acknowledgments

GREAT appreciates the efforts of the following agencies and individuals who contributed funding, time and resources to support the Robbinsville Pedestrian Connectivity Plan.

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1. Toward A More Walkable Robbinsville

Rural communities face unique challenges today more than ever as they have become activity hubs for larger rural regions but remain constrained from a financial and resources standpoint due to a small population base. This comes at a time when Robbinsville and the Graham Revitalization Economic Action Team (GREAT) are working to reimagine the town and promote economic development.

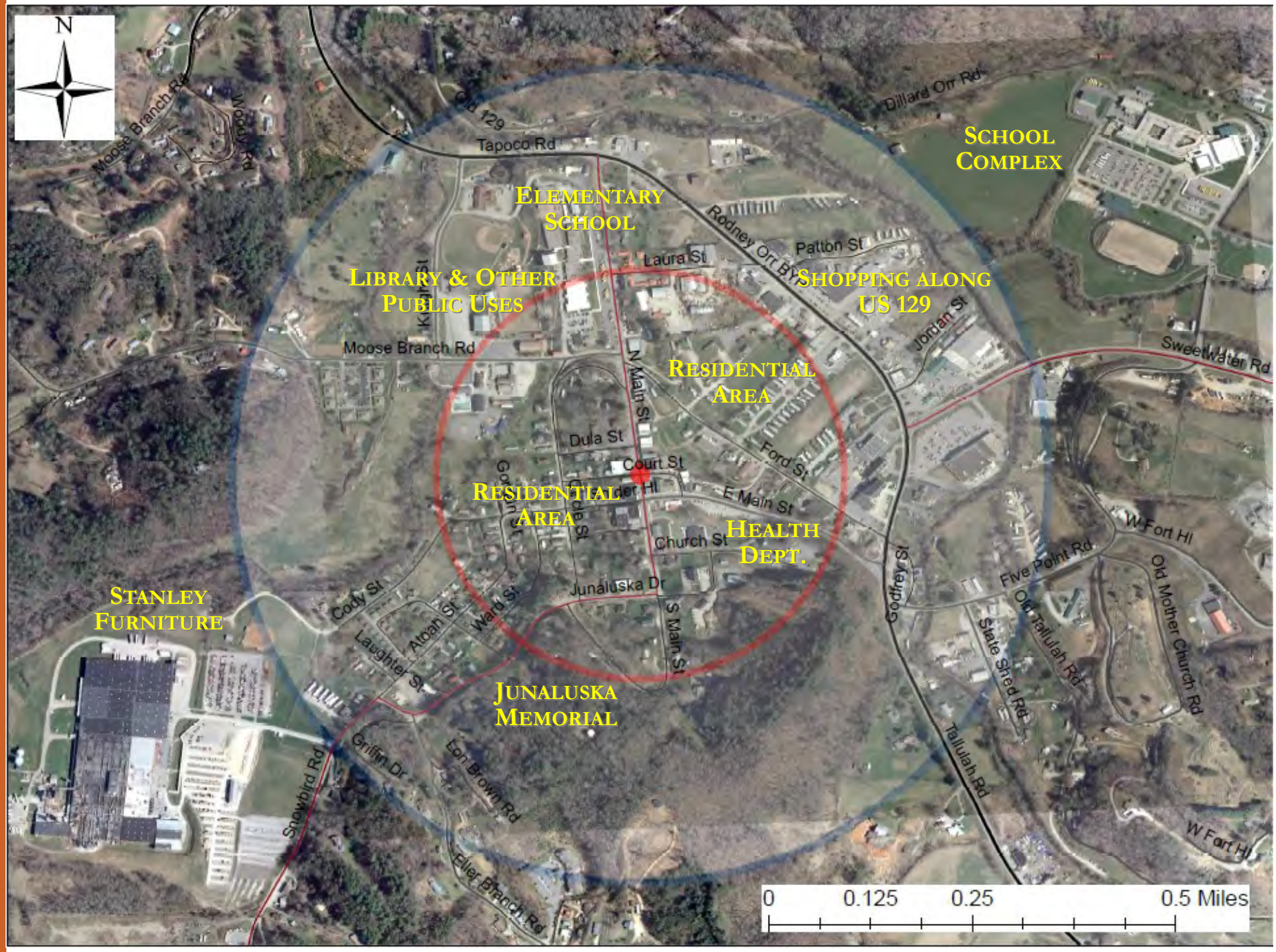
This Pedestrian Connectivity Plan is one step in the process to help reimagine the community on the heels of several other strategic planning efforts. In 2012, *Reimagining Robbinsville* set forth a series of strategies to help the community rebound from the economic downtown and promote the area for its natural beauty. Walkability is a key component of this economic renaissance for Robbinsville as several indicators suggest investing in greenways and sidewalks can have economic returns akin to investing in other type of infrastructure or economic incentives.

In a 2012 report, *The Changing Face of Rural and Small Town America*, the Environmental Protection Agency identified five areas of obstacles for small towns. Many of these reflect how a community can respond, in part, by creating a more walkable area as emerging demographic, health, and economic trends suggest physical activity and having places to recreate is at the heart of reviving small towns.

1. **Changing Demographics**. Rural communities find young adults continuing to move out of their areas. Moreover, older adults tend to be moving in. All of this leads to declining birth rates and rapidly aging populations in many rural communities.
2. **Health Issues.** In rural communities, obesity rates tend to be higher than the national average among every age group. This results from many rural areas lacking access to specialized medical care and an increasingly auto-reliant population. As an aside, children in rural areas tend to not walk to school as much as those in urban neighborhoods.
3. **Housing.** Based upon trends, young professionals, trades people, minorities, and some seniors prefer smaller, multi-family housing versus conventional single-family homes. Unfortunately, the single-family homes tend to be in larger supply in the rural towns.
4. **Rental Share.** In addition to the houses themselves, many, especially younger, people seek rental housing. Rental demand is increasing nationwide, but the change has been difficult for nonurban areas.
5. **Energy.** Despite the high cost of fuel, rural populations are very auto-dependent. Distance to certain markets and resources cause these energy costs to rise more because individuals must purchase more fuel.

Walkability is nothing new for Robbinsville. The community has always been a place where residents can comfortably walk from place to place. Re-creating the walkability throughout Robbinsville will fulfill many goals for the Town and GREAT as well as promote economic development.

Exhibit 1-1—Activity Connection Plan: Many Destinations within Robbinsville are within an easy 1/2-mile walk from Downtown.



While these may not be all of the problems, GREAT, the citizens of Robbinsville and Graham County have noted problems with health care, the protection of resources, and the loss of youth as major obstacles to economic development. Thinking about these problems provides an excellent launching point to assess the economic impacts of pedestrian connectivity in Robbinsville.

In this Plan, the concept of walkability, the economic impacts of walkability, and how it all ties into making Robbinsville more walkable are explored. Many of the economic benefits will address some of the problems listed here, as well as some of Robbinsville's goals, as stated in *Reimagining Robbinsville*, such as fostering a sense of place, providing recreational activities, and revitalizing downtown.

What is Walkability?

Walkability seems to be a term that individuals more intrinsically know than can exactly define. The Victoria Transport Policy Institute defines it as: "the quality of walking conditions, including factors such as the existence of walking facilities and the degree of walking safety, comfort and convenience." Everyone must remember that walking is the most basic and the cheapest form of transportation. Furthermore, people still walk, even in rural areas.

The Rails-to-Trails Conservancy analyzed data from the National Household Travel Survey and found that many in small, rural core communities and even more peripheral communities use walking and biking for just over 8% of their total trips from home. This is almost as much as larger, rural core communities and more than communities just outside urban areas. Based on this data, people will walk and bike given the opportunity, and plenty of room is available to grow into these modes of transportation.

Walkability in Robbinsville

The theme of walkability is not new to Robbinsville. One only has to examine historical images to see scores of people walking around town. An old picture housed in the Robbinsville Town Hall shows the current courthouse square with bicycle racks that are full.

Currently, much of Robbinsville remains within an easy walking distance to downtown, community facilities, shopping areas and recreational destinations. Perhaps just as important as investing in infrastructure to promote walkability is the retention of public facilities, government offices and other services within this convenient walking radius (Exhibits 1-1 & 1-2).

In 2012, the development of *Reimagining Robbinsville* set various recommendations for the future of the community. All have a tie, directly or indirectly, to walkability. It is these themes, as well as those outlined in GREAT's strategic plan, on which the Pedestrian Connectivity Plan was built.

These goals from *Reimagining Robbinsville* related to walkability include:

Even though pedestrian facilities in Robbinsville are not along every street, the community remains a walkable place because destinations are within walking distance and land uses such as government offices, shopping, parks, the library and schools are within the town limits or nearby.

Photo: Don Kostelec

Sidewalks: A Smart Investment

In her article, "Sidewalks—A Smart Investment," Dr. Kathleen Beine of Kingsport, Tennessee notes that "there are many approaches and solutions to the [health] crisis… A significant part of the solutions is to make it easy to be physically active---where you don't have to load up a car and drive someplace, or join a gym. Just make it easy by walking out your front door and lead your family on a neighborhood adventure outing, possibly to a small community park to play and visit with other neighbors."

"Sidewalks are smart investments. Benefits of properly-designed sidewalks and connectivity include:

- ⇒ Improved pedestrian safety…
- ⇒ Improved safety for motorists (not worrying about hitting a pedestrian, so they have a head on collision with a car)
- ⇒ Improved sociability and neighborliness
- ⇒ Improved air quality from decreased usage of vehicles
- ⇒ Improved family budgets because of being able to safely walk on short trips rather than driving (25% of vehicle trips are less than 1 mile)
- ⇒ Improved health, ie., aerobic capacity, cardiovascular fitness, muscle strength and balance; decreased obesity, diabetes, heart disease, high blood pressure, asthma, cancers of various types
- ⇒ Improved mental & emotional health, ie., decreased depression, anxiety, and social isolation -improved work performance, on the job and at school (that's where kids work)
- ⇒ Decreased medical costs for individuals and companies
- ⇒ The cost of a mile of sidewalk is cheap compared to emergency room visits, operations, hospital stays, rehab, and sometimes, permanent disability."

- Promote tourism by creating more location attractions.
- Develop greenways and parks to convert waterways into an asset for the community.
- Revitalize downtown by renovating vacant or underutilized properties and improving the streetscape.
- Improve appearance of the US 129 Bypass by making it more inviting to pedestrians.
- Promote local economic development to grow jobs locally and create a more resilient economy.
- Initiate community dialogue on sensitive issues to raise awareness and promote understanding.

Further, GREAT's recent update to its Strategic Plan reinforced many of these concepts and contained the following references that pertain to walkability:

- Enhance Graham County's infrastructure, facilities and the beauty of its towns and communities to support business and industry needs, tourism, recreation and quality of life. (Revitalization and Infrastructure Goal)
- Improve the health and social climate to position it as a model for quality of life in a mountain community. (Health and Social Goal)
- Maximize travel, tourism, and sustainable recreation opportunities as core contributors to business growth and quality of life while protecting valuable natural resources. (Tourism and Mountain Culture Goal)
- Improve the climate for existing businesses and entrepreneurs to thrive and connect to recruitment of new firms. (Economic Development, Business and Industry Goal)

Other key themes related to walkability contained in the individual objectives for GREAT's focus areas include:

Exhibit 1-2—Trips and Distances People are Willing to Walk

The 5E's of a Pedestrian Plan. **A Comprehensive Pedestrian Plan evaluates walkability through the lens of these 5 critical features of promoting a more walkable community.**

Direct:

- Support the installation of lighting and construction of walkways, sidewalks and greenways.
- Consider infrastructure needs for retirees.
- Provide information about transportation system enhancements.
- Explore grant opportunities to purchase property for public use such as a recreation complex.
- Increase active living options.
- Encourage reduction of the county's diabetes rate and help reduce and prevent obesity.

Indirect:

- Explore more services needed by seasonal tourists and visitors.
- Promote the development of a new Visitor and Welcome Center.
- Encourage continued renovation or removal of downtown buildings.
- Identify partners and funding opportunities.
- Expand recreation opportunities in the county.
- Provide support in seeking funding to accomplish the goals of the Recreation Master Plan.
- Support marketing and branding of nature-based tourism.

Planning for the 5E's

The foundation of the Pedestrian Connectivity Plan is built upon an examination of what is known as the "5E's" of a planning effort for walkability. Recognition of the variety of users along sideawalks and greenways, as well as the facilities they desire, led to this 5E approach that includes: Engineering, Education, Encouragement, Enforcement, and Evaluation.

Engineering represents what has been built or is planned to be built in the community to promote sidewalks and greenways, inclusive of developing recommendations for how they are built. Specific elements of the built environment include how pedestrian and bicyclists are considered in greenway corridors and in street design and construction that connects neighborhoods, downtown areas, natural features and other destinations to the sidewalk and greenway system. The interface with rivers, streams, parks, schools and natural areas is also an important consideration in how sidewalk and greenways are designed. Land use, including its design and placement, is a key element of a Complete Streets program to ensure pedestrians and bicyclists can access destinations along a well-designed and safe route.

Education is another key component for users of sidewalk and greenway systems—pedestrians, bicyclists, pedestrians, joggers, visitors and others—should be well-informed of safe methods to use sidewalks and greenways, how to interact with other users, and understand how to use the system in a safe manner. Various outreach programs and informational materials should be developed by a community to address all ages and all types of users.

Encouragement is inclusive of how a community promotes and encourages use and stewardship of its sidewalks and greenways through volunteers, schools, non-profit organizations, land conservancies, bicycle clubs, organized events, promotional materials and marketing, maps of sidewalks, greenways and trails, and Safe Routes to Schools programs. The development of other facilities such as sports fields, running tracks, river access points, fishing docks, velodromes, BMX tracks and mountain bike trails are also an element of encouragement that are associated with promoting walkability in many communities.

Enforcement relates primarily to the knowledge base of the law enforcement community and volunteers who look after the sidewalk and greenway system to encourage safe use. Enforcement programs include targeted efforts to encourage users to safely share the route or trail.

Evaluation is the method by which a community understands and tracks the progress of its various projects, programs and policies to measure how well it is performing. Many communities track performance of their pedestrian system and progress of the community by examining use through regular counts of users, tallying how many children participate in greenway programs, how many volunteers are registered to help maintain sidewalks and greenways and tracking how the system is growing.

Adjunct uses, such as mountain bike tracks, near greenways are necessary to maximize investment in the greenway and other pedestrian facilities. They are also an encouragement effort to promote walkability as well as bikability.

Photo: Don Kostelec

Recommendations

As GREAT, the Town of Robbinsville and various partners work toward implementation of this plan, it is important to remember these key tenets of walkability:

1. **Design with people in mind**. Remember that walkability is all about how people feel in reference to their pedestrian facilities. Therefore, successful pedestrian paths require consideration of this, particularly in terms of proximity and access.
2. **Use the plan to edify other aspects of Robbinsville**. Just as signage helps direct people to places around a town, the pedestrian paths will guide users to different parts of Robbinsville. Based on information from previous efforts and this one, some possible connections could be with downtown, Stanley Furniture, the high school, and the Forest Service trail. With an area like downtown, make sure to enhance it along with the pathway to provide the full walkability experience—to provide a destination.

This Pedestrian Connectivity Plan is just one step in helping to ensure a more walkable future for citizens and visitors in Robbinsville. Recommendations such as a Streetscape Plan for Main Street will help further the goals contained in this and other area plans.

Photo: Don Kostelec

3. **Community-based efforts increase use**. Research shows that community-wide campaigns increase usage of exercise facilities like pedestrian paths. This requires the Town, the community, and likely, the County to get together and encourage people to exercise and use the paths. Remember, this isn't government telling people what to do; it's the community seeking to improve itself.

4. **Measure the impact periodically**. The community will always want to know the real impacts it receives from investments like these. One idea may be counting pedestrians at annual events or along popular routes during busy times. Another might be tracking business owners' opinions of consumer spending before the facilities and a series of times afterward., though the general economy may influence that one a bit more.

5. **Keep in mind that this is a first step**. Changes will not occur overnight, but over time, Robbinsville may have a healthier community with more business activity. However, this requires the community to engage in the development effort through use, activity, and perseverance.

2. Project Recommendations

Developing a list of projects to improve walkability in Robbinsville is not as simple as identifying where sidewalks exist and where they are missing. Identifying projects that promote walkability is an exercise in identifying destinations or land uses that are most likely to generate pedestrian trips if linked through a network of quality pedestrian facilities.

The concept of "quality" is critical to understand as pedestrians are not a homogenous user of the transportation system; seniors have different needs than adults, as do children. Understanding what constitutes a quality of service for each user type will lead a community down the correct path to identify the proper pedestrian facility and corresponding dimensional needs.

Types of Projects

The types of project recommendations explored for the Robbinsville Pedestrian Connectivity Plan constitute a mix of traditional treatments along with some innovative and even cutting-edge solutions geared toward low-cost but effective implementation strategies. The breadth of pedestrian facilities recommended in this plan are summarized below.

Traditional Applications: These project types are what you would typically see in visiting most towns. Sidewalks and greenways are a standard element of most pedestrian networks and represent the "ideal" improvement. As with any pedestrian improvement, "universal design" standards should be followed to ensure the facility is accessible to all users of all abilities at all times.

- **Sidewalks** are the standard pedestrian facility consisting of a concrete paved walkway of at least 5-feet in width. Sidewalks are preferred along both sides of many town streets that have connectivity through town or connect parts of town. Some residential or side streets may only necessitate sidewalks on one side, based on topographical or right-of-way constraints or lower traffic volumes. Sidewalks are generally accompanied by curb and gutter to manage stormwater that falls on the street. In downtown areas, the sidewalk dimensions should reflect a higher level of use and therefore be wider to allow for more pedestrians to walk side by side or pass one another.
- **Greenways & Sidepaths** are multi-use trails meant for all types of non-motorized users. Because they are designed for pedestrians, bicyclists, joggers, non-motorized scooters, roller bladers, etc., the width of a greenway should be at least 10-feet, with 12-feet accommodated in high traffic areas. Greenways typically follow natural areas such as rivers and streams or bisect parks. Sidepaths are greenways located alongside streets (think of them as a much wider sidewalk built for bicyclists to use) and are typically used to link other greenways.

Not all pedestrians have the same needs. The quality of the pedestrian environment is important to consider when building projects to promote walkability. Main Street in Robbinsville is a place where all types of pedestrians are likely to be present, therefore the design of the sidewalks should be wider and provide more amenities than along less-traveled routes.

Photo: Don Kostelec

Extruded Curb/ Wide Shoulder Path

Pedestrian Lane

Pedestrian Shared Lane Markings

Innovative Applications: These applications are intended for situations where building the optimal solution may be impractical or cost-prohibitive. These solutions are not contained in most agency design standards and have come about as designers have tried to accommodate pedestrians in creative ways while still ensuring they are accessible to all users.

- **Extruded Curb / Wide Shoulder Walking Paths** are a pedestrian facility that have the same width as a sidewalk but are not separated from the street by curb and gutter. Rather, these facilities are along an extension of the road bed, separated by a raised curb. The benefit to these facilities are that they do not require more costly improvements to install stormwater systems. They should be considered only where sidewalks are cost prohibitive or drainage characteristics of an area necessitate a non-traditional solution. They should be 5-feet wide and follow all running and cross slope requirements associated with ADA-compliant sidewalk design.
- **Pedestrian Lanes** utilize existing on-street pavement width to delineate space for exclusive use by pedestrians. These lanes are simply painted on low volume, low speed streets where sidewalks or other types of pedestrian facilities are not feasible. As with a sidewalk, a pedestrian lane should be 5-feet wide. They generally follow the running slope of the street as they are contained within the street roadway prism. Decorative colors, specialized marking and signage may be used to denote the space is for pedestrian use and raise awareness to motorists that they should expect pedestrians to be sharing the street.

- **Pedestrian Shared Lane Markings** are a cutting-edge treatment for residential streets that do not contain sidewalks. They consist simply of painting feet or shoe prints on the street in decorative colors in the most common direction of travel along one side of the street. They should not be viewed as an "engineered" solution but rather as a community project to heighten the awareness of pedestrians. They should only be used on residential streets where there is limited vehicular traffic.

Identifying Projects for Robbinsville

The process of identifying projects for the Robbinsville Pedestrian Connectivity Plan consisted of:

- Reviewing results of *Reimagining Robbinsville* and the US 129 Streetscape Plan;
- Gathering feedback at the GREAT Annual Meeting and through GREAT's Revitalization and Infrastructure Committee about popular destinations and walking routes;
- Consultant field review; and
- The Health Impact Assessment & Activity Connection Plan®.

From this input, the project recommendation profiles contained in this chapter were developed at what is referred to as a "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 GREAT, the Town 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 a series of four phases depending on their level of complexity. 1. *Feasibility studies* may occur on projects like greenways or streetscape plans to gather more information; 2. Most projects begin with *Design*, which is the 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 process indicates additional land is needed; in some cases there may be existing right-of-way to accommodate the project; and 4) Once the project is designed and land has been acquired or is available, the project may then move into the *Construction* phase. A majority of the projects identified in this Plan are at a point they can move into either a design phase or a joint feasibility study / design phase. Depending on the implementing agency, design may be done by in-house staff or can be contracted through a design consultant.

This photo rendering illustrates what a greenway along Knight Street in Robbinsville could look like. Providing adequate buffer space from the street as well as innovative stormwater management treatments in the buffer will help fulfill goals of *Reimagining Robbinsville.*

Rendering: Equinox Environmental

In some areas of Robbinsville, projects consist of sidewalk replacement to upgrade and improve existing sidewalks and bring them up to current standards for accessibility.

Photo: Don Kostelec

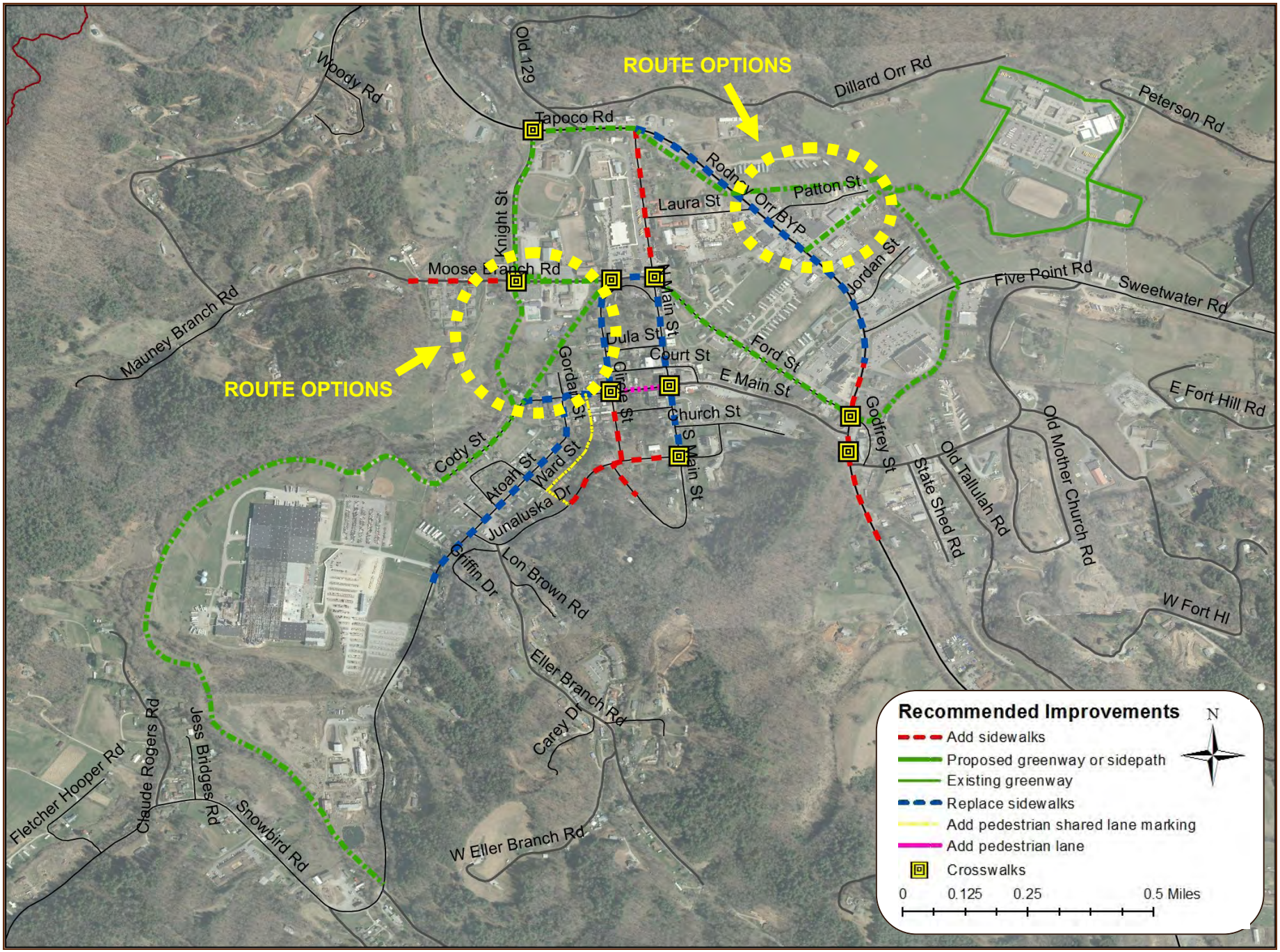
Prioritizing Projects

There are 9 project profiles on the following pages for GREAT and the Town of Robbinsville to move forward with implementation. The first three projects are considered to be of highest priority; three are considered to be of a moderate degree of priority; and three are low priority. The priority of the projects was judged based on the following qualitative parameters:

- **Economic development potential:** The likelihood the project can generate measurable financial return for Robbinsville.
- **Health impact:** The likelihood, as judged through the HIA, that the project will lead to positive health outcomes for the community.
- **Pedestrian demand:** Based on the project's location and how it links destinations, how much pedestrian usage is likely to result from the project.
- **Partnerships:** The likelihood of an array of potential partners would lead to a project being ranked higher in order to help diversify funding sources and engage stakeholders.
- **Need for completing the street**: Based on current conditions, the likelihood the project will greatly impact the users experience and promote safe usage by building the sidewalk or trail.

Each criterion was assigned a rank based on high, moderate or low impact. Based on the combination of these criteria, the projects were then sorted into priority order in which they are listed in this document.

Exhibit 2-1: Map of Pedestrian Project Recommendations for the Robbinsville Pedestrian Connectivity Plan



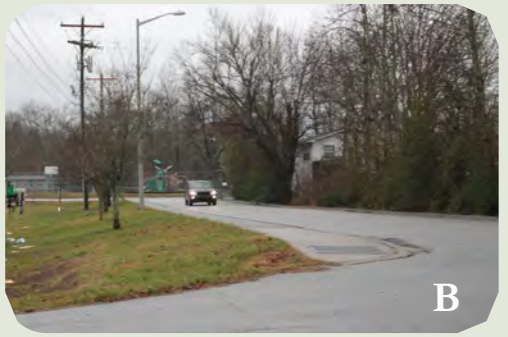
Robbinsville Greenway Connecting the School Complex to Stanley Furniture

The idea of a crosstown greenway emerged during *Reimagining Robbinsville* as a way to connect the high school complex and its fitness facilities to the planned recreational facilities at the Stanley Furniture property. Through the Pedestrian Connectivity Plan, the consultant team conducted more detail field evaluation of the routes posed in *Reimagining Robbinsville* to help GREAT and its partners narrow routing options in order to move into the design phase for the greenway.

The greenway is deemed to be the **Highest Priority** identified in the Robbinsville Pedestrian Connectivity Plan.

Cost Estimate (from edge of School property to edge of Stanley property):

Construction:		**$400,000**
Amenities (varies):	**up to**	**$ 60,000**



Route Description

Rodney Orr Bypass Section (image A). A 10-foot sidepath should be constructed along US 129 with considerations made to consolidate parking uses and connect businesses to reduce driveway cuts. Separation from the roadway and the greenway could be accommodated between Main Street and Knight Street to create a median between the two. Crosswalk improvements along this corridor should explore opportunities for refuge islands, and other techniques to create a node for greenway and park connectivity.

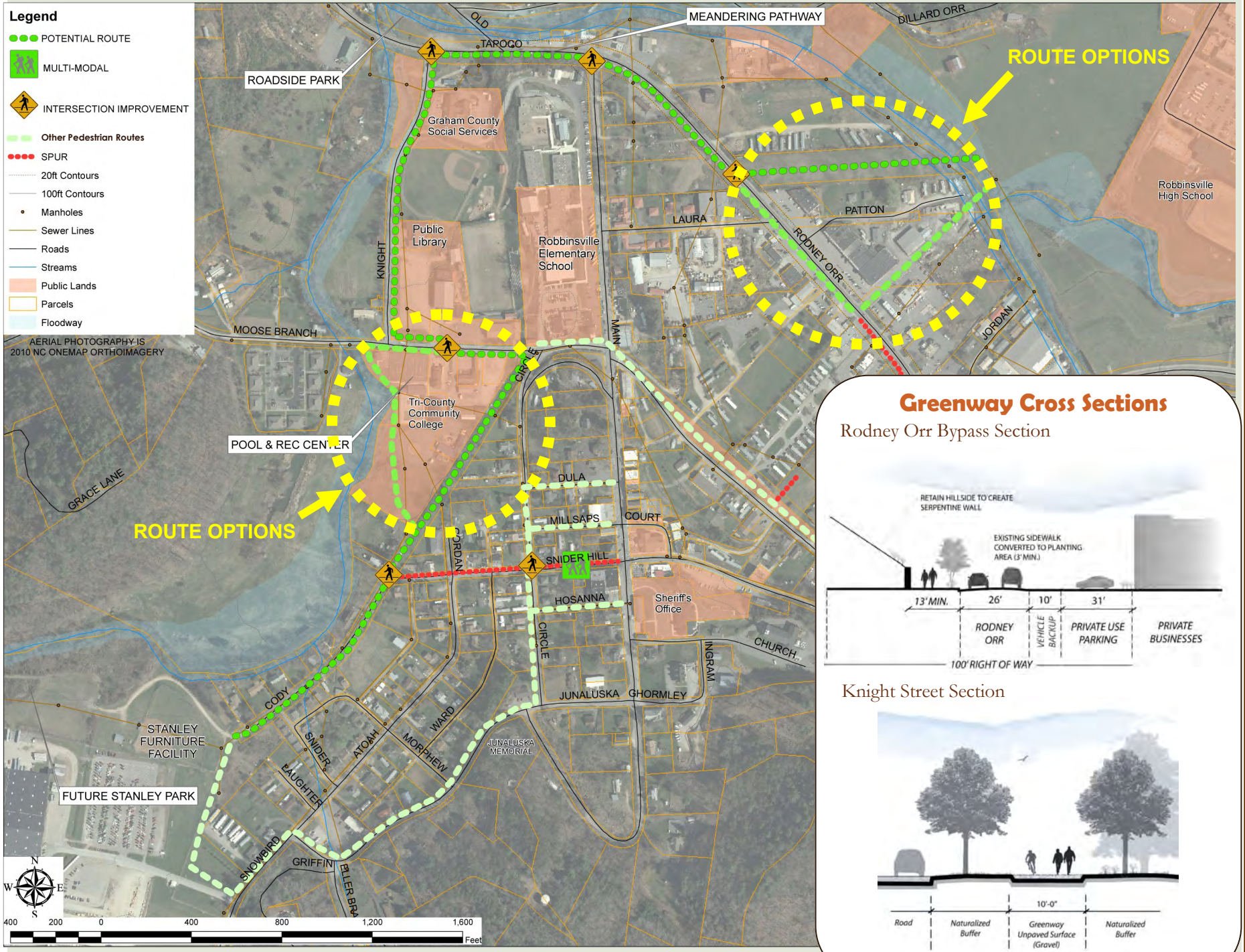
Knight Street Section (image B). A 10-foot sidepath should meander between the street and parking areas on the east side (in place of the existing sidewalk), creating a green buffer for the user and serving as a stormwater treatment area. This section would provide direct access to publicly-owned facilities such as the Library, Gym, ball fields, Robbinsville Elementary School, and Social Services. Circulation patterns and parking re-configuration should be studied to integrate the greenway and minimize loss of parking.

Moose Branch to Stanley Furniture. The corridor of Knight Street terminates into Moose Branch Road. An existing crosswalk in this location connects the public uses to the Community College property. An abandoned rail line exists along the eastern boundary of the property which appears to be within municipal right of way.

This roadbed could serve as a logical connection between Moose Branch and Cody Road (which terminates at Stanley). Abandoned rail beds provide ideal greenway conversion as they often lie at a gentle grade, are located within public ownership, and are graded to drain stormwater properly. An alternative route was identified along the western perimeter of the college, although this connection may entail topographic use (a playground), as well as other spatial challenges. This route will likely require flood modeling to ensure the alignment would not cause a rise along Long Creek. Another sidepath would follow Cody Street within the right-of-way to Stanley property.

Goals	Magnitude
Economic Development Potential	●
Health Impact	●
Pedestrian demand	●
Partnerships	◉
Need for Completing the Street	◉
Project Priority	●

High Degree ● | Moderate Degree ◉ | Low Degree ○



Greenway Cross Sections

Rodney Orr Bypass Section

Knight Street Section

US 129—Rodney Orr Bypass Replace Sidewalks, Fill Gaps, & Upgrade Streetscape

The US 129 Streetscape Plan (2013) identified design options for upgrading the pedestrian environment along US 129 from its intersections with North Main Street and East Main Street. This project includes the recommendations from the Streetscape Plan to replace the existing sidewalk with a new 5-foot sidewalk with a 5-foot grass buffer between the curb and sidewalk. In some locations the width of the buffer may vary based on existing buildings and slopes leading to ditches along the route. A portion of the route includes the proposed greenway. Speed limit on US 129 is 35 mph.

Context: US 129 is the most heavily traveled vehicular corridor in Robbinsville and is the location of many of the town's businesses. It is also a major connecting route to other traffic generators such as the School complex, Stanley Furniture and other communities in Graham County. The three-lane facility has moderate traffic volumes and a speed limit of 35 mph. For pedestrians, the current environment is not unpleasant but could be enhanced. NCDOT added new crosswalks and pedestrian signals at the intersections of North Main Street and NC 143. A mid-block crosswalk was also added in front of the Village Shopping Center.

Goals	Magnitude
Economic Development Potential	●
Health Impact	◎
Pedestrian demand	●
Partnerships	◎
Need for Completing the Street	○
Project Priority	●

High Degree ● | Moderate Degree ◎ | Low Degree ○

Cost Estimate:

Replace with 5-foot Buffered Sidewalk:		$700,000
Streetscaping (varies):	up to	$150,000

Main Street, US 129 to Junaluska Road Replace Sidewalks, Fill Gaps, & Upgrade Streetscape

Robbinsville Main Street is the old thoroughfare that linked the town to other communities and nearby destinations prior to construction of the US 129 Bypass. Main Street was envisioned in *Reimagining Robbinsville* as a major streetscape enhancement in the downtown core. This would coincide with a rebuilding of existing sidewalks. Sidewalk should be added north of Ford Street to connect to US 129 and link businesses along this section of Main Street and the Elementary School to other parts of town. The speed limit along Main is 20 mph.

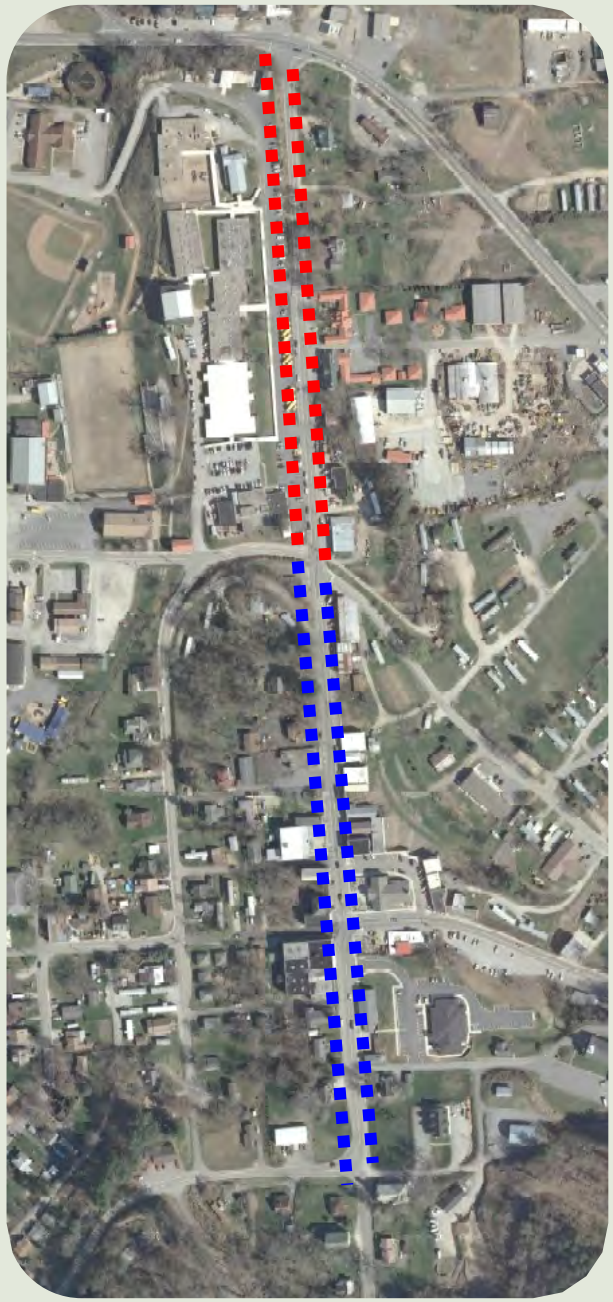
Context: Main Street is a low speed street leading into downtown Robbinsville. It links the school, businesses, town and county offices and the health department. Some truck traffic uses Main Street, primarily to access Stanley Furniture. A parking lane on the school property will need to be evaluated for removal in order to install sidewalks. The two-lane facility has low traffic volumes and a speed limit of 30 mph. For pedestrians, the current environment is confusing due to disconnects in the sidewalk and inconsistent treatments along store frontages. A crosswalk should be added at Ford Street. A pedestrian signal may be warranted in the future with the greenway.

Cost Estimate:

Replace Downtown Sidewalks: $150,000

Build New Sidewalk, Ford St. to US 129: $ 150,000

Streetscaping (varies): up to $ 100,000



Goals	Magnitude
Economic Development Potential	●
Health Impact	◎
Pedestrian demand	●
Partnerships	◎
Need for Completing the Street	◎
Project Priority	●

High Degree ● | Moderate Degree ◎ | Low Degree ○

Ford Street, Main Street to US 129 Construct greenway along former Railroad right-of-way

Ford Street is a neighborhood connector route between Main Street and US 129. It links residential areas along Ford Street to the Elementary School, parks, and shopping. The old railroad right-of-way runs along the north side of the street and portions of the old road bed are still visible near the intersection with Main Street. The proposed 10-foot wide multi-use trail would provide a linkage in the greenway system with the potential (long-term) to create a loop along Tallulah Creek. There is no posted speed limit sign along Ford Street (one should be installed).

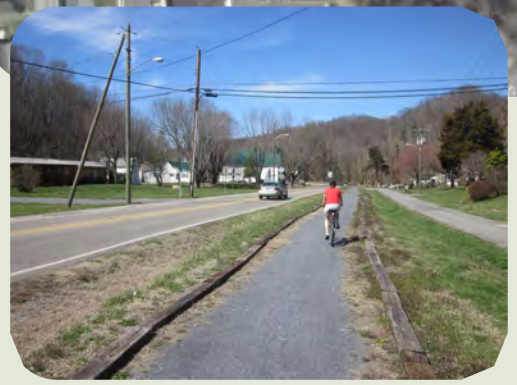
Context: Ford Street is a low volume roadway with narrow travel lanes, which reduces traffic speeds. There are some pedestrian facilities along the street but they are substandard and in disrepair. Residents in the area would benefit from non-motorized access to many of the town's destinations along this route. Once constructed, in combination with the Robbinsville Greenway, this would link these neighborhoods to recreational destinations along Knight Street and at the Stanley Furniture Recreation Park.

Goals	Magnitude
Economic Development Potential	○
Health Impact	●
Pedestrian demand	◉
Partnerships	○
Need for Completing the Street	●
Project Priority	◉

High Degree ● | Moderate Degree ◉ | Low Degree ○

Cost Estimate:

Construct 10-foot pathway: $100,000 (gravel) / $300,000 (paved)
Pocket park (varies): up to $100,000



Left: What a unpaved greenway along Ford Street might look like. An unpaved trail will require more maintenance than a paved trail.

Circle Street, Moose Branch Road to Junaluska Road Replace Sidewalks & Fill Gaps

Circle Street has old sidewalks along its west side north of Atoah Street but they are in disrepair. Sidewalks do not exist south of Atoah Street. Right-of-way may need to be acquired south of Atoah Street to build the sidewalk. Replacement of the existing sidewalks should be the priority given existing linkages. The speed limit is 20 mph.

Circle Street will connect to the future Robbinsville Greenway along Atoah Street or Moose Branch Road. Crosswalk or other signage needs should be examined at Moose Branch Road once the greenway project materializes.

Context: Circle Street connects neighborhoods west of downtown to the Elementary School and other public facilities along Moose Branch Road and Knight Street. It could also provide a future linkage to the Junaluska Memorial in combination with other pedestrian improvements along Junaluska Road.

Cost Estimate:
Replace Sidewalks: up to $30,000

Build new sidewalk: up to $40,000

Goals	Magnitude
Economic Development Potential	○
Health Impact	◉
Pedestrian demand	●
Partnerships	○
Need for Completing the Street	◉
Project Priority	◉

High Degree ● | Moderate Degree ◉ | Low Degree ○

Junaluska Road, South Main Street to Memorial Entrance Construct Sidewalk

Junaluska Road is the main route between downtown, Stanley Furniture and the Junaluska Memorial with a 20 mph speed limit. Junaluska Road was constructed by the state when South Main Street was bypassed to provide access to Stanley Furniture and the Snowbird Community. Improvements could range from a traditional sidewalk along one side of the street to an extruded curb/shoulder (shown in the image bottom right). A constraint for this project is topography. While a sidewalk on the south side will better link the Junaluska Memorial to downtown, the slope makes that difficult. If the sidewalk follows the north side to the Memorial entrance, there could be sight distance issues for motorists.

Context: The Junaluska Memorial is the primary pedestrian destination along this route. *Reimagining Robbinsville* envisioned an amphitheater at the intersection of South Main Street and Junaluska Road. If this materializes, this will provide a place to allow pedestrian access to reach the Memorial through a new pedestrian-only entrance. This is a preferred option due to constraints with constructing a sidewalk. An extruded curb pedestrian facility could be an option on the periphery of the amphitheater.

Goals	Magnitude
Economic Development Potential	◉
Health Impact	◉
Pedestrian demand	○
Partnerships	○
Need for Completing the Street	◉
Project Priority	◉

High Degree ● | Moderate Degree ◉ | Low Degree ○

Cost Estimate:

Construct sidewalk: $30,000 (extruded curb) / $60,000 (sidewalk)

Left: An extruded curb with a shoulder provides a flat walking area in situations where sidewalk installation is cost-prohibitive.

Moose Branch Road, Knight Street to 700 feet west of Knight Street Install Sidewalks

Moose Branch Road is a low volume street that crosses Long Creek and connects neighborhoods west of the creek to Robbinsville. A sidewalk is planned for the north side of the replacement bridge being installed by NCDOT in 2013. This presents some issues with connectivity to the housing development west of the creek on the south side of Moose Branch. Unfortunately, the bridge project cannot be modified at this stage and property impacts east of the creek along with an old tree prohibited the sidewalk connection to Knight Street on the north side of Moose Branch. Sidewalks should be constructed linking the bridge to the areas east and west of the bridge. Moose Branch Road also provides a potential future trail connection to the fitness trail on the shores of Santeetlah Lake. The speed limit is 20 mph.

Context: Moose Branch Road links a large multi-family housing development west of Long Creek to the Elementary School and other public facilities along Knight Street.

Cost Estimate:

Construct sidewalk: **$ 20,000**

Goals	Magnitude
Economic Development Potential	○
Health Impact	◉
Pedestrian demand	◉
Partnerships	○
Need for Completing the Street	◉
Project Priority	○

High Degree ● | Moderate Degree ◉ | Low Degree ○

Left: The bridge on Moose Branch is due for replacement but trees limited the ability of sidewalks to be on the north side. NCDOT will construct sidewalks on the north side of the bridge.

Atoah St / Snider Hill, Main St to Junaluska Rd Install Sidewalks & Other Pedestrian Treatments

Atoah Street/Snider Hill is interesting in that the street name stays the same through two turns in the route. The section between Main Street and Circle Street is one-way downhill. It is recommended for painting a "pedestrian lane" (shown in image below) on the north side of the street to provide a pedestrian route and serve as traffic calming. This should be considered a temporary treatment to be measured for effectiveness. A permanent sidewalk is desired but difficult due to terrain and other issues. Other sections require either a new sidewalk or replacement of existing sidewalk to the intersection with Junaluska Road. The speed limit is 20 mph.

Context: Atoah Street connects neighborhoods west of downtown to downtown, the future greenway (via Cody Street) and Stanley Furniture. The linkage from these neighborhoods to destinations within walking distance is the primary reason for this project.

Cost Estimate:

Construct/replace sidewalk:		$100,000
Paint & sign pedestrian lane	up to	$ 15,000

Goals	Magnitude
Economic Development Potential	○
Health Impact	◎
Pedestrian demand	◎
Partnerships	○
Need for Completing the Street	◎
Project Priority	○

High Degree ● | Moderate Degree ◎ | Low Degree ○

Right: A pedestrian lane painted on Atoah Street is one option to provide connectivity from downtown to the neighborhood.

Ward Street, Atoah Street to Morphew Street Paint Pedestrian Shared Lane Markings on Street

Ward Street seems to be a candidate for a treatment called "pedestrian shared lane", where paint is used on the street to raise awareness of the presence of pedestrians. Few cities have tried these as neighborhood projects as they are still very much experimental. The image at bottom right shows how this was done on a residential street without sidewalks. Ward Street will likely never warrant sidewalks but the prospects of a future greenway along with other recommendations in this Plan could raise pedestrian activity on the street. Painting feet or shoe sole markings on the street would make motorists realize that pedestrians are expected to be seen walking on the street.

Context: Ward Street is a low volume residential street that links neighborhoods to other pedestrian routes in Robbinsville. Many destinations are within a convenient walking distance.

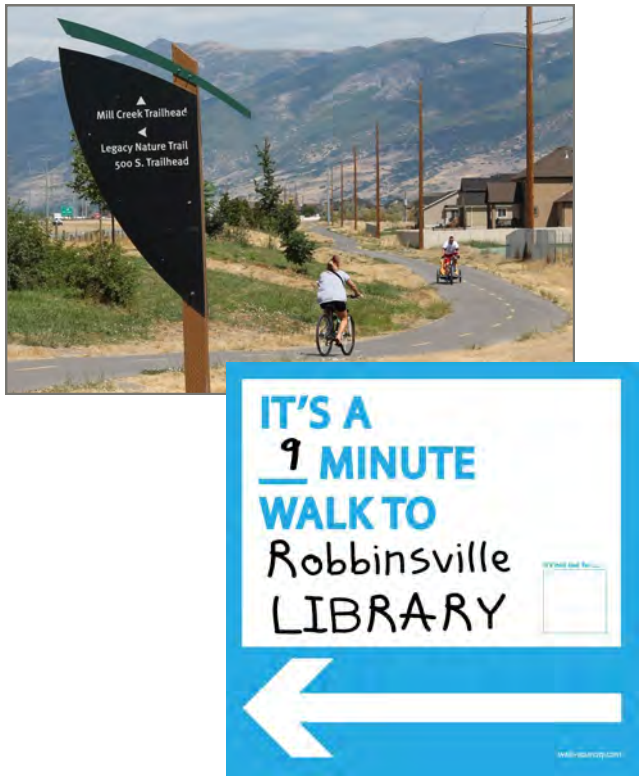
Cost Estimate:

Paint pedestrian marking on street/install signage: up to $ 10,000

Goals	Magnitude
Economic Development Potential	○
Health Impact	◉
Pedestrian demand	◉
Partnerships	○
Need for Completing the Street	◉
Project Priority	○

High Degree ● | Moderate Degree ◉ | Low Degree ○

Left: Pedestrian shared lane markings are an innovative treatment to simply raise the awareness of pedestrians on a residential street. They are simply feet or shoe markings painted on one side of the street.



Wayfinding signage for pedestrians and bicyclists can vary greatly—from more formalized signage integrated into an overall promotional theme (top image) to more community project based efforts such as the "guerilla wayfinding" sign templates (bottom image) available through www.walkyourcity.org

Photo: Don Kostelec

Long-Term Facilities

Two facilities are worth noting beyond those already outlined in this chapter.

- **US 129 beyond North Main Street and East Main Street:** Sidewalks should be installed along US 129 within Robbinsville Town Limits and in other areas that develop to urban standards. Requirements mays be placed on new development to construct sidewalks.
- **Greenway Loop along Tallulah Creek**: Once a greenway is constructed between the school complex and Stanley Furniture, completing the loop by connecting the trail along Tallulah Creek, south of the school to link to the sidepath along Ford Street is recommended.

Wayfinding

Wayfinding signage should be viewed as an integral element of the pedestrian system in Robbinsville. Wayfinding can take many forms, as shown at left, but the goal should be to make getting from point A to point B more intuitive. A formalized wayfinding system can be funded through partnerships such as the Tourism Development Association or Chamber of Commerce, while more ad hoc, low cost solutions can be managed by youth or other community organizations. Robbinsville could start with a more informal wayfinding system immediately before embarking on a more formal effort. Intersections that would be ideal for wayfinding include:

- **US 129 at Knight Street, North Main Street, NC 143, Ford Street and East Main Street;**
- **Main Street at Ford Street/Circle Street, East Main Street and Junaluska Road;**
- **Moose Branch Road at Knight Street and Circle Street;**
- **Any trailheads along the planned Greenway; and**
- **Entryways to the School Complex.**

Crosswalks

Robbinsville is fortunate to have several low speed and low volume streets, which means less costly crosswalk and signage treatment at major and minor intersections are feasible. Any existing sidewalk connection across a street should be considered for immediate upgrade to mark a crosswalk and appropriate signage. Some locations to consider for crosswalk installation include:

- **Main Street & Ford Street and Main Street & Church Street;**
- **US 129 & East Main Street (currently signalized);** and
- **Circle Street & Moose Branch Road (with other pavement markings).**

Crosswalks should be marked in the future at the following locations:

- **US 129 & Knight Street (with construction of roadside park);**
- **Moose Branch Road & Knight Street vicinity (with construction of greenway);**
- **Atoah Street & Circle Street (with construction of greenway);**
- **South Main St & Junaluska Rd (with amphitheater or sidewalk construction); and**
- **Main Street & Laura Street (with Main Street streetscape improvements).**

3. Health Impact Assessment

A Health Impact Assessment (HIA) is an evaluative model used to determine the potential physical and mental impacts of a proposed plan, policy or program through the lens of community health. Effective HIAs diversify the level and types of both qualitative and quantitative input to help inform the outcomes of efforts such as the Pedestrian and Greenway Plan. HIAs also bring together various interests in the community to help identify goals and objectives from a variety of stakeholders, then assess how those very aims are impacted – both positively and negatively – by the Plan's recommendations.

The Robbinsville Pedestrian Connectivity Plan employed a Rapid HIA due to limitations of resources and breadth of Plan recommendations. The basis of a Rapid HIA is fundamental research, a stakeholder workshop and synthesis of assessment findings. The benefit of a Rapid assessment is that the findings can be determined in a relatively short period of time and with minimal budget requirements when compared with intermediate or comprehensive varieties. The Robbinsville Pedestrian and Greenway Plan was under development from December 2012 through June 2013.

This chapter summarizes the HIA effort and is organized based on the six prescribed steps that are a required element of any HIA—Screening, Scoping, Assessment, Recommendations, Evaluation, and Monitoring.

Participants in the HIA Workshop for the Robbinsville Pedestrian Plan took to the sidewalks around town to explore health themes as they relate to walkability.

Photo: Don Kostelec

Step 1. Screening

The Graham Revitalization Economic Action Team (GREAT) undertook the development of a Robbinsville Pedestrian Connectivity Plan in 2013 to continue the momentum established through *Reimagining Robbinsville*. It was determined by GREAT and the consultant team for the Pedestrian Connectivity Plan that an integrated evaluation of health impacts of the recommendations of the plan's recommendations was desirable in order to better frame the issues of walkability and its impacts on public health.

From this, the HIA began with an exploration of available health data and a determination of schedule and resources to affirm that such an assessment was possible. It was then decided that conducting an HIA as part of the planning process would be necessary and warranted considering the concerning health conditions and future trends in the community as well as the probable impacts of recommended facilities resulting from the Plan.

This HIA is one of the first conducted and adopted in North Carolina associated with a joint pedestrian and greenway connectivity plan. It was employed to bring an added value and new perspective to the planning process and to help position Robbinsville for a more broad-based approach to pursuing funding and gathering support to implement the Plan.

Exhibit 3-1—Graham County 2010 Census Demographic Data

General	Population 620
Life Expectancy	Male, 75.6 Female, 78.8
Demographic	White 84.7% American Indian 3.4% Asian 1% Other Race 9.4%
Economic	Poverty Rate 36.6% Families 238
Housing	Total Housing 384 Vacancy Rate 26.3%
Education (percentage of population age 25 and older)	H.S Graduation Rate 35.4% Drop Out Rate 36.7%

Methodology. In conducting this HIA, a methodology was needed to determine how an HIA would fit within the structure of available data, time constraints and input from area experts. It was determined that using a four-pronged approach would be most effective and practical.

The four elements incorporated into this HIA include:

1. Reviews of various support documents, including existing plans and both health and demographic data; (Scoping)
2. An in-field evaluation of various existing and planned pedestrian and greenway facilities; (Assessment)
3. A half-day workshop with area health professionals and associated groups; and (Assessment)
4. Evaluation of health-related outcomes of Plan recommendations. (Assessment & Recommendations)

Step 2. Scoping

The Town of Robbinsville has a population of fewer than 700, and is located in Western North Carolina. The town is comprised of one Census Tract and limited in terms of specific data gathered within the community related to health and other demographic characteristics. Therefore, when looking at health information, most of the information used for this report was deduced from the County level and led to assumptions of similar conditions within Robbinsville. By correlating countywide health statistics with demographic information, trends and likely conclusions were extrapolated. For example, areas or population cohorts with less discretionary income often have less access to health care than areas with more discretionary income. Higher rates of heart disease and higher rates of morbidity measures are also likely among low-income groups.

Demographics. Demographics are statistics that can be useful when examining a given area and helps further provide an indication of health conditions found within various cohorts. Robbinsville 2010 Census data is shown in Exhibit 3-1.

Graham County Community Health Assessment. A significant source of information for not only Robbinsville, but also Graham County is the 2012 *Graham County Community Health Assessment*. The assessment evaluates a plethora of various health measures or leading indicators, demographic data and survey responses from area residents. The survey was completed in December of 2012, making it the best and most recent statistical compilation of health data available for use.

Health indicators and statistics were identified for Robbinsville for their potential to have strong correlation to pedestrian and greenway-related activity. Specific areas which were used to demon-

strate current conditions and trends were:

1. Mortality Rates;
2. Morbidity Rates;
3. Physical Activity; and
4. Demographics.

Mortality Rates. The leading Causes of Death from 2006 to 2010 in Graham County were heart disease, cancer, chronic lower respiratory disease, and cerebrovascular disease. With a strong relationship between leading causes of death in Graham County and physical activity, there is an opportunity to limit or even prevent such affliction through improved diet and exercise associated with walking, running or bicycling; all activities possible on pedestrian and greenway facilities.

Heart Disease is the leading cause of death in Graham County and likely Robbinsville with 215.1 deaths per 100,000 population. Heart disease rates are above average within the state and even in Western North Carolina as indicated in Exhibit 3-2. Heart disease can largely be prevented if individuals take part in regular physical activity and eat a well-rounded high fiber diet. Recommended activity levels include a minimum of 30 continuous minutes of cardiovascular exercise per day

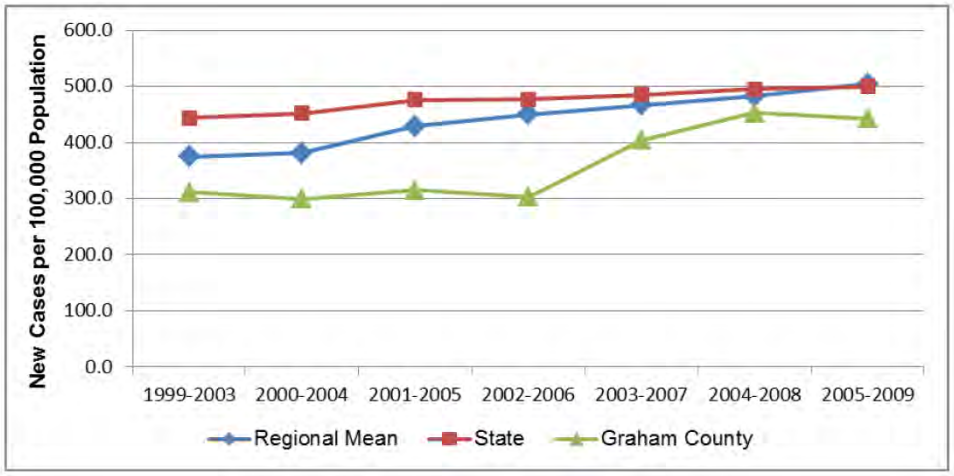
Exhibit 3-2—Rank of Cause-Specific Mortality Rates for the 15 Leading Causes of Death (2006-2010)

Leading Cause of Death	Graham County		WNC Mean		NC Mean	
	Rank	Rate	Rank	Rate	Rank	Rate
Heart Disease	1	215.1	1	194.4	1	184.9
Total Cancer	2	180.5	2	180.3	2	183.1
Chronic Lower Respiratory Disease	4	50	3	51.1	4	46.4
Cerebrovascular Disease	5	n/a	4	44	3	47.8
All Other Unintentional Injuries	3	50.9	5	42.9	5	28.6
Alzheimer's Disease	14	n/a	6	30.7	6	28.5
Diabetes Mellitus	6	n/a	7	19.6	7	22.5
Pneumonia and Influenza	7	n/a	8	19.1	9	18.6
Unintentional Motor Vehicle Injuries	11	n/a	9	16.7	10	16.7
Suicide	12	n/a	10	16.7	12	12.1
Nephritis, Nephrotic Syndrome & Nephrosis	10	n/a	11	16.2	8	18.9
Septicemia	9	n/a	12	13.4	11	13.7
Chronic Liver Disease & Cirrhosis	8	n/a	13	13.2	13	9.1
Homicide	13	n/a	14	n/a	14	6.6
Acquired Immune Deficiency Syndrome	15	n/a	15	n/a	15	5.4

or 150 minutes per week, with an optimum goal of 300 minutes per week in total. (2)

Cancer is the second leading cause of death in the Robbinsville/Graham County area with a rate of 180.5 deaths per 100,000. Cancer can be a broad term as there are many different forms of the disease and can impact men and women in various ways. The four most prolific types of cancers included within the survey were cancers of the Lung, Breast, Prostate and Colon. New cases of the disease vary and over the past 5 years their reported rates with the county, region and state can be seen in Exhibit 3-3:

Exhibit 3-3—Total Cancer Incidence Rates, New Cases per 100,000 Population
(Five-Year Aggregates, 1999-2003 through 2005-2009)



Overall, Graham County ranks 88 out of the 100 counties in North Carolina for overall mortality rates according the County Health Rankings (Exhibit 3-4), putting the County in the bottom quarter. However, morbidity rates are well above average at 27 out of the 100 North Carolina Counties.

Morbidity Rates. Diabetes and obesity are the two most prevalent morbidity afflictions for area residents. Obesity is a major factor contributing to increased risk for chronic diseases or serious health conditions such as cancer, hypertension, Type 2 diabetes, various heart issues, and stroke.

Exhibit 3-4—County Health Rankings via MATCH (2012)

	County Rank (out of 100 in NC)						
	Health Outcomes		Health Factors				
Geography	Mortality	Morbidity	Health Behaviors	Clinical Care	Social & Economic Factors	Physical Environment	Overall Rank
Graham Co.	88	27	33	91	85	80	69

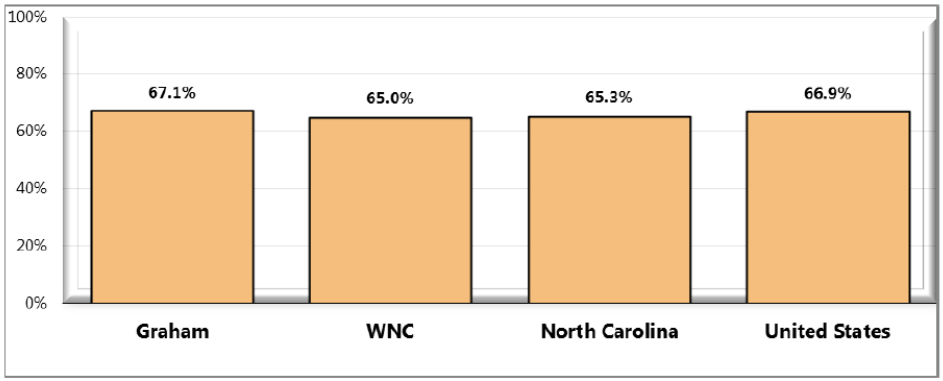
In Graham County, 67% of the adult population (over 20 years of age) is classified as overweight/obese and 32% are within healthy Body Mass Index ranges (Exhibit 3-4). With roughly 620 in total population, applying the 67% county rate to Robbinsville population would indicate that approximately 415 citizens have a body mass index (BMI) measure of 30 or greater. According to recent County Health Rankings for all counties in the United States (conducted by the University of Wisconsin Population Health Institute), this is slightly above the collective average score across the state (65.0%) and national average (66.9%).

Obesity rates amongst Robbinsville elementary school students are a significant concern within the community. BMI measurements have been gathered since the inception of the Healthy Carolinians Act through the County Health Departments in conjunction with local schools. Data for the 2012-2013 school year indicated that more children are technically overweight or obese than of normal weight. Students measuring in the overweight or obese range (>85th percentile for overweight, >95th percentile for obese) comprised 53% or the total while normal weight students made up 47%. North Carolina state BMI averages for overweight/obese is 33.5% and US average is 31.6%. What is particularly concerning is that 29% or virtually 1 in 3 school aged kids are not just overweight but categorized as technically obese.

Mental Health. The topic of mental health in the United States continues to grow in concern and attention due to continuing awareness. In Robbinsville and the Graham County area, the diagnoses of mental health disorders are similar when compared with Western North Carolina counties when surveyed. However, when asked if physical or emotional problems kept them from being physically active, Graham County residents responded that in fact such mental states prevented taking such action by nearly 2 to 1 when compared with national averages. Exhibit 3-5 illustrates Graham County data compared to Western North Carolina data what respondents said related to number of day in which mental health was not good.

Being outdoors and either walking or bicycling continues to demon-

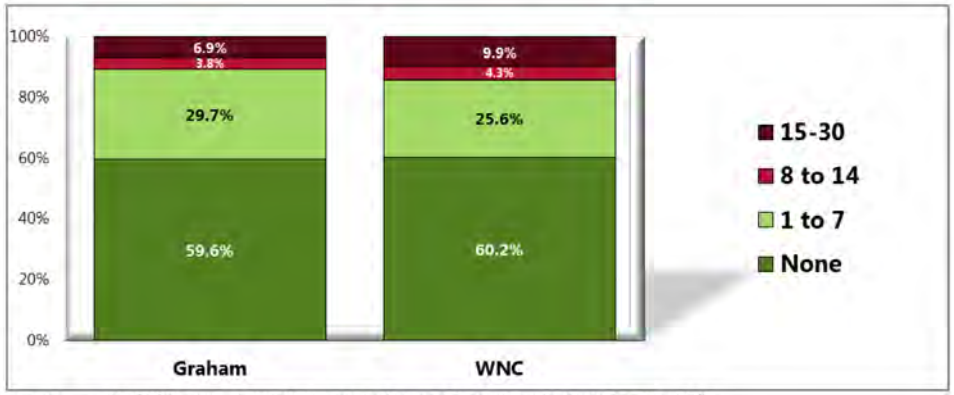
Exhibit 3-4—Prevalence of Total Overweight (WNC Healthy Impact Survey)
(% of Overweight or Obese Adults; Body Mass Index of 25.0 or Higher)



Sources:
- 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 85]
- 2011 PRC National Health Survey, Professional Research Consultants, Inc.
- Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia. United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC): 2010 North Carolina data.

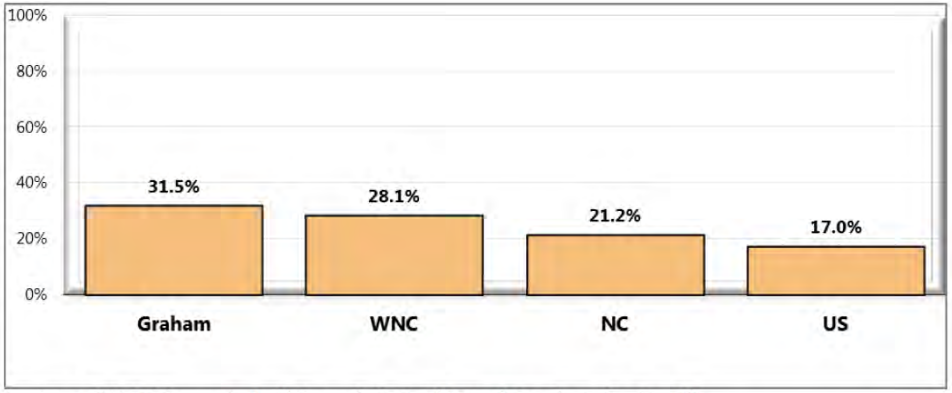
Notes:
- Based on reported heights and weights, asked of all respondents.
- The definition of overweight is having a body mass index (BMI), a ratio of weight to height (kilograms divided by meters squared), greater than or equal to 25.0, regardless of gender. The definition for obesity is a BMI greater than or equal to 30.0.

Exhibit 3-5—Number of Days in the Past 30 Days on Which Mental Health was Not Good (WNC Healthy Impact Survey)



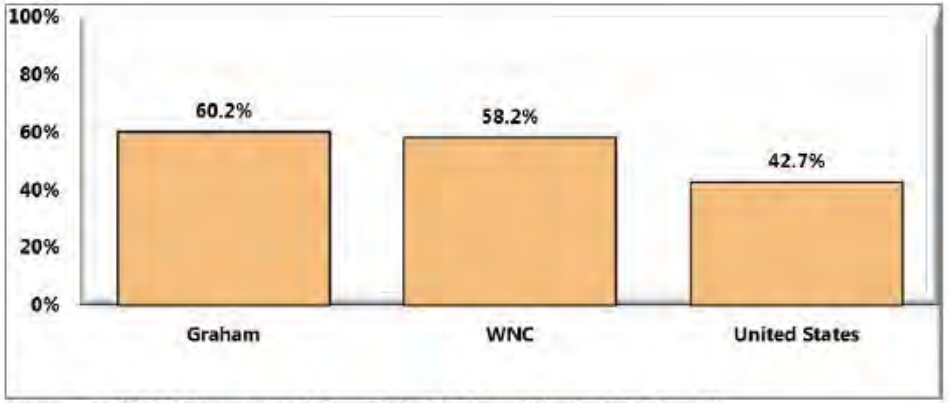
Sources:
- 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 64]

Exhibit 3-6—Limited in Activities in Some Way Due to Physical, Mental or Emotional Problem (WNC Healthy Impact Survey)



Sources:
- 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 67]
- Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia. United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC): 2010 North Carolina data.
- 2011 PRC National Health Survey, Professional Research Consultants, Inc.

Exhibit 3-7—Meets Physical Activity Needs (WNC Healthy Impact Survey)



Sources:
- 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 80]
- 2011 PRC National Health Survey, Professional Research Consultants, Inc.

strate merit to combat various forms of mental health issues including anxiety, stress, even slows the effects of Alzheimer's. According to the Graham County Community Health Assessment:

> "Mental health and physical health are closely connected. Mental health plays a major role in people's ability to maintain good physical health. Mental illnesses, such as depression and anxiety, affect people's ability to participate in health-promoting behaviors. In turn, problems with physical health, such as chronic diseases, can have a serious impact on mental health and decrease a person's ability to participate in treatment and recovery."

Physical Activity. To achieve a healthy level of physical activity, people need a minimum of 2.5 hours of moderate activity per week. Being physically active is an important element in the lives of area residents as proven by survey responses on the subject. Nearly 18% more area residents claimed that they met minimum activity standards when compared with national averages. This may be due in part to the numerous community facilities within the community. Robbinsville is home to several public recreational sites including baseball, football and soccer fields, basketball and tennis courts, playgrounds, a recreational center and track. When asked about the importance of accessing such activity sites, residents indicated that it is of greater importance to them than regional averages by nearly 7%. Though higher citizen support for recreational facilities than the regional average, more area citizens listed barriers be it social or physical, than their constituents. Exhibits 3-6, 3-7, and 3-8 relate to physical activity and active transportation responses in the Graham County Community Health Assessment

Local Agency Goals. The Graham County Department of Public Health is the lead agency trying to instill healthy activities, information and programs. As part of the Healthy Carolinians act, the Health Department is tasked with making inroads with several chronic and social issues. The agency has established four primary goals to improve community health:

1. Decrease obesity;
2. Decrease diabetes;
3. Increase physical activity;

4. Increase healthy eating.

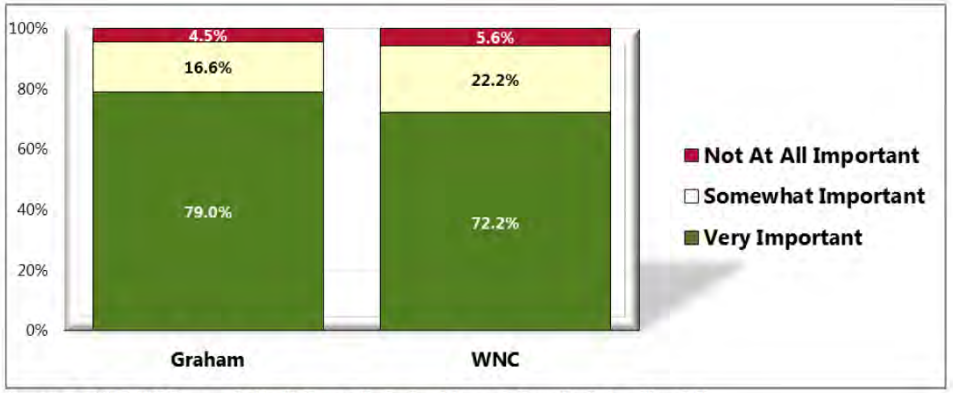
To this end, the Department has continued outreach efforts targeting those searching to learn about facilities or activities helpful to achieve healthy lifestyles. Weight loss programs have been established, playgrounds built, a recreational plan drafted, and all around family fitness promoted as examples of how the County has tried to achieve a healthier population.

Graham County School District. The school district serving Robbinsville and one of the largest employers within the county, Graham County School District, launched a new promotional campaign aimed at improving the health of school faculty. Project 180 (Exhibit 3-9), is a comprehensive wellness program that seeks to get participants active for a minimum of 120 minutes per week. By providing a myriad of activity opportunities for over a 6 month duration, the intent is to improve staff health, introduce healthy activities and build lifelong habits and routines.

Graham Revitalization Economic Activity Team (GREAT). A 100% citizen-based advocacy group, GREAT strives to improve overall conditions throughout Graham County including the areas of economics, health, education, and heritage amongst many. The non-profit group has several subcommittees whose intentions are to pursue improvements in each of the key areas. To keep the organization and subgroup focused, a strategic plan was developed including both goals and projects aimed at fulfilling the overall mission. One subcommittee, the Health and Social, was the lead participant for the HIA effort as they seek to curb many of the health issues facing Robbinsville. The organization has brought about numerous improvements by strengthening relationships, instituting programs, and constructing or improving facilities. Some of the recent actions include but are not limited to:

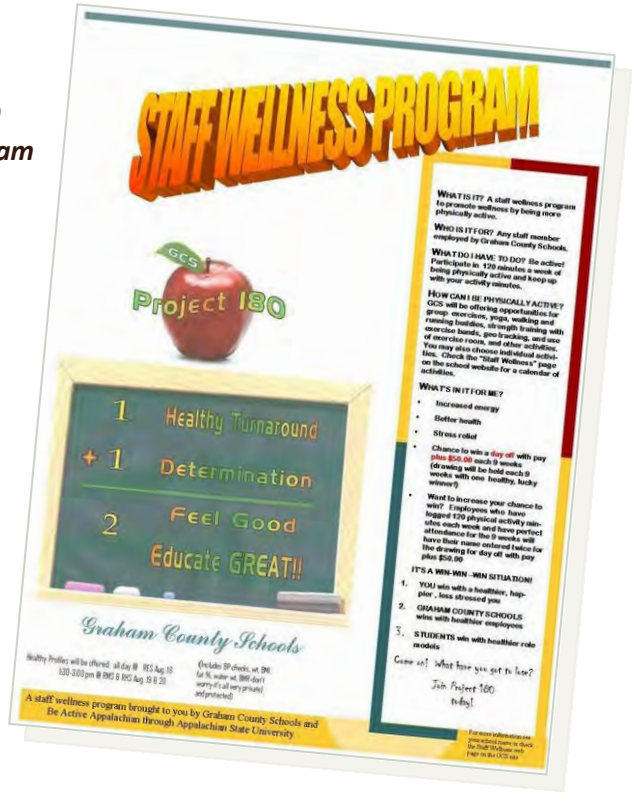
- Funding to Graham County Diabetes Coalition
- Completing *Reimagining Robbinsville*, a redevelopment vision plan
- Strategic planning for pathways
- New Fit Communities playground
- Collecting funding to improve access to local health care

Exhibit 3-8—Importance That Communities Improve Access to Trails, Parks and Greenways (WNC Healthy Impact Survey)



Sources: • 2012 PRC Community Health Survey, Professional Research Consultants, Inc. [Item 61]
Notes: • Asked of all respondents.

Exhibit 3-9—Project 180 Advertisement for Graham County Schools.



- Partnering with eight Western North Carolina counties for Community Transportation Grant, Active Living and Healthy Eating and Tobacco Free Living initiatives
- Support and sponsorship of the formation of the Santeetlah Bike Club

Step 3. Assessment

The assessment phase of the HIA included field work, a community workshop and research regarding the validity of health impact claims. The workshop was a half day meeting attended by area stakeholders and health experts. Attendees: 1. Were given a thorough background of the HIA process; 2. Were given an overview of the Robbinsville Pedestrian and Greenways Plan and desired outcomes; 3. Participated in a user preference survey and community walkabout; and 4. Crafted a logic framework model.

Workshop Results. Workshop participants were led through a series of exercises to help gather and understand the many ways pedestrian and greenway facilities and design can impact the health of Robbinsville residents. From the exercises, opinions and statements were organized into two principal elements of the assessment: 1) Health Impact Claims and 2) Potential Facility Use. An example of these outputs is shown in Exhibit 3-10.

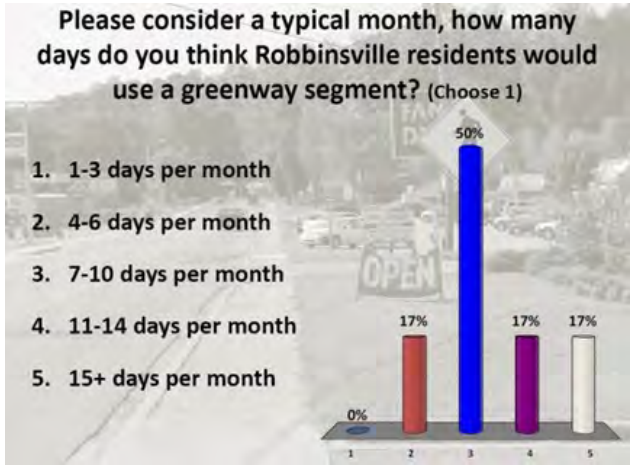
Exhibit 3-11 is an overview aerial photograph of Robbinsville, North Carolina. The various colored lines overlaid on many roads show the recommended pedestrian and bicycle features resulting from the planning process. Roadway treatments include facilities along perimeter streets and several sidewalk recommendations that penetrate areas within Robbinsville and connect proven attractors of both pedestrian and bicyclists.

Located in the northwestern part of the town, a series of activity sites exist that is virtually unheard of for a community the size of Robbinsville. Playgrounds, tennis courts, basketballs courts, a running track, community gym, softball and baseball fields, soccer fields, and walking trails are all part of the amenities and community assets. Most of the Town's commercial activity is located in the northeast, while downtown is located in south-central Robbinsville with residential neighborhoods centered in several pockets throughout.

Plan Basics. The Robbinsville Pedestrian Connectivity Plan calls for specific treatments and facilities along many of the routes through and along the town boundaries. Routes were selected due to their community breadth, probable use by local and out of area residents, and safety considerations such as traffic volumes and speed, road width, crash history and right of way ownership.

- Pedestrian-specific facilities include pedestrian lanes, replacing or adding sidewalks, and both pedestrian shared lane markings and crosswalks.

Exhibit 3-10—HIA Workshops Responses Related to Greenway Usage



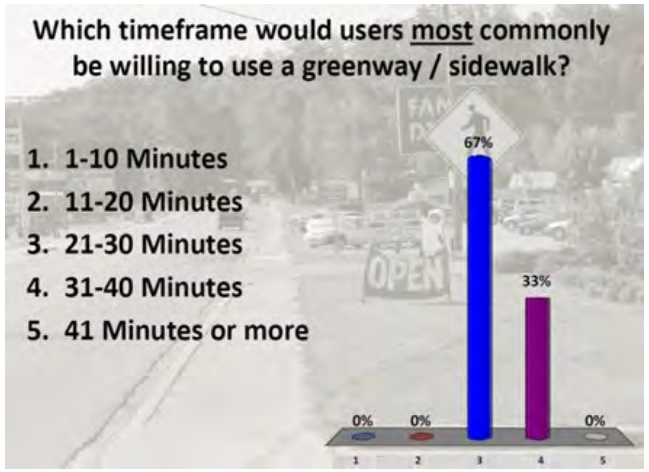


Exhibit 3-11—Map of Pedestrian Project Recommendations for the Robbinsville Pedestrian Connectivity Plan

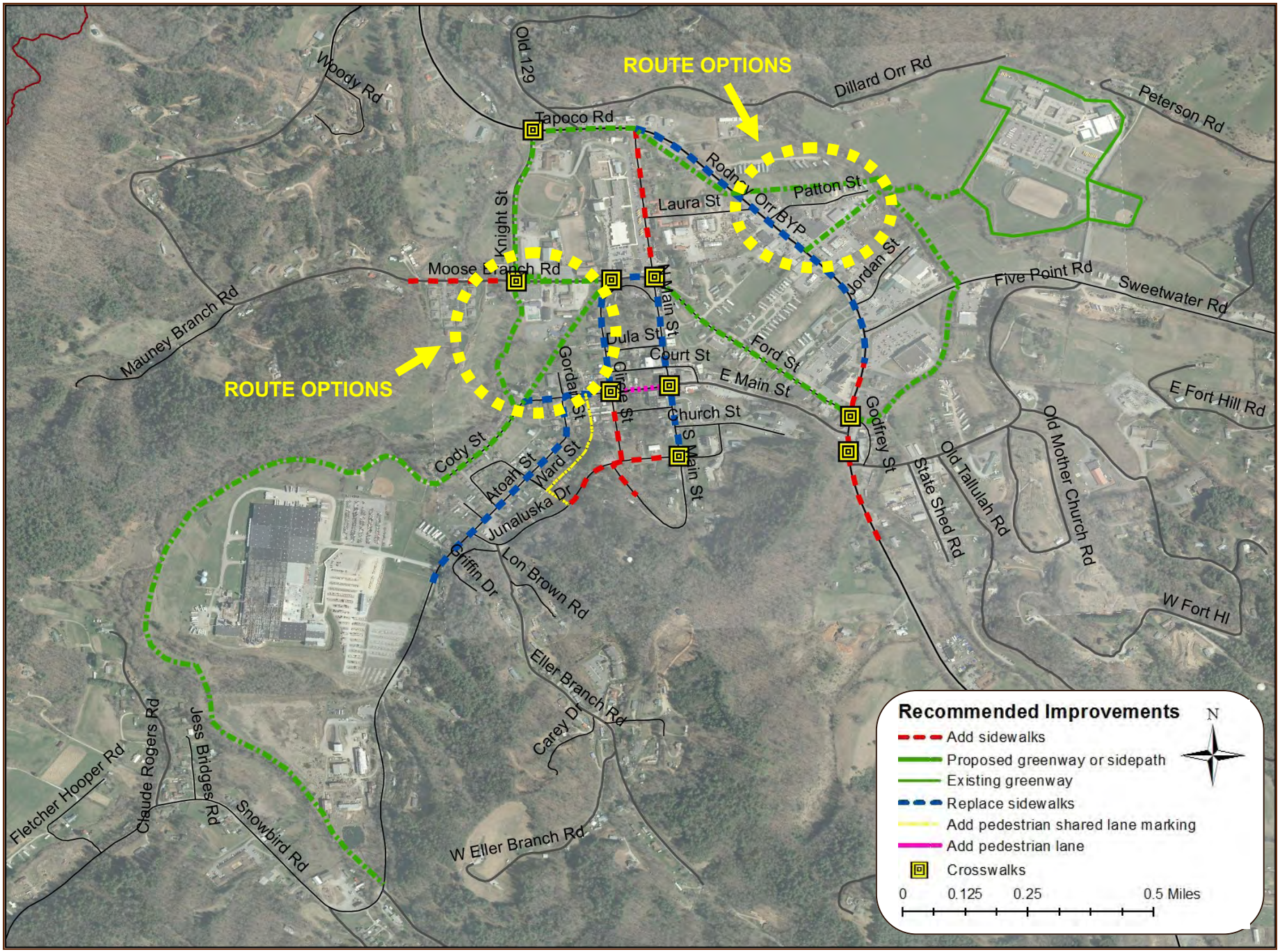


Exhibit 3-12—Potential Health Effects of Different Pedestrian Facilities

Facility Type	Description	Broad Health Effects
Building 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 sidewalks will vary in width where pedestrian use is higher and should be built with adequate roadway buffer space where warranted.	▲ 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 soft surfaces. ▼ Initial construction can generate noise, dust, and potential stress. ▼ The addition of only sidewalks on a high speed, high volume street may not maximize safety for pedestrians.
Building New Greenways & Sidepaths	Greenway routes are constructed to ADA standards, are generally outside of roadway right of ways and span through open space, riverways, or through designated easements. Greenways are free of vehicle traffic, but can intersect roads and accommodate all user types both pedestrian and bicyclists.	▲ Removes user from roadways. ▲ Dedicated pedestrian/bicyclist space. ▲ Connects land uses other than by roadway. ▲ Provides stable and predictable walking surface. ▼ If isolated, perception of danger heightened. ▼ User type variability could lead to bike/pedestrian, or bike/bike crashes. ▼ If too far outside of peripheral vision of motorists, crash rates at intersection increased.
Replacing Damaged Sidewalks	When sidewalks become damaged by root heaves, water damage, or general wear, Robbinsville should repair existing sidewalks to maintain a consistent and negotiable surface for the safety of all potential users.	▲ Prevents trip hazards. ▲ Prevents slips and falls. ▲ Keeps pedestrians out of travel lanes. ▲ Promotes walking.

Exhibit 3-12 (continued)—Potential Health Effects of Different Pedestrian Facilities

Facility Type	Description	Broad Health Effects
Crosswalks	Providing a designated space for pedestrians to cross a street either at an intersection or mid-block is the intended use for crosswalks. Crosswalk design can range from simple paint schemes, to more complex design including the use of pedestrian or traffic signals, pedestrian countdown signals, auditory devices and refuge islands.	▲ Fosters pedestrian movement at predictable locations. ▲ Allow accessibility to particular land uses. ▲ Heightens awareness for pedestrian presence to drivers. ▲ If used with an elevated platform, can calm traffic and reduce severity of possible crash. ▼ Without maintenance, crosswalks can lose both reflective properties and visual prominence. ▼ Crosswalks generally put pedestrians in direct line with motorists. Use is principally dependent on driver compliance.
Painting Pedestrian Lanes	When adding curb, gutter, and sidewalk to a street is not possible for various reasons, in some cases adding paint to define a space is acceptable. Pedestrian Lanes are paint schemes used to define a pedestrian-only space on a road surface to increase awareness of motorists and give predictability to pedestrians.	▲ Provides pedestrians with a dedicated space where other constraints prohibit a sidewalk. ▲ Elevates the presence of pedestrians to motorists. ▲ Focuses drivers' vision. ▼ Doesn't remove pedestrian from travel lane like sidewalks. ▼ Can be prone to flooding or puddling as typical location is at the edge of pavement.
Painting Pedestrian Shared Lane Markings	In certain instances, creative low-cost solutions can help solve relatively simple issues. Pedestrian shared lane markings refers to using paint in an artistic yet informative way to denote the presence of pedestrians, especially children. Painting colorful feet, people or other symbols are the principal applications for pedestrian shared lane markings.	▲ Increase awareness to drivers as to the presence of pedestrian activity. ▲ Promotes more focused pedestrian walk space. ▼ Limited sight line for motorists. ▼ Doesn't remove pedestrian from travel lane like sidewalks. ▼ Can be prone to flooding or puddling at the edge of pavement.

▲ Indicates a potential positive broad health effect if implemented.

▼ Indicates a potential negative broad health effect if implemented.

- Multi-use facilities include greenway sidepaths.

Listed in Exhibit 3-13 (page 34-35) is a basic description of each of the identified facility types and a high level description of the potential benefits or detriment for each.

Forecasting Use. Through the use of real time surveying, the workshop participants were asked a series of questions to indicate to the project team the expected use of greenways by Robbinsville citizens. This approach was successfully utilized in a near identical setting and topic only a few months prior in Buncombe County. Answers given by the stakeholders during that exercise were similar to those provided by Robbinsville participants:

- When asked to predict how often residents would use the new greenway facilities in Robbinsville, 50% of respondents suggested that between 7-10 days per month was most likely, while 4-6 days, 11-14 days and 15+ days per month each received 17% of the replies.
- When asked how long in duration each episode would occur, 67% responded by stating that 20-30 minutes is accurate, while 33% thought 31-40 minutes was more likely.

With 620 residents as per the 2010 census, use rates of new greenway facilities are shown in Exhibit 3-13. .

Health Impact Claims. By conducting a user preference survey, community walk phase, and logic framework model discussion, the team was able to capture the many ways that both the pedestrian and greenway facilities can impact health or by identifying what related elements can spur use. The results of the Health Claims analysis are shown in Exhibit 3-14

Exhibit 3-13—Potential Distribution Effects for Sidewalk/Greenway Investment

Days per Month	Duration in Minutes	Impacted Users	Minutes per Month Max Duration x Days per Month
4-6 (17%)	20-30	105	120-180
	31-40		160-240
7-10 (50%)	20-30	310	210-300
	31-40		280-400
11-14 (17%)	20-30	105	330-420
	31-40		440-560
15+ (17%)	20-30	105	450+
	31-40		600+

Exhibit 3-14—Health Outcome / Determinant Analysis for Walkability Investments

References included at end of this chapter.

Health Outcome/Determinant	Direction and Extent	Likelihood	Distribution	Quality of Evidence
Mental Health				
Stress reduction[1,2]	▲▲▲	Likely	Effect linked to green/natural spaces. Equal impact	**
Social connection and social capital[3,4,5,6,7]	▲▲▲	Likely	Residents of higher density neighborhoods more impacted	***
Improved attention	▲▲	Possible	Effect linked to increased exposure to nature and natural play settings. Adults in urban settings[8] and children with ADHD diagnosis[9] more impacted.	**
Family bonding	◊	Uncertain		*
Physical Activity (PA)				
Increased PA	▲▲▲	Likely	Residents within 1 mile of sidewalk, greenway or trail[10] & targeted by promotional activities. Women, low SES & sedentary residents likely to be more impacted by trails.	** (mixed results in the literature[11])
Increased PA with increased street and pedestrian connectivity to non-residential destinations[12, 13,14]	▲▲▲	Likely	Equal impact	**
Increased PA with access to pedestrian facilities (e.g. sidewalks, walking trails)[15,16, 17,18,19]	▲▲▲	Likely	Women over 40; residents with household incomes under $20,000; sedentary people[20] more impacted	*** (conflicting evidence[21])
Increased cycling with new bicycle lanes[22,23]	▲▲	Possible	Not specified; most research conducted in major urban settings	***
Increased PA with seeing others in neighborhood physically active	▲▲▲	Possible	African American women[24,25]; rural, white adults[26] more impacted	**
Increased PA with enjoyable scenery[27,28]	▲▲▲	Possible	Lower income residents more impacted	** (conflicting evidence[29])
Increase PA with perception of safety[30]	▲▲▲	Uncertain	White adults more impacted	** (conflicting evidence[31])

Direction and Extent of Impact

Table adapted from Human Impact Partners, http://www.humanimpact.org/doc-lib/finish/13/100

▲ = Small impact on few people ▲▲ = Moderate impact on medium number ▲▲▲ = Major impact on many

Exhibit 3-14 (cont'd)—Health Outcome / Determinant Analysis for Walkability Investments

References included at end of this chapter.

Health Outcome/Determinant	Direction and Extent	Likelihood	Distribution	Quality of Evidence
Safety				
Density of cars on local roads[32,33]	▼	Likely	Equal impact; most research conducted in major urban settings	***
Injury from bicycle crashes	▼	Likely	Assumption of some bicycle traffic moving from road use to separate trail use	***
Increased traffic safety	▲▲▲	Possible	Most densely utilized intersections more (assumption of less cars and less bicycle commuters at busy intersections)	***
Use makes better driver/pedestrian/bicycle interactions[34]	▲▲	Possible	Residents most exposed to mixed use transportation corridors more impacted	**
Overall Health Improvements				
Perceived general health and well-being[35,36]	▲▲	Likely	Those within 1-3km radius of green space and in urban areas impacted more; elderly and youth impacted more[37]	**
Positive Child Development[38]	▲	Possible	Effect linked with exposure to nature	**
Respiratory health[39]	▲	Possible	Assuming decreased automobile traffic and increased physical activity	*
Cardiovascular health[40]	▲▲▲	Likely	Those more physically active impacted more	***
Cancer rates[41]	▼	Possible	Specifically, colon cancer. Those more physically active impacted more	*
Youth overweight and obese (BMI levels > 85th%ile)[42]	▼	Possible	Those with connectivity to play spaces impacted more. Those more physically active impacted more	*
Economic Health				
Housing values[43]	▲▲▲	Likely	Homes within 3200 ft. of trails impacted more	***
Rural property value[44]	▼	Uncertain	Agricultural land with tight zoning for trail corridors impacted more	**
Housing displacement	◊	Uncertain	Renters and fixed income residents impacted more	*
Business attraction[45]	▲▲	Likely	High-tech and service industries impacted more	***
Retail access[46]	▲▲	Likely	Likely concessioners (e.g. bike shops, cafes) impacted more	**
Workforce health improvements	▲	Uncertain	Worksites adjacent to trails impacted more	*
Environment				
Increased awareness/access to natural environments	▲▲	Likely	Residents with connections to the most natural sections of the project impacted more	*
Improved air quality[47]	▲	Possible	Equal impact	*

Strength / Quality of Evidence-based Research

* = No clear studies but generally consistent with principles of public health. ** = One or two good studies. *** = Many strong studies.

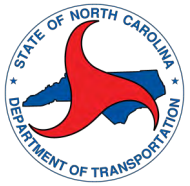
Step 4: Recommendations

The suggested improvements recommended within the Robbinsville Pedestrian Connectivity Plan should result in largely positive health outcomes and impacts. Additional steps can and should be taken by the two associated agencies to further realize positive health outcomes from the new or improved facilities.

- **Policy.** To avoid perpetuating shortfalls in community facilities such as sidewalks, Robbinsville and Graham County should review existing city codes, subdivision ordinances, or Comprehensive Plan policies to determine compatibility with the goals and intentions of the Pedestrian Connectivity Plan.
- **Education and awareness.** The proper use of new facilities, especially for those new to a community or visiting, will be necessary to ensure safety and compliance. Education and awareness campaigns can be made through temporary signage, pamphlets, QR codes for smart phone and website updates. Additional outlets can include discussion through schools, community gathering places or public meetings.
- **Heightened enforcement**. Similar to educating citizens about proper use of new facilities, enforcement campaigns should also be instituted to ensure motorists are also given an opportunity to learn or are later reprimanded for lack of compliance with law regarding pedestrian safety. Enforcement and city officials should design a plan of action that is intended to improve conditions for pedestrians or bicyclists and their interactions with drivers. The plan should educate, warn, then fine in the form of a moving violation and non-compliance by the motoring public.
- **Lighting**. Mentioned in the Plan and a valuable design element at key locations, lighting can help improve visibility for all road users and improve overall safety. Lighting should be instituted in the form of street lights, pedestrian scale lighting or trail lighting where possible conflicts and heavier use is predicted at key intersections.
- **Maintenance.** Ensuring that facilities are kept safe over time is essential to keeping users safe and to ensure continual comfortable use. A regular maintenance cycle will need to be crafted and agreed upon by the various parties associated with overseeing them. Particular maintenance practices will include at a minimum: debris removal, occasional crack sealing or resurfacing, weed and landscaping upkeep, and ensuring proper functioning drainage.
- **Promotion & Events**. Organizing and hosting regular events can further improve proper use and awareness. Having community walk or bicycling events on greenways, or walk to school events using new sidewalks and crosswalks can not only remind users of their utility

Maintenance of greenways and sidewalks is critical to maximizing health benefits. The effects of tree roots, stormwater, erosion and freeze/thaw cycles can damage pavement, which can lead to trips and falls by users and other safety concerns.

Photo: Don Kostelec



Many partners are needed to carry out the Monitoring steps recommended from the HIA to increase walkability and improve public health through walking in Robbinsville.

but also of how to use them properly.

Construction mitigation. Several of the recommended facilities will be newly constructed while others may be reconstructed. In either case, decreasing the impact of associated construction related activities, though temporary, is important to lessen health impacts resulting from noise, dust, and general stress. Using dust abatement techniques, financial incentives for contactors to accelerate project delivery, proper notification for detours, and confining loud actions to brief periods are all steps worth coordinating and implementing.

Future facilities. Once the projects recommended in the Plan are implemented and realized, the community should study their use and determine additional needs. It is highly likely that land uses will change in Robbinsville and will result in new needs based on generation or attraction of additional trips by both pedestrians and bicyclists.

Step 5: Monitoring

Monitoring is generally about the groups, agencies, or affiliations impacted or involved with the HIA-focused activities. These roles can include maintaining an awareness of how the process unfolds, continuing dialogue, and sharing of vital information. The principal groups associated with this plan include but are not limited to:

- GREAT;
- Town of Robbinsville;
- Graham County Health Department;
- NCDOT; and
- Graham County Schools.

Below are lists of monitoring steps that each entity can undertake to track the progress of the Pedestrian Connectivity Plan with regard to public health.

GREAT

- Create an annual report of Pedestrian Connectivity Plan progress.
- Seek funding to collect more town- or area-specific health data through academic, government and institutional partners.
- Assist other partners in fulfilling Monitoring recommendations.

Town of Robbinsville

- Once a year monitor and inform community regarding completed projects.
- Once every two years gather and review traffic and crash data to determine traffic pattern changes or additional elements to recommended facilities.
- Once a year conduct a facility condition inventory to maintain in good standing existing or

new facilities.

- Once a year conduct user count exercises to determine use or trends for walking and bicycling.

Graham County Health Department

- Monitor hospital discharge records to determine hot button issues.
- During the Community Health Assessment update, survey Robbinsville residents to determine attitudes, perceptions or awareness of new facilities.
- Meet once a year with Town of Robbinsville to share health data and exchange user rates.

NCDOT

- Meet once a year with the Town of Robbinsville and GREAT to determine priority projects or urgent maintenance needs.

Graham County Schools

- Two times per school year conduct a show of hands survey to determine student walk and bicycle rates.
- Annually send to parents and collect the Safe Routes to School travel survey.

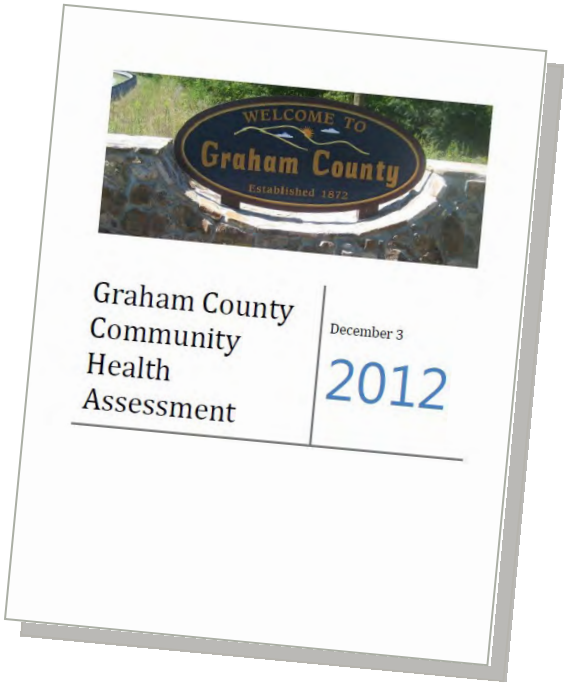
Step 6: Evaluation

The final step in the HIA process is that of an evaluation, which is conducting an assessment of how the HIA process unfolded. This includes how the HIA was conducted, identifying strengths and weaknesses of the HIA, and identifying lessons learned so that future HIAs in the area can build upon the elements contained in the Pedestrian Connectivity Plan HIA.

HIA Process. The Robbinsville Pedestrian Connectivity and Greenway Plan was accompanied by a supplemental Rapid HIA. The HIA version was selected as a way to inform the planning process in a unique way and fold in a health element not common to pedestrian or greenway planning. The rapid type of HIA was also chosen due to limitations of schedule, funding, and data sources of the Robbinsville area. Limitations meant that the collection of town-specific health data and stakeholder input was limited.

Data limitations meant that information may not be as accurate as possible due to the extrapolating of information from larger geographies into Robbinsville specific assumptions. Countywide data, Census tracts or Western North Carolina information was principally used to cast light on the likely, but not fully certain, conditions of Robbinsville citizens. No data is available regarding the health of visitors to the area.

Limitations of schedule and funding meant that public outreach efforts were done to coincide with other events such as GREAT meetings. The April 2013 HIA workshop was the center of



Future updates to the Graham County Community Health Assessment should seek to better understand health at a more refined geography, particularly for Robbinsville, to better understand local conditions and help health professionals and others identify interventions that can uniquely impact the community.

the opinion collection effort. It was a four-hour event attended by 10 community and agency members from GREAT, the Town of Robbinsville, Graham County Health Department and Schools, and the Community Transformation Grant. The limited number of attendees meant that forecasts and health claims were generated from a small sample size, though those participating were representative of various public agencies, social clubs and business interests.

Areas which could be impacted due to the limitations described could be found in all HIA areas including the health claims analysis, forecasted use, and potential impacts. However, it is worth noting that Robbinsville represents only a proportion of Graham County, therefore total population and forecasts were illustrated as a a potential range rather than as absolutes to minimize misrepresentation of data.

Lessons Learned. Over the course of every project, team members and collaborators should learn valuable lessons to continually sharpen skills before embarking on future efforts. The Robbinsville Pedestrian Connectivity Plan presented several items to build upon:

- Fully vet and discuss with area health professionals how accurate extrapolating larger sample sizes into smaller size can be conducted.
- Ensure that all workshop participants can attend the duration of the day or capture their survey phase opinions by other means.
- Work with participating agencies to establish free community survey instruments like on-line surveys or public comment forums.
- During walk phase of future workshops focused on pedestrian or greenway plans, simulate and examine mobility limitations.
- Continue to solicit the attendance and opinions from the medical community and established medical research practitioners.

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4. Economic Impacts of Walkability

It is well-proven that walkable communities, particularly small towns, stand to benefit economically by being walkable and promoting it. This chapter outlines how a more walkable Robbinsville can support and enhance the local and areawide community.

Jobs

The basic economic measure of success is job stability and job creation. Keeping and attracting new businesses to employ residents is a common goal for Robbinsville, Graham County and GREAT. Developing a more walkable and connected Robbinsville should be seen as one foundational principle in making the community more attractive to industry, business and visitors.

The prospect of the greenway connecting the school complex to Stanley furniture is likely to be the single-most relevant statement about walkability in Robbinsville. It will connect destinations and places of physical activity, provide a place for visitors to enjoy, and create a place for children and families to play. Businesses are starting to gravitate toward communities with these facilities as younger generations and more and more retiring baby boomers seek more active lifestyles.

Tourism

As the columnist from AARP noted, if a place is designed around people, then it's certainly more likely to attract them. Walkability helps attract all kinds of people, thus, the most obvious benefit of walkability is growth in tourism. When people feel comfortable—when people are able to experience assorted activities—when lifestyle retail is developed, tourism will undoubtedly increase.

"New Economy" Attraction

Creativity and innovation moves our economy forward. While the economy at large may not be completely restored, the technology industry has managed to stay afloat at much higher levels than other industries.

These types of businesses thrive on interaction and connectivity. Therefore, physical design and walkability hold a high level of importance when it comes to attracting creative and innovative people. This often-overlooked point can be incredible in helping an area attract new types of businesses.

Furthermore, walkability can encourage niche market development. Towns and communities with specific assets can attract companies searching for those assets. In Robbinsville's case, this could be in a market that desires plentiful outdoor resources and activities, e.g. the mountain biking market. Overall, these developments can lead to a more diverse, unique local economy.

The conceptual design for the a Graham County Visitor Center, as envisioned in *Reimagining Robbinsville,* is located along Main Street and is a cornerstone for new economic development based, in part, on the theme of walkability.

Just as gateway signage is seen as a key component to maintaining an attractive appearance, fostering a walkable community sends a message to businesses and visitors that Robbinsville is a special place you can enjoy safely on foot.

Photo: Don Kostelec

Housing Values

Evidence shows a direct link between walkability and the value of homes. Logically, pedestrian facilities such as sidewalks or trails add another dimension to a home. Moreover, the demand for homes with access to pedestrian facilities has increased around the nation. As such, people are and will be willing to pay more for homes with access to pedestrian facilities. Housing values work to better an area in two ways. First, increasing home values provide better equity for families. Their ability to obtain loans and the price, if they choose to sell their homes, would be higher than the original. Second, when it comes time for tax assessments, local governments realize a slight increase in property tax values. This can mean more tax revenue for projects and providing basic town and county services.

The Message to Businesses

Sometimes, business development can become stagnant without walkability. However, if an area has a high degree of walkability, business development can be exceptional. The most obvious benefit comes directly from business stability. From the business owner's standpoint, business begins picking up because more customers are coming right to his/her door via the access that proper sidewalks provide. Furthermore, this means the property owner sees less turnover in businesses.

However, the most important benefit comes in the form of facilitating investment. When a community makes an investment that focuses on the people and the community, future businesses will see a willingness to invest in them. In turn, the community experiences greater economic development.

Construction and Maintenance

The construction of trails and greenways requires grading, laying of base and asphaltic courses, and initial as well as ongoing clearing of shrubs and trees. Certainly, the type of trail – on-road or off-road, casual or formal – makes a difference to the cost of construction and the duration and extent of related work efforts such as planning, design, construction, and maintenance. Like any infrastructure investment, workers will need to purchase food and services, perhaps even short- or long-term lodging to complete the project.

Indirect Benefits

This category of impact encompasses health effects of increased trail use/walking, improved mental benefits of exercising, reductions in mobile source emissions for trips that replace an automobile with a non-motorized mode of travel, new or expanded business opportunities that key on trail users and their needs, and the impacts to adjacent property values. A mention about the im-

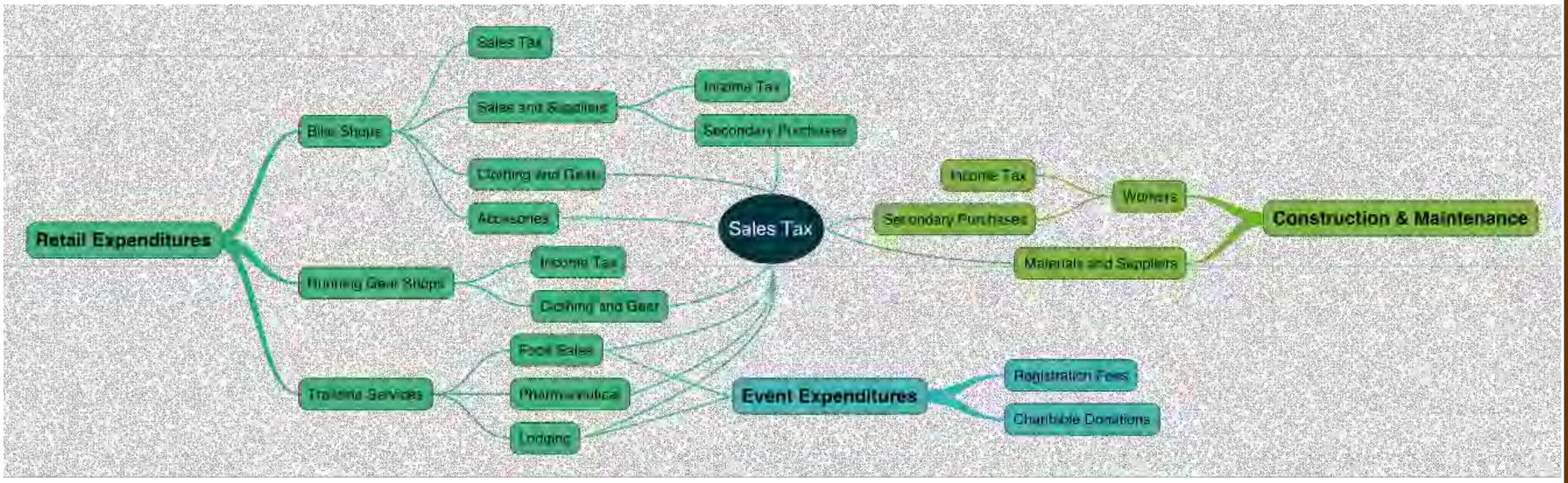
pacts to property values – and hence public tax revenues assessed on property – through such externalities (an economic term meaning any effect that is outside of the direct inputs or outputs of an economic assessment) as increased exposure, loss of privacy, littering, and trespassing is necessary in any discussion about the economic impacts of greenways and trails.

The debate created by proposals to construct greenways near pre-existent residential communities will continue to draw many differing opinions, but the preponderance of evidence from the more robust scientific studies as well as forecasts for single trail use continues to support the position that walking infrastructure either affects property values insignificantly or positively. Typical ranges cited for property value increases are from 0% to 7%, with several studies relying on a quarter-mile influence for conferring benefits of greenways and trails.

Exhibit 4-1 illustrates some of the relationships, or connectivity, between greenway, trail and sidewalk expenditures and other factors such as job creation and tax revenues. The complexities of the relationships are understated, particularly when long-term, indirect effects are accrued to the total benefit profile of a project. Even relatively small categories of expenditures can add up.

Exhibit 4-1 also illustrates the main components of economic impact from greenway and sidewalk infrastructure investments: retail expenditures, construction and maintenance expenditures, and event-related expenditures. Externalities such as health benefits and reductions in pollution or traffic congestion are not included in the majority of economic impact studies and are challenging to quantify for proposed systems.

Exhibit 4-1: Relationships between Greenway, Trail and Sidewalk Expenditures and Other Factors



As Robbinsville begins implementation of its greenway trail, it should develop policies that promote orientation of new buildings—businesses and residences—toward the trail to maximize economic return.

Photo: Don Kostelec

Events and Promotion

Greenways, trails and sidewalks can help foster public events, spur local trips by commuters or exercise enthusiasts, or generally aid in the promotion of outdoor activities. Various categories of expenditure are commonly recognized in economic impact analyses of cycling on a community. The ones that follow are fairly commonplace in national studies of economic impacts from greenway and sidewalk construction and use and, with the exception of the indirect category, are benefits that few people would dispute, although the magnitude of the effect is much more open to debate and analysis. It is for this that the acquisition of local data through surveys and field observations are so important in determining the true impact of investing in walkability.

Maximizing Economic Benefits

A number of recommendations can help government agencies improve the return on investment from greenway and sidewalk infrastructure programs and projects. Supporting facilities with educational and encouragement programs help to ensure that the economic benefits cited previously come to fruition – a greenway that no one knows about will generate little interest, and almost no recognition outside the community in the immediate vicinity. Communities can also create opportunities for increasing trail-oriented development (TROD) by adhering to design principles that support and promote the greenway.

- **Orient policies – and buildings – toward the trail.** Properties that "back up" to a trail should be open to the trail, and not present fenced-off parking areas or refuse bins. Creating a comprehensive design review process or even overlay zone is one method of formalizing development requirements that would take full advantage of trail access. Screening loading and refuse collection from view presents a more interesting and accessible building line to trail users.

- **Ensure that existing marketing materials incorporate bicycling, jogging, and other outdoor amenities that can be accessed or enhanced by trail connections.** Many agencies, including the Chamber of Commerce, develop marketing brochures, websites, and videos and then distribute them to various markets. Having relevant content included in these brochures is a low-cost way of making sure that the "brand" of the trail system is included in the overall marketing scheme for the region; make sure that relevant website links are shown on websites that list resource information for the area.

- **Don't forget bicycle parking.** Adding bicycle racks in front of businesses allow those business owners to tout their "bicycle-friendliness" as well as to send a message to cyclists that they are welcome to return – and to spend a few dollars on the trip at local retailers. The costs to purchase and install bicycle racks is usually under $500, especially if municipal or county construction crews do the installation.

- **To market the benefits of greenways you have to know what they are.** As already explained, the acquisition of data for all kinds of trail use is critical, not only for determining the benefits but also for marketing the activity. Hence, conducting a brief annual survey, or making sure that greenway questions are included in the economic surveys conducted by business groups or local governments, is crucial. Over time, charting the increase in activity and expenditures can provide key information to prioritizing new facilities and programs to support greenways, trails and sidewalks.
- **Focus on connecting to complimentary land uses.** Since off-road trails typically connect destinations along a stream bank, residential uses predominate. Using trail stubs to reach businesses and commercial centers as well as parks and schools greatly increases the transportation utility of the facility. When siting a new trail, considering how the adjacent land uses could support trail users – or how redeveloped property could support them – is important.
- **Create trail maps.** The most useful dedicated resource for trail joggers and cyclists is a map plus cue sheet that explains the route and its hazards, destinations, and scenic resources. Creating these maps that can be easily downloaded and printed from the Internet is an important consideration when considering formatting. Also, make sure that each map includes information about where to go for more information.

The Alleghany Trail Alliance has published a good reference tool for "capturing trail-based tourism." This document lists a number of additional ways that municipalities and counties can work to enhance the popularity, utility, and economic and social benefits of trails and create a fertile ground for generating trail-oriented development.

- **Leadership is important.** Leaders that keep the trail system in front of prospective businesses and developers can carry a pro-greenway and trail message much farther in some circles that can town or county governmental staff. Some of the most important leaders – or catalysts – of successful trails and trail systems came from outside the sponsoring agency.
- **Follow the Plan.** This Plan creates a number of recommendations that should be put into place as funds allow. Don't be discouraged if every recommendation can't be implemented right away – keep at it consistently and change will happen.
- **Create Private Resources.** Recruit those providers of goods and services necessary to accommodate runners, cyclists, hikers and casual users of the trail system. It is these same people that will generate champions for trail projects, people that can make more compelling arguments in many circles of supporters than traditional sponsors of greenway and trail construction – government – could hope to achieve alone.

A new generation of retirees and young professionals are seeking amenities related to active lifestyles. Developers are now promoting their access to greenways and constructing greenways and natural trails within development to attract buyers.

Photo: Don Kostelec

Rocheport, Missouri, is an example of a small town that has redefined itself based on its proximity to the Katy Trail—a rails to trail project—that links several communities in Missouri.

Photo: Rails to Trails Conservancy

- **Work with Law Enforcement.** Work frequently and well with local law enforcement personnel, who can be your biggest ambassadors to potential trail users as well as a source of well-being for existing trail users.
- **Design Matters.** The design of the trail system and nearby businesses, including lighting, building facades/displays, building materials and landscaping create a very clear message about whether it is safe and worthwhile to walk or bike to a place. Gateway treatments and providing supportive designs for connecting links between trails and important destinations within ½-mile (e.g., downtown businesses, schools, and parks) are critical to generating more trail usage.
- **Provide Clear Directions.** Consistent trail signage and directional information to key destinations as well as restrooms, water fountains, assistance, and camping are important to help out-of-town guests get around, as well as to help children and the elderly feel secure on a trail system.
- **Promote Trail-Oriented Events**. Organizing events that make use of the trails is becoming ever more popular. Don't leave out walking associations, "mud run" events, and disc golfing as possibilities, in addition to the more typical marathon, half-marathon, shorter races, and charity rides/races. Running and cycling groups are usually very enthusiastic organizers, but may need just a little direction and coordination at the outset to make an event a reality.

Case Studies: Where has this worked?

Before getting into the case studies, it is important to note that little has been written about communities the size of Robbinsville making investments like these. Typically, a small community will make investments that cause it to grow and then make another series of investments that are better documented. Therefore, this effort sought the most similar investments that could be found for communities the size of Robbinsville: **The Rails to Trails Conservancy**. The Conservancy helps communities through capital accrual, design, and other areas to renovate unused or dilapidated railroad lines into usable trails connecting communities and providing great pedestrian facilities. Each of the communities shown here, similar to Robbinsville's situation, were helped in gathering the investment, but already possessed the physical attributes to become great small towns. This is of particular relevance to Robbinsville in that there appears to be an opportunity to incorporate an old rail line owned by the Town into the area's pedestrian network.

Rocheport, Missouri

A community of around 239, Rocheport, Missouri, is part of the largest Rails to Trails project, the Katy Trail, which stretches over three states. While the trail exists along the waterfront of the Missouri River, Rocheport's Riverwalk is a series of shops along the same river, allowing for a

unique connection between nature, physical activity, and shopping. Rocheport was voted one of the best small towns in Missouri.

Rocheport isn't far from Columbia, Missouri, a city of 110,000, a significant difference from Robbinsville. However, of those using the Katy Trail, "more than 61% visited Rocheport, which is considered the halfway point…36% visited Columbia." This means that more people who enjoy the outdoor activities offered sought the small town of Rocheport rather than the larger city of Columbia. People enjoy small towns, particularly when they have something to offer.

Rocheport's Riverwalk provides a unique experience to visitors and residents. Robbinsville could be much the same. The serenity of the mountains of Western North Carolina, much like the Missouri River in Rocheport, helps people feel a sense of place that Robbinsville simply must build upon. The Pedestrian Connectivity Plan puts sense of place and the revitalization of downtown one step forward. Thus, Robbinsville, a larger community than Rocheport, can replicate such a model to reach its economic development goals.

Ohiopyle, Pennsylvania

Along the Great Allegheny Passage rests the Ohiopyle borough. This very small community is famous for its log homes and offers tourists and residents a wide variety of outdoor activities. As shown in the picture at right, many have renovated their buildings into bike rentals and the like to provide residents and visitors activity and entertainment along the trail.

Ohiopyle, Pennsylvania, incorporated a nearby trail into its community and the payoff has been a 117.6% increase in trail-oriented business.

Photo: Rails to Trails Conservancy

This incredibly small community of 82 actively chose to incorporate the trail into their community rather than to separate themselves from it. This is shown by their 117.6% increase in Outdoor/Trail related business in the first few years after the trail was completed. As a result, this community became the most popular point on the trail to begin or end a journey. (Note it is neither the beginning nor the end of the trail.)

Robbinsville can choose a similar path. With the efforts that GREAT and the Town of Robbinsville have made, economic development is a solid goal. As such, the Pedestrian Connectivity Plan begins a journey toward achieving that goal by encouraging community connectedness and interaction.

Lanesboro, Minnesota

Part of the Root River State Trail, Lanesboro is the Bed and Breakfast Capital of Minnesota. About an hour from its nearest city, Lanesboro offers a nice downtown with a wide variety of outdoor activity elsewhere. As the "Beyond Urban Centers" report said about one farmer:

"Originally I was opposed," the Lanesboro farmer admits. He helped organize a group of farmers to purchase the 100-mile right-of-way to prevent the rail-trail from going in. The trail turned out

Increasing walkability within Robbinsville stands to benefit the community in a variety of ways, including improving health, increasing property values in the town and sending a strong message to businesses that the town is poised to maximize its exposure for visitors.

Photo: Don Kostelec

to be wildly popular, so the practical-minded farmer decided to convert an old farmhouse on the trail into a bed-and-breakfast, which he operated for more than 15 years before retiring from innkeeping."

Before the trail was going to be put in, the town began making investments in its downtown, offering incentives for business development, and opening up its first bed and breakfast along with eateries and art galleries. The idea garnered support and has since continued with community-wide support.(13)

This small town, far away from any city, had a solid set of assets, a communal desire to grow, and, despite some opposition, did grow. Robbinsville's situation seems incredibly similar. While it isn't a big trail coming through, the consideration of a trail and the implementation of this plan and the streetscape plan move Robbinsville toward that situation of growth and successful economic development.

What about Robbinsville's Benefits?

1) **Health**. Considering that one of the most important parts of creating a healthier community is in the opportunity to be physically active, Robbinsville will likely experience a healthier community from simply following through on the Pedestrian Connectivity Plan. For these reasons, the Pedestrian Connectivity Plan also includes a Health Impact Assessment to more directly address potential health outcomes from investing in the pedestrian environment.

2) **Housing**. Much like the opportunity aspect in the health benefit, homebuyers will be more likely to pay for homes with access to pedestrian facilities, such as sidewalks. Of course, this benefit likely means encouraged use of pedestrian facilities too. This can help stabilize existing neighborhoods and attract new development to a walkable area.

3) **The Message to Businesses**. A Pedestrian Connectivity Plan like this will be an excellent beginning investment for the community to attract future private investment. Moreover, the benefits of business stability, more customers and less turnover, are practically inevitable. Robbinsville has already been working toward this end with the recent implementation of streetscape improvements along US 129.

4) **Tourism**. Robbinsville has some great area attractions so there's no reason that Robbinsville's tourism development cannot increase as a result of pedestrian facilities and its related benefits. The tourism that is most likely will be similar to that demonstrated in the **Lanesboro, Minnesota** case.

5. Designing a Walkable Community

Pedestrian facility use is a function of a variety of factors, including the connectivity of the facilities, their safety, their convenience, and their comfort. For this reason, pedestrian facility design should be thoughtful and sensitive to the needs of its users. By following the guidelines provided in this section for sidewalk, crossing, and trail design, as well as other items associated with pedestrian facilities, Robbinsville should be able to create a built environment that will promote walking and continue to support and increase pedestrian traffic in the Town.

This section provides guidance for GREAT, the Town of Robbinsville as private developers, NCDOT or others construct new pedestrian facilities and reconstruct existing pedestrian facilities to meet better standards. This section is divided into the following topics:

- Legal rights of pedestrians;
- Pedestrian facilities and their design;
  - Sidewalks.
  - Crossings: signalized or unsignalized.
  - Greenways.
- ADA requirements;
- Downtown area standards;
- School standards;
- Sidewalk construction policy and maintenance; and
- Parking lots.

Currently, the Town has few standards for pedestrian facilities – sidewalks, crosswalks, and other pedestrian-related amenities are constructed on an ad-hoc, as-needed basis. This section of the Plan is important because it provides a consistent set of guidelines within the Town to help create a uniform appearance to Robbinsville's sidewalks and a more connected system.

Legal Rights of Pedestrians

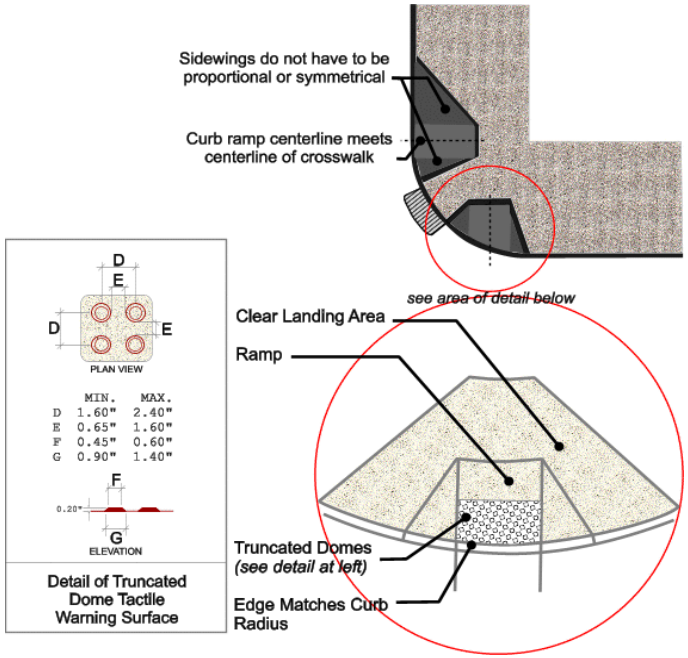
It is important to understand the legal rights of pedestrians because these guide and define how pedestrian facilities are constructed and provided. Some of the legal rights of pedestrians are defined in Sections 20-172 through 20-175.2 of the North Carolina General Statutes. More information can also be found in the NC Bicycle and Pedestrian Laws guidebook, available online through NCDOT's Division of Bicycle and Pedestrian Transportation webpage by searching for the guidebook by its title.

Some of the items which should be considered are the following:

Appropriate Curb Ramp Placement directs pedestrians into the crosswalks. Detectable warning surfaces (right) with truncated domes are required on all curb ramps leading to the crossing of a street.

Photo: Don Kostelec

Exhibit 5-1—Detail of an ADA-compliant curb ramp design with truncated dome measurements.



- Drivers must yield to pedestrians (or bicyclists) crossing a driveway, alley exit, or parking garage exit on a sidewalk. (§20-173)
- Pedestrians crossing any roadway other than at a marked crosswalk must yield to vehicles.
- Pedestrians should cross at street intersections or in marked crosswalks.
- If there are sidewalks, pedestrians are not to walk in the roadway. Where sidewalks are not provided, any pedestrian walking along the roadway will walk to the extreme left, facing in the direction of approaching traffic.
- Every driver must consider pedestrians at all times, especially exercising care in the presence of children or incapacitated persons on the roadway. (§20-174)
- Special emphasis on leaving adequate crossing room at intersections is noted for visually handicapped persons. (§20-175.2)

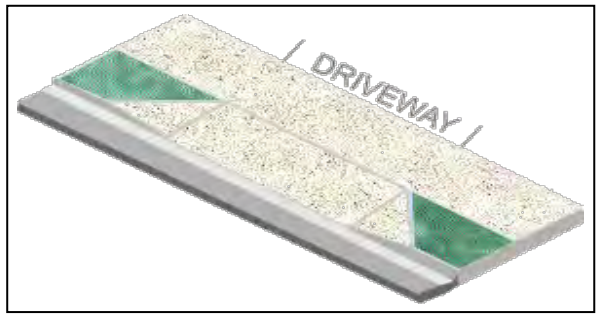
In addition, pedestrian access is also governed by the requirements of the American Disabilities Act of 1990, a civil rights law which prohibits discrimination against people with disabilities in all aspects of life. As done throughout the US, the Town of Robbinsville and NCDOT must provide transportation facilities, including sidewalks and other pedestrian facilities, which comply with the guidelines set forth in the ADA Accessibility Guidelines (ADAAG) in order to meet the standards of the American Disabilities Act. Some of the major items related to pedestrian facilities that are addressed by ADAAG include curb ramps and cross-slopes. The following bullets describe ADAAG-compliant design for these items:

Curb Ramps: Design and Placement

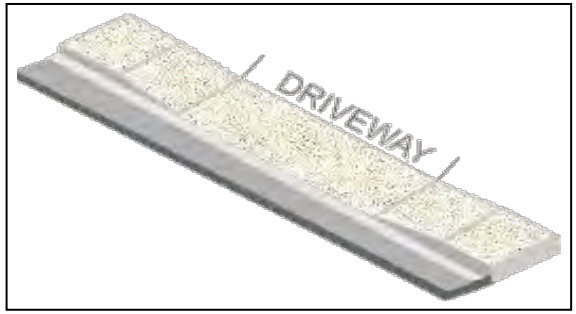
Design. Curb ramps are a significant and required feature of accessible pedestrian transportation systems, and must be designed carefully to fulfill their function and the requirements of the Americans with Disabilities Act. Curb ramps should not have a slope greater than 1:12, meaning that for every foot of travel, the slope should not rise more than one inch. To provide a tactile warning to the visually impaired, raised truncated domes with a color contrast to the background material (typically concrete) should be used, with measurements shown in Exhibit 5-1.

Placement. Curb ramps should be placed entirely within the area of a marked crosswalk, so that a pedestrian can enter the ramp space at an angle perpendicular to the direction of travel. Generally, the standard is to have separate curb ramps on each corner; if a shared (sometimes called corner or diagonal) curb ramp is constructed, then the width and radius should accommodate the user so that entry onto the ramp is parallel to the direction of travel.

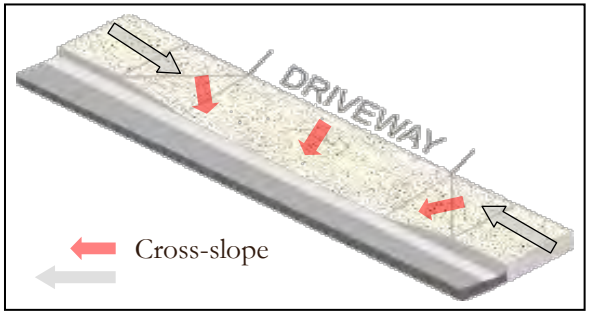
Exhibit 5-2—Examples of acceptable and unacceptable design solutions for minimizing cross-sloping at a driveway and sidewalk interface.



Preferred – *The sidewalk is set behind the driveway apron and planting strip.*



Conditionally Acceptable – *The "dip" at the driveway apron allows for safer passage with no cross-slope.*



Not Acceptable – *The cross-slope at the driveway apron provides a difficult challenge for a person using a wheelchair*

Cross-Slopes

Cross-slopes, or a slope along the travelway surface which is perpendicular to the direction of travel, can often make it very difficult for wheelchair travel. In addition, it can also make for treacherous walking conditions for individuals with problems with their balance and coordination. Cross-sloping most frequently occurs in conditions in which a driveway meets a sidewalk, but can also occur in other situations. In order to minimize the risk of a dangerous and difficult travel condition for some, cross-slope is regulated by ADAAG such that cross-slopes should not exceed two percent (2%), and preferably not exceed 1.5 percent (1.5%) where possible. Exhibit 5-2 indicates the preferred (left), conditionally acceptable (middle), and unacceptable (right) design solutions for new driveways as they interface with sidewalks.

For a complete guide to ADA requirements, please see the National Access Board's website: www.access-board.gov.

Pedestrian Facilities and their Design

There are a variety of sources for design guidance for pedestrian facilities, including the following:

- NCDOT Complete Streets Guidelines (2012)
- NCDOT Highway Design Manual (2002)
- NCDOT Traditional Neighborhood Street Design Guidelines (2002)
- The American Association of State Highway and Transportation Officials' *Guide for the Planning, Design, and Operation of Pedestrian Facilities* (AASHTO, 2004)
- Manual on Uniform Traffic Control Devices (MUTCD), frequently updated
- Federal Highway Administration (FHWA)

The North Carolina Department of Transportation adheres to the design guidelines provided in the AASHTO and MUTCD guidebooks. In general, pedestrian facilities can be described in the following categories:

- Sidewalks;
- Crossings; and
- Greenway trails.

The Town currently does not have its own standards for pedestrian facilities. The following paragraphs provide national standards and best practices for pedestrian facilities by category.

Sidewalks

Standard sidewalk is usually is five feet minimum in width, concrete, and placed along roadways with curb and gutter. In general, the width of sidewalks should accommodate two persons walking past one another, a width generally perceived to be five feet, at a minimum. Other circumstances that may require additional sidewalk width are to accommodate: (1) high pedestrian volumes, such as in a central business district; (2) the overhang of parked vehicles from off-street or angled on-street parking areas; and (3) additional buffer from traffic when a planting strip cannot be installed. Exhibit 5-3 shows common dimensional needs for pedestrian types.

Additional design considerations for on-street sidewalk facilities include the following:

- Eliminating both high and low contact points with tree branches, mast-arm signs, overhang-

User Type	Surface Width (feet)	Clearance Required (feet)
Pedestrian using a walker	3	4
Tourist with wheeled luggage	3	4
Wheelchair user	3	4
Jogger	3	5
Parent walking with child in hand	4	6
Romantic couple walking arm-in-arm	4	5
Business colleagues walking side-by-side	5	6
Wheelchair user with assistance dog or pet	5	7
Two parents side-by-side with strollers	6	7
Wheelchair user on a date with somebody using a walker	6	8

Exhibit 5-3—Dimensional needs for common pedestrians. *This illustrates why a simple default to a five-foot wide sidewalk may be inadequate to promote walkability as such a width is not enough to accommodate two people walking side by side.*

ing edges of amenities or furniture, and

- Providing clear space between walls on one side of the walkway and amenities, parking overhang, or plantings on the curb side of the walkway (Exhibit 5-4 diagrams the relationships between pedestrian features, building facades, and roadway).

In general, standard sidewalks should be concrete, which is more durable than asphalt. However, brick and other decorative materials can be used to create a thematic streetscape. A more flexible material, such as rubberized paving, can also be considered in situations in which there is the potential for tree roots to crack and lift the concrete. Using these types of materials can reduce the risk of a tripping hazard, and also lower maintenance costs. More permeable materials, such as porous pavers, can be considered for all pedestrian-ways, and in particular for greenways near streams, in order to reduce run-off from storm events.

Crossings

Pedestrian-friendly crossings are a critical feature in a well-connected pedestrian system because they provide the linkages between one segment of sidewalk to another as a pedestrian may cross a street, connect to another existing piece of sidewalk, or pass to a new development. A well-placed crossing can dramatically reduce pedestrian travel time and improve pedestrian safety – greatly increasing the convenience of walking as a mode of travel. Crossings can be either signalized or unsignalized, and located at intersections or at mid-block locations. The Town of Robbinsville has several signalized and unsignalized crossings at various intersections throughout the Town.

The most basic crossing is an unsignalized intersection with standard, continental or zebra crosswalk markings. Other potential treatments for unsignalized crossings include raised crosswalks and/or signage. In-street or overhead "yield to pedestrian" signs are an effective treatment for unsignalized intersections, encouraging motorists to stop for pedestrians as they cross the street. These signs offer a visual cue and instill some friction in the roadway, as they are typically placed in the middle of a bi-directional, two-lane road. Additional treatments can be added for crosswalk visibility at unsignalized and signalized locations, including decorative brick, textured crosswalks or experimental paint colors.

All signalized intersections should be outfitted with countdown pedestrian signals and crosswalks, per NCDOT and MUTCD standards. In some cases, the built environment or user context may require audible pedestrian signals or special treatments like a High Intensity Activated Crosswalk (HAWK) Signal. Marked crosswalks (at signalized and unsignalized locations) should not be less than 6 ft in width, with 10 ft or greater for downtown areas and locations of high pedestrian traffic. Advance stop bars should be placed 4 - 10 ft from the pedestrian crosswalk (with 6 - 15 ft recommended in uncontrolled locations or multilane roads).

Exhibit 5-4—Horizontal clearance zones for a sidewalk, most commonly found in downtown setting (FHWA).

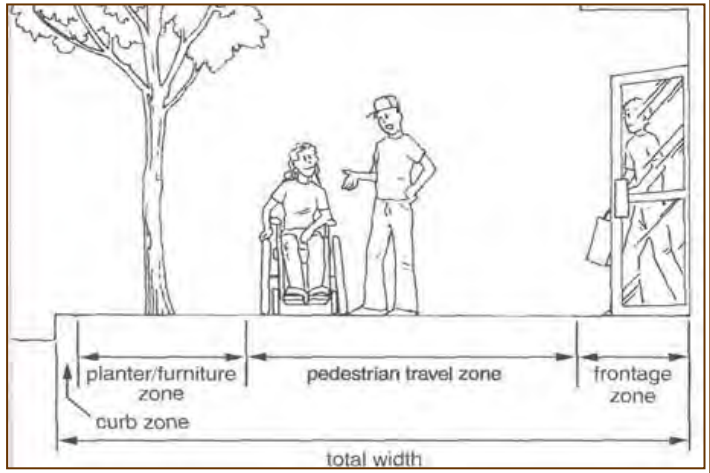


Exhibit 5-5—Typical styles for marked crosswalks (FHWA).

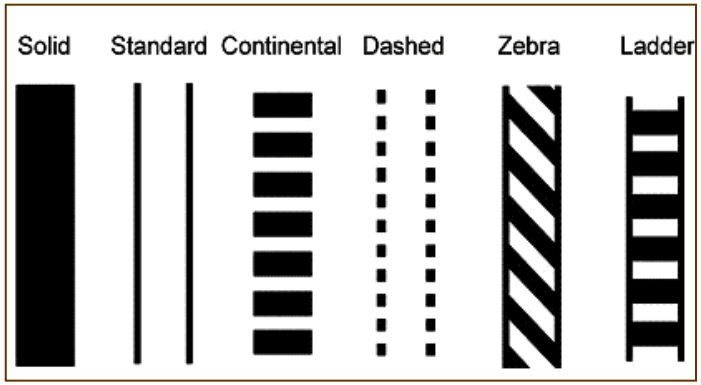


Exhibit 5-6—Common signage placed along streets to alert motorists of crossings and rights of pedestrians.

Pedestrian push buttons should accompany pedestrian signals that are not phased into the regular traffic signal cycle; push buttons should be placed in a convenient and wheelchair accessible location. Pedestrian-activated signals should be used for roadways with long traffic signal cycles where pedestrians are to be given preference when present, and/or for signals where the pedestrian cue is not phased into the traffic cycle unless a button is activated. Pedestrian-activated signalization can also be used to provide lead pedestrian intervals in high-conflict areas, in order to give pedestrians a few seconds of full use of the intersection or crosswalk prior to allowing right or left turning movements for motorists. These options reinforce pedestrian safety at high-conflict intersection locations with significant crash history.

Mid-block crossings are typically unsignalized crossings, but can also utilize pedestrian-activated signalization. There is still no national consensus for when a crossing should be created mid-block, and when the mid-block crossing should be signalized. In addition to numbers of pedestrians, vehicle speed, and vehicle volume on the roadway, there are a variety of other considerations which must be accounted for when determining whether to construct a mid-block crossing. these considerations include: lighting conditions, sight distance, numbers of lanes, and roadway width.

Given the sensitive nature of mid-block crossings, every new mid-block crossing treatment will require a specific investigation by the Town and NCDOT (on State-maintained streets) prior to initiating design and construction. Nevertheless, mid-block treatments can be useful in improving safety in areas with fairly high pedestrian crossings and low numbers of vehicles and vehicle speeds, if located and designed properly.

Signage

In addition to sidewalks and crossings, pedestrian facilities also include signage along major pedestrian routes. Regulatory and warning signs serve primarily to reinforce traffic laws and rules of the road, and notify motorists and others of the presence of pedestrians. Often, the intended effect is to instruct motorists to drive more cautiously and reduce their speeds, thereby improving the safety for pedestrians in the given area.

Regulatory and warning signs can be used in a variety of places, including at crosswalks, at intersections, in-street, and near schools. National standards for sign placement and use can be found in the Manual for Uniform Traffic Control Devices (MUTCD). The MUTCD provides guidance for warning signs which can be used at both crosswalks, or along the roadway:

> *"Non-vehicular signs may be used to alert road users in advance of locations where unexpected entries into the roadway or shared use of the roadway by* ***pedestrians,*** *animals, and other crossing activities might occur."*

The following are some recommended regulatory and warning signs which Robbinsville should

consider installing. Signs, such as those shown in Exhibit 5-6, give notice to road users of traffic laws or regulations. Warning signs, commonly seen in yellow diamond shapes, gives notice to road users of a situation that might not be readily apparent. For more signs and more detailed guidelines for sign installation and use, Robbinsville should consult the MUTCD.

In addition to regulatory and warning signs, many communities are adding non-traditional way-finding signage to their public streets as an added amenity to pedestrians, cyclists and motorists. Pedestrian wayfinding signs typically give directional cues to pedestrians navigating a dense central business district or downtown area by foot. These signs include general directional information to major cultural, civic, institutional or historic landmarks, and sometimes include distances to those destinations (by mile or by block). Wayfinding signs can also indicate local "districts" or neighborhoods via specialized color-schemes or other symbolic gateway décor. Pedestrian way-finding signs can be in the form of gateway banners, kiosks or maps, placed in the "furniture zone" of the walkway, out of the way of pedestrian traffic and at a height of 7ft or more for appropriate clearance but within legible distance of the reader. Associate hardcopy maps are often used to complement these signs.

Greenways

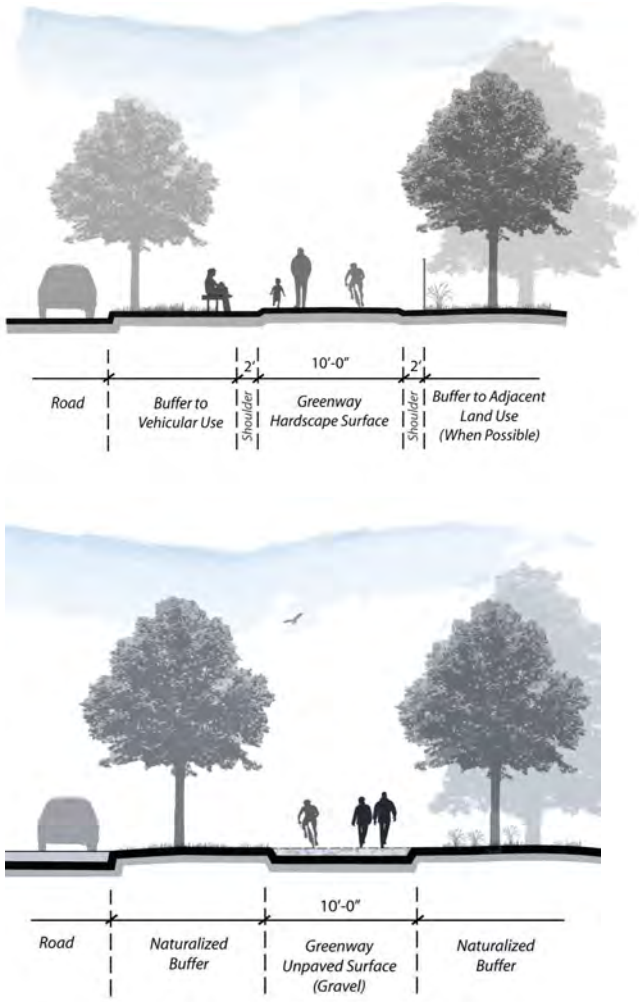
Greenway trails, sometimes called multi-use trails or simply "greenways," are one of the most popular pedestrian facilities, especially for recreation. Greenway trails can be paved or unpaved paths, often unassociated with a roadway. They can be used by pedestrians, cyclists, and other non-motorized users. Greenways are typically no less than 10 feet wide with minimum 2 feet wide graded shoulders on each side of the trail. Surface options include paving with standard or permeable asphalt or concrete, or using pea gravel or granite screenings. Trail design and maintenance should provide for an 8 ft minimum vertical clearance from obstructions, including tree canopy. Proper pedestrian-scale lighting is essential if the trail will be open to commuters or recreational users in the early morning or late evenings. Bushes, trees and undergrowth should be well-maintained to ensure user safety. Often, additional amenities are added to greenways for user convenience, such as benches, water fountains, interpretative trail signs, map kiosks with distance and landmark information, and even emergency telephones if crime is considered a problem.

An example greenway cross-section is provided in Exhibit 5-7.

Downtown Area Standards

Many municipalities consider their downtown the starting point and standard for creating a pedestrian-friendly Town. Downtowns were typically constructed in a time period where walking was a much more functional mode of transportation, not an amenity or form of optional exercise.

Exhibit 5-7—Typical cross sections for a greenway within town limits (Equinox Environmental)



In order to maintain its pedestrian-oriented nature, and also to enhance the area's attractiveness and visual appeal, Robbinsville's downtown area should have certain standards which may or may not be required beyond the downtown area. Some of these recommendations are as follows (and supported through *Reimagining Robbinsville*):

- **Build on the Downtown.** Already, the downtown area has good height-to-width (of street) ratios, architectural detailing, and well-connected sidewalks that are the foundation of a good walking environment.
- **Provide wide sidewalks.** Currently, the sidewalk in the downtown area is approximately 4 to 6 feet wide. New or reconstructed sidewalk should be kept at a minimum of 10 feet, if not wider, in the downtown but may be limited in some areas to preserve some on-street parking spaces. Pedestrians need space to window shop, stroll, walk side-by-side with their families, and even stop for a rest in the sidewalk space. The Town should also consider accommodating restaurants or cafes interested in creating outdoor, on-street seating, which is often a major booster to making a street look more popular and pedestrian-friendly. It also attracts even more visitors and potential shoppers and diners.
- **Provide many pedestrian amenities.** In addition to sidewalk width, the Town and GREAT should also provide pedestrian amenities such as benches, trash cans, and water fountains to make walking in downtown more comfortable for the visitors that come to the downtown. The Town should consider adding more street trees and promoting events (such as a Farmers' Market) to add life to the street. Finally, public restrooms should be available for visitors to use while touring downtown or using any of the recreational amenities near downtown, such as the nearby Parks and the future trail system. The more pedestrian amenities available in a particular area, the more inviting the area for pedestrians and visitors.
- **Provide accessible, safe pedestrian crossings.** Downtown Robbinsville near Courthouse Square has marked crosswalks at the intersection. In order to improve upon these features and maintain the accessibility of the downtown area, crosswalks should be added at intervals and at key intersections. If signalized at some point in the future, they are required to be accompanied by countdown pedestrian signals, as well as ADA-compliant curb ramps for wheelchair access.
- **Provide wayfinding signage to guide visitors.** Pedestrian wayfinding signage provides directional cues and helps visitors navigate the area effectively and can be integrated into an overall wayfinding and beautification efforts as envisioned in *Reimagining Robbinsville*. Such signage can take the form of kiosks with maps and information, historical markers, theme-based pedestrian signage or other forms.

Downtown areas require special considerations to maximize the walkability of the area. Downtown Banner Elk, NC (above) streetscape elements include wide brick sidewalks, human-scaled street lamps, benches and trash cans, street-level windows, and high-visibility crosswalks.

Photo: Don Kostelec

Schools

In addition to Downtown, schools are public spaces that merit special treatment for child safety and well-being. Schools require special treatment because of the presence of both children and very high levels of traffic during arrival and departure times. Especially during arrival and departure, traffic near schools can be incredible varied - consisting of small and large personal vehicles, school and other activity buses, pedestrians, and bicyclists. Specific design features should be required around schools to improve safety within a ½-mile radius of the school, emphasizing higher -density residential areas first. Some of these design features (Exhibit 5-8) include:

- Requiring sidewalks on both sides of the street;
- Placing crosswalks and pedestrian signals at all intersections near the school;
- Reducing and enforcing speed limits along adjacent streets; and,
- Providing signage to warn drivers of the school's presence and the potential for children in the street.

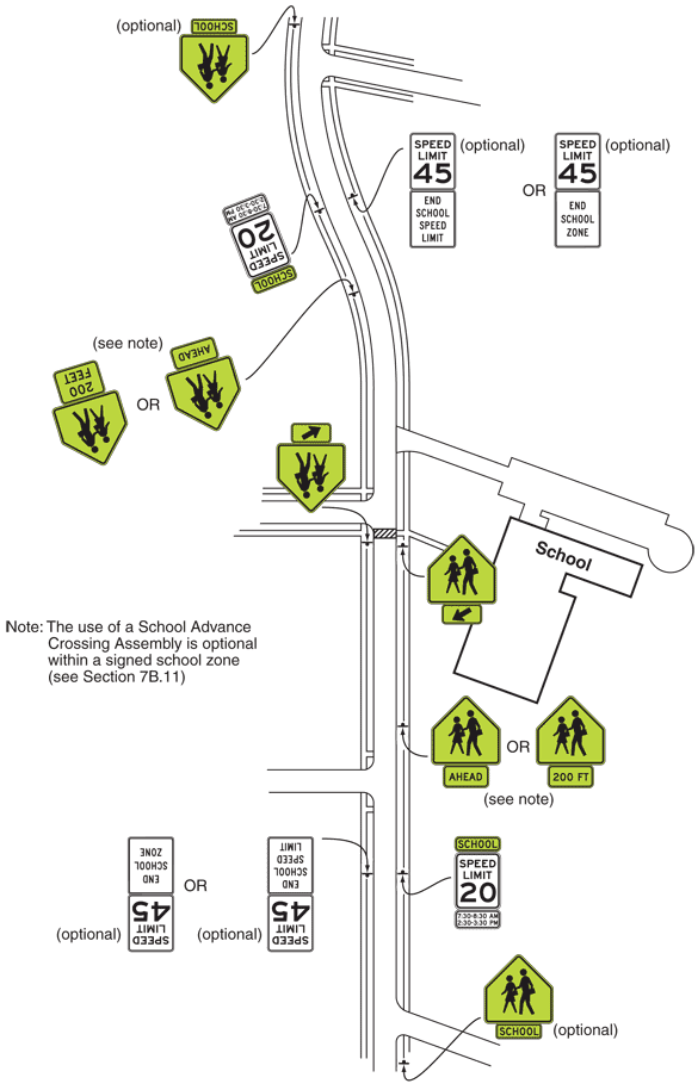
Construction Zones

It is important that during construction of any kind, convenient and safe pedestrian access to destinations remain open and accessible. During the construction or expansion of private development, roadways, utilities, the entity responsible for the construction is also responsible for providing adequate pedestrian access through or around the site as well as signage that provides advance warning to pedestrians and motorists of the closure. Both the MUTCD (Manual on Uniform Traffic Control Devices), NCDOT's Planning and Designing Local Pedestrian Facilities, and the ADA (Americans with Disabilities Act) stipulate that safe passage should be maintained throughout a temporary closure unless it occurs during an extreme situation such as a natural or man-made emergency. During private construction within Town limits, it is the responsibility of the Town of Robbinsville to ensure compliance with these rules by regular monitoring.

The following should be considered whenever a sidewalk or trail will be closed temporarily:

- **Accessibility for Mobility Impaired Citizens**. At least one accessible route should be provided to accessible parking areas/spaces, public streets/sidewalks and public parking areas to an accessible entrance of the building. This route(s) will comply with all other accessibility provisions contained in the ADA regardless of whether they are temporary or permanent. A barrier shall be placed across the full width of the sidewalk or trail to be detectable by a visually impaired person using a cane. An audible information device may be needed in cases where there are especially high traffic volumes challenging a visually impaired person making a street crossing.

Exhibit 5-8—Example of Signing for a School Zone (MUTCD)



Road construction activities should not cause sidewalks to be blocked without the designation of an accessible detour route. If such a route is not available, then signage should be moved out of the sidewalk.

Photo: Don Kostelec

- **Temporary Obstructions.** Parked construction equipment, erosion control fencing, storage of materials/construction debris, and other potential obstructions should be kept away from roadside pedestrian access and pedestrian or multi-use trails so as to keep a permanent passageway open for pedestrians crossing the site. Signs and other devices should not protrude more than 4" into the pedestrian passageway and 7' or less above a sidewalk (8' min. preferred).
- **Advance Warning and Signage.** Advance warning may consist of a single sign to a flashing strobe, depending on the nature of the construction or context (such as vehicular volumes) of the work area. Advance signage should be placed so that pedestrians have an opportunity to read the sign and make a safe crossing at a street intersection to the opposite side of the roadway. Smaller, mid-block closures will require fewer treatments, but will still retain the "Sidewalk Closed Ahead Cross Street" advance warning at an appropriate and safe crossing point in advance of the closure, at a minimum.
- **Route Design.** Temporary traffic barriers like jersey barriers (although not intermittent short sections of jersey barriers) and breakaway bollards should be considered as tools to help delineate a buffer from moving vehicles in areas with high pedestrian traffic volumes and/or to help ensure worker safety.

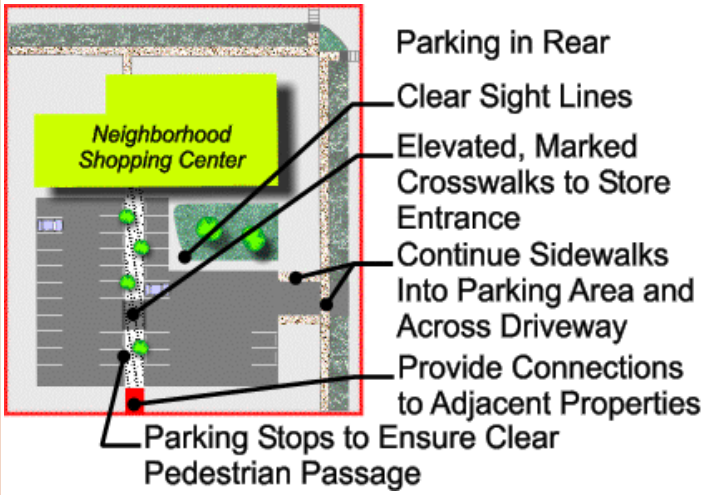
Parking Lot Design

Everyone becomes a pedestrian once they park their car and it was noted that a notable proportion of the pedestrian crashes in Robbinsville occur in parking lots or driveway. Poor parking lot design at the least will deter customers that may be walking or riding transit to a business, and at the most can create a dangerous safety hazard by increasing pedestrian-vehicle interaction. The most common design issue is that the primary carriageway for vehicles in the parking lot happens to coincide with where the greatest number of pedestrians cross: Directly in front of the main entrance to a business.

Other issues include poor sight lines to spot pedestrians; bad transition areas from the public domain (e.g., streets) to the private parking area; and inconvenient pedestrian access between parking areas, shops, and adjacent communities. Exhibit 5-9 illustrates a preferred set of suggestions to overcome these common problems. The larger the parking lot, the more vehicles and pedestrians, and therefore the more important it is to carefully design treatments to minimize vehicle-pedestrian interaction. Some suggested treatments:

- **Parking in the rear and sides.** One way to attract pedestrians to a store and to reduce pedestrian-vehicle interaction is to minimize the amount of parking lot that a pedestrian must walk through to get to the store entrance. This can be done by placing parking in the rear or

Exhibit 5-9—Example of pedestrian-friendly parking lot design



sideyards of a building, which will reduce travel time for pedestrians approaching the store from the street-front and sidewalk. It will also minimize pedestrian-vehicle interaction by keeping pedestrian customers separate from vehicles by allowing the pedestrian customers to access the store directly from the sidewalk rather than through a parking lot. Parking lots in the rear also create a more attractive streetscape – something that encourages pedestrian use.

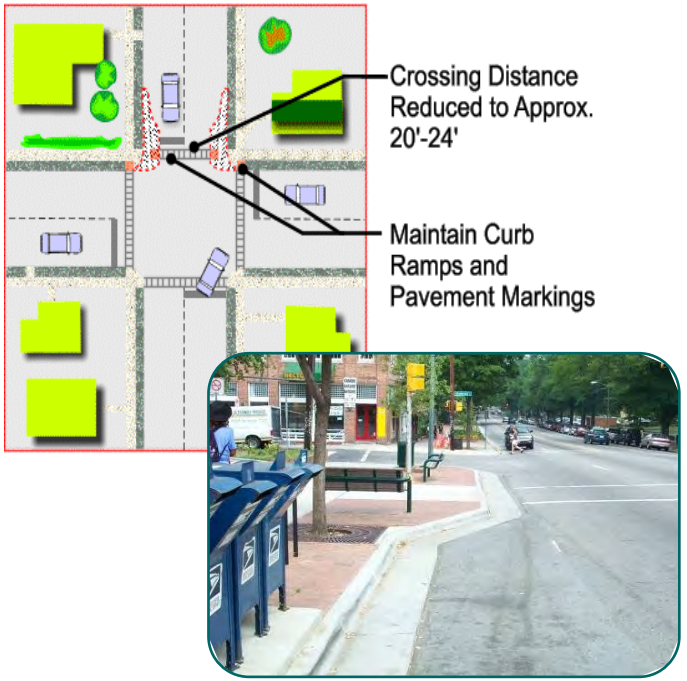
- **Create safe "landing areas".** Provide continuous transitions from the street into a safe "landing" area in the parking lot; don't just "dump" pedestrians into the throat of a drive-way.
- **Maintain good sight lines** at major turning points inside the parking area.
- **Provide well-marked pedestrian access perpendicular to store fronts.** Whenever possible, provide perpendicular pedestrian access into the front of a high volume land use such as major retail uses. The final crossing to the store entrance(s) should be well-marked, preferably with a raised crosswalk and/or colored demarcations to provide good visual cues to the driver. Moving the main parking aisle away from the principal entrance is another option.
- **Supply adequate, pedestrian-scale lighting.** Adequate lighting is often perceived as a personal security issue in many large parking areas, and should be provided while avoiding disabling glare (looking into a direct light source and being partially blinded) or causing light pollution to adjoining properties.
- **Provide awnings.** Especially for some "big box" stores, it is important that the transition for customers from inside the store to the outside be gradual and protected as much as possible from conflicts with vehicles. By providing awnings, a store protects its customers from the rain while allowing for a more comfortable pedestrian environment for customers to window shop and wait for rides.

Robbinsville has minimal shopping centers and areas with large parking lots, but others may be on the way. It is important that the Town keep the pedestrian's access and safety in mind when reviewing development proposals. Through better design and better design review, the Town will be able to create parking lots that are both convenient for a car and comfortable for a pedestrian.

Curb Extensions (Bulb-Outs) and Curb Radii

The primary purpose of bulb-outs is to shorten the distance that pedestrians must travel to cross a street. In addition, they may encourage motorists to drive slower by narrowing the travel lane and reducing vehicular speeds during turning movements at intersections. Motorists will travel more slowly around corners with smaller curb radii even without the use of curb extensions. Landscaping and other aesthetic treatments such as special paving textures should be carefully

Exhibit 5-10—Example of bulb-out placement to reduce curb radii and shorten crossing distance for pedestrians.



designed to avoid hazards to drivers and visually-impaired citizens while minimizing maintenance costs. Exhibit 5-10 (previous page) shows an example image bulb-out placement to reduce curb radii and make an intersection more pedestrian-friendly.

Roundabouts

Traffic circles and roundabouts are also an increasingly popular traffic calming technique, used instead of a stop control or traffic signal installation at an intersection. The Pedestrian Connectivity Plan recommends evaluation of a roundabout on US 129 if a new access route to the school complex is constructed. Federal design guidance for roundabouts is available online and should be consulted when necessary to ensure compliance with the Americans with Disabilities Act (ADA). It is important to note that additional widths for pedestrians and bicyclists is required at a roundabout, particularly if part of a greenway route. Crosswalks, curb ramp widths and other design elements should be 10' in width to accommodate pedestrians and bicyclists through the roundabout.

Pedestrian-Friendly Street Design

In addition to all the treatments noted above, it is often important to consider pedestrians as part of the built environment from roadway design to architectural standards. Including pedestrian-friendly elements throughout a roadway or development project - from the creation of conceptual alternatives to construction and maintenance phases – can greatly impact the long-term walkability of an area. In recognition of this fact, NCDOT has developed a set of *Traditional Neighborhood Development Street Design Guidelines*. These guidelines are available for proposed TND developments and permit localities and developers to design certain roadways according to TND guidelines rather than the conventional subdivision street standards. The guidelines recognize that in TND developments, mixed uses are encouraged and pedestrians and bicyclists are accommodated on multi-mode/shared streets.

As Robbinsville and GREAT pursue implementation of *Reimagining Robbinsville*, the TND guidelines may be helpful in integrating land use and transportation design to promote economic development, safety and walkability.

Accommodating pedestrians at roundabouts require pedestrian refuge islands on approaches, high-visibility crosswalks and various spacing dimensions to increase the awareness of the presence of pedestrians and clearly delineate where pedestrians should cross.

Photo: Don Kostelec

References & Resources

Stormwater "Best Management Practices Manual," July 2007 Edition. NC Department of Environment and Natural Resources, Division of Water Quality.

Manual on Uniform Traffic Control Devices for Streets and Highways, 2009 Edition. Federal Highway Administration, 2009.

Planning and Designing Local Pedestrian Facilities, North Carolina Department of Transportation Office of Bicycle and Pedestrian Transportation. February, 1997, Chapter 10.

Americans with Disabilities Act, US Code 28 CFR Part 36: ADA Standards for Accessible Design.

6. Promoting Pedestrian Safety

In order to encourage economic development through walkability, a community must create an environment where people feel safe walking. As pedestrians are among the most vulnerable users of the road network, pedestrian traffic is particularly sensitive to real or perceived safety concerns. This also means that pedestrian safety improvements can yield significant benefits in terms of increased pedestrian activity.

Robbinsville, like many small towns that serve as marketplaces and government centers for expansive rural areas, sees many pedestrians who drive into town and then begin their walking trips. While this out-of-town traffic is vital to the local economy, it can bring with it a unique set of traffic safety concerns. Many of the pedestrians walking in Robbinsville may be from extremely rural areas and not accustomed to walking in more heavily trafficked areas or where there are pedestrian facilities and crossing signals present.

Many drivers may also be unaccustomed to driving through areas with significant pedestrian traffic in combination with more vehicular turning movements and other distractions. Drivers who are merely passing through town may see the area businesses and associated pedestrian traffic as more of an inconvenience than an amenity, but improving and beautifying pedestrian areas along state highways may help encourage those drivers to stop in Robbinsville on their way through.

In small towns that are hubs of commerce and government for rural populations, conflicts can arise between pedestrians who may be visitors or only in town for errands and drivers who are not accustomed to seeing pedestrians along their routes.

Photo: Don Kostelec

Current Conditions

The current pedestrian crash data that is available from the North Carolina Department of Transportation (NCDOT) through the online Pedestrian and Bicycle Crash Data Tool includes crashes reported to police agencies across the state from 1997 to 2010. In those 14 years, there were 10 pedestrian crashes reported in Robbinsville. This is an extremely high number relative to population, giving Robbinsville significantly more crashes per 1,000 residents over that time than any other small municipality in Western North Carolina (see Exhibit 6-1; next page).

NCDOT's 2005-2009 Pedestrian Crash Facts Summary indicates average pedestrian crash rates are far lower than what Robbinsville has been experiencing. Urban areas (defined as all incorporated municipalities) across the state had an annual pedestrian crash rate of 3.7 per 10,000 population and rural (unincorporated) areas had an annual rate of 1.4 per 10,000 population. Over 14 years, this would give the average municipality 5.18 pedestrian crashes per 1,000 population and the average rural area 1.96 per 1,000 population, compared with Robbinsville's 16.1.

Fortunately, none of the ten crashes reported in Robbinsville from 1997 to 2010 were fatal. This indicates that the crashes probably took place at relatively low speeds. Speed data from NCDOT indicates that eight of the ten crashes took place at speeds of 0-5 miles per hour. However, this

Exhibit 6-1—Pedestrian Crash Rates for Western NC Communities

An evaluation of pedestrian crash data from 1997-2010 revealed that Robbinsville has the highest pedestrian crash rate per 1,000 persons of any small community in the mountain region of the state. These rates are significantly higher than the average for North Carolina communities.

Community	Population (2010)	Crashes (1997-2010)	Pedestrian crashes per 1,000 pop.
Robbinsville	**620**	**10**	**16.1**
Hayesville	311	4	12.9
Sylva	2,588	25	9.7
Forest City	7,476	66	8.8
Blowing Rock	1,241	9	7.3
Bryson City	1,424	10	7.0
West Jefferson	1,299	9	6.9
Murphy	1,627	10	6.1
Columbus	999	6	6.0
Rosman	576	3	5.2
Franklin	3,845	20	5.2
Sparta	1,770	9	5.1
Andrews	1,781	9	5.1
Rutherfordton	4,213	21	5.0
Highlands	924	4	4.3
Tryon	1,646	7	4.3
Brevard	7,609	30	3.9
Spruce Pine	2,175	8	3.7
Hot Springs	560	2	3.6
Maggie Valley	1,150	4	3.5
Spindale	4,321	14	3.2
Weaverville	3,120	9	2.9
Waynesville	9,869	27	2.7
Mars Hill	1,869	5	2.7
Marion	7,838	19	2.4
Jefferson	1,611	3	1.9
Clyde	1,223	2	1.6
Cherokee	2,138	3	1.4
Burnsville	1,693	2	1.2
Fletcher	7,187	8	1.1
Banner Elk	1,028	1	1.0
Cullowhee	6,228	6	1.0
Canton	4,227	4	0.9
Woodfin	6,123	4	0.7

probably indicates incomplete data as speeds for some crashes weren't assessed or reported. No pedestrian crashes were reported as having involved a vehicle traveling over 35 miles per hour.

Four of the ten crashes took place in parking lots or driveways, and while specific location data is not available for the pedestrian crashes, NCDOT's High Frequency Crash Locations map for Graham County indicates that the majority of all traffic crashes in town are clustered around the intersection of US 129 and NC 143, including in the parking lot of the Ingles grocery store, with a secondary hot spot at the intersection of US 129 and North Main Street. Unusual intersection geometry, limited facilities for pedestrians, and presence of numerous curb cuts in close proximity to the intersections are common factors between these intersections and along the US 129 corridor. Some of the concerns were addressed with the addition of pedestrian signals and crosswalks at these intersection in conjunction with the US 129 resurfacing project in 2013. It will be important to track if these additional pedestrian facilities help to improve both the crash rate and the perception of safety for pedestrians at these intersections.

Senior Pedestrian Safety

Another factor to consider is the particular vulnerability of older pedestrians. Numerous studies at both national and regional levels have shown that senior citizens are at least twice as likely to be victims of fatal pedestrian crashes as any other age group and are also more likely to be injured in motor vehicle crashes. Seniors over 75 years old are even more at risk. Despite the dangers, walking is particularly important for seniors as many are no longer able to drive safely or comfortable driving and research has shown a strong connection between moderate physical activity such as walking and reduced rates of dementia and improved overall mental and physical health in seniors.

Seniors are particularly vulnerable pedestrians for many reasons. First, they frequently can't move as quickly as younger pedestrians. A study conducted by Transportation Alternatives and the New York City Department of Transportation found that the average speed at which a 75-year-old without an identified disability crossed a street was 2.5 feet per second. However, the minimum crossing time permitted by the Manual on Uniform Traffic Control Devices (MUTCD) assumes that pedestrians can travel at 3.5 feet per second. As a result, many jurisdictions have begun requiring longer crossing intervals at intersections that are near senior centers or high concentrations of elderly residents. Another option is to provide a push button that allows an elderly, disabled, or slow moving pedestrian to request a longer crossing time.

Seniors also frequently have reduced visual acuity, making it more difficult for them to see hazards and react to them. Senior mobility experts such as Sandra Rosenblum of The Urban Institute estimate that as few as 35% of senior pedestrian injuries involve being struck by a vehicle. Many injuries such as falls that don't involve a vehicle are not reported to police and therefore are not incorporated into common pedestrian safety statistics. Maintenance of sidewalks that are level and free of obstructions and complying with Americans with Disabilities Act (ADA) requirements regarding detectable warnings and visible signage are particularly important to the safety of older pedestrians.

Finally, seniors often suffer more serious injuries than younger pedestrians would from the same collision or fall simply because their bodies aren't as resilient. Extensive recovery periods from an injury that may have been minor for a younger person can seriously impact an older person's long-term health prospects.

Older adults are particularly vulnerable as pedestrians. The presence of pedestrian facilities as well as good maintenance practices reduce exposure to vehicular traffic and reduces trips and falls hazards.

Photo: Don Kostelec

Children and other demographics

Only one child under the age of 16 was among the pedestrians struck by vehicles in Robbinsville between 1997 and 2010. However, there are special factors to consider related to young pedestrians. Children may be more difficult to for drivers to see, and often lack mature decision-making skills which may cause them to dart into roadways or fail to look both ways before crossing. It is incumbent on licensed adult motor vehicle operators to be prepared for such situations. Additionally, active transportation plays a vital role in children getting the needed 60 minutes of exercise per day and parents' perception of safety has a profound effect on how much children are permitted to walk or bicycle to destinations including school and recreational facilities.

While children and seniors are particularly vulnerable and are often the first groups that come to mind in discussions of pedestrian safety, it is actually middle-aged males, particularly those who are minorities or have lower incomes, who are most often the victims of pedestrian crashes. In Robbinsville, seven of the ten pedestrian crashes had male victims. Five of the eight involved

drivers who were identified were male, which also parallels national trends. Only one of the ten crash victims was of Hispanic descent, but cultural considerations such as different customs for which side of a road to walk on when there are no sidewalks can put recent immigrants at particular risk. With over 10% of Robbinsville's population being of Hispanic descent, it may be advisable to target some outreach efforts to Spanish-speaking residents.

In 2013, NCDOT's resurfacing of US 129 upgraded pedestrian facilities at the NC 143 and North Main Street intersection to remove barriers such as the median islands shown above. Even with the improvements, these intersections have other geometric features that make pedestrian more vulnerable when navigating them.

Photo: Don Kostelec

Engineering

In a community with limited existing pedestrian facilities, the most essential component to improving pedestrian safety is engineering improvements to accommodate pedestrians. Basic improvements that will promote safety along with increased pedestrian activity and economic development include installing continuous sidewalks where there are gaps along streets such as US 129, NC143, and Main Street. These sidewalks should be free of obstructions such as utility poles, protected from vehicular traffic to the maximum extent possible, and include fully ADA-compliant curb ramps and crossing treatments. Many of these design considerations are described in more detail in Chapter 5.

In constructing these sidewalks, the town should work with business owners and NCDOT on reducing the number of curb cuts and narrowing driveways where possible to reduce the number of conflict points and the speeds at which vehicles enter parking lots and driveways. All sidewalks, new and old, should be maintained regularly to address potential tripping hazards. Snow and ice removal on sidewalks should also be taken into account, as should maintenance of pedestrian traffic during construction projects.

Two intersections in particular warrant attention in regard to pedestrian and vehicular safety. The intersection of US 129 and NC 143 has historically been the location of a large portion of the crashes in Robbinsville. NCDOT addressed pedestrian needs at this intersection as part of the 2013 resurfacing project. The new configuration includes crosswalks and pedestrian signals as well as reconstructed curb ramps. The intersection still contains less than optimal sight lines and wide turning radii that allow vehicles to make turns at higher speeds than are desirable in a neighborhood commercial area with pedestrians present.

An engineering study and realignment of the intersection to address both pedestrian and vehicular crash concerns is advisable in the long-term. Consideration should be given to safety enhancements beyond basic marked crosswalks at this location due to the relatively high volumes of both traffic and crashes.

The intersection of North Main Street and US 129 is another area identified as a High Frequency Crash Location by NCDOT that included the recent addition of pedestrian accommodations with the resurfacing project but not all of the pedestrian needs were addressed. The north side of US

129 in the vicinity of the intersection is mostly open access to parking lots with no curb or sidewalk to delineate the road from the private property of the businesses there. Installing sidewalk and defining driveways for the businesses would reduce conflicts between pedestrians and vehicles both accessing those businesses and traveling along US 129. Similar improvements were addressed in the US 129 Streetscape Plan.

The addition of crosswalks with the US 129 resurfacing project should help. Evaluating a future realignment of the intersection to reduce the turning radius for vehicles could protect not only pedestrians and vehicles traveling through that intersection but also serve to reduce the speed of vehicles as they enter Main Street and the downtown area of Robbinsville. As Main Street provides access to Robbinsville Elementary School, improvements to this intersection could play a critical role in improving safety for elementary school students and increasing the number of young people who are able to walk or bike to school in the community.

With four out of the ten identified pedestrian crashes having occurred in parking lots or driveways, it is also important to work with business owners to encourage safety-oriented parking lot and driveway designs. GREAT could host a seminar for business owners on parking lot safety and beautification, or work with individual property owners to incorporate safety as they repave or redesign their properties. Projects to improve parking lot safety and appearance can have a dual benefit, not only reducing crashes on private property but also making the businesses themselves more attractive to customers arriving either in vehicles or on foot. In particular, pedestrian -oriented improvements such as landscaping, directional signage, and driveway improvements could improve both safety and attractiveness of the large Ingles' parking lot at the corner of US 129 and NC 143.

Greenways

While the majority of fatal and severe pedestrian injuries occur on or adjacent to roadways, safety concerns must also be incorporated into the design of greenways to reduce the incidence of falls, pedestrian and bicycle conflicts, and errors such as motor vehicles being inadvertently driven onto greenways by intoxicated or inattentive operators. Path width and geometry should, at minimum, comply with the Public Rights-of-Way Accessibility Guidelines (PROWAG) and the AASHTO Guide for the Design of Bicycle Facilities; and volume and mix of users should be evaluated to determine if minimum widths are sufficient. Street crossings on greenways also need to be carefully designed to ensure that path users are visible to traffic on the intersecting street and that motor vehicle access onto the trail is restricted without creating an undue hazard for trail users. Safety rules for greenways, including possible speed limits for bicyclists, should be clearly posted at trailheads and along the route.

A section of the planned greenway will likely parallel US 129 like the one shown above. When designing for safety on a greenway, the width of the path, crossing dimensions, vehicular interactions and visibility considerations are different than with sidewalks as the users are more diverse.

Photo: Don Kostelec

Signage that supplements the typical required streetside signage installed by the Town and NCDOT can alert motorists to the presence of pedestrians.

Photo: Don Kostelec

Education

While the presence and quality of facilities may have the single largest impact on pedestrian and driver safety behavior, education is also an important component of creating a safe and walkable environment. For a small town bisected by US and state highways, maximizing driver awareness that they are entering a special place, particularly a business district or downtown area, is a key component of addressing safety within the town limits.

Signage alerting drivers to lower speed limits and the presence of pedestrians as they enter town is vital, and can be supplemented with billboards promoting the walkability of downtown and encouraging drivers to watch for pedestrians. Drivers who do most of their travel in rural areas without frequent traffic signals or marked crosswalks may not even be aware of the legal requirement that they stop for pedestrians in crosswalks, including the unmarked crosswalks at intersections.

Those who drive into town and then become pedestrians may likewise not be accustomed to crossing or walking along streets in high traffic areas with numerous curb cuts. They may need reminders of safety tips such as walking against traffic when there are no sidewalks present, crossing at intersections or marked crosswalks whenever possible, obeying traffic signals, watching for turning and backing vehicles at driveways, and wearing bright or reflective clothing to maximize visibility when walking at night or in inclement weather. A variety of media including billboards, flyers distributed at downtown business, messages in newsletters, social media, or the town web site can all help increase awareness of pedestrian safety tips and laws. GREAT can lead efforts to promote pedestrian safety messages to residents both in Robbinsville and in surrounding Graham County.

In order to address pedestrian safety concerns, NCDOT has partnered with the University of North Carolina Highway Safety Research Center of the *Watch for Me NC* campaign. This campaign has initially focused on urbanized areas in the Research Triangle area, but will be expanding this year to include some small towns in Central and Eastern North Carolina. The intent is to eventually extend the program to the entire state. The Town of Robbinsville could request and use materials from this campaign, and could also contact the Highway Safety Research Center to express interest in being a future direct participant. The campaign includes billboard designs, educational handouts, and television and radio spots, all of which are available for public use. Some of the materials are available in Spanish.

Children's education is another key component of creating a safe walking culture. With Robbinsville Elementary School located near downtown and the Middle School and High School complex location nearby as well, establishing a robust Safe Routes to School program could provide multi-

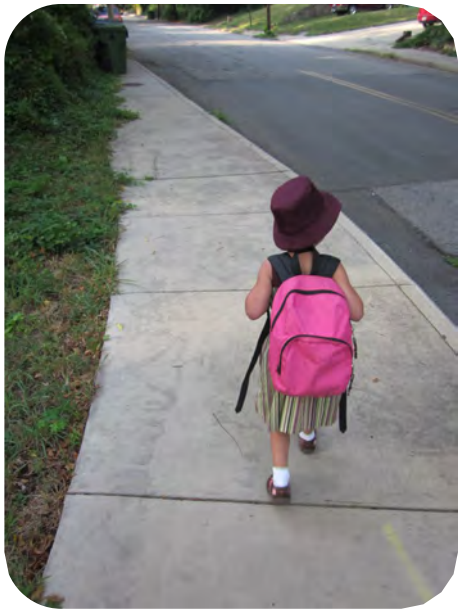
ple benefits to the community. Educating young people about traffic safety not only helps them make better decisions when walking, but also can help make them safer future drivers and even educate their parents about the importance of pedestrian safety. Although the federal Safe Routes to School program no longer has a dedicated funding source, much of national and state infrastructure established to support Safe Routes programs is still in existence and most former Safe Routes projects are eligible for grants under the federal Transportation Alternatives Program. NCDOT continues to employ a Safe Routes to School Coordinator in the Division of Bicycle and Pedestrian Transportation and North Carolina is also home to the National Center for Safe Routes to School located at the University of North Carolina at Chapel Hill.

Education campaigns targeting senior pedestrians and drivers have also been implemented. These programs typically encourage walking for health as well as promoting safety rules and alerting seniors to concerns that may evolve as they age. One example is the *Walk Wise, Drive Smart* initiative that was implemented by the City of Hendersonville in cooperation with the University of North Carolina and the National Highway Traffic Safety Administration.

Enforcement

Enforcement of traffic safety laws can be particularly effective in reducing impacts to the most vulnerable road users, who are not protected by vehicle safety features such as air bags and seatbelts. The fact that all of the pedestrian crashes reported in Robbinsville have occurred at relatively low speed may indicate that local law enforcement has been quite successful in enforcing speed limits within the town, but ongoing assessment of observed vehicle speeds and targeted enforcement to ensure drivers slow down as they enter town is crucial to maintaining safe speeds in the areas where pedestrian traffic is common. Enforcement of other prohibited acts such as driving under the influence of alcohol or drugs and texting while driving also protects pedestrians along with all other road users.

Another tactic employed by law enforcement agencies to reduce the number and severity of pedestrian crashes is conducting pedestrian stings where an officer or trainee serves as a decoy pedestrian, crossing legally in a crosswalk while other officers watch for vehicles that fail to yield to the decoy pedestrian and issue tickets or warnings. Local officials should observe the rate at which vehicles yield to pedestrians at crosswalks and if non-compliance is prevalent, crosswalk stings may be warranted. In Robbinsville, this should occur during high traffic periods. It is important that, initially, these stings are not seen as punitive but rather educational as not to appear that the town is hostile to visitors; rather there is a desire for visitors and others to value Robbinsville and those who walk.



Safe Routes to Schools programs are just as much about educating motorists and children about how to walk and drive safely as they are about new or improved infrastructure.

Photo: Don Kostelec

Given the higher than average pedestrian crash rates in Robbinsville, the Town, GREAT and law enforcement should evaluate how and why this is occurring. Assessing the design of facilities as well as conducting field observations following a pedestrian crash can help identify potential problems.

Photo: Don Kostelec

Evaluation

A variety of techniques can be used to assess the effectiveness of pedestrian safety initiatives. The most basic performance measures are the numbers or rates of crashes and fatalities, but as described earlier these do not address the full scope of pedestrian safety concerns. A substantial increase in pedestrian traffic may indicate that pedestrians feel safer walking around town. Similarly, studies of driver speed and compliance with crosswalk laws may show important progress over time that is not captured in simple crash rates.

Some communities also work with local hospitals to collect data on pedestrian injuries that are not reported to police. Finally, informal before and after surveys can be helpful in assessing the effectiveness of education, enforcement, and engineering programs in improving citizens' knowledge of and compliance with traffic laws as well as their subjective experience of safety as a pedestrian or a driver traveling through the community. When pedestrian safety campaigns are part of a larger economic development initiative, the subjective measures of citizen response to the improvements are particularly important to assess whether the program is meeting its objectives.

The high crash rate experienced in Robbinsville also warrants ongoing monitoring. Although the sample size is small and there have not been any recent fatal pedestrian crashes, town staff and GREAT should stay up to date as NCDOT releases updated pedestrian crash statistics and continue to assess locations and circumstances of crashes, as well as how rates in Robbinsville compare to peer communities and statewide averages. It is likely that a substantial emphasis on improving pedestrian infrastructure and promoting awareness of walking safety will lead to a reduction at least to pedestrian crash rates closer to the state average.

7. Action Steps for Implementation

The completion of the Robbinsville Pedestrian Connectivity Plan is the first of many steps to improve the economy of Robbinsville by investing in walkability. The two primary partners in implementation—GREAT and the Town of Robbinsville—will need to coordinate efforts to design, construct and maintain facilities while identifying roles and responsibilities for implementing complementary programs to promote safe driving, safe walking and increased use of greenways and sidewalks. This chapter provides a series of action steps for moving forward with the recommendations of the Plan, as well as potential funding sources and partners for proposed projects as identified through the "Give-Gain Grid" exercise (Exhibit 7-1) conducted as part of the Plan.

Implementation strategies contained in the Robbinsville Pedestrian Connectivity Plan reflect what is considered to be feasible in terms of accomplishments over the next five to 10 years. GREAT and its partners should be poised to take advantage of any opportunity that arises to fund and implement recommendations of this Plan. While projects such as the Robbinsville Greenway may be the highest priority, it is also the most expensive and time-intensive project. As GREAT is working toward identifying funding for the Greenway, other opportunities may arise to construct or re-build sidewalks on other priority routes. Given the state of limited funding from various sources, particularly the uncertainty with regard to funding through the North Carolina Department of Transportation, no opportunity should be refused.

The 10 Action Steps for Implementation illustrated on pages 76 and 77 helps guide development of the proposed greenway and sidewalk network for Robbinsville and creates a supportive program and policy environment for a walk-friendly community. These steps will be crucial in moving forward with the overall recommendations of the Pedestrian Connectivity Plan.

The Roadside Park along US 129, as proposed in *Reimagining Robbinsville*, is at a key intersection with the planned greenway. These investments will require numerous partnerships along with immediate and short-term action items.

Partnership Opportunities

Continuing GREAT's initiatives to create strong partnerships, not just among area agencies but among regional and national agencies, foundations, academic institutions and non-profit organizations, is critical to implementation of the Pedestrian Connectivity Plan. While the scope of the plan emphasizes Robbinsville, implementing the Plan should be viewed as a county-wide or even region-wide effort to improve safety and increase awareness of pedestrians.

Further, the Pedestrian Connectivity Plan is one of several planning and strategic investment initiatives undertaken in Graham County and the recommendations contained herein will likely coincide and sometimes compete with priorities identified in other initiatives. Any investment in the public or private realm in Robbinsville should be considered by the implementing agency or organization for its impacts to walkability of the town.

Exhibit 7-1—What will partners be "giving" and "gaining" from investing in a more walkable Robbinsville?

Partner	Give	Gain
GREAT	• Grant pursuits • Publicity	• Achievement • More grants • Involvement
Town of Robbinsville	• Approval of projects • Property • Maintenance	• Increased revenues • Stable & new business • Safer streets • Happier kids • Healthier citizens
Graham County	• Assist in grants • Maintenance • Property	• Increased revenues • Healthier citizens • Happier kids
Chamber / Tourism	• Outreach/presentation • Buy-in	• Increased revenues • More members • Stable & new business • Promotional value
Businesses	• Parking considerations • Easements	• Enhanced storefront • Increased revenues • Stability • Promotional value
NCDOT	• Approve permits • Assist in design, construction	• Good PR • Safer streets • Fewer complaints
Southwestern Commission	• Assist in grant pursuits & identification • Policy support	• Good PR • Happy member agencies
Community Transformation Grant	• Identify sources of funding for programs and projects	• Accomplishment • Healthier citizens

Many of the education, encouragement and enforcement programs will be carried out by partnerships between GREAT, the Town , local nonprofit and civic organizations, the tourism authority and chamber of commerce, business owners, developers and others. During the Pedestrian Plan effort, a workshop was organized to identify potential partners for implementation. They included:

- GREAT;
- Town of Robbinsville;
- Graham County;
- Graham County Travel and Tourism;
- Graham County Chamber of Commerce;
- Graham County Schools;
- Graham County Sheriff's Department;
- Graham County Health Department;
- Appalachian Regional Commission;
- Community Transformation Grant;
- Southwestern Commission;
- Tri-County Community College
- North Carolina Department of Commerce;
- North Carolina Department of Transportation; and
- Service Clubs, such as Rotary, Kiwanis, and Lion's Club.

Measuring Performance

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, cities, MPOs and DOTs are finding value in tracking the performance of a variety of actions. For groups like GREAT and the Town of Robbinsville, methods of tracking the performance of projects, programs and policies can greatly help in justifying need for additional projects as grants are pursued. Communities that show measurable progress in the implementation of their plans find themselves in a more strategic position to receive funding from grants and 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.

GREAT and its partners should track performance of the pedestrian system on an annual basis and promote this performance through an annual report and presentation to the Town, County and other organizations. Exhibit 7-2 depicts several performance areas that GREAT should consider to measure and document performance of itself and outreach efforts related to walkability.

Funding

Given the state of the economy and transportation programs that are in a constant state of flux, it is difficult to identify specific funding sources for GREAT and its partners to pursue. At the time of publication of this Plan, the ability of agencies such as NCDOT to continue to assist in funding local pedestrian projects is part of the larger state budget debate. Federal transportation programs that traditionally funded pedestrian investments are also changing with the existing transportation funding bill due to expire in 2013.

GREAT should continue to work with its major funding partners and transportation planning agencies (e.g. NCDOT, Southwestern Commission, and Appalachian Regional Commission) to identify existing or emergent funding sources.

One source that remains in existence is the Recreational Trails Program, which is funded by Congress and administered by the State of North Carolina with funding 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. Graham County receives the annual solicitations for this program, which is a potential source to fund the Robbinsville Greenway.

Most small towns in North Carolina have quaint, walkable downtowns that are the result of diverse partnerships among organizations such as GREAT, towns, counties, businesses and other organizations. These partnerships are required to fully realize a vision for walkability in Robbinsville and generate economic return.

Photo: Don Kostelec

10 Action Steps for Implementation

1 Adopt the Plan

This is the first stage of implementation. The Plan should be forwarded to regional and state decision-makers, such as the RPO, NCDOT Division office, and Community Transformation Grant, for inclusion in a regional planning and development processes. Agencies in Graham County should also receive a copy for consideration when local plans or ordinances are updated.

Partners: GREAT, Town

2 Pursue design funding for Robbinsville Greenway

The Greenway is the top priority for promoting walkability in Robbinsville and funding for design of the greenway should be pursued. It is estimated that design of the greenway will cost approximately **$460,000**. The scope of the design should include survey, environmental review, floodplain analysis, identifying property impacts and developing design drawings to allow the partners to move toward the acquisition and construction phase.

Partners: GREAT, County, Town, Southwestern Commission

3 Pursue funding for US 129 Streetscape Plan Upgrades

The US 129 Streetscape Plan recommends replacement of existing sidewalks and upgrading the streetscape to provide a sidewalk buffer and more landscaping along the route. Some implementation has begun, but more costly efforts such as sidewalk replacement is yet to be funded. Southwestern Commission has committed resources to helping the Town and GREAT identify funding for this improvement, which could be done in phases.

Partners: GREAT, County, Town, Southwestern Commission

4 Organize a Pedestrian Safety Summit

The high rate of pedestrian crashes in Robbinsville suggests a broader discussion is needed to determine a set of actions to promote pedestrian safety. GREAT should convene a half-day summit of stakeholders to discuss ways to promote a safer environment for pedestrians.

Partners: GREAT, Sheriff's Department, *County, Towns, NCDOT, Southwestern Commission, Chamber, Travel &Tourism*

5 Emphasize Complete Streets

Many initiatives from *Reimagining Robbinsville* could bring about change to the build environment in Robbinsville. Plans for a new visitors center, an amphitheater and a streetside park are a few of the efforts identified. Complete Streets need to be incorporated into the design process of these initiatives to ensure people are able to walk safely to and from these venues.

Partners: GREAT, County, Town, NCDOT, Travel & Tourism

6 Meet regularly with stakeholders & organizations to promote walkability

The planning effort engaged citizens and organizations in visioning, goal-setting and identification of projects, programs, and policies. Some organizations and businesses may take more convincing that a walkable Robbinsville is beneficial to them. Keeping citizens and organizations engaged in regular conversation about implementation is vital. The meetings and conversations often lead to identification of mutual interests and projects or funding sources.

Partners: GREAT, Chamber/Tourism, County, Town

10 Be unique. Think big.

This Plan contains many firsts for Robbinsville with regard to: a small town pedestrian connectivity plan, a Health Impact Assessment, and a prioritized list of projects to promote walkability. These components should position GREAT and the Town at the top of the list when it comes to funding for pedestrian investments and recognizing the community as a a place that values walkability for safety, health and economics.

Everyone.

7 Develop supportive education, encouragement & enforcement programs

Pedestrian facilities alone will not lead to a walkable community. A variety of program recommendations are highlighted in this plan to be to promote a walkable Robbinsville. Ideally, programs and policy priorities should be implemented alongside infrastructure improvements, but the community should recognize that programs such as installing signage or wayfinding can occur several years before major infrastructure projects.

Partners: GREAT, Town, County, Graham County Schools, Health Department, Tri-County Community College, Sheriff's Department

9 Engage Youth & Seniors to Raise Awareness

Our youth and senior populations are the most vulnerable pedestrians who use the system. Design of facilities should be done in a manner that is accessible for persons "8 to 80." New program ideas and suggestions for specific design features can emerge through engaging youth and seniors in the design of pedestrian facilities. Know where they want to play along the greenway, where they want to rest, and what amenities they desire. If built with youth and seniors in mind, the pedestrian system of Robbinsville will be safe for all.

Partners: GREAT, Town, County, Health Department, Graham County Schools

8 Measure performance

Exhibit 7-2 (next page) identifies methods by which GREAT and its partners can track the performance and implementation of the Plan, which can help justify funding pursuits and strengthen the ability of the community to gain funding from various sources. An annual report of Plan progress should be developed.

Partners: GREAT, Southwestern Commission, Town, Tourism & Travel, Chamber

Exhibit 7-2—Ways to Measure Performance of Creating a More Walkable Robbinsville

Performance Measure	Frequency (Every 1 or 2 years)	Performance Measure	Frequency (Every 1 or 2 years)
Engineering		**Education**	
• Projects pursued in Pedestrian Plan	1	• Children taught safe walking skills in Graham Schools	1
• Miles of Sidewalks in Robbinsville	2	• Senior citizens taught safe walking skills	1
• Miles of Multi-Use Trails/Greenways	2		
• Signage Added along Routes	2	**Evaluation**	
		• Pedestrian Counts along US 129, downtown, at parks	2
Encouragement		• Total Volunteer Hours	1
• Participants in Walk to School Day	1	• Economic Impact Survey	5
• Participants in Safe Routes to School Program	1	• BMI Rates at Graham County Schools	1
• Outreach opportunities to businesses, visitors	1	• Meetings with Town Officials	1 to 2
		• Funding allocated to Pedestrian-related Expenditures	1 to 2
Enforcement		• Interaction with Municipal, Corridor & Regional Plans	Ongoing
• Number of Crashes (by level / total)	2	• Number of Presentations to Civic Groups, Others	1
• Meetings with Law Enforcement	1	• Number of Grants Applied For	1
• Public Service Announcements	1	• Participation in seminars, webinars and other training	1
• Number of Walking Route Maps Distributed	1		